Appendix G14
Biodiversity Development Assessment Report

Environmental Impact Statement

for Alterations and Additions to

St Philip's Christian College, Cessnock

Biodiversity Development Assessment Report (BDAR)

10 Lomas Lane, Nulkaba

Prepared for

St Philips Education Foundation c/- Barr Planning

Final V2 / 18th January 2022

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BOAMS STATUS

BOAMS	Finalised [21-01-2022]
BAM-C	Finalised [21-01-2022]
Accredited Assessor	Matt Doherty – Accreditation # BAAS17044

Approval for use:

Matt Doherty
Accredited BAM Assessor # BAAS17044
21st January 2022

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EXECUTIVE SUMMARY

MJD Environmental has been engaged by Barr Planning on behalf of St Philips Christian Education Foundation to prepare a Biodiversity Development Assessment Report (BDAR) for a State Significant Development (SSD), being expansion of infrastructure and facilities at St Philips Christian College, being Lots 1 / DP126765, 1 / DP744377, 2 / DP600895 and 518 / DP837571, 10 Lomas Lane Nulkaba NSW.

The proposal meets the requirements of an SSD, pursuant to Schedule 1, 15(2) of the *State Environment Planning Policy* (*State and Regional Development*) *2011* (SRD SEPP). The Secretary's Environmental Assessment Requirements (SEARs) for the project have directed the applicant to: "*Assess any biodiversity impacts associated with the development in accordance with the Biodiversity Conservation Act 2016 and the Biodiversity Assessment Method 2020, including the preparation of a Biodiversity Development Assessment Report (BDAR), unless a waiver is granted, or the site is on biodiversity certified land*". As the impacts to biodiversity do not meet the requirements of a BDAR waiver due to the presence of native vegetation and habitat constraints, this BDAR has been prepared to assess residual impacts.

The Biodiversity Assessment Methodology (BAM) 2020 was used as the assessment method, to establish impacts on threatened species and threatened ecological communities in the locality under the *Biodiversity Conservation Act* 2016. In addition, preliminary assessment was also undertaken having regard to those threatened entities listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. Assessment has been considered against the *State Environmental Planning Policy (Koala Habitat Protection) 2021.*

The proposed Subject Land is situated over land zoned RU2 – Rural Landscape. Lot 1 DP 126765 is the site of the current educational establishment of St Philip's Christian College, comprising parking, buildings, sports ground and open space. Lot 1 DP 744377 is generally comprised of open space with unsealed access and one building, being the SPCC Dynamic Alternative Learning Environment. Lot 518 DP 837571 comprises of open space, unsealed access, a greenhouse, an irrigation dam and an equestrian centre. Across all lots, substantial managed open space dominates.

Field surveys carried out as part of the BDAR delineated the following Plant Community Type (PCT) within the Subject Land:

- 1594 – Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter

No threatened species listed as under the BC Act were recorded within the subject land.

Additionally, the Subject Land is mapped on the Important Areas Map as habitat for *Anthochaera phrygia* (Regent Honeyeater) listed as Critically Endangered under both the BC & EPBC Acts, however no impact to mapped vegetation is proposed.

Impact Avoidance & Mitigation

A package of avoidance and mitigation measures have been described in this BDAR associated with the project.

The Subject Land for development was selected due to the largely cleared or managed lands with low native species diversity as a result of past and present land use. A total of 3.22ha of native vegetation is to be entirely removed under this proposal within the Study Area.

All measures have been incorporated into the design (avoidance) in the first instance with mitigation measures assessed for the construction phases of the project.

Impact Analysis

The proposal will result in the following impacts and required Biodiversity Offset Liability as calculated using the BAM-C Calculator.

PCT	TEC	Area (ha)	HBT Cr	No HBT Cr	Offset Credits required
Ecosystem Credits					
1594 - Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	0.16	4	0	4
1594 - Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter	Not a TEC	2.8	0	0	0

The full Biodiversity Credit Liability is to be retired prior to the commencement of works. Clearing of the Subject Land is anticipated to occur as a single event and so, no staged retirement of credits is listed here.

A market appraisal will be undertaken to determine if some or all of the credit types are available and/or an application will be made to the Biodiversity Conservation Trust for payment into Biodiversity Conservation Fund.

A preliminary assessment under the EPBC Act determined the proposed action is unlikely to have an impact to MNES assessed in this report based on the assessment criteria set out in relevant Commonwealth policies and advices as at the time of this assessment.

Assessment against the SEPP (Koala Habitat Protection) 2021 criteria determined the proposal is unlikely to impact this species.

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GLOSSARY OF TERMS AND ABBREVIATIONS

Term/ Abbreviation	Meaning
BAM	Biodiversity Assessment Method
BDAR	Biodiversity Development Assessment Report
BC Act	Biodiversity Conservation Act 2016
BS Act	Biosecurity Act 2016
Council	Lake Macquarie City Council
DoEE	Commonwealth Department of the Environment & Energy
DPE	NSW Department of Planning and Environment
DPI Water	NSW Department of Primary Industries – Water
EP&A Act	NSW Environmental Planning and Assessment Act 1979
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
ha	hectare
HBT	Hollow Bearing Tree
KTP	Key Threatening Process
LGA	Local Government Area
LLS Act	Local Land Services Act
OEH	NSW Office of Environment and Heritage

1 Introduction

MJD Environmental has been engaged by Barr Planning on behalf of St Philips Christian Education Foundation to prepare a Biodiversity Development Assessment Report (BDAR) to support a State Significant Development Application for alterations and additions to an existing school known as St Philip's Christian College Cessnock. The school caters for students from Kindergarten to Year 12 and also incorporates an Early Education Centre and Prep program as well as a special school for students requiring an alternate learning environment.

The school is located on the corner of Lomas Lane and Wine Country Drive, Nulkaba and its land holdings incorporate four large lots described as Lot 1 DP 126765, Lot 1 DP 744377, Lot 2 DP 600895 and Lot 518 DP 837571, hereafter referred to as 'Subject Land'. Refer to **Figure 1**.

The site is irregular in shape and has an overall area of 41.8 hectares. The site's northern boundary has frontage to Lomas Lane of approximately 390 metres and its western boundary fronts Wine Country Drive with a length of approximately 1030 metres. The site's eastern boundary is defined by Black Creek.

Plate 1: Proposed Site Plan – Overall. Refer to Appendix A for plans of the proposal.

1.1 Description of Proposal

The proposed development, to be constructed in several stages, consists of seven (7) new buildings and additions/alterations to six (6) existing buildings. As part of the development certain existing pre-fabricated buildings will be removed to make way for new permanent buildings.

The proposed development also incorporates infrastructure works external to the site associated with provision of a new intersection on Wine Country Drive providing direct access to the school at the southern end of the campus, and the upgrade of the intersection of Wine Country Drive and Lomas Lane to a roundabout. Widening of Lomas Lane will also be carried out to facilitate the provision of bus bays and a bus layover area.

The school has a current enrolment of approximately 1,270 students in total. This application seeks approval for an increase in student numbers up to 1,732.

1.2 Aims & Objectives

The proposed alterations and additions to SPCC Cessnock are State Significant development under Part 4 of the *Environmental Planning and Assessment Act 1979*.

This Biodiversity Development Assessment Report (BDAR) has been prepared as part of an Environmental Impact Statement (EIS) for the State Significant development and addresses the anticipated Secretary's Environmental Assessment Requirements (SEARs).

This BDAR is based on an application of the NSW Biodiversity Assessment Methodology 2020 (BAM), which provides a framework for assessing development impact on biodiversity. A two-stage investigation path was performed in accordance with the BAM as listed below:

Stage 1 – Biodiversity Assessment; and

Stage 2 – Impact Assessment.

This report sets out the minimum BAM assessment requirements for the preparation of a BDAR in Appendix K of the BAM (2020).

In addition, preliminary assessment was undertaken having regard to those threatened entities listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

1.3 Site Particulars

The following nomenclature has been used in this report (Refer to **Figure 1**):

- Study Area – Refers to the 4 Lots which make up the school's land holdings
- Subject Land – Refers to the impact area.

Locality	The Subject Lands are in Nulkaba, NSW
Land Title	Lot 1 DP 126765, Lot 1 DP 744377, Lot 2 DP 600895, and Lot 518 DP 837571
LGA	Cessnock City Council
Area	Lot (Study Area) – 41.80 ha Subject Land – 3.22 ha
Zoning	RU2 – Rural Landscape

Boundaries	The Study Area is bounded by Wine Country Drive in the west, Lomas Lane in the north, forested riparian zone surrounding Black Creek in the east, and cleared rural lands to the south.
Current Land Use	Lot 1 DP 126765 is the site of the current educational establishment of St Philip's Christian College Cessnock, comprising parking, buildings, sports ground and open space. Lot 1 DP 744377 is generally comprised of open space with unsealed access and one building, being the SPCC Dynamic Alternative Learning Environment. Lot 518 DP 837571 comprises of open space, unsealed access, an irrigation dam and an equestrian centre. Across all lots, substantial managed open space exists.
Topography	The Study Area is generally flat, occurring on elevations of 58-64m AHD with a peak in the extreme southwest corner but no other meaningful gradient over the area.

1.4 Qualifications & Licencing

Qualifications

This BDAR has been prepared by Chris Spraggon [B Sc. (Hons)] and Coral Pearce [B. A. Sc. (Ecology), M. Sc] and under the guidance of Matt Doherty (BAAS# 17044) accredited BAM Assessor.

Field work for the BDAR was carried out by Coral Pearce and Alexandria Bragg [B. Ani. Sc. (Hons)] of MJD Environmental (Aust) Pty Ltd.

Refer to **Appendix F** for personnel qualifications.

Licencing

Research was conducted under the following licences:

- NSW National Parks and Wildlife Service Scientific Investigation Licence SL101684 (Valid 31 January 2022).
- Animal Research Authority (Trim File No: 16/170) issued by NSW Department of Primary Industries (Valid 8 February 2022).
- Animal Care and Ethics Committee Certificate of Approval (Trim File No: 16/170) issued by NSW Department of Primary Industries (Valid 8 February 2022).

SPCC 10 LOMAS LANE, NULKABA

FIGURE 1: SITE AND LOCATION

Legend

- Study Area
- Subject Site
- Cadastral Boundaries

0 55 110 220

Meters

1:4,000

N W E S

MJD Environmental

Aerial: NearMap (2021) | Data: MJD Environmental, Spatial Services (2021) | Datum/Projection: GDA 2020 MGA Zone 56 | Date: 17/12/2021| Version 1 | | This plan should not be relied upon for critical design dimensions.

STAGE 1 BIODIVERSITY ASSESSMENT

2 Landscape Context

2.1 Landscape Features

The following section provides a description of the landscape features within the Study Area and surrounding 1,500 m buffer as outlined in Section 3 of the BAM (2020).

2.1.1 Interim Biogeographic Regionalisation of Australia (IBRA)

Bioregion

The Subject Land occurs wholly within the Sydney Basin Bioregion. The Sydney Basin Bioregion comprises of Mesozoic sandstones and shales; dissected plateaus: forest, woodlands and heaths: The soils are primarily skeletal soils, sands and podzolics (Thackway & Cresswell 1995).

This Bioregion borders NSW North Coast to north: Nandewar and Brigalow Belt south to the north and the South Eastern Highlands in the south.

Subregion

The Study Area occurs wholly within the Hunter subregion.

2.1.2 Mitchell Landscapes

The Study Area occurs wholly within the Sydney Basin Hunter *Central Hunter Foothills.*

Undulating lowlands, rounded to steep hills with rock outcrop on ridges on Permian lithic sandstone, conglomerate, shale and coal, general elevation 40 to 300 m with a few higher peaks, local relief 30 to 120 m. Red-brown to yellow brown harsh texture-contrast soils on slopes, dark coloured clays in valleys and limited accumulations of sand and gravel in streams. Woodlands to open forest of Spotted Gum (*Corymbia maculata*), Forest Red Gum (*Eucalyptus tereticornis*), Narrow-leaved Ironbark (*Eucalyptus crebra*), Red Ironbark (*Eucalyptus sideroxylon*), White Box (*Eucalyptus albens*), Slaty Gum (*Eucalyptus dawsonii*), Rough-barked Apple (*Angophora floribunda*) with Kangaroo Grass (*Themeda triandra*) and Wallaby Grass (*Rytidosperma* sp).

2.1.3 Rivers, Streams, Estuaries and Wetlands

The Study Area is located within the Hunter River catchment in the Hunter region. The Study Area is located west of Black Creek in the township of Nulkaba.

The hydrology of the Subject Land is typified by one 4th order stream being Black Creek, with 1st and 2nd order tributaries. Black Creek runs in a meandering north/south orientation generally in the eastern part of the Study Area. Black Creek eventually joins the Hunter River at Elderslie.

2.1.4 Connectivity

The surrounding environment to the site is largely a rural landscape, except for a small residential zoned area to the southwest, being the township of Nulkaba. The vegetation around Black Creek is a significant vegetated riparian corridor in the immediate area, with connectivity in the north and south to Werakata National Park, approximately 1.8 km to the east of the Study Area. Connectivity is limited in all other directions due to past and current land uses, with higher order watercourses represented the majority of retained native vegetation, and these all ultimately join Black Creek at varying points to the north. One isolated patch of native vegetation exists within the Study Area, straddling Lots 1 DP 126765 and 1 DP 744377 south of the established school grounds and east of a wetland lake.

2.1.5 Areas of Geological significance and soil hazard features

No karsts, caves, crevices or cliffs or other areas of geological significance occur in or adjacent to the subject site.

A review of the Acid Sulphate Soils Risk mapping (Naylor et al 1998) records indicate the site has not been assessed for ASS.

2.1.6 Areas of Outstanding Biodiversity Value

There are no Areas of Outstanding Biodiversity Values within the 1,500 m buffer or in the general locality of the Study Area.

2.2 Site Context

The site context was assessed for the Study Area and wider area via desktop assessment of, Aerial Photograph Interpretation (API) using GIS Software and site visit. Site context considerations included native woody cover and patch size in accordance with section 3.2 of the BAM (2020).

2.2.1 Native Vegetation Cover

The native vegetation cover of the Subject Land and 1,500 m buffer was carried out by API of high quality aerial photography using GIS Software (Map Info), and local vegetation mapping data *Lower Hunter Vegetation Mapping* (Cockerill *et al* 2013).

Native vegetation cover has been assessed as 31%.

Refer to **Figure 2**.

2.2.2 Patch Size

A patch is defined in BAM 2020 as:

an area of intact native vegetation that occurs on the subject land. The patch may extend onto adjoining land beyond the footprint of the subject land, and for woody ecosystems, includes native vegetation separated by ≤100 metres from the next area of intact native vegetation. For non-woody vegetation, this gap is reduced to ≤30 metres.

Patch size for the Study Area has been assessed using the methods outlined above in Section 4.3.2 and it has been determined that the patch size is greater than 100 ha.

SPCC 10 LOMAS LANE, NULKABA

FIGURE 2: NATIVE VEGETATION EXTENT

0 190 380 760

Meters

1:13,000

N W E S

Legend

- 1st Order Stream
- 2nd Order Stream
- 3rd Order Stream
- 4th Order Stream
- 5th Order Stream
- 6th Order Stream
- Study Area
- Subject Site
- 1500m Buffer from Site
- Native Vegetation

MJD Environmental

Aerial: NearMap (2021) | Data: MJD Environmental, NSW DPIE Bionet, Spatial Services (2021) | Datum/ Projection: GDA 2020 MGA Zone 56 | Date: 17/12/2021| Version 1 | | This plan should not be relied upon for critical design dimensions.

3 Native Vegetation

3.1.1 Preliminary Vegetation Review

A desktop analysis of vegetation within the Study Area and its surrounds were informed by large-scale vegetation mapping projects and aerial photography to determine potential Plant Community Types (PCT) occurring within the Study Area, they include:

- *Lower Hunter Vegetation Mapping* (Cockerill *et al* 2013);
- GIS analysis including - Aerial Photograph Interpretation (API) and consultation of topographic map (Scale 1:25,000) layers for the Study Area; and
- OEH VIS Classification Database.

3.2 Methodology: Field Assessment

All vegetation survey methods have been carried in accordance with the following documentation and methods:

- *Biodiversity Assessment Methodology (BAM):* Office of Environment and Heritage (OEH), October, 2020;
- *Biodiversity Assessment Method 2020 Operational Manual- Stage 1* Department of Planning, Industry & Environment (DPIE), December 2020;
- *Biodiversity Assessment Method Operational Manual- Stage 2* Office of Environment and Heritage (OEH), October 2020;
- *NSW Guide to Surveying Threatened Plants* Office of Environment and Heritage (OEH), February 2016; and
- *NSW Survey Guide for Threatened Frogs – A guide for the survey of threatened frogs and their habitats for the Biodiversity Assessment Method* DPIE September 2020.

3.2.1 Field Survey

Field assessments of the vegetation were carried out within the Study Area over two days, 22nd October and the 18th November 2021 by Coral Pearce and Alexandria Bragg. The field surveys were carried out in accordance with Biodiversity Assessment Methodology (BAM 2020) with additional assessment methods to assist in gaining an overview of Subject Land biodiversity values.

The following methods were used to inform the vegetation survey associated with the BDAR:

- Broad vegetation identification, delineation and stratification into vegetation zones carried out by detailed random meander methods (Cropper 1993);
- Collection of six (6) plots/transect based full floristic data as per Section 4 of the BAM, recording the following;
    - Identification of all flora species to genus where identification attributes were present
    - Composition, Structure attributes within 20x20 plot; and
    - function attributes within the 20X50m plot
- Collection of Subject Land landscape attributes that included, landform, aspect, soil type, detailed descriptions of the vegetation condition, current land use and the current impacts.
- It should be noted that one (1) plot/transect (B01) was conducted following an amended plot design, due to the constraints of the site. The floristic 20 x 20 m plot was conducted, taking up almost the entirety of the patch (the proposed bus turnaround area off of Lomas Lane), while the structural transect is offset, following the road edge north to south, as to not capture the paved road. Therefore two (2) points are included in Figure 3 for B01.

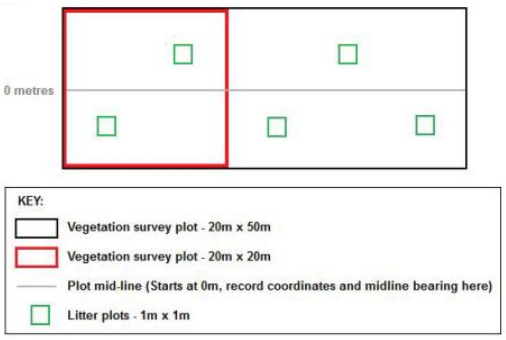


Plate 2: Plot layout (BAM Stage 1 Operation Manual Dec 2020)

3.2.2 Hollow Bearing Tree Survey

A hollow bearing tree survey was undertaken (October/November 2021) across the Subject Land with the following information collected:

- Location (D-GPS);
- Tree species;
- Tree DBH;
- Presences of hollows (including potential hollows) and class;
- Habitat suitability for large Forest Owls; and
- Any observational information.

3.3 Results

3.3.1 Native Vegetation Extent

The Subject Land is 41.8 ha in size which includes cleared and managed land, disturbed native and exotic vegetation. The extent of native vegetation has been interpreted using API and ground truthing during field survey works. (Refer to **Figure 3**).

The vegetation within the Subject Land has been mostly cleared, historically for agriculture, with remnant vegetation generally limited to the riparian corridor of Black Creek. Some patches of native canopy persist within the lots away from the creek, chiefly in the northeast and an isolated small forest centrally; these comprise of canopy only with a managed understorey. The former and current land uses have resulted in the modification of the structure of native vegetation within the Subject Land to a point that vegetation representative of the assigned Plant Community Type (PCT) is defined generally by canopy. The groundcover throughout the Subject Land is generally cultivated grass species with occasional native grass, graminoid and herbaceous species.

Identification of PCTs within the Subject Land were determined using:

- Occurrence within the Sydney IBRA bio-region;
- Vegetation formation and class:
- landscape position; and
- dominant species noted during field data collected from the full floristic plots/transects established in accordance with the BAM 2020.

One PCT was identified within the Subject Land.

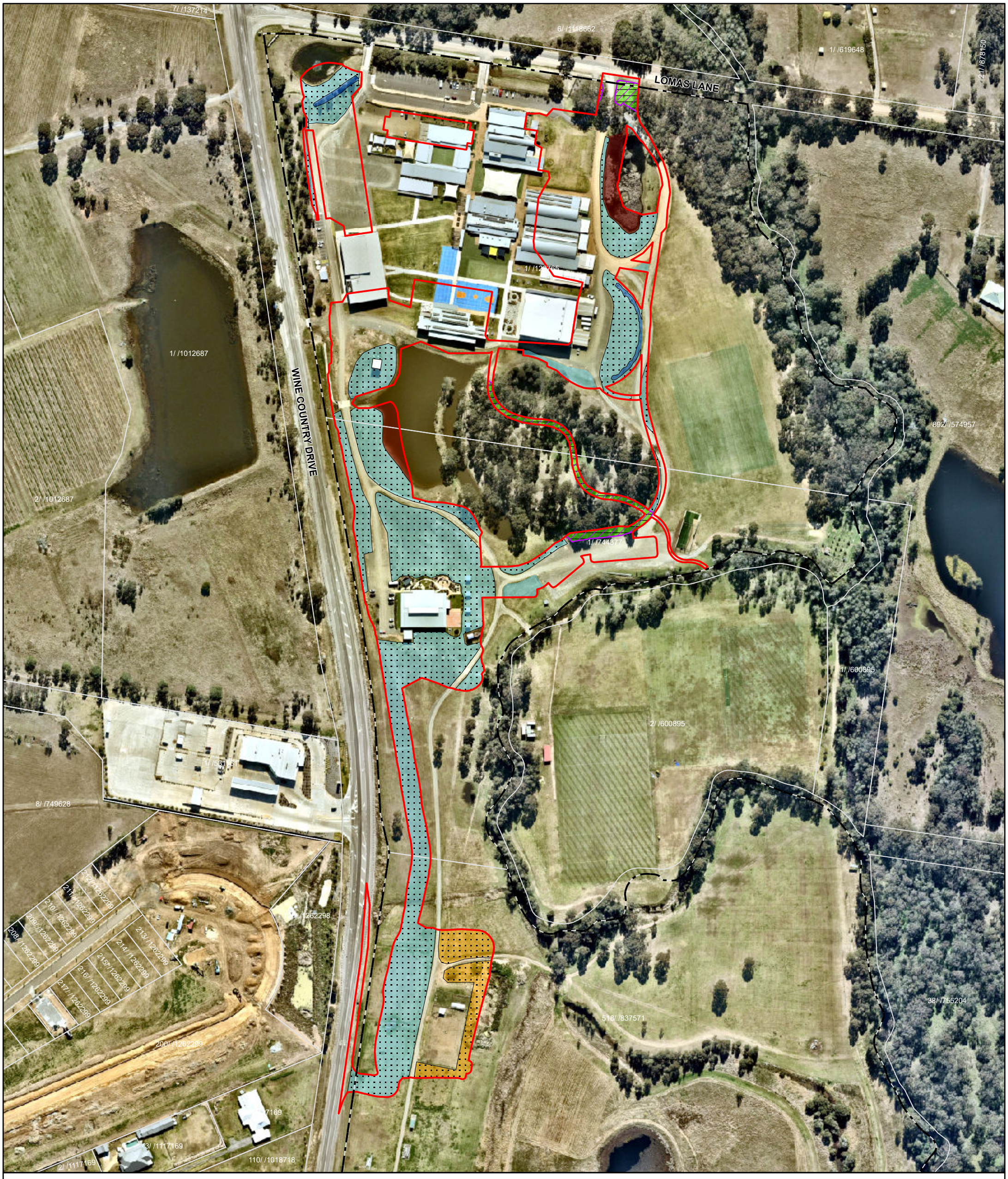
PCT 1594: Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter

TEC Status: This PCT is partially a subsect of BC Act (Endangered) and EPBC Act (Critically Endangered) River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions.

Plate 3: PCT 1594: Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter

SPCC 10 LOMAS LANE, NULKABA

FIGURE 3: PLANT COMMUNITY TYPES AND BAM PLOT LOCATIONS



0 40 80 160

Meters

1:2,800

Legend

- Study Area
- Subject Site
- Cadastral Boundaries
- Critically Endangered: River-Flat Eucalypt Forest on Coastal Floodplains (EPBC Act); Endangered: River-Flat Eucalypt Forest on Coastal Floodplains (BC Act)

Condition

- Poor
- Low

- VZ1 - PCT 1594: Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter
- VZ2 - PCT 1594: Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter
- VZ3 - PCT 1594: Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter
- VZ4 - Planted
- Dam

MJD Environmental

Aerial: NearMap (2021) | Data: MJD Environmental, Spatial Services (2021) | Datum/Projection: GDA 2020 MGA Zone 56 | Date: 17/12/2021| Version 1 | | This plan should not be relied upon for critical design dimensions.

4 Vegetation Integrity Assessment

Native vegetation identified on site has been delineated into one PCT, PCT 1594, which was categorised into three vegetation zones. These vegetation zones were delineated based on the general condition of vegetation, differences in current and past management, observation of distinct change or variation in the vegetation based on general attributes such as vegetation age, observable disturbance (past and present), exotic species presences and any structural difference in the stratum present. One non-native vegetation zone was identified.

The Subject Land has been delineated into four vegetation zones:

- VZ 1: 1594_poor
- VZ 2: 1594_lawn
- VZ 3: 1594_weedy
- VZ 4: planted native vegetation

The following table provides a brief description of the vegetation zones justifying the categorisation.

Six (6) full floristic BAM plots were conducted. The number of plots carried out are in accordance with the minimum required plots per area as outlined in Table 3 of the BAM (2020).

4.1 Vegetation Zones

Vegetation Zone 1

PCT 1594: Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter	
Area within Subject Site	0.16
Vegetation Formation	KF_CH9 Forested Wetlands
Vegetation Class	Coastal Floodplain Wetlands
Floristic Description	The canopy is characterised by a young cohort dominated by *Eucalyptus moluccana* (Grey Box), with subdominant *E. tereticornis* (Forest Red Gum) and *E. amplifolia* (Cabbage Gum) with scattered *Angophora floribunda* (Rough-barked Apple) across the subject land. As the Subject Land sits within the floodplain of Black Creek to the east. Where the PCT begins to transition toward the watercourse, Melaleuca species, namely *M. nodosa* (Prickly-leaved Paperbark) and *M. linariifolia* (Flax-leaved Paperbark) start to occur as *E. tereticornis* becomes more dominant in moister areas. It should be noted that this transition commences outside of the subject land. The mid strum is absent due to current land use and management, with a disturbed/managed ground stratum containing both native and exotic grasses and graminoids. The ground stratum contains a number of native grass and graminoid species such as *Panicum simile* (Two-coloured Panic), *Microlaena stipoides* (Weeping grass), *Themeda triandra* (Kangaroo grass), *Aristida calycina* (Dark wiregrass), *Cyperus gracilis* (Slender flat-sedge) *as* well as the cosmopolitan *Cynodon dactylon* (Couch). Common forb and herb species were present such as *Dianella longifolia* (Blue Flax-lily), *Euchiton japonicus (*Creeping cudweed), *Dichondra repens* (Kidney weed) and *Einadia hastata* (Berry saltbush). Exotic species were common in the understory with exotic grass and forb species dominant across the subject land. The following HTE recorded throughout; *Senecio madagascariensis* (Fireweed), *Galenia pubescens, Bidens pilosa* (Cobbler's pegs) *Heliotropium amplexicaule* (Blue Heliotrope), *Eragrostis*

PCT 1594: Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter	
	curvula (African lovegrass) and *Bryophyllum delagoense* (mother-of-millions). See Appendix C for a full floristics list.
Condition	Poor
Structure	Canopy structure is consistent throughout the subject land, with few scattered larger remnant *Eucalyptus moluccana* (Grey Box) present though infrequent and not impacted by the proposal. Canopy species present occur as a primarily young cohort due to regeneration and supplementary planting. No mid stratum is present within the subject land. The ground stratum is heavily modified by the land management such as mowing of the site and spreading of mulch to supress exotic grasses.
Justification for PCT Selection	This vegetation presents as a Forested Wetland and Coastal Floodplain Wetland Class. It occupies the floodplains of the subject land, occurring within 2 m elevation difference the swale landform to the east. The presence of *E. amplifolia* (Cabbage Gum) and *E. tereticornis* (Forest Red Gum) is indicative of this PCT. The presence of *E. moluccana* (Grey Box) is not associated with this PCT though due to the young cohort of the canopy species, the species presence is likely due to regeneration further conflated by intentional plantings of the species. The absence of a mid-stratum and ground stratum disturbance drives the PCT determination primarily through the Vegetation Formation and Class. During determination PCT were assessed using BioNET VIS, all PCTs were assessed using Mitchell Landscape, IBRA subregion, LGA, Vegetation Class and Formation as a filter. Final determination was based on floristics, landform and knowledge of the area with PCT 1598, 1731 and 1748 considered.
TEC Status	**BC Act**: **Commensurate** with Endangered *River-Flat Eucalypt Forest (RFEF) on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* Partial subset of Endangered *Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion* – assessed as **not commensurate** (outside bioregion)
	EPBC Act: Commensurate with Critically Endangered *River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*

Vegetation Zone 2

PCT 1594: Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter	
Area within Subject Site	2.57
Vegetation Formation	KF_CH9 Forested Wetlands
Vegetation Class	Coastal Floodplain Wetlands
Floristic Description	No canopy or mid stratum is present within this VZ. The ground stratum contains both exotic and native species, dominated by *Cynodon dactylon* (Couch), *Panicum simile* (Two-coloured Panic), *Euchiton japonicus* (Creeping Cudweed) and *Dichondra repens* (Kidney Weed) within occasional *Oxalis perennans,* and *Centella asiatica* (Indian Pennywort). In wetter areas species such as *Nymphoides montana* (Marshwort) and *Marsilea hirsute* (Nardoo) were also recorded. A number of HTE species were also present such as *Cenchrus clandestinus* (Kikuyu grass), *Paspalum dilatatum* (Dallas grass) and *Stenotaphrum secundatum* (Buffalo grass), indicative of a managed lawn. See Appendix C for a full floristics list.
Condition	Lawn.
Structure	The vegetation within this VZ is heavily modified from past land clearing and ongoing land management practices, as it currently mown. Few scattered trees occur within this VZ, however outside of the Subject Land and therefore were not sampled within the BAM plot. These were primarily planted and regenerating *E. tereticornis* (Forest Red Gum) and *Angophora floribunda* (Rough-barked Apple) and a singular exotic *Jacaranda mimosifolia* (Jacaranda).
Justification for PCT Selection	As per BAM 2020 where a cleared landscape is present with native vegetation the assessor must determine the mostly likely original PCT, therefore this VZ is mostly clearing cleared from the surround PCT 1594.
Status	**BC Act**: No (Associated [part] with RFEF – ruled out) No (Associated [part] with SCFF – ruled out)
	EPBC Act: No (Associated [part] with RFEF – ruled out)

Vegetation Zone 3

PCT 1594: Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter		
Area within Subject Site	0.26	
Vegetation Formation	KF_CH9 Forested Wetlands	
Vegetation Class	Coastal Floodplain Wetlands	
Floristic Description	As per VZ 2 no canopy or mid stratum is present within this VZ. This VZ has been parsed out of VZ 2 due to the difference in land management, as this area was not managed by mowing and in some areas was undergoing grazing by Ungulates. Few native species were present, limited to *Cynodon dactylon* (Couch) and *Oxalis perennans*, though mor native grass species were observed outside of the BAM floristics plot. HTE species present were *Paspalum dilatatum* (Dallas grass) and *Senecio madagascariensis* (Fireweed) with a number of exotic grass species recorded See Appendix C for a full floristics list.	
Condition	Weedy.	
Structure	The vegetation within this VZ is heavily modified from past land clearing and ongoing land management practices, such as grazing. This area also had recent ground disturbance, likely resulting in further weed introduction/proliferation from the seedbank.	
Justification for PCT Selection	As per VZ 2 justification.	
Status	**BC Act**:	No (Associated [part] with RFEF – ruled out) No (Associated [part] with SCFF – ruled out)
	EPBC Act:	No (Associated [part] with RFEF – ruled out)

VZ 4: Planted native vegetation

The vegetation in this zone has been assessed according to Appendix D of the BAM (2020).

The planted native vegetation on the site comprises of a small (4 x 40m) raised, mulched garden bed with a mixture of native and exotic species, with woody species planted in a single, linear row of stems. It is situated in an open context, surrounded by managed fields and adjacent to a carpark and larger amenity planting. The planting was installed for aesthetic purpose within school grounds, and does not include individuals of a threatened flora species. On these bases, under the D1 Decision Tree, Sections 4 and 5 of the BAM (2020) are not required to be applied to this vegetation. As per D2 Assessment, the vegetation in this zone does not constitute suitable habitat for threatened species nominated as species credit species by the BAM-C, contains no nests, hollows or secondary indications of fauna use, and does not form a connective corridor between or extending areas of remnant native vegetation. The flowering shrubs may provide forage in the form of nectar for highly mobile, less vulnerable or aggressive bird species typically associated with modified rural and residential landscapes.

The tree species in this planting at time of inspection include immature *Eucalyptus* sp. Shrubs include *Callistemon citrinus*, *Grevillea* cv. and Banksia *oblongifolia.* Graminoids include *Doryanthes excelsa* and the exotic *Agapanthus praecox*. Groundcovers are not present as the raised garden bed is heavily mulched and managed.

4.2 Vegetation Integrity Assessment results

A total of 76 plant species were identified within six plots comprising 31 native species and 45 exotic species. The results of the plot field data and a flora species list can be found in **Appendix B** and **Appendix C**.

The plot data from the vegetation plot was entered into the BAM-C calculator and the results of the vegetation integrity assessment is summarised in **Table 2**.

Table 1 Vegetation Integrity Results

Vegetation Zone	No. of Plots	Composition condition Score	Structure Condition Score	Function Condition score	Vegetation Integrity Score (V.I)	TEC
VZ 1 – 1594_poor	2	45.1	37.8	63.8	**47.7**	Yes
VZ 2 – 1594_lawn	3	12.7	53.9	2.6	**12.1**	No
VZ 3 – 1594_weedy	1	5	63	4.9	**11.5**	No

- As outlined in section 9.2.1 of the BAM biodiversity offset credits are required for native vegetation where the vegetation integrity score:
    - is ≥15 where the PCT is representative of an endangered or critically endangered ecological community; or
    - is ≥17 where the PCT is associated with threatened species habitat (as represented by ecosystem credits), or is representative of a vulnerable ecological community: or
    - is ≥20 where the PCT is not representative of a TEC or associated with threatened species habitat.
- Biodiversity offsets are required for the above non-TEC Vegetation Zone - 1 as the vegetation integrity score is >17.
- No biodiversity offsets are required for the above non-TEC Vegetation Zones – 2 and 3 as the vegetation integrity score is <17.

5 Threatened Species

5.1 Desktop Assessment

A review of threatened species information was undertaken to provide context and understanding of biodiversity values occurring within the Subject Land. Information reviewed included:

- Online database searches involving a 10-km buffer around the Study Area to provide potentially occurring threatened flora and fauna and migratory species under both the BC Act and EPBC Act:
  - NSW Bionet (accessed 8th December 2021 and continually during BDAR production)
  - Commonwealth Protected Matters of National Significance search tool (accessed 8th December 2021)
- BioNet Vegetation Classification – Threatened species associated with known PCTs to occur within the Study Area.

5.2 Ecosystem Credit Species

Ecosystem Credit Species are reliably predicted to occur by vegetation surrogates and landscape features. An assessment of the habitat suitability for each predicted species was undertaken to determine the presences or potential utilisation of the Subject Land as part of their home range. These species are presented in **Table 3**.

Table 2 Ecosystem Credit Species

Scientific Name	Common Name	BC Act	EPBC Act	PCT 1594	Habitat Present (VZ1)	Sensitivity to Gain
Chthonicola sagittata	Speckled Warbler	V	-	X	Yes	High
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	-	X	Yes	High
Daphoenositta chrysoptera	Varied Sittella	V	-	X	Yes	Moderate
Dasyurus maculatus	Spotted-tailed Quoll	V	E	X	Yes	High
Hirundapus caudacutus	White-throated Needletail	-	V	X	Yes	High
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V	-	X	Yes	Moderate
Neophema pulchella	Turquoise Parrot	V	-	X	Yes	High
**Ninox connivens*	Barking Owl	V	-	X	Yes	High
Petroica boodang	Scarlet Robin	V	-	X	Yes	Moderate

Key:

V = Vulnerable E = Endangered CE = Critically Endangered
* Dual Credit Species

The vegetation within VZ1 of the Subject Land has been assessed to provide marginal suitable habitat for all species listed above. It is therefore assumed that these species may utilise this portion of Subject Land for foraging opportunities. The remaining VZs are not considered suitable habitat, addressed in **Table 4.**

Table 3 Ecosystem Credit Species assessed as habitat not occurring within the Subject Land

Scientific Name	Common Name	Habitat requirement	Habitat present on development site (VZs 2-4)
Birds			
Chthonicola sagittata	Speckled Warbler	The Speckled Warbler has a patchy distribution throughout south-eastern Queensland, the eastern half of NSW and into Victoria, as far west as the Grampians. The species is most frequently reported from the hills and tablelands of the Great Dividing Range, and rarely from the coast. The Speckled Warbler lives in a wide range of Eucalyptus dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. Large, relatively undisturbed remnants are required for the species to persist in an area. There are total of 35 records of the species within 10 km of the subject land, recorded between 1999 and 2021. No suitable habitat occurs for the species within VZs 2 – 4 as this area is highly modified and under active management. No large undisturbed remnants persist within the subject land.	Unlikely
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	The Brown Treecreeper is endemic to eastern Australia and occurs in eucalypt forests and woodlands of inland plains and slopes of the Great Dividing Range. It is less commonly found on coastal plains and ranges. The western boundary of the range of the species runs approximately through Corowa, Wagga Wagga, Temora, Forbes, Dubbo and Inverell. The eastern subspecies lives in eucalypt woodlands through central NSW and in coastal areas with drier open woodlands. Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey; also found in mallee and River Red Gum (*Eucalyptus camaldulensis*) Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses; usually not found in woodlands with a dense shrub layer; fallen timber is an important habitat component for foraging. There are total of 128 records of the species within 10 km of the subject land, recorded between 1990 and 2020. No suitable habitat occurs for the species within VZs 2 – 4 as this area is highly modified and under active management. No areas of fallen timber appropriate for foraging are present within the subject land, nor unmanaged woodland.	Unlikely

Scientific Name	Common Name	Habitat requirement	Habitat present on development site (VZs 2-4)
Daphoenositta chrysoptera	Varied Sittella	The Varied Sittella is sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands. Distribution in NSW is nearly continuous from the coast to the far west. Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. There are total of 79 records of the species within 10 km of the subject land, recorded between 1999 and 2020. No suitable habitat occurs for the species within VZs 2 – 4 as this area is highly modified and under active management.	Unlikely
Hirundapus caudacutus	White-throated Needletail	The White-throated Needletail is widespread in across the coast of eastern and south-eastern Australia, and Tasmania. White-throated Needletails only occur as vagrants in the Northern Territory and in Western Australia. In Australia, the White-throated Needletail is almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground. Because they are aerial, it has been stated that conventional habitat descriptions are inapplicable (Cramp 1985), but there are, nevertheless, certain preferences exhibited by the species. They are probably recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland. There are 15 records of the species within 10 km of the Subject Land recorded between 2005 and 2019. No suitable habitat occurs for the species within VZs 2- 4 as this area is highly modified and under active management.	Unlikely
Melanodryas cucullata cucullata	Hooded robin (south-eastern form)	The Hooded Robin is widespread, found across Australia, except for the driest deserts and the wetter coastal areas - northern and eastern coastal Queensland and Tasmania. However, it is common in few places, and rarely found on the coast. Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. Often perches on low dead stumps and fallen timber or on low-hanging branches, using a perch-and-pounce method of hunting insect prey. There are two historic records of the species within 10 km of the Subject Land recorded 1986 and 1997. No suitable habitat occurs for the species within VZs 2- 4 as this area is highly modified and under active management.	Unlikely
Neophema pulchella	Turquoise Parrot	The Turquoise Parrot's range extends from southern Queensland through to northern Victoria, from the coastal plains to the western slopes of the Great Dividing Range. Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland.	Unlikely

Scientific Name	Common Name	Habitat requirement	Habitat present on development site (VZs 2-4)
		There are 10 records of the species within 10 km of the Subject Land from 1992 – 2018. No suitable habitat occurs for the species within VZs 2- 4 as this area is highly modified and under active management.	
Ninox connivens	Barking Owl (Foraging)	Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Roost in shaded portions of tree canopies, including tall midstorey trees with dense foliage such as *Acacia* and *Casuarina* species. The site comprises marginal foraging habitat in the form of cleared land within an agricultural landscape. No further survey is required. Two historic records of the species occur within 10 km of the Subject land, from 2005 and 2008 approximately 5.7 km to the east and approximately 10 km to the south respectively. No suitable habitat occurs for the species within VZs 2- 4 as this area is highly modified and under active management.	Unlikely
Petroica boodang	Scarlet Robin	The Scarlet Robin is found from south east Queensland to south east South Australia and also in Tasmania and south west Western Australia. In NSW, it occurs from the coast to the inland slopes. After breeding, some Scarlet Robins disperse to the lower valleys and plains of the tablelands and slopes. Some birds may appear as far west as the eastern edges of the inland plains in autumn and winter. The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. This species lives in both mature and regrowth vegetation. It occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat. The Scarlet Robin breeds on ridges, hills and foothills of the western slopes, the Great Dividing Range and eastern coastal regions; this species is occasionally found up to 1000 metres in altitude. The Scarlet Robin is primarily a resident in forests and woodlands, but some adults and young birds disperse to more open habitats after breeding. In autumn and winter many Scarlet Robins live in open grassy woodlands, and grasslands or grazed paddocks with scattered trees. There are 32 records of the species within 10 km of the subject land, ranging between 1986 – 2019. No suitable habitat occurs for the species within VZs 2- 4 as this area is highly modified and under active management.	Unlikely

Scientific Name	Common Name	Habitat requirement	Habitat present on development site (VZs 2-4)
Mammals			
Dasyurus maculatus	Spotted-tailed Quoll	The Spotted-tailed Quoll (southeastern mainland population)) occurs in eastern Australia from south-eastern Queensland to western Victoria. Populations are now fragmented and isolated and estimates of the decline range from 50–90 percent for the mainland and 25–50 percent for the population in New South Wales since European settlement (DELWP 2016). It has been extirpated from many parts of its former range, most notably including south-eastern South Australia (Woinarski et al. 2014). The Spotted-tailed Quoll is a mainly forest dependent species but occurs in a variety of habitats including closed forests (including temperate and sub-tropical rainforest), tall eucalypt forests, open woodlands, open forests, drier rainshadow woodlands and coastal heathlands (Oakwood et al. 2007). The highest densities of the species have been recorded from both wet and dry forest habitats (Watt 1993; Mansergh 1995; Jones & Rose 1996; Belcher 2000; Dawson 2005; Glen & Dickman 2006b). During the day Spotted-tailed Quolls shelter in fallen logs, boulder piles, burrows, tree hollows and occasionally under dwellings (Woinarski et al. 2014). Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites. Species is unlikely to utilise the Subject Land due to a lack hollows or logs for denning. No area structures such as windrows were recorded on the site therefore occupation of the site by the species is unlikely. There are a total of six records of the species within 10 km of the Subject land, occurring from 2004 (7.3 km and 9.8 km to the north, 6.7 km to the west of the subject land), 2006 (7.8 km southeast of the subject land) and 2016 (approximately 9.3 km south of the subject land). No suitable habitat occurs for the species within VZs 2- 4 as this area is highly modified and under active management.	Unlikely

5.3 Species Credit Species

Species Credit Species (Candidate Species) are species that cannot be reliably predicted to use an area based on habitat surrogates. Species credit species that have potential to occur within the Subject Land must be surveyed to determine presences/absence or provide an expert report. In the absence of either of these the species will be presumed to be present within the Subject Land.

The conditions of vegetation and habitat within the Subject Land can be assessed by an accredited assessor to have sufficient degradation of key habitat constraints associated with species credits species, therefore is unlikely to utilise the Subject Land and not requiring further assessment. These species are identified in **Table 5** and a habitat assessment for species credit species in **Table 6**.

Table 4 Species Credit Species

Scientific Name	Common Name	BC Act	EPBC Act	Survey Period	Paddock Trees	Requires further assessment	SAII
Hoplocephalus bitorquatus	Pale-headed Snake	V		Nov-Mar		No (See Table 6 for Reasoning)	No
Litoria aurea	Green and Golden Bell Frog	E	V	Nov-Mar		No (See Table 6 for Reasoning)	No
Litoria brevipalmata	Green-thighed Frog	V		Oct-Mar		No (See Table 6 for Reasoning)	No
Ninox connivens	Barking Owl	V		May-Dec		No (See Table 6 for Reasoning)	No

Key:

V = Vulnerable E = Endangered CE = Critically Endangered EX = Extinct

As no habitat for Candidate Threatened Species was identified within the Subject Lands, no further survey for these entities has been undertaken in the assessment of this proposal.

Table 5 Species Credit Species Habitat Assessment

Scientific Name	Common Name	Habitat requirement	Habitat present on development site	Species requires further assessment
Birds				
Ninox connivens	Barking Owl (Breeding)	Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Roost in shaded portions of tree canopies, including tall midstorey trees with dense foliage such as *Acacia* and *Casuarina* species. The site comprises marginal foraging habitat in the form of cleared land within an agricultural landscape. No suitable nesting or breeding habitat exists in the form of trees with large hollows (>20cm) that will be impacted by the proposal. No further survey is required. Two historic records of the species occur within 10 km of the Subject land, from 2005 and 2008 approximately 5.7 km to the east and approximately 10 km to the south respectively.	Unlikely	No
Reptiles				
Hoplocephalus bitorquatus	Pale-headed Snake	The Pale-headed Snake is a highly cryptic species that can spend weeks at a time hidden in tree hollows. Found mainly in dry eucalypt forests and woodlands, cypress forest and occasionally in rainforest or moist eucalypt forest. In drier environments, it appears to favour habitats close to riparian areas. Shelter during the day between loose bark and tree-trunks, or in hollow trunks and limbs of dead trees. The Subject Land comprises no suitable habitat, being largely cleared and with no impacted hollow trees, nor providing connectivity between adjacent riparian habitat and other significant patches of native vegetation. There are no records of the species within 10 km of the Subject Land. No habitat constraints for the species are listed within the TBDC. No further survey is required.	Unlikely	No

Scientific Name	Common Name	Habitat requirement	Habitat present on development site	Species requires further assessment
Amphibians				
Litoria aurea	Green and Golden Bell Frog	Inhabits marshes, dams and stream-sides, particularly those containing bull rushes (*Typha* spp.) or spike rushes (*Eleocharis* spp.). Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (*Gambusia holbrooki*), have a grassy area nearby and diurnal sheltering sites available. Some sites, particularly in the Greater Sydney region occur in highly disturbed areas. Though the subject site contains an unshaded waterbody, surrounded by managed lawns, the predatory fish *Gambusia holbrooki* was detected during the site visit and the waterbody is physically disconnected from the broader landscape by existing gravel roads which encircle the patch. The land gently slopes from the east of the Subject Land toward swamp forest floodplain dominated by a number of Melaleuca species, *E tereticornis* and *Casuarina glauca* at the northeast of the site. Within this swale landform ephemeral pools would likely occur with evidence of regular inundation recorded during site visit. However, this zone is outside of the Subject Land boundary and will not be impacted by the proposal. Furthermore, the majority of the Subject Land is disconnected from this riparian corridor, extending north to south, by managed lawns (school ovals) creating a hostile environment for many fauna species. The waterbody which occurs within the Subject Land will be retained by the proposal, therefore there are no impacts to potential habitat for the species. proposal will retain the waterbody. There are no records of the species within 10 km of the Subject Land.	Unlikely	No
Litoria brevipalmata	Green-thighed Frog	Occurs in a range of habitats from rainforest and moist eucalypt forest to dry eucalypt forest and heath, typically in areas where surface water gathers after rain. It prefers wetter forests in the south of its range but extends into drier forests in northern NSW and southern Queensland. This species is thought to forage in leaf-litter. No suitable habitat occurs on the Subject Land, which is broadly cleared and managed in the understorey (where canopy persists), preventing formation of litter. Forests associated with permanently or ephemerally wet areas occur outside the Subject Land in the Black Creek corridor. No further survey is required. Though it should be noted that there are two recent records of the species within 10 km of the Subject Land, approximately 8.3 and 8.9 km to the south east.	Unlikely	No

5.4 Candidate Species Surveys

Targeted surveys for flora and fauna candidate species were not conducted at the site due to the lack of suitable habitat observed within the Subject Land. All flora within B01 was recorded as the entirety of the patch fell within the BAM floristics plot, while all other VZ areas are highly modified and currently managed resulting no available habitat for threatened entities associated with the PCT identified.

Threatened flora species are unlikely to present within the Subject Land due to current land management practises such as active mulching and mowing in addition to the presence of exotic grass species (a known KTP).

Suitable habitat threatened fauna species was searched for within the Subject Land such as HBTs, searches for logs and areas of leaf litter, existing culverts or derelict structures. Multiple waterbodies occur within the Study Area, as described in Section 2.1.3, with one heavily modified dam being partially altered by the proposal though ultimately retained. See **Table 6** for justification of habitat suitability. No targeted threatened fauna surveys were conducted as a result.

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FIGURE 4: FLORA SURVEY LOCATIONS

Legend

- BAM Plot
- Flora Survey Transect
- Study Area
- Subject Site
- Cadastral Boundaries

0 55 110 220

Meters

1:4,000

N W E S

MJD Environmental

Aerial: NearMap (2021) | Data: MJD Environmental, Spatial Services (2021) | Datum/Projection: GDA 2020 MGA Zone 56 | Date: 17/12/2021| Version 1 | | This plan should not be relied upon for critical design dimensions.

Secondary Indications and Incidental Observations

Opportunistic sightings of secondary indications (scratches, scats, diggings, tracks etc.) of resident fauna were noted. Such indicators included:

- Distinctive scats left by mammals;
- Scratch marks made by various types of arboreal animals;
- Nests made by various guilds of birds;
- Feeding scars on Eucalyptus trees made by Gliders;
- Whitewash, regurgitation pellets and prey remains from Owls;
- Aural recognition of bird and frog calls;
- Skeletal material of vertebrate fauna; and
- Searches for indirect evidence of fauna (such as scats, nests, burrows, hollows, tracks, and diggings).

5.4.1 Limitations

Limitations associated with this assessment report are presented herewith. The limitations have been taken into account specifically in relation to threatened species assessments, results and conclusions.

In these instances, a precautionary approach has been adopted; whereby 'assumed presence' of known and expected threatened species, populations and ecological communities has been made where relevant and scientifically justified to ensure a holistic assessment.

Seasonality & Conditions

The flowering and fruiting plant species that attract some nomadic or migratory threatened species, often fruit or flower in cycles spanning a number of years. Furthermore, these resources might only be accessed in some areas during years when resources more accessible to threatened species fail. As a consequence, threatened species may be absent from some areas where potential habitat exists for extended periods and this might be the case for nomadic and opportunistic species.

Data Availability & Accuracy

The collated threatened flora and fauna species records provided by NSW Bionet are known to vary in accuracy and reliability. This is usually due to the reliability of information provided to the National Parks and Wildlife Service (NPWS) for collation and/or the need to protect specific threatened species locations. During the review of threatened species records sourced from OEH Atlas of NSW Wildlife, consideration has been given to the date and accuracy of each threatened species record in addition to an assessment of habitat suitability within the subject site.

Similarly, EPBC Protected Matters Searches provide a list of threatened species and communities that have been recorded within 10 km of the Study Area, or which have suitable habitat within the wider area, and are subject to the same inherent inaccuracy issues as the State derived databases.

In order to address these limitations in respect to data accuracy, threatened species records have only been used to provide a guide to the types of species that occur within the locality of the Study Area. Consequently, BAM assessment and the results of surveys conducted within the Subject Land and surrounds have been used to assess the likelihood of occurrence of threatened species, populations and ecological communities to occur therein.

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FIGURE 5: FAUNA SURVEY LOCATIONS

Legend

- Bird Census Locations
- Study Area
- Subject Site
- Cadastral Boundaries

0 40 80 160

Meters

1:2,800

N W E S

MJD Environmental

Aerial: NearMap (2021) | Data: MJD Environmental, Spatial Services (2021) | Datum/Projection: GDA 2020 MGA Zone 56 | Date: 17/12/2021| Version 1 | | This plan should not be relied upon for critical design dimensions.

5.5 Fauna Survey Results

5.5.1 Weather Conditions

Field surveys were undertaken by MJD Environmental on the 22nd October and 18th November 2021. The prevailing weather conditions during the survey are presented in a **Table 6** below.

Table 6 Prevailing Weather Conditions

Date	Min Temp (°C)	Max Temp (°C)	Rain (mm)	Wind (km/h)	Sunrise-Sunset
22nd October 2021	12.3	24.8	0	ESE 13km/h to E13km/h	0606 - 1912
18th November 2021	10.2	28.7	0	ENE 2km/h to NNW 15km/h	0543 - 1936

Sources: : http://www.bom.gov.au/climate/dwo/IDCJDW0200.shtml

http://www.ga.gov.au/bin/geodesy/run/sunrisenset

Mammals

Arboreal

No threatened species were observed. No other native or exotic species were observed.

Terrestrial

No threatened species were observed. No other native or exotic species were observed.

Fish

The exotic species *Gambusia holbrooki* (Plague Minnow) was observed in the dams on site.

Avifauna

No threatened species were recorded. A limited number of native bird species were recorded during the survey efforts. A total of fourteen (13) bird species were identified visually or by vocalisation during the surveys. The species recorded include Pacific black duck (*Anas superciliosa*), Hardhead (*Aythya australis*), Little Corella (*Cacatua sanguinea*), Australian Raven (*Corvus coronoides*), White-faced heron (*Egretta novaehollandiae*), Galah (*Eolophus roseicapillus*), Dusky Moorhen (*Gallinula tenebrosa*), Magpie-lark (*Grallina cyanoleuca*), Welcome swallow (*Hirundo neoxena*), Willie wagtail (*Rhipidura leucophrys*), Common Myna (*Sturnus tristis*), Rainbow Lorikeet (*Trichoglossus haematodus*) and Masked lapwing (*Vanellus miles*).

Herpetofauna

No threatened species were observed. No other native or exotic species were observed.

Microchiropteran Bats

No threatened species were observed. No other native or exotic species were observed.

6 Identify Prescribed Additional Biodiversity Impacts

6.1 Habitat for threatened entities

Karst, caves, crevices, cliffs, rocks, and other geological features of significance

There are no occurrences of karst, caves, crevices, rock outcrops or cliffs within the Subject Land.

Human made structures

Occupied and operational educational buildings exist across the Study Area, across all Lots.

Non-native vegetation

Non-native vegetation exists on the Subject Lands in the form of managed turf and pasture grasses, and areas of unmanaged annual weeds.

6.2 Habitat Connectivity

The surrounding environment to the site is largely a rural landscape, except for a small residential zoned area to the southwest, being the township of Nulkaba. The vegetation around Black Creek is a significant vegetated riparian corridor in the immediate area, with connectivity in the north and south to Werakata National Park, approximately 1.8 km to the east of the Study Area. Connectivity is limited in all other directions due to past and current land uses, with higher order watercourses represented the majority of retained native vegetation, and these all ultimately join Black Creek at varying points to the north. One isolated patch of native vegetation exists within the Study Area, straddling Lots 1 DP 126765 and 1 DP 744377 south of the established school ground and east of a wetland lake.

6.3 Water bodies, water quality and hydrological processes that sustain threatened entities

The Subject Land includes the western bank of Black Creek at 56 m elevation. The site is relatively flat, and includes ephemerally and permanently inundated water bodies, generally draining to the north and east into Black Creek (a tributary to the Hunter River).

The hydrology of the Subject Land is typified by one 4th order stream (Black Creek) in the eastern boundary of the site, as well as a 1st and 2nd order tributaries across the site. This watercourse eventually joins the Hunter River approximately 20km north of the Subject Land.

There are two mapped dams within the Study Area, with an area in the Subject Land of 0.19 ha (**Figure 3**). All dams will be retained under the proposal, with potential minor alterations to the boundary of the dams on Lots 1 / DP744377 and 1 / DP126765 to facilitate the proposal.

6.4 Wind turbine strikes

Not applicable to this proposal.

6.5 Vehicle strikes

There is current vehicle thoroughfare through the Subject Land to facilitate student drop off and collection, staff parking and land management. Under the proposal, thoroughfare through the Subject Land will be increased with the construction of additional sealed and unsealed roads, and new carparks. The increase in student capacity will also cause an increase in vehicle movements over and around the site.

7 Matters of National Environmental Significance

An EPBC Act Protected Matters Search (accessed 08-12-2021) was undertaken to generate a list of those Matters of National Environmental Significance (MNES) from within 10 km of the Study Area. An assessment of those MNES relevant to biodiversity has been undertaken in accordance within EPBC Act Policy Statement 1.1 Significant Impact Guidelines Matters of National Environmental Significance (DoE, 2013). The Matters of National Environmental Significance protected under national environment law include:

- Listed threatened species and communities;
- Listed migratory species;
- Ramsar wetlands of international importance;
- Commonwealth marine environment;
- World heritage properties;
- National heritage places;
- The Great Barrier Reef Marine Park;
- Nuclear actions; and
- A water resource, in relation to coal seam gas development and large coal mining development.

Listed Threatened Species and Communities:

A total of 46 threatened species and 5 threatened ecological communities listed under the EPBC Act have been recorded on the protected matters search. A likelihood of occurrence assessment for these MNES has been completed in **Appendix D**.

Threatened Species

Ten threatened birds, eight mammals, three frogs, two reptiles, and twenty-three plants were recorded on the protected matters search. None were considered to have the potential to utilise the habitats within the Subject Land.

This assessment concluded that the proposal is unlikely to impact the listed threatened species.

Threatened Ecological Communities

Vegetation Zone 1 was assessed as being commensurate with EPBC Act listed Critically Endangered *River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*. An assessment of impact has been undertaken in **Appendix G**

Listed Migratory Species:

The protected matters search nominated 16 migratory species or species habitat that may occur with the 10 km Study Area buffer search area. No listed migratory species were observed within the subject site. This assessment concluded that no habitat within the Subject Land or Study Area is critical to their survival. Therefore, it is unlikely that the proposal over the Subject Land will impact migratory species.

Wetlands of International Significance (declared Ramsar wetlands):

The Subject Land is not a wetland of international significance or declared Ramsar wetland. The Subject Land buffer is nominated as being 20-30 km upstream from the Hunter Estuary Wetlands, however in reality over 100 km of waterway separates the site from the wetland and no activities are proposed which are likely to negatively impact local or regional waterways.

Commonwealth Marine Areas:

The Subject Land is not part of a Commonwealth Marine Area and is not in close proximity to any such area.

World Heritage Properties:

The Subject Land is not a World Heritage area and is not in close proximity to any such area.

National Heritage Places:

The Subject Land is not a National Heritage area and is not in close proximity to any such area.

Great Barrier Reef Marine Parks:

The Subject Land is not part of or within close proximity to any Great Barrier Reef Marine Park.

Nuclear Actions:

The proposal over the Subject Land is not and does not form part of a Nuclear action.

Water Resources in relation to Coal Mining and CSG:

The proposal over the Subject Land is related to an Educational Institution and as such is not or does not form part of a coal mining and/or CSG proposal.

Summary - In summary, the proposed action is unlikely to have an impact to MNES assessed in this report based on the assessment criteria set out in relevant Commonwealth policies and advices as at the time of this assessment.

8 SEPP (Koala Habitat Protection) 2021

The *State Environmental Planning Policy (Koala Habitat Protection) 2021* commenced on 17 March 2021 to replace and repeal the State Environmental Planning Policy (Koala Habitat protection) 2020.

The principles of the Koala SEPP 2021 are to:

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

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

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

The SEPP (2021) does not apply as the Study Area is zoned RU2 Rural Landscape in a relevant LGA (being Cessnock City Council) – as such the requirements of the SEPP (2020) apply to this development.

No Koala records exist according to DPIE Bionet within 2.5km of the site in the last 18 years. Further, Koala feed trees listed in Schedule 2 comprise less than 15% of the trees in Vegetation Zone 1, which is the only VZ containing native canopy. Significant barriers to Koala movement within the Subject Lands exist, reducing the likelihood that Koalas could utilise the Subject Land for transitory forage or refuge. No secondary indications (scats, fur, scratches consistent with Koala and belly rub trees) were observed during surveys over the site.

On this basis, the Subject Lands are not considered to represent core or potential Koala habitat, nor serve an important ecological function for Koalas, nor to be important for the recovery of the Koala, and further assessment is therefore not required.

STAGE 2 - IMPACT ASSESSMENT

9 Avoid and Minimise Impacts

9.1 Biodiversity Values

Site Selection

The Study Area is a parcel of rural land which has undergone historical clearing and comprises managed pasture and turf with patches of retained vegetation and vegetated riparian corridors. Retained vegetation is generally limited to canopy only with disturbed or managed understorey. Riparian lands within the Study Area have been entirely avoided, with proposed works largely limited to road frontage, cleared land and the established school site. Works on Lomas Lane are proposed for the smallest practical area fit for purpose, avoiding areas of continuous canopy further west of the existing school entrance.

An initial site inspection provided a preliminary assessment of biodiversity values within the Subject Land to assist with site selection and avoidance of higher biodiversity values in the Study Area. subject site.

Project Design

Project design for this proposal has been an iterative process. Consultation between the planners, engineers, bushfire consultant and ecologist has been collaborative. The final development footprint was produced in accordance with BAM requirements including avoiding and minimising biodiversity impacts as much as practicably possible. Avoidance of PCT 1233 associated with the Black Creek riparian corridor has been achieved, and minimal removal of PCT 1594 was avoided where possible. Both are associated with Threatened Ecological Communities (TEC).

Refer to **Figure 1** showing the development footprint as the Subject Land.

9.2 Prescribed Biodiversity Impacts

The avoidance and minimisation of prescribed biodiversity impacts is a critical component of the BAM, as many of these biodiversity values are difficult to quantify, replace or offset.

The BC regulation (clause 6.1) identified actions that are prescribed as impacts to be assessed under the biodiversity offset scheme. Where these items occur, they have been addressed below.

9.2.1 Habitat for Threatened Entities

Karst, caves, crevices, cliffs, rocks, and other geological features of significance

Not applicable to this proposal.

Human-made structures

Occupied buildings exist in the established School adjacent to the Subject Lands, however do not constitute suitable habitat for threatened species as they are well maintained and regularly occupied or utilised.

Non-native vegetation

Non-native vegetation on the site is limited to managed exotic turf and pasture grasses and areas of unmanaged annual weeds, which do not constitute habitat for threatened species identified as having the potential to occur in the Study Area. Exotic vines in the riparian corridor may provide refuge for threatened species, and these areas have been avoided.

9.2.2 Habitat Connectivity

The proposed development avoids vegetation removal almost entirely, limiting works to the cleared lands west of the Black Creek riparian corridor. Connectivity to adjacent areas of habitat are maintained via this corridor with only a very small fringing area to be disturbed for a bus turnaround, in vegetation that is limited to canopy only with a managed and mulched understorey. All other works occur on the frontage of Lomas Lane and Wine Country Drive where no current connectivity exists.

9.3 Water bodies, Water Quality and Hydrological Processes that Sustain Threatened Entities

Proposed works will avoid all mapped watercourses and will largely avoid existing dams on the Subject Land.

9.3.1 Wind Turbine Strikes

Not applicable to this proposal.

9.3.2 Vehicle Strikes

The proposed development will have a moderate increase in vehicle movements within the Subject Land, due to the proposed increase in student capacity, and increasing vehicle movements through the subject land. Access to the Subject Land will continue from Lomas Lane, with proposed new access from Wine Country Drive.

The new access has been located on the southernmost lot, removed from areas of retained native vegetation and unlikely to form a connection between areas of habitat, between which fauna movements might increase vehicle strike. The upgraded existing access from Lomas Lane has been set aside for mass transport, with a bus turnaround bay. This accessway is adjacent to retained vegetation but logistically will operate as a slow-in, slow-out, pick-up and drop-off area.

Vehicle velocity through the site at peak times will also be moderated by school zone speed limits.

10 Unavoidable Impacts

The following section outlines potential direct and indirect impacts on biodiversity values and prescribed impacts associated with the proposal.

10.1 Direct Impacts

The proposed construction of school buildings and infrastructure at Lomas Lane, Nulkaba, NSW will result in the following direct impacts:

Removal of Native Vegetation & TEC

A total of 2.94 ha of native vegetation is to be entirely removed. **Table 7** provides an overview of the area to be cleared and the current and future vegetation integrity score (V.I).

Of this 0.16 ha of PCT 1594 is to be removed which is commensurate with BC Act Endangered and EPBC Act Critically Endangered Ecological Community *River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*.

Removal of Threatened Species (Candidate Species Credit Species)

No Candidate Threatened Species we identified as potentially utilising habitat on the Subject Lands.

Table 7 Direct Impacts on Native Vegetation

Vegetation Zone	Condition	Threatened Ecological Community	Area (ha)	Current V.I Score	Future V.I Score
1594: Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter					
VZ 1	1594_poor	Yes	0.16	47.7	0
VZ 2	1594_lawn	No	2.57	12.1	0
VZ 3	1594_weedy	No	0.26	11.5	0

Candidate Species Credit Species and SAII

As part of the biodiversity assessment, it has been determined the proposal will:

- Not impact any threatened ecological communities which are listed as a candidate Serious and Irreversible Impact entity in accordance with *Guidance to assist a decision-maker to determine a serious and irreversible impact* (BAM 2020)

10.2 Indirect Impacts

The proposed construction of school buildings and infrastructure at Lomas Lane, Nulkaba, NSW will result in the following indirect impacts described in **Table 8**.

Table 8 Potential Indirect Impacts

Impact	Extent	Frequency/likelihood	Duration	Threatened species or TEC likely to be affected	Consequence of the impact on bioregional persistence of the threatened species, TEC and/or habitat
Inadvertent impacts on adjacent habitat or vegetation	Immediate surrounds	Likely – Ongoing	During & post construction	▪ Hollow bearing trees used by threatened species such as birds, forest owls, microbats and arboreal mammals (potential to occur). ▪ Threatened flora and fauna ▪ Adjacent TEC – (PCT 1233) – River Flat Eucalypt Forest east of the Subject Land	▪ Risk of disturbance of genetic exchange between flora species ▪ Risk of disturbance to retained vegetation ▪ Risk of loss/disturbance to fauna habitat (nests, foraging habitat) ▪ Minor risk of injury or mortality of fauna during clearing within the Subject Land ▪ Risk of disturbance to riparian zone (Black Creek)
Reduced viability of adjacent habitat due to noise, dust or light spill	Immediate surrounds	Likely - On-going	On-going during construction and post development	▪ Forest Owls (foraging) ▪ Microbats (foraging) ▪ All potential threatened fauna that may forage in the adjacent habitat ▪ Threatened flora ▪ Adjacent TEC – (PCT 1233) – River Flat Eucalypt Forest east of the subject land	▪ Alter fauna behaviour (breeding, roosting and movement) in the immediate locality ▪ Dust cover may impact function of flora species in immediately adjacent vegetation ▪ Increased light in the locality impacting on nocturnal fauna movements.
Erosion and sediment impacts to adjacent vegetation	Unknown	Infrequent pending mitigation measures	Construction and Operational	▪ Threatened flora and fauna ▪ Adjacent TEC – (PCT 1233) – River Flat Eucalypt Forest east of the subject land	▪ Erosion and sedimentation impact on potential adjacent native vegetation ▪ Erosion and sedimentation impact on potential adjacent disturbed swamp forest/creeklines

10.3 Assessment of Prescribed Biodiversity Impacts

10.3.1 Habitat for Threatened Entities

Karst, caves, crevices, cliffs, rocks, and other geological features of significance

Not applicable to this proposal.

Human-made structures

Occupied buildings exist in the established School adjacent to the Subject Lands, however do not constitute suitable habitat for threatened species as they are well mainlined and regularly occupied or utilised.

Non-native vegetation

Non-native vegetation on the site is limited to managed exotic turf and pasture grasses and areas of unmanaged annual weeds, which do not constitute habitat for threatened species identified as having the potential to occur in the Study Area. Exotic vines in the riparian corridor may provide refuge for threatened species, and these areas have been avoided.

10.4 Habitat Connectivity

The proposal will result in the removal or disturbance of up to 0.16 ha of native vegetation within a broadly cleared rural landscape, on a highly and frequently trafficked site. The proposed works will have a negligible effect on the habitat connectivity for threatened species locally and within the wider region, as existing connectivity is heavily biased to the riparian corridor east of the Subject Lands, which will be entirely retained. The proposed infrastructure is to be installed within an established educational facility, an on the frontage of an arterial road, both of which constitute significant existing barriers to fauna movement.

The site in its current form is connected to surrounding vegetation only in the east, where the riparian corridor of Black Creek connects to the north and east, ultimately linking with the Hunter River in the north, and connecting to the east to Werakata National Park. These connections are fragmented in places by rural land management. No connection exists to the west, and while connection exists to the south following a riparian corridor, this connection is highly disturbed and terminates at the township of Cessnock.

The proposal will not significantly influence habitat connectivity or existing fragmentation patterns within nearby corridors. The removal or modification of vegetation from the site that represents habitat exists in a disturbed condition due to land management patterns across the site. Specifically, the proposal is located on actively managed school grounds which have been historically cleared and disturbed to an extent where native fauna habitat is limited except for isolated patches of canopy which may constitute foraging habitat or refuge for highly mobile fauna species, and which will be almost entirely retained.

The removal or disturbance of a small patch of native vegetation (0.16 ha) will, on balance, retain existing connectivity and minimise fragmentation of habitat for biodiversity in the locality as a result of development within the Subject Land.

10.5 Water bodies, Water Quality and Hydrological Processes that Sustain Threatened Entities

Proposed works will avoid all mapped watercourses and dams on the Subject Land. There is potential for works to temporarily increase the risk of sedimentation into adjacent watercourses, however mitigation measures (**Section 11**) should ameliorate this risk.

10.5.1 Wind Turbine Strikes

Not applicable to this proposal.

10.5.2 Vehicle Strikes

The proposed development will potentially increase vehicle strike at a minor level for threatened diurnal fauna that may use adjacent vegetation as a place to forage and roost during peak vehicle movements through the Study Area.

11 Mitigation and Managing Impacts

The following section outlines general mitigation measures required to manage impacts associated with the development proposal. All mitigation measures propose to manage impacts that include techniques, timing, frequency and responsibility for implementing each measure.

Table 9 Mitigation Measures

Mitigation Measures	Responsibility	KPI	Timing	Corrective Action
Direct Impacts				
Vegetation Clearing				
Vegetation removal works are to occur outside core breeding periods for species known to use habitat within the Subject Land wherever possible.	Project ecologist in consultation with project manager	Works plan indicates tree clearing areas during optimal months	Spring to Summer where possible	Cease site works, revert to KPI
Pre-clearance survey of tree to be removed	Project Ecologist	Tree pre-clearance survey completed maximum one week prior to removal No breeding fauna observed at time of clearing	Prior to commencement of works for each stage	Cease site works, revert to KPI
Indirect Impacts				
Weeds, disease and edge effects				
Equipment and vehicles entering the Subject Land are cleaned of foreign soil and seed prior to entering the Study Area	Contractors	Best practice hygiene protocols followed, No visible foreign material, certification available upon request	Prior to machinery arriving to the Subject Land	Non-compliance due to foreign material present, Refer to KPI
Retained Vegetation				
Establish No go zones at the Subject Land and Study Area interface.	Contractor in consultation with project ecologist	Fencing to include high vis bunting and star pickets or similar	Prior to construction	Cease site works and refer to KPI
Develop a weed management protocol to be included in Construction Environment Management Plan (CEMP) for constructions period to limit degradation of interface of development and retained vegetation	Contractor with Ecologist input	Approved CEMP (Inc. weed management protocols) prior to construction of each stage	Prior to construction of each stage adjacent to retained vegetation	Increases in weed presences, will require amendments to weed management protocols
Noise and light Impacts				
Limit construction works to daylight hours to reduce impacts from light and noise	Construction contractor	No construction works to occur from dusk till dawn.	During construction works	Cease site works and refer to KPI
All machinery is correctly maintained and operator as per operation manual	Construction contractor	No excessive noise of machinery due to poor maintenance or faulty parts	During construction works	Cease site works and refer to KPI

Mitigation Measures	Responsibility	KPI	Timing	Corrective Action
Dust Impacts				
Vehicles/machinery to observe 10km/h speed limit on Subject Land	Contractors	No excessive dust	For the duration of Subject Land works until impervious surfaces established.	Reassess KPI and control measures if excessive dust continues
Prescribed Biodiversity Impacts				
Erosion and sediment controls enacted in accordance with construction environment management plan (CEMP) to limit impacts on retained vegetation or riparian zones	Construction Contractor	CEMP followed & modified as needed	Prior to commencement of works, for duration of Subject Land works	Cease site works, Refer to KPI
Establish Speed limits during construction and operation of the proposed development	Project Manager	Low speed limits set to minimise vehicle strikes	Prior to construction and during operation	Refer to KPI

12 Offset Requirements for Unavoidable Impacts

A summary of offset liabilities for the proposed development with respect to native vegetation are provided below (Refer to **Table 10**) as per 9.2.1 BAM 2020:

An offset is required for all impacts of development on PCTs that are associated with:

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

12.1 Ecosystem Credits

Table 10 Ecosystem Credits

Vegetation Zone	PCT ID	Area (ha)	Vegetation Integrity Score (V.I) loss	Ecosystem Credits Required	SAII
VZ1_1594_Poor	1594	0.16	47.7	4	No
VZ2_1594_Lawn	1594	2.57	12.1	0	
VZ3_1594_Weedy	1594	0.26	11.5	0	
			Total	**4**	

12.2 Species Credit

As no habitat for Candidate Threatened Species was identified within the Subject Land, no offset liabilities are generated for Species Credit species.

12.3 Areas not requiring Offsets

There is 0.1 ha of exotic groundcover that will be impacted by the proposal. As this vegetation does not align with native vegetation, it does not require offsetting or further assessment. Additionally, VZ 2 & 3 will not require offsets as both VZ's accrued 0 credits.

12.4 Credit Summary

The following **Table 11** displays the required Biodiversity Offset Liability based on the BAM-C and **Figure 7** depicts areas that require offset. Refer to **Appendix E** for the BAM Credit Report.

Table 11 Biodiversity Liability Credit Summary

PCT	TEC	Area (ha)	HBT Cr	No HBT Cr	Offset Credits required
Ecosystem Credits					
1594 - Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	0.2	4	0	4
1594 - Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter	Not a TEC	2.8	0	0	0

The full Biodiversity Credit Liability is to be retired prior to the commencement of works.

A market appraisal will be undertaken to determine if some or all of the credit types are available and/or an application will be made to the Biodiversity Conservation Trust for payment into Biodiversity Conservation Fund.

SPCC 10 LOMAS LANE, NULKABA

FIGURE 6: OFFSET REQUIREMENTS

Legend

- Study Area
- Subject Site
- Cadastral Boundaries
- Impacts Requiring Offsets
- Impacts Not Requiring Offsets
- Areas Not Requiring Assessment
- Areas Not Impacted

0 40 80 160

Meters

1:2,800

N W E S

MJD Environmental

Aerial: NearMap (2021) | Data: MJD Environmental, Spatial Services (2021) | Datum/Projection: GDA 2020 MGA Zone 56 | Date: 17/12/2021| Version 1 | | This plan should not be relied upon for critical design dimensions.

13 Conclusion

MJD Environmental has been engaged by Barr Planning on behalf of St Philips Christian Education Foundation to prepare a Biodiversity Development Assessment Report (BDAR) for a State Significant Development (SSD), being expansion of infrastructure and facilities at St Philips Christian College, being Lots 1 / DP126765, 1 / DP744377, 2 / DP600895 and 518 / DP837571, 10 Lomas Lane Nulkaba NSW.

The proposal meets the requirements of an SSD, pursuant to Schedule 1, 15(2) of the *State Environment Planning Policy* (*State and Regional Development*) *2011* (SRD SEPP). The Secretary's Environmental Assessment Requirements (SEARs) for the project have directed the applicant to: "*Assess any biodiversity impacts associated with the development in accordance with the Biodiversity Conservation Act 2016 and the Biodiversity Assessment Method 2020, including the preparation of a Biodiversity Development Assessment Report (BDAR), unless a waiver is granted, or the site is on biodiversity certified land*". As the impacts to biodiversity do not meet the requirements of a BDAR waiver due to the presence of native vegetation and habitat constraints, this BDAR has been prepared to assess residual impacts.

The Biodiversity Assessment Methodology (BAM) 2020 was used as the assessment method, to establish impacts on threatened species and threatened ecological communities in the locality under the *Biodiversity Conservation Act* 2016. In addition, preliminary assessment was also undertaken having regard to those threatened entities listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. Assessment has been considered against the *State Environmental Planning Policy (Koala Habitat Protection) 2021.*

The proposed Subject Land is situated over land zoned RU2 – Rural Landscape. Lot 1 DP 126765 is the site of the current educational establishment of St Philip's Christian College, comprising parking, buildings, sports ground and open space. Lot 1 DP 744377 is generally comprised of open space with unsealed access and one building, being the SPCC Dynamic Alternative Learning Environment. Lot 518 DP 837571 comprises of open space, unsealed access, a greenhouse, an irrigation dam and an equestrian centre. Across all lots, substantial managed open space dominates.

Field surveys carried out as part of the BDAR delineated the following Plant Community Type (PCT) within the Subject Land:

- 1594 – Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter

No threatened species listed as under the BC Act were recorded within the subject land.

Additionally, the Subject Land is mapped on the Important Areas Map as habitat for *Anthochaera phrygia* (Regent Honeyeater) listed as Critically Endangered under both the BC & EPBC Acts, however no impact to mapped vegetation is proposed.

Impact Avoidance & Mitigation

A package of avoidance and mitigation measures have been described in this BDAR associated with the project.

The Subject Land for development was selected due to the largely cleared or managed lands with low native species diversity as a result of past and present land use. A total of 3.22ha of native vegetation is to be entirely removed under this proposal within the Study Area.

All measures have been incorporated into the design (avoidance) in the first instance with mitigation measures assessed for the construction phases of the project.

Impact Analysis

The proposal will result in the following impacts and required Biodiversity Offset Liability as calculated using the BAM-C Calculator.

PCT	TEC	Area (ha)	HBT Cr	No HBT Cr	Offset Credits required
Ecosystem Credits					
1594 - Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	0.16	4	0	4
1594 - Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter	Not a TEC	2.8	0	0	0

The full Biodiversity Credit Liability is to be retired prior to the commencement of works. Clearing of the Subject Land is anticipated to occur as a single event and so, no staged retirement of credits is listed here.

A market appraisal will be undertaken to determine if some or all of the credit types are available and/or an application will be made to the Biodiversity Conservation Trust for payment into Biodiversity Conservation Fund.

A preliminary assessment under the EPBC Act determined the proposed action is unlikely to have an impact to MNES assessed in this report based on the assessment criteria set out in relevant Commonwealth policies and advices as at the time of this assessment.

Assessment against the SEPP (Koala Habitat Protection) 2021 criteria determined the proposal is unlikely to impact this species..

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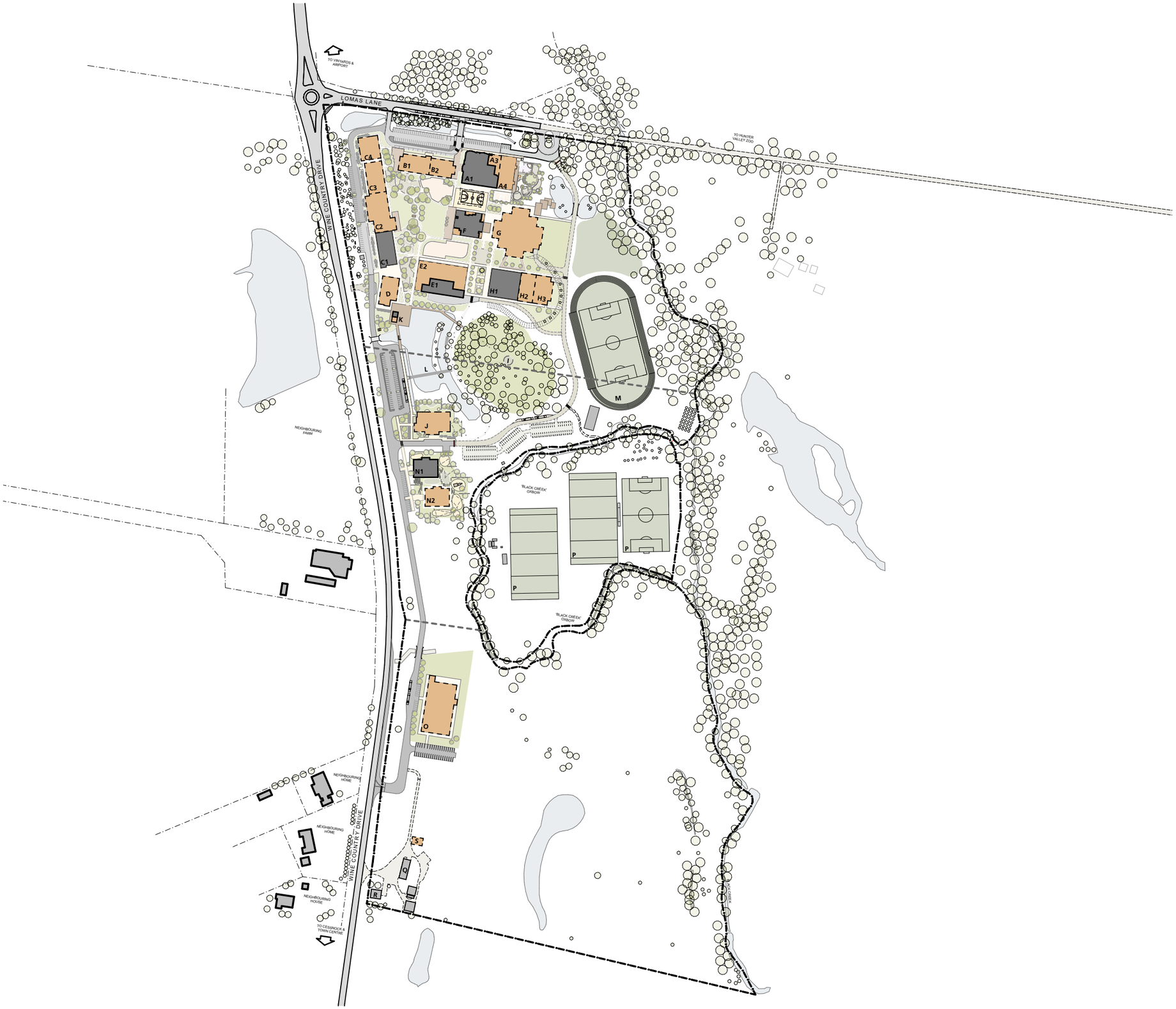
Appendix A Plan of Proposal



SSD APPLICATION

1. Dimensions are in millimetres unless otherwise shown.
2. Work to given dimensions. Do not scale from drawing.
3. Check all dimensions on site prior to construction and fabrication.
4. Bring any discrepancies to the attention of the proprietor & architect.

LEGEND

- Existing building
- Proposed buildings for SSD application
- Site Boundary
- Lot Boundary

A - Junior School
B - Middle School
C - Senior School + Library
D - Admin & Welcome Centre
E - Trade Training Centre
F - Canteen / Cafe Hub
G - Performing Arts Centre
H - Sports Hall
I - Outdoor Meeting Circle
J - Narnia
K - Cafe
L - Boardwalks
M - Sports Field & Running Track
N - D.A.L.E
O - Aquatic Centre
P - Existing Sports Fields
Q - Waste Management Depot
R - Existing Sheds
S - Existing House

4347
CD1003
RevB 18.01.22

Proposed Site Plan - Overall

St Philip's Christian College Cessnock
10 Lomas Lane, Nulkaba

0m 50 100 150 200 250 1:5000 @A3

SHAC

Nominated Architect Justin Hamilton (6160) | ABN 32 131 584 846

SSD APPLICATION

1. Dimensions are in millimetres unless otherwise shown.
2. Work to given dimensions. Do not scale from drawing.
3. Check all dimensions on site prior to construction and fabrication.
4. Bring any discrepancies to the attention of the proprietor & architect.

LEGEND

- EXISTING BUILDINGS
- PROPOSED BUILDINGS
- Site Boundary
- Lot Boundary
- EXISTING ROAD NETWORK & PARKING
- PROPOSED ROAD NETWORK & PARKING
- GRAVEL ROAD / OVERFLOW CAR PARKING
- FOOTPATHS / BUSH TRACKS
- EXISTING TREES
- BOOM GATE / CONTROLLED ACCESS
- MAIN ENTRY
  A: JUNIOR / MIDDLE SCHOOL
  B: SENIOR SCHOOL

A - Junior School
B - Middle School
C - Senior School + Library
D - Admin & Welcome Centre
E - Trade Training Centre
F - Canteen / Cafe Hub
G - Performing Arts Centre
H - Sports Hall
I - Outdoor Meeting Circle
J - Narnia
K - Cafe
L - Boardwalks
M - Sports Field & Running Track
N - D.A.L.E
O - Aquatic Centre
P - Existing Sports Fields
Q - Waste Management Depot
R - Existing Sheds
S - Existing House

PROJECT SCOPE

The following project stages are within this State Significant Development (SSD) Application:

A3 - Junior School
A4 - Junior School
B1 - Middle School
B2 - Middle School
C2 - Senior School
C3 - Senior School
C4 - Library / Chapel
D - Admin & Welcome Centre
E2 - Trade Training Centre
F - Canteen / Cafe Hub
G - Performing Arts Centre
H2 - Sports Hall
H3 - Sports Hall
J - Narnia
K - Welcome Cafe
L - Boardwalks
N2 - D.A.L.E
O - Aquatic Centre
Q - Waste Management Depot

4347
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Proposed Site Plan (North)

St Philip's Christian College Cessnock
10 Lomas Lane, Nulkaba

0m 25 50 75 100 125 1:2500 @A3

SHAC

Nominated Architect Justin Hamilton (6160) | ABN 32 131 584 846

SSD APPLICATION

1. Dimensions are in millimetres unless otherwise shown.
2. Work to given dimensions. Do not scale from drawing.
3. Check all dimensions on site prior to construction and fabrication.
4. Bring any discrepancies to the attention of the proprietor & architect.

LEGEND

- EXISTING BUILDINGS
- PROPOSED BUILDINGS
- Site Boundary
- Lot Boundary
- EXISTING ROAD NETWORK & PARKING
- PROPOSED ROAD NETWORK & PARKING
- GRAVEL ROAD / OVERFLOW CAR PARKING
- FOOTPATHS / BUSH TRACKS
- EXISTING TREES
- BOOM GATE / CONTROLLED ACCESS
- MAIN ENTRY
  A: JUNIOR / MIDDLE SCHOOL
  B: SENIOR SCHOOL

A - Junior School
B - Middle School
C - Senior School + Library
D - Admin & Welcome Centre
E - Trade Training Centre
F - Canteen / Cafe Hub
G - Performing Arts Centre
H - Sports Hall
I - Outdoor Meeting Circle
J - Narnia
K - Cafe
L - Boardwalks
M - Sports Field & Running Track
N - D.A.L.E
O - Aquatic Centre
P - Existing Sports Fields
Q - Waste Management Depot
R - Existing Sheds
S - Existing House

PROJECT SCOPE

The following project stages are within this State Significant Development (SSD) Application:

A3 - Junior School
A4 - Junior School
B1 - Middle School
B2 - Middle School
C2 - Senior School
C3 - Senior School
C4 - Library / Chapel
D - Admin & Welcome Centre
E2 - Trade Training Centre
F - Canteen / Cafe Hub
G - Performing Arts Centre
H2 - Sports Hall
H3 - Sports Hall
J - Narnia
K - Welcome Cafe
L - Boardwalks
N2 - D.A.L.E
O - Aquatic Centre
Q - Waste Management Depot

4347
CD1005
RevB 18.01.22

Proposed Site Plan (South)

St Philip's Christian College Cessnock
10 Lomas Lane, Nulkaba

0m 25 50 75 100 125 1:2500 @A3

SHAC

Nominated Architect Justin Hamilton (6160) | ABN 32 131 584 846

Appendix B BAM Plot Data

Plot Info							Composition						Structure (%)						Function									
Plot	PCT	Condition Class	Vegetation Zone	Easting	Northing	Bearing	Tree	Shrub	Grass	Forbs	Ferns	Other	Tree	Shrub	Grass	Forbs	Ferns	Other	Lge Tree	Hollow bearing tree	Litter Cover (%)	Logs	Tree Stem 5-10	Tree Stem 10-20	Tree Stem 20-30	Tree Stem 30-50	Tree Stem 50-80	Tree Regen	HTE (%)
B01	1594	Poor	1	345705	6370357	130	2	0	5	7	0	2	20	0	2.8	1	0	0.4	2	0	48.4	0.0	Y	Y	Y	1	1	0	0.8
B02	1594	Lawn	2	345719	6370224	298	0	0	1	7	1	0	0.0	0.0	35.0	6.0	0.2	0.0	0	0	1.2	0.0	N	N	N	0	0	0	60.0
B03	1594	Weedy	3	345522	6369618	358	0	0	1	2	0	0	0.0	0.0	90.0	2.1	0.0	0.0	0	0	14.4	0.0	N	N	N	0	0	0	0.0
B04	1594	Lawn	2	345577	6369692	106	0	0	1	1	0	0	0.0	0.0	70.0	0.1	0.0	0.0	0	0	29.0	0.0	N	N	N	0	0	0	10.2
B05	1594	Poor	1	345684	6370029	308	1	0	4	4	0	0	25.0	0.0	47.1	13.3	0.0	0.0	2	1	72.0	0.0	N	Y	Y	0	1	0	7.7
B06	1594	Lawn	2	345558	6369897	190	0	0	3	1	0	0	0.0	0.0	41.5	5.0	0.0	0.0	0	0	2.0	0.0	N	N	N	0	0	0	40.4

Appendix C Flora and Fauna Species Tables

Flora			BAM Plots					
Family	Species Name	Common Name	B01	B02	B03	B04	B05	B06
Aizoaceae	**Galenia pubescens*	Galenia					x	
	Tetragonia tetragonioides	New Zealand Spinach					x	
Apiaceae	*Centella asiatica*	Indian Pennywort		x				
Asteraceae	**Ambrosia tenuifolia*	Lacy Ragweed					x	
	**Arctotheca calendula*	Capeweed				x		
	**Bidens spp.*		x				x	
	Chrysocephalum apiculatum	Common Everlasting	x					
	**Cirsium vulgare*	Spear Thistle		x		x		
	**Conyza bonariensis*	Flaxleaf Fleabane	x		x	x	x	
	Euchiton japonicus		x	x				
	Euchiton spp.	A Cudweed			x			x
	**Facelis retusa*		x		x	x		
	**Gamochaeta pensylvanica*	Cudweed		x				
	**Gamochaeta purpurea*	Purple Cudweed				x		
	**Hypochaeris glabra*	Smooth Catsear	x					
	**Hypochaeris radicata*	Catsear	x	x	x	x	x	x
	**Senecio madagascariensis*	Fireweed	x			x	x	x
	**Soliva sessilis*	Bindyi	x	x	x	x		x
	**Sonchus oleraceus*	Common Sowthistle				x	x	
Boraginaceae	**Heliotropium amplexicaule*	Blue Heliotrope					x	x
Caryophyllaceae	**Arenaria leptoclados*	Lesser Thyme-leaved Sandwort		x				
	**Cerastium glomeratum*	Mouse-ear Chickweed				x		
	**Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian Whitlow				x	x	
Chenopodiaceae	*Einadia hastata*	Berry Saltbush					x	
	Einadia nutans	Climbing Saltbush	x					
Convolvulaceae	*Dichondra repens*	Kidney Weed	x	x			x	

Crassulaceae	**Bryophyllum delagoense*	Mother of millions	x					
Cyperaceae	*Cyperus gracilis*	Slender Flat-sedge					x	
	Cyperus polystachyos							x
	**Cyperus rotundus*	Nutgrass			x			
Euphorbiaceae	**Euphorbia prostrata*		x					
Fabaceae - Faboideae	*Glycine tabacina*	Variable Glycine	x					
	**Medicago polymorpha*	Burr Medic	x					
	**Trifolium campestre*	Hop Clover		x				x
	**Trifolium repens*	White Clover				x		
	**Trifolium spp.*	A Clover			x			
Iridaceae	**Romulea minutiflora*	Small-flowered Onion Grass						x
Malvaceae	**Malva parviflora*	Small-flowered Mallow					x	
	**Modiola caroliniana*	Red-flowered Mallow		x	x	x	x	
	Sida rhombifolia	Paddy's Lucerne	x			x	x	
Marsileaceae	*Marsilea hirsuta*	Short-fruited Nardoo		x				
Menyanthaceae	*Nymphoides montana*	Marshwort		x				
Myrtaceae	*Eucalyptus moluccana*	Grey Box	x				x	
	Eucalyptus tereticornis	Forest Red Gum	x					
Onagraceae	*Ludwigia peploides subsp. montevidensis*	Water Primrose		x				
Oxalidaceae	*Oxalis perennans*		x	x	x	x	x	
Phormiaceae	*Dianella longifolia*	Blueberry Lily	x					
Phyllanthaceae	**Phyllanthus virgatus*	Wiry Spurge	x					
Plantaginaceae	**Plantago lanceolata*	Lamb's Tongues	x	x	x	x	x	x
Poaceae	*Aira cupaniana*	Silvery Hairgrass					x	
	**Aristida calycina*		x					
	**Bromus catharticus*	Praire Grass					x	
	Cenchrus clandestinus	Kikuyu Grass		x			x	x
	**Cynodon dactylon*	Common Couch	x	x	x	x	x	x

	**Ehrharta erecta*	Panic Veldtgrass					x	
	Eleusine tristachya	Goose Grass						x
	**Eragrostis brownii*	Brown's Lovegrass	x					
	**Eragrostis curvula*	African Lovegrass	x					
	Lolium perenne	Perennial Ryegrass	x				x	
	Microlaena stipoides	Weeping Grass					x	
	Panicum simile	Two-colour Panic						x
	**Paspalidium spp.*						x	
	Paspalum dilatatum	Paspalum	x			x		x
	Rytidosperma racemosum	Wallaby Grass					x	
	**Rytidosperma spp.*		x					
	Themeda triandra		x					
	**Urochloa decumbens*	Signal Grass		x				
	**Vulpia myuros*	Rat's Tail Fescue		x	x			
Polygonaceae	*Persicaria lapathifolia*	Pale Knotweed		x				
Primulaceae	**Lysimachia arvensis*	Scarlet Pimpernel	x	x		x	x	
Ranunculaceae	*Clematis glycinoides*	Headache Vine	x					
Rubiaceae	**Richardia humistrata*							x
Solanaceae	**Cestrum aurantiacum*	Orange Cestrum					x	
	**Solanum nigrum*	Black-berry Nightshade					x	
Typhaceae	*Typha orientalis*	Broad-leaved Cumbungi		x				
Verbenaceae	**Verbena bonariensis*	Purpletop	x			x		

* = non-native species

Fauna	
Scientific Name	**Common Name**
Anas superciliosa	Pacific Black Duck
Acridotheres tristis	Common Myna
Aythya australis	Hardhead
Cacatua sanguinea	Little Corella
Corvus coronoides	Australian Raven
Egretta novaehollandiae	White-faced Heron
Eolophus roseicapilla	Galah
Gallinula tenebrosa	Dusky Moorhen
Grallina cyanoleuca	Magpie-lark
Hirundo neoxena	Welcome Swallow
Rhipidura leucophrys	Willie Wagtail
Trichoglossus haematodus	Rainbow Lorikeet
Vanellus miles	Masked Lapwing

* = non-native species

(V) = listed as Vulnerable under the BC & EPBC Act

Appendix D EPBC Likelihood of Occurrence Table

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
Birds				
Anthochaera phrygia	Regent Honeyeater	Critically Endangered	The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River She-Oak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. Every few years non-breeding flocks are seen foraging in flowering coastal Swamp Mahogany and Spotted Gum forests, particularly on the central coast and occasionally on the upper north coast. The Regent Honeyeater is a generalist forager, although it feeds mainly on the nectar from a relatively small number of eucalypts that produce high volumes of nectar. Key eucalypt species include Mugga Ironbark, Yellow Box, White Box and Swamp Mahogany. Other tree species may be regionally important. For example the Lower Hunter Spotted Gum forests have recently been demonstrated to support regular breeding events. Flowering of associated species such as Thin-leaved Stringybark *Eucalyptus eugenioides and other Stringybark species, and Broad-leaved Ironbark E. fibrosa* can also contribute important nectar flows at times. The Subject Land is outside of BAM Important Areas Map for this species. Further, the site lacks diversity of mature trees, high canopy cover and abundance of mistletoes preferred by this species. While Swamp Mahogany *Eucalyptus robusta* do occur on the site, the habitat is small and fragmented as well as highly disturbed being between cleared agricultural land. It is unlikely that this species uses habitat on the Subject Land.	Unlikely
Botaurus poiciloptilus	Australasian Bittern	Endangered	Inhabits dense tall sedge vegetation and permanent wetlands. No suitable habitat occurs within the Subject Land.	Unlikely
Calidris ferruginea	Curlew Sandpiper	Critically Endangered	Inhabits intertidal mud flats in estuaries, bays, lakes and lagoons or areas of bare mud or sand on which to forage. No suitable habitat occurs within the Subject Land	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
Erythrotriorchis radiatus	Red Goshawk	Vulnerable	Inhabit open woodland and forest, preferring a mosaic of vegetation types, a large population of birds as a source of food, and permanent water, and are often found in riparian habitats along or near watercourses or wetlands. In NSW, preferred habitats include mixed subtropical rainforest, *Melaleuca* swamp forest and riparian *Eucalyptus* forest of coastal rivers. While some suitable habitat occurs on the site, it is fragmented and disturbed. No records exist within a 10km Bionet search, and as such it is unlikely that the species inhabits the site.	Unlikely
Falco hypoleucos	Grey Falcon	Vulnerable	Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. No suitable habitat occurs within the Subject Land and site is outside known or predicted range.	Unlikely
Grantiella picta	Painted Honeyeater	Vulnerable	Inhabits Boree/ Weeping Myall (*Acacia pendula*), Brigalow (*A. harpophylla*) and Box-Gum Woodlands and Box-Ironbark Forests. No suitable habitat occurs within the Subject Land.	Unlikely
Hirundapus caudacutus	White-throated Needletail	Vulnerable	White-throated Needletails occur in Australia only between late spring and early autumn, but mostly in summer, when they sometimes form large flocks, appearing as a swirling cloud of birds. They have been seen catching flying insects at heights of more than a kilometre. Sometimes they form mixed-species feeding flocks with other swifts, such as Fork-tailed Swifts or swallows. These feeding flocks may be associated with thunderstorms, the uplift of which may assist with their flight and carry insects high into the air. This species is primarily aerial, and while individuals may temporarily use trees on the site to roost, the species is unlikely to depend on any habitat within the Subject Land.	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
Lathamus discolor	Swift Parrot	Critically Endangered	This species migrates to the Australian south-east mainland between March and October. On the mainland they occur in areas where eucalypts are flowering profusely or where there is abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany *Eucalyptus robusta*, Spotted Gum *Corymbia maculata*, Red Bloodwood *C. gummifera*, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens*. Commonly used lerp infested trees include Inland Grey Box *E. microcarpa*, Grey Box *E. moluccana* and Blackbutt *E. pilularis*. The Subject Land does contain a very small number of trees of a nominal species, however the BAM Important Areas Map for this species does not include the Subject Land and no records exist within a 10km Bionet Search. It is unlikely this species utilises the subject land.	Unlikely
Numenius madagascariensis	Eastern Curlew, Far Eastern Curlew	Critically Endangered	Inhabits intertidal mud flats in estuaries, bays, lakes and lagoons. No suitable habitat occurs within the Subject Land.	Unlikely
Rostratula australis	Australian Painted Snipe	Endangered	Inhabits floodplain wetlands of major coastal rivers, minor flood plain, coastal sandplain wetlands and estuaries. No suitable habitat occurs within the Subject Land.	Unlikely
Frogs				
Heleioporus australiacus	Giant burrowing Frog	Vulnerable	Inhabits open dry sclerophyll forest, woodlands, and heaths, breeding in soaks or pools within first or second order streams. No suitable habitat occurs within the Subject Land.	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
Litoria aurea	Green and Golden Bell Frog	Vulnerable	Inhabits marshes, dams and stream-sides, particularly those containing bullrushes (*Typha* spp.) or spikerushes (*Eleocharis* spp.). Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (*Gambusia holbrooki*), have a grassy area nearby and diurnal sheltering sites available. Some sites, particularly in the Greater Sydney region occur in highly disturbed areas. No suitable habitat occurs within the Subject Land.	Unlikely
Mixophyes balbus	Stuttering Frog, Southern Barred Frog (in Victoria)	Vulnerable	Found in rainforest and wet, tall open forest in the foothills and escarpment on the eastern side of the Great Dividing Range. Outside the breeding season adults live in deep leaf litter and thick understorey vegetation on the forest floor. Breeding occurs in streams during summer after heavy rain. No suitable habitat occurs on site.	Unlikely
Reptiles				
Hoplocephalus bungaroides	Broad-headed Snake	Vulnerable	Shelters in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring. Moves from the sandstone rocks to shelters in crevieces or hollows in large trees within 500m of escarpments in summer. No suitable habitat occurs on site	Unlikely
Delma impar	Striped Legless Lizard, Striped Snake-lizard	Vulnerable	The Striped Legless Lizard occurs in the Southern Tablelands, the South West Slopes and possibly on the Riverina. Populations are known in the Goulburn, Yass, Queanbeyan, Cooma and Tumut areas. Found mainly in Natural Temperate Grassland but has also been captured in grasslands that have a high exotic component. Habitat is where grassland is dominated by perennial, tussock-forming grasses such as Kangaroo Grass Themeda australis, spear-grasses Austrostipa spp. and poa tussocks Poa spp., and occasionally wallaby grasses Austrodanthonia spp. Sometimes present in modified grasslands with a significant content of exotic grasses. Usually found where soils are predominantly basalt with a high clay content and a propensity for cracking. Favoured habitat typically contains little bare ground, with plant litter to a depth of approximately 3 cm.	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
			No suitable habitat occurs within the Subject Land.	
Mammals				
Chalinolobus dwyeri	Large-eared Pied Bat	Vulnerable	Found mainly in areas with extensive cliffs and caves. Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (*Petrochelidon ariel*), frequenting low to mid-elevation dry open forest and woodland close to these features. Females have been recorded raising young in maternity roosts (c. 20-40 females) from November through to January in roof domes in sandstone caves and overhangs. They remain loyal to the same cave over many years. Found in well-timbered areas containing gullies. No caves are present within the Subject Land thus no suitable habitat critical to the species survival beyond forage occurs within the subject land.	Unlikely
Dasyurus maculatus maculatus (SE mainland population)	Spot-tailed Quoll, Endangered (southeastern mainland population)	Vulnerable	Inhabits a wide range of habitat types, including woodlands, rainforest, coastal heath and inland riparian forest. This species uses fallen logs and hollow bearing trees. Predates primarily on terrestrial fauna, however is an excellent climber and will hunt possums and gliders in tree hollows and prey on roosting birds. Sufficient habitat features are present on the site to warrant further survey	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
Petauroides volans	Greater Glider	Vulnerable	Inhabits and is restricted to eucalypt forests and woodlands. This species favours forests with a diversity of eucalypt species, due to seasonal variation in its preferred tree species. It is typically found in highest abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows. No suitable habitat occurs on site	Unlikely
Petrogale penicillata	Brush-tailed Rock-wallaby	Vulnerable	This species occupies rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north. Generally, browse on vegetation in and adjacent to rocky areas eating grasses and forbs as well as the foliage and fruits of shrubs and trees. Shelter or bask during the day in rock crevices, caves and overhangs and are most active at night. No suitable habitat occurs on site	Unlikely
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)	Koala (combined populations of QLD, NSW & ACT)	Vulnerable	Inhabit eucalypt woodlands and forests in a fragmented distribution throughout eastern Australia. In NSW this species mainly occurs on the central and north coasts with some populations in the west of the Great Dividing Range but have been recorded in the southern tablelands. This species feeds on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. Spend most of their time in trees but will descend and traverse open ground to move between trees. Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size. No Koala records exist according to DPIE Bionet within 2.5km of the site in the last 18 years. Further, Koala feed trees listed in Schedule 2 comprise less than 15% of the trees in Vegetation Zone 1, which is the only VZ containing native canopy. Significant barriers to Koala movement within the Subject Lands exist, reducing the likelihood that Koalas could utilise the Subject Land for transitory forage or refuge. No secondary indications (scats, fur, scratches consistent with Koala and belly rub trees) were observed during surveys over the site. It is unlikely this species utilises or traverses the subject land.	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
Potorous tridactylus tridactylus	Long-nosed Potoroo (SE Mainland) [	Vulnerable	Inhabits coastal heaths and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an essential part of habitat, and may consist of grass-trees, sedges, ferns or heath, or of low shrubs of tea-trees or melaleucas. A sandy loam soil is also a common feature. No suitable habitat occurs on site	Unlikely
Pseudomys novaehollandiae	New Holland Mouse, Pookila	Vulnerable	Inhabits heathlands, woodlands with dense undergrowth, vegetated sand dunes, generally in areas with soils suitable for digging. No suitable habitat occurs on site.	Unlikely
Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	Occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Feed on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines. No known roosting colonies are present on site. Nearest roosting colony is 4 km away at East Cessnock. While foraging potential exists on the site, it is marginal in comparison to adjacent retained and neighbouring riparian vegetation. This species is unlikely to utilise the subject land.	Unlikely
Flora				
Acacia bynoeana	Bynoe's Wattle	Vulnerable	This species occurs in heath or dry sclerophyll forest on sandy soils. Prefers open, sometimes disturbed sites such as trail margins, edges of roadside spoil mounds and in recently burnt patches. Associated overstorey species include *Corymbia gummifera, Eucalyptus haemastoma, Eucalyptus parramattensis*, *Banksia serrata* and *Angophora bakeri.* No associated PCTs occur on the subject land, which also lacks significant populations of overstorey species commonly cooccurring with this species.	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
Allocasuarina glareicola		Endangered	Restricted to a few small populations in and near Castlereagh State Forest, NE of Penrith. In open forest on lateritic soil. The Subject Land is significantly geographically removed from the potential range of this species.	Unlikely
Cryptostylis hunteriana	Leafless Tongue-orchid	Vulnerable	This species is known to be extremely cryptic as it does not flower each year. Known to occur within a wide range of habitats including woodlands to swamp heaths. Within the Hunter region larger populations have been typically found in woodland dominated by *Eucalyptus racemosa* (Scribbly Gum) and it prefers areas with an open grassy understorey. The species typically prefers moist sandy soils in sparse to dense heath and sedge land, or moist to dry clay loams in coastal forests. This species is known to occur in association with *C. subulata* and *C. erecta.* The Subject Land is unlikely to be habitat for this species as no associated PCTs occur on the site.	Unlikely
Cynanchum elegans	White-flowered Wax Plant	Endangered	The White-flowered Wax Plant usually occurs on the edge of dry rainforest vegetation and other associated vegetation types such as littoral rainforest; coastal scrub and open forest and woodland. Species associated include; Coastal Tea-tree *Leptospermum laevigatum* – Coastal Banksia *Banksia integrifolia* subsp. *integrifolia* coastal scrub; Forest Red Gum *Eucalyptus tereticornis* aligned open forest and woodland; Spotted Gum *Corymbia maculata* aligned open forest and woodland; and Bracelet Honey myrtle *Melaleuca armillaris* scrub to open scrub. No suitable habitat occurs within the Subject Land.	Unlikely
Eucalyptus glaucina	Slaty Red Gum	Vulnerable	Found only on the north coast of NSW and in separate districts: near Casino where it can be locally common, and farther south, from Taree to Broke, west of Maitland. Grows in grassy woodland and dry eucalypt forest. Grows on deep, moderately fertile and well-watered soils. Assessment of the site confirmed this conspicuous species is absent.	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
Eucalyptus parramattensis subsp. decadens	Earp's Gum, Earp's Dirty Gum	Vulnerable	This species occurs in dry sclerophyll woodland with dry heath understorey. It also occurs as an emergent in dry or wet heathland. Often where this species occurs, it is a community dominant. In the Kurri Kurri area, *E. parramattensis* subsp. *decadens* is a characteristic species of 'Kurri Sand Swamp Woodland in the Sydney Basin Bioregion', an endangered ecological community under the TSC Act. In the Tomago Sandbeds area, the species is usually associated with the 'Tomago Swamp Woodland' as defined by NSW NPWS (2000). Assessment of the site confirmed this conspicuous species is absent.	Unlikely
Eucalyptus pumila	Pokolbin Mallee	Vulnerable	Currently known only from a single population west of Pokolbin in the Hunter Valley. Historical records also exist for Wyong and Sandy Hollow, however, has not been recorded recently in these areas. The single known population occupies north-west-facing slopes derived from sandstone. Present as a mid-canopy species to a height of 6 m within dry sclerophyll woodland which has a canopy comprising Eucalyptus fibrosa, Callitris endlicheri and, to a lesser extent, Corymbia maculata. Very little is known about the biology or ecology of this species. No suitable habitat exists on the subject site, and assessment of the site confirmed this conspicuous species is absent.	Unlikely
Euphrasia arguta		Critically Endangered	Historic records of the species noted the following habitats: 'in the open forest country around Bathurst in sub humid places', 'on the grassy country near Bathurst', and 'in meadows near rivers'. Plants from the Nundle area have been reported from eucalypt forest with a mixed grass and shrub understorey; here, plants were most dense in an open disturbed area and along the roadside, indicating the species had regenerated following disturbance. The number of plants at a given site may vary over time depending on the season and disturbance history. Near Nundle, local populations had apparently declined at sites that had been disturbed twice within three years, in contrast with sites that were disturbed only once. No suitable habitat exists on the site, and the history of disturbance further reduces the likelihood that the species will be encountered on the site.	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
Grevillea parviflora subsp. parviflora	Small-flower Grevillea	Vulnerable	This species is sporadically distributed throughout the Sydney Basin with sizeable populations in the Hunter in the Cessnock - Kurri Kurri area (particularly Werakata NP). Separate populations are also known from Putty to Wyong and Lake Macquarie on the Central Coast. This species grows in sandy or light clay soils usually over thin shales, often with lateritic ironstone gravels and nodules. Occurs in a range of vegetation types from heath and shrubby woodland to open forest, the Hunter in Kurri Sand Swamp Woodland and is also known to occur in *C. maculata- A. costata* open forest. Associated species in the Kurri Sand Swamp Woodland include *Eucalyptus parramattensis* subsp. *decadens*, *Angophora bakeri* and *E. fibrosa* with *Acacia elongata*, *Dillwynia parvifolia*, *Melaleuca thymifolia*, *Grevillea montana*, *Eragrostis brownii* and *Aristida vagans*. Found over a range of altitudes from flat, low-lying areas to upper slopes and ridge crests. Hunter occurrences are usually 30-70m ASL, while the southern Sydney occurrences are typically at 100-300m ASL. Often occurs in open, slightly disturbed sites such as along tracks. No suitable habitat or associated PCTs occur on the Subject Land.	Unlikely
Leionema lamprophyllum subsp. fractum		Critically Endangered	This species occurs in sparse heathland or very open low woodland in skeletal sandy soils on exposed rocky terrain. Currently known only from the Broken Back Range near Cessnock, with a historical collection from Munghorn Gap Nature Reserve near Wollar. No suitable habitat occurs within the Subject Land.	Unlikely
Persicaria elatior	Knotweed, Tall Knotweed	Vulnerable	This species normally grows in damp places, especially beside streams and lakes. Occasionally in swamp forest or associated with disturbance. No suitable habitat occurs within the Subject Land.	Unlikely
Persoonia hirsuta	Hairy Geebung, Hairy Persoonia	Endangered	The Hairy Geebung is found in sandy soils in dry sclerophyll open forest, woodland and heath on sandstone. It is usually present as isolated individuals or very small populations. No suitable habitat occurs within the Subject Land.	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
Persoonia pauciflora	North Rothbury Persoonia	Critically Endangered	Persoonia pauciflora is found in dry open forest or woodland dominated by Spotted Gum (*Corymbia maculata*), Broad-leaved Ironbark (*Eucalyptus fibrosa*) and/or Narrow-leaved Ironbark (*E. crebra*) and supporting a moderate to sparse shrub layer and grassy groundcover. The majority of the population is known to occur on silty sandstone soils derived from the Farley Formation. Extremely restricted distribution; all but one of the plants which make up the only known population occur within a 2.5 km radius of the original specimen at North Rothbury in the Cessnock local government area. No suitable habitat occurs within the Subject Land.	Unlikely
Pomaderris brunnea	Rufous Pomaderris, Brown Pomaderris	Vulnerable	This species occurs in small populations in NSW. It is found on the Colo R., the Nepean R. floodplain at Menangle, in creeklines at Wirrumbirra Sanctuary (Bargo) and on the Hawkesbury R. The distribution may extend into the southern section of Yengo NP along major creeklines and floodplains. Also in the East Gippsland region of Vic. No suitable habitat occurs within the Subject Land.	Unlikely
Prasophyllum sp. Wybong (C.Phelps ORG 5269)	a leek-orchid	Critically Endangered	Prasophyllum sp. Wybong (C. Phelps ORG 5269) is a terrestrial orchid known from seven populations in open eucalypt woodland and grassland in New South Wales. The species' area of occupancy is estimated to be 1.5 km2 with an estimated population size based on surveys in 2006 of 460 mature individuals. No suitable habitat occurs within the Subject Land, which is geographically removed from known populations.	Unlikely
Prostanthera cineolifera	null	Vulnerable	The distribution of Prostanthera cineolifera is uncertain, but it is considered to be restricted to only a few localities near Walcha, Scone and St Albans, NSW. Prostanthera cineolifera occurs in sclerophyll forests (Harden, 2002) and open woodlands on exposed sandstone ridges and is often found in association with shallow or skeletal sands. No suitable habitat occurs within the Subject Land.	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
Pterostylis gibbosa	Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood	Endangered	All known populations grow in open forest or woodland, on flat or gently sloping land with poor drainage. In the Hunter region, the species grows in open woodland dominated by Narrow-leaved Ironbark *E. crebra*, Forest Red Gum and Black Cypress Pine *Callitris endlicheri*. No suitable habitat occurs within the subject land.	Unlikely
Rhizanthella slateri	Eastern Underground Orchid	Endangered	Habitat requirements are poorly understood and no particular vegetation type has been associated with the species, although it is known to occur in sclerophyll forest. Highly cryptic given that it grows almost completely below the soil surface, with flowers being the only part of the plant that can occur above ground. Therefore usually located only when the soil is disturbed. Flowers September to November. No suitable habitat occurs within the Subject Land.	Unlikely
Rhodamnia rubescens	Scrub Turpentine, Brown Malletwood	Critically Endangered	Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils. No suitable habitat occurs within the subject land.	Unlikely
Rhodomyrtus psidioides	Native Guava	Critically Endangered	Pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines. No suitable habitat occurs within the subject land.	Unlikely
Rutidosis heterogama	Heath Wrinklewort	Vulnerable	This species grows in heath on sandy soils and moist areas in open forest and has been recorded along disturbed roadsides. No suitable habitat occurs within the subject land.	Unlikely

Scientific Name	Common Name	Status	Habitat Requirement	Habitat present on development site
Syzygium paniculatum	Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub	Vulnerable	Occurs on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities. No suitable habitat occurs within the subject land.	Unlikely
Thesium australe	Austral Toadflax, Toadflax	Vulnerable	Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast. Often found in association with Kangaroo Grass (*Themeda australis*). No suitable habitat occurs within the subject land.	Unlikely

Appendix E BAM Credit Report Summary

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00030003/BAAS17044/21/00030004	21035 - SPCC 10 Lomas Lane	24/11/2021
Assessor Name	Report Created	BAM Data version *
Matt Doherty	21/01/2022	50
Assessor Number	BAM Case Status	Date Finalised
BAAS17044	Finalised	21/01/2022
Assessment Revision	Assessment Type	
0	Major Projects	

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

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

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

Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter												
1	1594_1594_poor	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	47.7	47.7	0.16	PCT Cleared - 0%	High Sensitivity to Potential Gain	Endangered Ecological Community	Critically Endangered	2.00		4
											Subtotal	**4**
Cabbage Gum-Rough-barked Apple grassy woodland on alluvial floodplains of the lower Hunter												
2	1594_1594_lawn	Not a TEC	12.1	12.1	2.6	PCT Cleared - 0%	Low Sensitivity to Potential Gain			1.00		0
3	1594_1594_weedy	Not a TEC	11.5	11.5	0.26	PCT Cleared - 0%	High Sensitivity to Potential Gain			1.50		0
											Subtotal	**0**
											Total	**4**

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAII	Species credits

Appendix F Personnel Qualifications

Name	Title	Qualifications	Roles
Matt Doherty	Director	▪ BAM Assessor (#BAAS17044) ▪ B. Landscape Management and Conservation (Soil and Water Management) ▪ Bush Regeneration Cert IV	Review and approval of BDAR.
Coral Pearce	Ecologist	▪ Bachelor of applied Science (Ecology and Environmental Science) ▪ Masters (Research) Mammal Ecology	Field work including PCT identification, BAM plots and surveys for threatened species habitat; Assist with BDAR production
Chris Spraggon	Ecologist	▪ B. Science (Honours) ▪ Conservation & Land Management Cert III	BDAR production
Ali Bragg	Field Ecologist	▪ B. Animal Science (Honours)	Assist with field work
Ellen Saxon	GIS Officer	▪ Bachelor of Environmental Science & Management ▪ Advanced ArcGIS Training, XGIS ▪ Diploma in Conservation & Land Management	Mapping & assist with BDAR production (Figures & mapping)

Appendix G EPBC Assessment

EPBC Act Assessment of Significance for Critically endangered and endangered ecological communities

An assessment of significance has been prepared for *River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* which is listed as Critically Endangered under the EPBC Act. Under the EPBC Act, an action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:

- reduce the extent of an ecological community
- fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines
- adversely affect habitat critical to the survival of an ecological community
- modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns
- cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting
- cause a substantial reduction in the quality or integrity of an occurrence of an ecological community,
- including, but not limited to:
    - assisting invasive species, that are harmful to the listed ecological community, to become established, or
    - causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological
- community which kill or inhibit the growth of species in the ecological community, or
- interfere with the recovery of an ecological community

These impact criteria are assessed below.

Impact Criteria for Critically Endangered Ecological Community	*River Flat Eucalypt Forest*
Reduce the extent of an ecological community	The assessed vegetation zone is 0.16 ha in size, and consists almost exclusively of canopy (both remnant and planted) with a heavily managed and mulched understorey. Although equivalence to this ecological community could not be ruled out, it is a heavily disturbed parcel of vegetation and is unlikely to represent a functional extension to the ecological community. Further, the area of disturbance represents an insignificant proportion of the estimated 10.600 ha remaining in NSW according to the federal conservation advice, being less than two thousandths of a percent. Hence the proposal is not likely to reduce the extent of the community.
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	The vegetation assessed for removal is at the boundary of already fragmented and disturbed native vegetation and broadly cleared agricultural landscape. The subject site represents no connectivity to the west that could be facilitated by the assessed vegetation, and as above the assessed area represents a marginal remnant of the ecological community. The assessed vegetation therefore presents as a disturbed boundary extrusion of the ecological community, and the proposal will not fragment or increase fragmentation of the ecological community.

Adversely affect habitat critical to the survival of an ecological community	The assessed vegetation represent very low diversity and limited to no connectivity with respect to the ecological community. The proposal is unlikely to impact any adjacent remnant patches of the ecological community, and therefore highly unlikely to adversely affect habitat critical to the survival of the ecological community.
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	With reference to the above assessments, the assessed vegetation has predominantly cleared and managed/mulched understorey and ground layer. The abiotic factors attributed to the assessed vegetation would be highly modified and likely degraded, no significant water flows over the area, and the very small size of the assessed vegetation patch at 0.16 ha mean that the proposal is highly unlikely to modify or destroy abiotic factors necessary for the survival of the ecological community.
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	The assessed vegetation represents a very small, marginal patch of the ecological community, being only 0.16 ha of low-diversity vegetation, the removal of which is highly unlikely to cause any change to the species composition of the ecological community. Furthermore, no ongoing disturbance will occur following the removal of the small area required for the proposal.
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: *-Assisting invasive species, that are harmful to the listed ecological community, to become established, or* *-Causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community*	The assessed vegetation which is to be impacted as part of the proposal is of such a small area (0.16 ha) that it is highly unlikely that it is possible for the proposal to cause any reduction in the quality or integrity of the ecological community in the region. The impact of the proposal is not likely to increase exotic/invasive species which are harmful to this ecological community, and no such species known to impact the ecological community occur on the subject land. The proposal will not increase the use of fertilisers, herbicides or pesticides or their runoff into the ecological community.
Interfere with the recovery of an ecological community	The assessed vegetation represents a disturbed and marginal patch of the ecological community on the interface of a disturbed riparian corridor and a broadly cleared agricultural area, and on school grounds. The assessed vegetation could not feasibly contribute to the recovery of the ecological community, and hence the proposal is highly unlikely to interfere with the recovery of the ecological community