New Liverpool Primary School
Biodiversity Development Assessment Report

CBRE on behalf of Schools Infrastructure NSW

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Executive Summary

Schools Infrastructure NSW proposes to construct and operate the New Liverpool Primary School (NLPS) at 18 Forbes Street, Liverpool. A Biodiversity Development Assessment Report (BDAR) was prepared to address Planning Secretary's Environmental Assessment Requirements (SEARs) for State Significant Development (SSD) SSD-10391. Due to the presence of planted native vegetation within the development site, this BDAR was prepared under the streamlined assessment module for planted native vegetation consistent with Appendix D of the Biodiversity Assessment Method (BAM) 2020.

No native vegetation is proposed to be removed under SSD-10391. Biodiversity impacts were assessed as negligible.

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Abbreviations

Abbreviation	Description
BAM	Biodiversity Assessment Method
BAMC	Biodiversity Assessment Method Credit Calculator
BC Act	NSW *Biodiversity Conservation Act 2016*
BDAR	Biodiversity Development Assessment Report
CEEC	Critically Endangered Ecological Community
DAWE	Commonwealth Department of Agriculture, Water and the Environment
DPIE	NSW Department of Planning, Industry and Environment
EEC	Endangered Ecological Community
ELA	Eco Logical Australia Pty Ltd
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
FM Act	NSW *Fisheries Management Act 1994*
GIS	Geographic Information System
GPS	Global Positioning System
IBRA	Interim Biogeographic Regionalisation for Australia
LGA	Local Government Area
NSW	New South Wales
NOW	NSW Office of Water
PCT	Plant Community Type
SEPP	State Environmental Planning Policy
SSD	State Significant Development
SSI	State Significant Infrastructure
TEC	Threatened Ecological Community
VIS	Vegetation Information System
WM Act	NSW *Water Management Act 2000*

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1. Introduction

This Biodiversity Development Assessment Report (BDAR) was prepared by Diane Campbell, an Accredited Person (BAAS17069) under the NSW *Biodiversity Conservation Act 2016* (BC Act). This report was prepared to meet the requirements of the Biodiversity Assessment Method (BAM) 2020 and the Planning Secretary's Environmental Assessment Requirements (SEARs) pertaining to biodiversity for State Significant Development (SSD) SSD-10391, issued 9 January 2020.

Definitions of terminology used throughout this report are presented in Appendix A.

1.1. General description of the subject land

The proposed New Liverpool Primary School (NLPS) at 18 Forbes Street, Liverpool (Lot 1 DP 1137425) is within the Liverpool City Council local government area (LGA) (Figure 1). The site is currently used as sports fields in the eastern portion of the existing Liverpool Boys and Girls High School. It features well-maintained exotic grass with planted native trees adjacent fencing on the northern and eastern sides. The site has flat topography, with a very slight slope from the north west to the south east of the site.

The subject land is defined by the BAM as the area to which a BDAR applies and includes all areas that will be directly and indirectly impacted by a proposed development. For the purposes of this BDAR the subject land is bound by the red polygon in Figure 2. The proposed development footprint, comprising buildings and recreation areas, is bound by the yellow dashed-line polygon in Figure 3.

1.2. Brief description of the proposal

The proposed development will involve construction and operation of the NLPS. This will include construction of a new school building for core school facilities, teaching spaces, support units, preschools as well as associated landscaping and open space improvements. The subject land boundary and final proposal footprint, including the construction footprint, are presented in Figure 3. Site access will be via Burnside Drive (vehicle and pedestrian access) and Lachlan Street (pedestrian access only).

No native vegetation will be removed for SSD-10391.

1.3. Sources of information used

The following data sources were reviewed as part of this report:

- NSW Government BioNet Vegetation Classification
- NSW BioNet / Atlas of NSW Wildlife 5 km database search (accessed 15 March 2021)
- The Native Vegetation of the Sydney Metropolitan Area v.3 (NSW Office of Environment & Heritage (OEH) 2016)
- NSW Government ePlanning Spatial Viewer
- Request for Secretary's Environmental Assessment Requirements Proposed New Liverpool Primary School (NLPS) prepared by Ethos Urban (2019)
- Arboricultural Development Impact Assessment prepared by Birds Tree Consultancy (2021)
- Liverpool Education Precinct Phase 02 Concept Design Business Case Option 5 & 5A prepared by Fitzpatrick and Partners Architects (2020)

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- Additional Geographic Information Systems (GIS) datasets including soil, topography, geology and drainage
- Flora and Fauna Assessment prepared by ELA to accompany a Review of Environmental Factors for NLPS enabling works (ELA, 2021).

1.4. Response to SEARs

The *Biodiversity Conservation Act 2016* requires that State Significant Development Applications be accompanied by a BDAR unless otherwise specified under the Act. The following table indicates where the relevant Secretary's Environmental Assessment Requirements (SEARs) have been addressed in this BDAR.

Table 1: Response to SEARs

SEARs	Response / Relevant section of this report
Biodiversity impacts related to the proposed development are to be assessed in accordance with the Biodiversity Assessment Method and documented in a Biodiversity Development Assessment Report (BDAR). The BDAR must include information in the form detailed in the Biodiversity Conservation Act 2016 (s6.12), Biodiversity Conservation Regulation 2017 (s6.8) and Biodiversity Assessment Method.	This document is a BDAR and has been prepared in accordance with the BAM. Due to the presence of planted native vegetation within the development site, this BDAR was prepared under the streamlined assessment module for planted native vegetation consistent with Appendix D of BAM 2020
The BDAR must document the application of the avoid, minimise and offset framework including assessing all direct, indirect and prescribed impacts in accordance with the Biodiversity Assessment Method.	Refer to Section 6 – Assessment of impacts The SSD avoids impacts to native vegetation
The BDAR must include details of the measures proposed to address the offset obligation as follows: • the total number and classes of biodiversity credits required to be retired for the development/project • the number and classes of like-for-like biodiversity credits proposed to be retired • the number and classes of biodiversity credits proposed to be retired in accordance with the variation rules any proposal to fund a biodiversity conservation action • any proposal to make a payment to the Biodiversity Conservation Fund.	Refer to Section 7 – Mitigation and management of impacts There are no impacts to native vegetation, therefore no offsets are required.
If seeking approval to use the variation rules, the BDAR must contain details of the reasonable steps that have been taken to obtain requisite like-for-like biodiversity credits.	The variation rules are not applicable in this case.
The BDAR must be submitted with all spatial data associated with the survey and assessment as per the BAM.	Spatial data is submitted with this BDAR.
The BDAR must be prepared by a person accredited in accordance with the Accreditation Scheme for the Application of the Biodiversity Assessment Method Order 2017 under s6.10 of the Biodiversity Conservation Act 2016.	This BDAR was prepared by Diane Campbell, an Accredited Person (BAAS17069) under the NSW Biodiversity Conservation Act 2016 (BC Act).

SEARs	Response / Relevant section of this report
Where a Biodiversity Assessment Report is not required, engage a suitably qualified person to assess and document the flora and fauna impacts related to the proposal.	Not applicable

Figure 1: Development site location

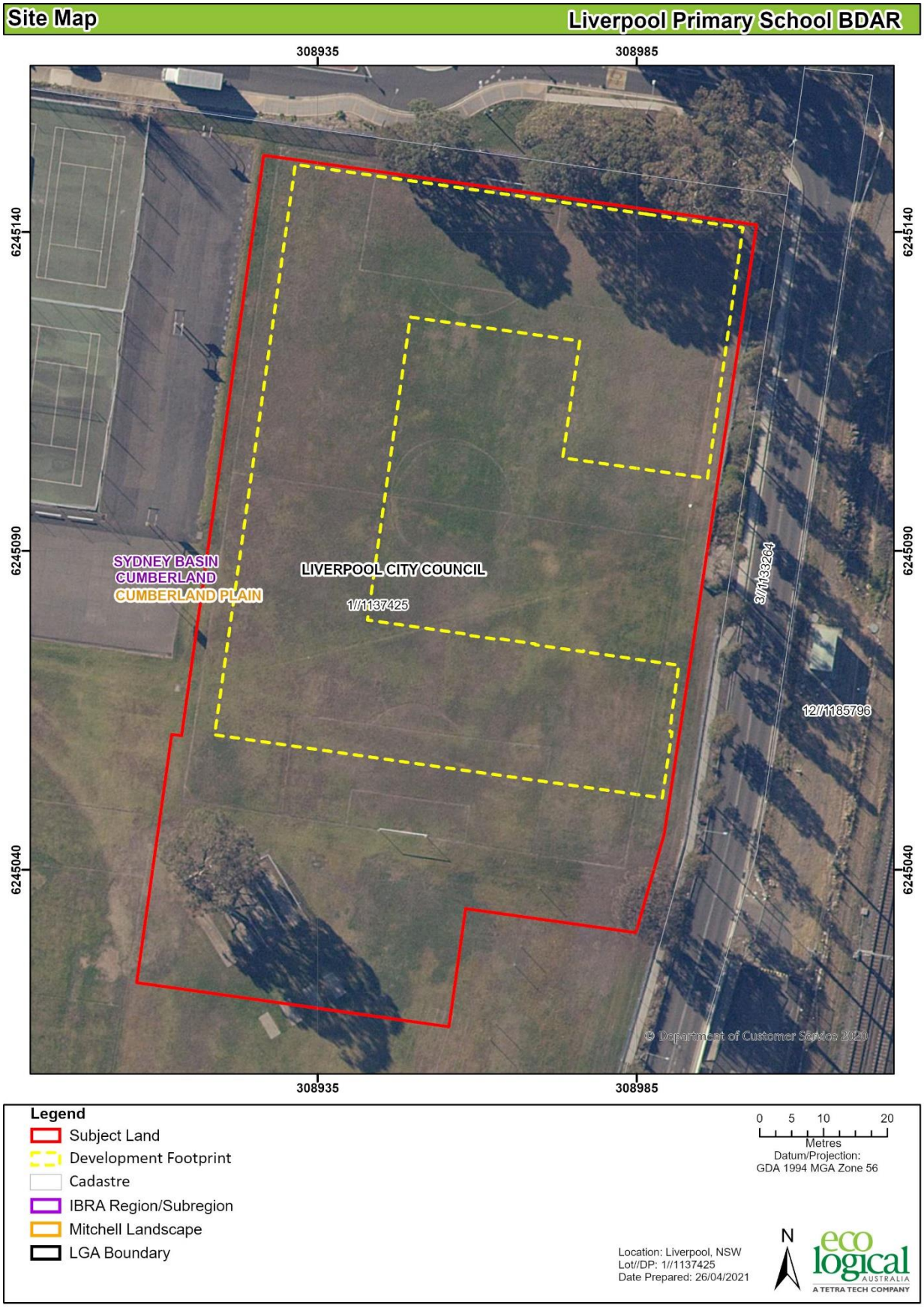

Figure 2: Subject land

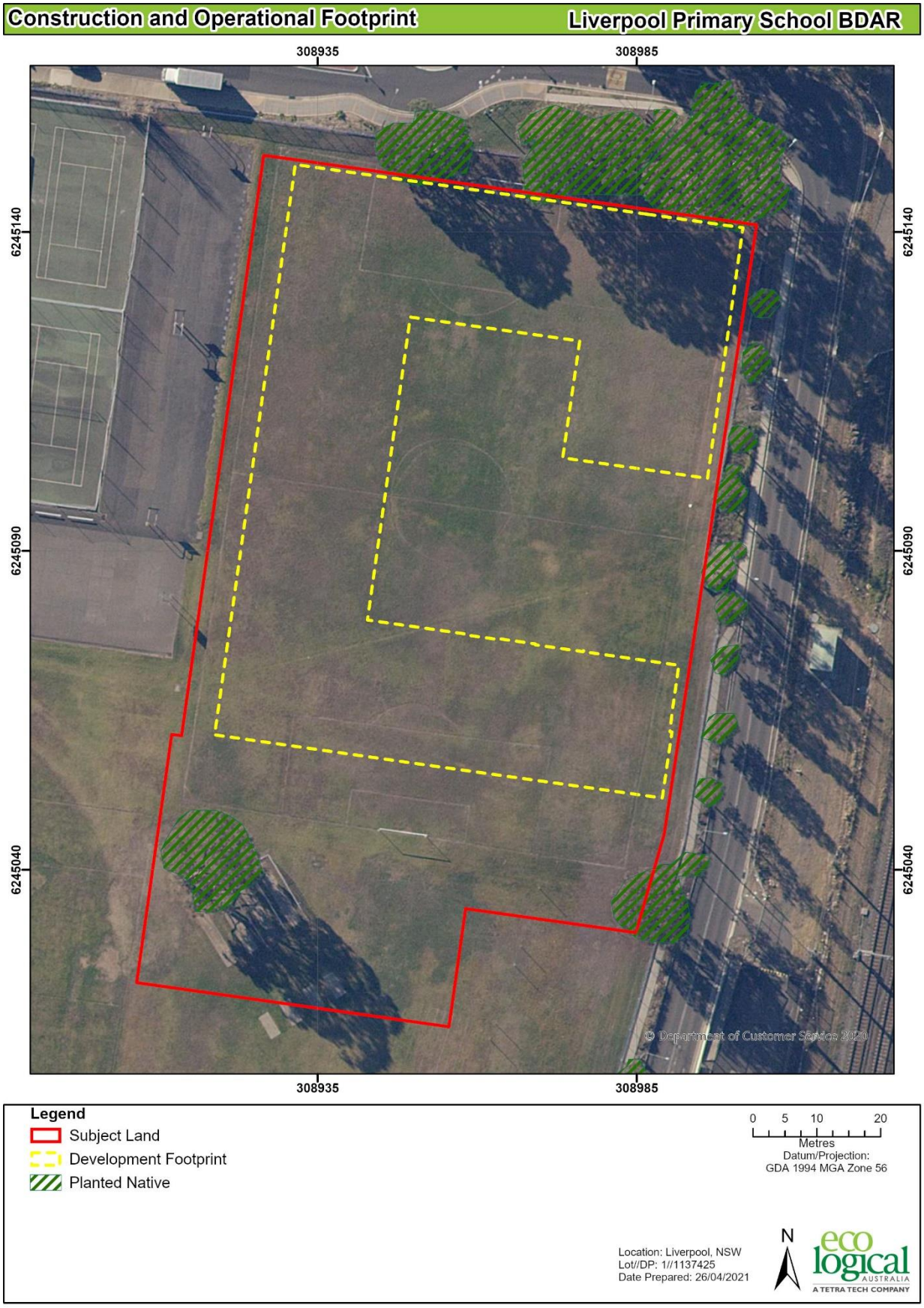

Figure 3: Development footprint

1.5. Legislative context

Legislation relevant to the development site is outlined in Table 2.

Table 2: Legislative context

Name	Relevance to the project
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	Matters of National Environmental Significance (MNES) have been identified on or near the development site. This report assesses impacts to MNES and concludes that the development is not likely to have a significant impact on MNES.
Environmental Planning and Assessment Act 1979 (EP&A Act)	The EP&A Act is the principal planning legislation for NSW. It provides a framework for the overall environmental planning and assessment of development proposals. The proposed development is to be assessed as a State Significant Development (SSD-10879802) under Part 4.7 (or 5.1) of the EP&A Act. SEARs were issued on 4 December 2020. This report addresses Biodiversity requirements as follows: *"11. Biodiversity* • *Provide a Biodiversity Development Assessment Report (BDAR) that assesses the biodiversity impacts of the proposed development in accordance with the requirements of the Biodiversity Conservation Act 2016, Biodiversity Conservation Regulation 2017 and Biodiversity Assessment Method, except where a BDAR waiver has been issued in relation to the development or the development is located on biodiversity certified land.* • *Where a BDAR is not required because a BDAR waiver has been issued in relation to the development, provide:* ○ *a copy of the BDAR waiver and demonstrate that the proposed development is consistent with that covered in BDAR waiver.* ○ *an assessment of flora and fauna impacts where significant vegetation or flora and fauna values would be affected by the proposed development."*
Biodiversity Conservation Act 2016	The proposed development is an SSD and therefore requires submission of a Biodiversity Development Assessment Report.
Fisheries Management Act 1994	The proposed development does not involve impacts to Key Fish Habitat, does not involve harm to marine vegetation, dredging, reclamation or obstruction of fish passage. A permit or consultation under the FM Act is not required.
Water Management Act 2000	The proposed development does not involve works on waterfront land. Therefore, a Controlled Activity Approval under s91 of the WM Act is not required.
State Environmental Planning Policy (SEPP) (Coastal Management) 2018	The proposed development is located on land to which this SEPP does not apply.
State Environmental Planning Policy (Koala Habitat Protection) 2021	This SEPP applies to the City of Liverpool LGA in which the development site is located. Koala habitat (trees) will not be affected by the SSDA.
Liverpool Local Environment Plan (LEP) 2012	The development site is zoned SP2 – Infrastructure under the Liverpool Local Environmental Plan (LEP) 2008. Liverpool LEP does not contain any provisions or mapping relating to biodiversity for this site.
Liverpool Development Control Plan (DCP) 2008	The DCP contains provisions relating to tree preservation, landscaping and incorporation of existing trees, and bushland and fauna habitat preservation. Section 2 Tree Preservation states the following objectives: • To ensure the protection of trees that are contributing to the ecological and aesthetic values of the Liverpool LGA.

Name	Relevance to the project
	• To protect the integrity of heritage items through preservation of all trees occurring within the heritage place, precinct or land. • To ensure trees are maintained in an appropriate manner as not to cause harm or damage to the tree or community. • To ensure that construction works and the ultimate design treatments protect the identified trees. • To ensure that trees that provide high ecological or amenity benefits are protected wherever possible. Section 3 Landscaping and Incorporation of Existing Trees states the following objectives: • Promote landscape planning and design as part of a fully integrated approach to site development. • Assist in improving the climate of the local environment. • Retain as many existing trees as possible. • To provide habitat for locally indigenous plants and animals and contribute to biodiversity. • To encourage landscaping that is appropriate to the natural, cultural, built and heritage characteristics of its locality. • Improve the amenity of developments and adjoining areas by ensuring proposals adequately complement the proposed building forms and surrounding streetscape. • Ensure that the proposed landscape designs provide functional attributes such as privacy, shade and wind protection, while discouraging the opportunity for crime and vandalism. Section 4 Bushland and Fauna Habitat Preservation state the following objectives: • To protect and manage natural assets in association with the development of land. • To conserve the natural heritage of Liverpool. • To maintain and improve the amenity and scenic qualities of Liverpool. • To maintain and enhance the biodiversity and natural ecology of Liverpool. The proposed development will retain all trees within the SSDA subject land. Landscape plans for the proposed development should consider these objectives and associated controls.

2. Landscape context

The site-based method was applied for this assessment therefore the assessment area is the 1,500 m buffer surrounding the outside edge of the boundary of the subject land.

The landscape features considered for this assessment are presented in Table 3, and Figures 1-3.

Table 3: Landscape features

Landscape feature	Description	Data source
IBRA Region(s)	Sydney Basin	Interim Biogeographic Regionalisation for Australia, Version 7
IBRA subregion(s)	Cumberland	Interim Biogeographic Regionalisation for Australia, Version 7
Rivers and streams	Georges River	NSW LPI Waterway mapping, Aerial imagery
Estuaries and wetlands	None present in the assessment area	NSW directory of important wetlands, Aerial imagery
Connectivity of different areas of habitat	The development site contains a narrow strip of planted native vegetation on the eastern and northern boundary, which exists in a narrow linear band, providing limited connectivity from riparian vegetation along Georges River to the south to small areas of urban vegetation in Hart Park and Berryman Reserve to the north, and to Rosedale Park and Horseshoe Pond in the east.	Aerial imagery
Geological features of significance and soil hazard features	The development site and assessment area do not contain any geological features of significance (i.e., karst, caves, crevices, cliffs etc.) or soil hazard features.	Aerial imagery
Biodiversity Values	The development site and assessment area do not include areas mapped under the NSW Biodiversity Values Map (accessed 26 March 2021).	Biodiversity Values Map and Threshold Tool
Areas of Outstanding Biodiversity Value	The development site does not include areas of declared critical habitat (accessed 26 March 2021).	Register of Declared Areas of Outstanding Biodiversity Value (DPIE 2020)

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3. Native vegetation

3.1. Survey effort

The site was traversed on foot to:

- Determine if any of the vegetation met descriptions for any plant community types (PCTs) and associated threatened ecological communities (TECs)
- Search for any threatened flora species that may be present
- Search for hollows, nests or dreys, or any other habitat feature that may be important for threatened fauna species.

Mapping, tracks and photographs were recorded on a mobile phone. Vegetation was recorded in one non-standard BAM plot of 10 m x 40 m. Waypoints were taken using Avenza Maps where habitat features or trees of potential importance were observed. Tree numbers were noted and compared with the Aboricultural Impact Assessment Report (Birds Arboricultural Consultancy 2021).

3.2. Vegetation present

The development site and footprint did not contain any naturally occurring or remnant native vegetation. This means that no PCTs could be assigned to the vegetation present. The vegetation present contained a mix of planted native and non-native plants, typical of a twentieth century public school ground (Figure 4).

The canopy contained several native trees, including *Angophora costata* (Smooth-barked Apple), *Corymbia maculata* (Spotted Gum) and *Eucalyptus microcorys* (Tallowwood). Outside the school grounds along the road reserve the canopy consisted mostly of *C. maculata*, with several other commonly planted native trees such as *A. costata*, *C. citriodora*, *E. sideroxylon* and *E. microcorys*.

There was one planted threatened species, *E. scoparia* (Wallangarra White Gum). This species is not naturally occurring on the Cumberland Plain and is well outside its natural range. This tree species has been used extensively in the Sydney metropolitan area as part of landscaping projects, typical of the 1970s.

The ground cover was mostly non-native pasture grasses such as *Cynodon dactylon* (Common Couch), *Ehrharta erecta* (Panic Veldtgrass), and the forbs *Pseudognaphalium luteoalbum* (Jersey Cudweed) and *Sonchus oleraceus* (Sowthistle). The occasional cosmopolitan native species such as *Dichondra repens* (Kidney Weed) and *Wahlenbergia* sp. (Bluebell) were present.

The development site contains land that has been modified through historic clearing, maintenance and operation as a playing / sports area.

3.3. Use of streamlined assessment module – Planted native vegetation

Due to the presence of planted native vegetation within the development site, this BDAR was prepared under the streamlined assessment module for planted native vegetation consistent with Appendix D of BAM 2020. This appendix contains a decision-making key which provides a framework for the assessment of planted native vegetation. This framework is applied to the proposal in Table 4.

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Table 4: Decision-making key for the assessment of Planted native vegetation in accordance with Appendix D of the BAM 2020

Question	Response and justification
1) Does the planted native vegetation occur within an area that contains a mosaic of planted and remnant native vegetation and which can be reasonably assigned to a PCT known to occur in the same IBRA subregion as the proposal? i Yes – the planted native vegetation must be allocated to the best-fit PCT and the BAM must be applied. ii No – Go to 2.	No – the canopy species were planted in rows as part of school landscaping.
2. Is the planted native vegetation: a. Planted for the purpose of environmental rehabilitation or restoration under an existing conservation obligation listed in BAM Section 11.9(2.), and b. The primary objective was to replace or regenerate a plant community type of a threatened plan species or its habitat? i Yes – the planted native vegetation must be assessed in accordance with Chapters 4 and 5 of the BAM ii No – Go to 3.	No – planted native vegetation was not representative of a PCT. There was a dominance of the widely used *Corymbia maculata* and the primary purpose was for school landscaping.
3. Is the planted / translocated native vegetation individuals of a threatened species or other native species planted/ translocated for the purpose of providing threatened species habitat under one of the following: a. A species recovery project b. *Saving our Species* project c. Other types of government funded restoration project d. Condition of consent for a development approval that required those species to be planted or translocated for the purpose of providing threatened species habitat e. Legal obligation as part of a condition of ruling of court. This includes regulatory directed or ordered remedial plantings (e.g. Remediation Order for clearing without consent issued under the BC Act or the Native Vegetation Act) f. Ecological rehabilitation to re-establish a PCT or TEC that was, or is carried out under a mine operations plan, or g. Approved vegetation management plan (e.g. as required as part of a Controlled Activity Approval for works on waterfront land under the NSW *Water Management Act 2000*)? i Yes – the planted native vegetation must be assessed in accordance with Chapters 4 and 5 of the BAM • No – Go to 4.	No – the tree species present are commonly used as street or landscaping trees and are not representative of a PCT or TEC, therefore it is unlikely that they were planted or translocated for any of the purposes listed.
4. Was the planted native vegetation (including individuals of a threatened flora species) undertaken voluntarily for revegetation, environmental rehabilitation or restoration within a legal obligation to secure or provide for management of the native vegetation? i Yes – Go to D.2 Assessment of planted native vegetation for threatened species habitat (the use of Chapters 4 and 5 of the BAM are not required to be applied) • No – Go to 5.	No – the planted native vegetation forms part of the landscaping for the existing school and includes non-native vegetation.
5. Is the planted native vegetation (including individuals of a threatened flora species) planted for functional, aesthetic, horticultural or plantation forestry purposes? This includes examples such as; windbreaks in agricultural landscapes, roadside plantings (including street trees, median stripes, roadside batters), landscaping in parks, gardens and sport fields/complexes, macadamia plantations or teatree farms?	Yes – the planted native vegetation forms part of the landscaping for the existing school.

Question	Response and justification
i Yes – Go to D.2 Assessment of planted native vegetation for threatened species habitat (the use of Chapters 4 and 5 of the BAM are not required to be applied) ii No – Go to 6.	
6. Is the planted native vegetation a species listed as a widely cultivated native species on a list approved by the Secretary of the Department (or an officer authorised by the Secretary)? i Yes – Go to D.2 Assessment of planted native vegetation for threatened species habitat (the use of Chapters 4 and 5 of the BAM are not required to be applied) ii No – There may be other types of occurrences of planted native vegetation that do not easily fit into the decision-making key above.	N/A

4. Threatened species habitat

The development site was surveyed for potential threatened fauna species habitat. This included checking for hollows, rock ledges, leaf litter and coarse woody debris.

There were few fauna habitat types present due to the modified and maintained nature of the development site. No trees appeared to have either potential nesting material or hollows suitable for either threatened fauna or prey items. In general, the development of hollows can take decades and up to 200 years (Mackowski 1984; Menkorst 1984; and Scotts 1991). It is therefore highly unlikely that there would be hollows not visible from the ground. The consulting arborist (Birds Tree Consultancy 2021) also noted that there were no tree hollows present.

There were no areas of rock outcrop, waterways, or coarse woody debris. This means that fauna habitats were highly limited and unlikely to support populations of any threatened fauna species.

Pteropus poliocephalus (Grey-headed Flying Fox) has many BioNet records within the 1,500 m assessment area. There are no known camps on or near the development footprint and no prospect of a camp developing given the small number of trees present.

There are no buildings in the area affected by the proposal and the development footprint presents unlikely habitat for microchiropteran bats.

Figure 4: Trees on the perimeter of the site and BAM plot location

5. Prescribed biodiversity impacts

5.1. Locating and designing a proposal to avoid and minimise prescribed biodiversity impacts

The development has been located and designed in a way which avoids prescribed biodiversity impacts as outlined in Table 5.

Table 5: Locating and designing a proposal to avoid and minimise prescribed biodiversity impacts

BAM Section 7.2 location and design principles	How addressed / Justification
Locate surface works and design measures to avoid direct impacts on the habitat features identified as potential prescribed biodiversity impacts	The SSDA surface works will not affect native vegetation.
Locate subsurface works, in both the horizontal and vertical planes, and design measures to avoid and minimise operations beneath the habitat features identified as potential prescribed biodiversity impacts	N/A – the development site does not include geological features of significance or groundwater-dependent plant communities
Locate the proposal to avoid severing or interfering with corridors connecting different areas of habitat and migratory flight paths, to important habitat or local movement pathways	The proposed development will retain native vegetation which provides, at most, stepping-stone habitat within the fragmented landscape of the school.
Optimise the proposal layout and include design elements to minimise interactions with threatened entities	N/A – the proposed development does not include the construction of structures which could regularly interact with threatened entities (e.g., wind turbines)
Locate the proposal to avoid impacts on water bodies or hydrological processes and design measures that maintain hydrological processes that sustain threatened entities and control the quality of water released from the site, to avoid or minimise downstream impacts on threatened entities	N/A – the development site does not contain water bodies and would not result in prescribed impacts to hydrological processes
Engineering solutions, such as proven techniques to: • minimise fracturing of bedrock underlying features of geological significance or groundwater-dependent communities and their supporting aquifers • restore connectivity and movement pathways	N/A – the development site does not have prescribed impacts that require engineering solutions

5.2. Identification and assessment of prescribed biodiversity impacts

The development site has the prescribed biodiversity impacts as outlined in Chapter 6 of the BAM 2020.

Table 6: Prescribed biodiversity impacts

Prescribed biodiversity impact	Threatened entities associated with prescribed impacts	Importance of habitat features to the species	Nature, extent frequency, duration and timing	Predicted consequences of impacts on threatened entities
Karst, caves, crevices, cliffs rock and other geological features of significance	N/A – the development site does not contain geological features of significance			
Occurrences of human-made structures	N/A – the site does not include any human-made structures			
Occurrences of non-native vegetation	There is no non-native vegetation within the development area. The planted native trees may provide seasonal foraging habitat for Grey-headed Flying-fox.	Planted native trees available as foraging habitat for Grey-headed Flying-fox within the development site are not of great importance given that similar vegetation is readily available in the surrounding area.	No planted native trees are proposed to be removed for the SSDA. Non-native mown grass (part of the playing fields) will be removed.	The removal of grass will not affect the persistence of Grey-headed Flying-fox in the locality or bioregion.
Corridors or other areas of connectivity linking habitat for threatened entities / movement of threatened species that maintains their life cycle	Planted native trees within the study area may provide foraging habitat for highly mobile threatened species, including Grey-headed Flying-fox.	Connectivity is limited to planted trees on the perimeter of the site which could provide foraging habitat for flying-foxes. This habitat is not proposed to be removed under the SSDA.	The proposed development would not result in the removal of habitat for highly mobile species.	No change to habitat connectivity is proposed under the SSDA.
Water bodies or any hydrological processes that sustain threatened entities	N/A – the development site does not contain water bodies and would not result in prescribed impacts to hydrological processes			
Where the proposed development may result in vehicle strike on threatened fauna or on animals that are part of a threatened ecological community	N/A – the proposed development would be unlikely to result in vehicle striking fauna during construction or during operation as a school			

6. Assessment of impacts

6.1. Locating and designing a proposal to avoid and minimise impacts

The development has been located and designed in a way which avoids and minimises impacts as outlined below.

Table 7: Locating and designing a proposal to avoid and minimise impacts on vegetation and habitat

BAM location and design principles	How addressed and justification
Locating the proposal (including ancillary facilities) in areas lacking biodiversity values	The SSDA development footprint has been located in existing cleared areas.
Locating the proposal (including ancillary facilities) in areas where the native vegetation or threatened species habitat is in the poorest condition	The SSDA development footprint has been located in existing cleared areas.
Locating the proposal (including ancillary facilities) in areas that avoid habitat for species with a high biodiversity risk weighting or land mapped on the important habitat map, or native vegetation that is a TEC, a highly cleared PCT or an entity at risk of a serious and irreversible impact (SAII)	The SSDA development footprint has been located in existing cleared areas.
Locating the proposal in areas outside of the buffer area around breeding habitat features such as nest trees or caves	The SSDA development footprint has been located in existing cleared areas.
Reducing the proposal's clearing footprint by minimising the number and type of facilities	The SSDA development footprint has been located in existing cleared areas.
Designing a proposal to include actions and activities that provide for rehabilitation, ecological restoration and/or ongoing maintenance of retained areas of native vegetation, threatened species, threatened ecological communities and their habitat on the subject land	Landscaping with native species is part of the proposed scope for the SSDA.

6.2. Assessment of direct impacts

The proposed development would not directly impact any native vegetation, threatened fauna species or habitat for threatened fauna species. Species credits are not required to offset the proposed impacts in accordance with Appendix D.2 of BAM 2020.

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6.3. Assessment of indirect impacts

The indirect impacts of the development are outlined below.

Table 8: Assessment of indirect impacts on native vegetation and threatened species

Indirect impacts	Project phase	Nature	Extent	Frequency	Duration of short-term and long-term impacts	Timing
Inadvertent impacts on trees/ planted vegetation	Construction / operation	Runoff during construction works and operation	Sedimentation confined to development site with fencing. Nutrient rich run-off treated prior to leaving the site through stormwater management measures.	During heavy rainfall or storm events	During rainfall events	Short-term impacts
Reduced viability of adjacent habitat due to noise, dust or light spill	Construction / operation	Noise impacts may disturb Grey-headed Flying Fox using foraging habitat; impact of dust on vegetation	Planted vegetation	Daily, or nightly or during construction works and during heavy rainfall or storm events	Throughout construction period	Short-term impacts
Transport of weeds and pathogens from the site to adjacent vegetation	Construction	Spread of weed seed or pathogens	Potential for spread into adjacent habitat	Daily, during construction works	Sporadic throughout construction period	Potentially long-term impacts
Inhibition of nitrogen fixation and increased soil salinity	Construction / operation	Runoff during construction works	Confined to development footprint with sediment fencing	During heavy rainfall or storm events	During rainfall events	Short-term impacts

6.4. Serious and Irreversible Impacts (SAII)

The development has no candidate SAII entity. One species that is a potential SAII entity, *Eucalyptus scoparia* (Wallangarra White Gum), occurs outside the development footprint and would not be affected.

7. Mitigation and management of impacts

Measures proposed to mitigate and manage impacts at the development site before, during and after construction in accordance with BAM 2020 section 8.4 are outlined in Table 9.

Table 9: Measures proposed to mitigate and manage impacts

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
Develop and implement a Construction Environmental Management Plan that includes: • tree protection measures recommended in the Arboricultural Development Impact Assessment report (Birds Tree Consultancy 2021), consistent with *Australian Standard AS4970-2009 Protection of Trees on Development Sites* • soil erosion and sediment controls	Moderate	Minor	Trees/ vegetation identified for retention should be clearly delineated as a 'No Go' zone with high visibility bunting. Appropriate controls are to be utilised to manage exposed soil surfaces and stockpiles to prevent sediment discharge into waterways. Soil and erosion measures such as sediment fencing, clean water diversion must be in place prior the commencement of the construction work and must be regularly inspected and maintained throughout the development of the site.	Trees/ vegetation to be retained outside of the development site boundary will not be disturbed/impacted. Erosion and sedimentation will be controlled.	Demarcation of trees/ vegetation to be set up prior to any works occurring on site and to remain throughout duration of construction works. Sediment controls to be in place and maintained for the duration of construction works.	Project Manager

8. Consistency with Legislation

8.1. Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

The EPBC Act establishes a regime for assessing and regulating the environmental impact of activities (including development) where a Matters of National Environmental Significance (MNES) may be affected. Under the EPBC Act, any action which has, will have, or is likely to have a significant impact on a matter of MNES is defined as a "controlled action", and requires approval from the Minister. The Commonwealth Department of Agriculture, Water and the Environment (DAWE), is responsible for administering the EPBC Act.

The process includes undertaking an Assessment of Significance for listed threatened species and ecological communities that represent a matter of MNES that will be impacted as a result of the proposed action. The Significant Impact Guidelines 1.1 – Matter of National Environmental Significance' published by DAWE (2009a) provide overarching guidance on determining whether an action is likely to have a significant impact on a MNES.

The following MNES was assessed in accordance with the Significant Impact Guidelines 1.1:

- Grey-headed Flying-Fox.

8.1.1. *Pteropus poliocephalus* (Grey-headed Flying-fox)

The Grey-headed Flying-fox is listed as vulnerable under the EPBC Act. The distribution and habitat associations of this threatened species are presented in Appendix D. This species was not identified within the development site during surveys, however vegetation within the development site as the potential to provide seasonal foraging habitat. No camps were identified within the development site and the nearest camp is located approximately 12 km southwest of the development site at Macquarie Fields. Significant Impact Criteria for this species are applied in Table 10.

Table 10: Application of the Significant Impact Criteria to the Grey-headed Flying-fox

Criterion	Question	Response
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:		
1)	Lead to a long-term decrease in the size of an important population of a species *Note: An 'important population' is a population that is necessary for a species' long-term survival and recovery.*	No roosting habitat (camps) will be affected by the proposed action and no foraging habitat will be removed so there would be no effect on the population.
2)	Reduce the area of occupancy of an important population	There will be no change in the area of available habitat.
3)	Fragment an existing important population into two or more populations	According to the Draft Recovery Plan for the Grey-headed Flying-fox 2017, "the Grey-headed Flying-fox is considered to be a single, mobile population with individuals distributed across Queensland, New South Wales, Victoria, South Australia, Tasmania and the ACT." The proposed action will not fragment an existing important population into two or more populations. No camps will be affected by the proposed action and there will be no change to foraging

Criterion	Question	Response
		habitat available for this highly mobile species within the region.
4)	Adversely affect habitat critical to the survival of a species *Note: 'Habitat critical to the survival of a species or ecological community' refers to areas that are necessary:* • *for activities such as foraging, breeding, roosting, or dispersal* • *for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators)* • *to maintain genetic diversity and long-term evolutionary development, or* • *for the reintroduction of populations or recovery of the species or ecological community.*	The Draft Recovery Plan for the Grey-headed Flying-fox 2017 identifies 'a continuous temporal sequence of productive foraging habitats, linked by migration corridors or stopover habitats, and suitable roosting habitat within nightly commuting distance of foraging areas' as habitat critical to the survival of the species. No habitat will be removed.
5)	Disrupt the breeding cycle of an important population	The proposed action will not disrupt the breeding cycle of the Grey-headed Flying-fox given that no camps will be affected by the proposed action and foraging habitat will continue to be available.
6)	Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	There will be minor modification of foraging habitat within the site when the school is built due to possible noise at night when flying-foxes would be present. Given the trees are adjacent existing roads, any change would be minor.
7)	Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The proposed action is unlikely to result in the establishment of an invasive species that is harmful to the Grey-headed Flying-fox.
8)	Introduce disease that may cause the species to decline, or	Grey-headed Flying-fox are more likely to be affected by disease if they are stressed. Construction and operation of the new school will be during the day when the flying-foxes aren't present at the site.
9)	Interfere substantially with the recovery of the species.	Additional planting for SSDA landscaping will increase potential foraging habitat in the long term.
Conclusion	**Is there likely to be a significant impact?**	**No. The proposed action is unlikely to have a significant impact on the Grey-headed Flying-fox because no camps or foraging habitat will be affected by the proposed action.**

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Appendix A Definitions

The following terminology has been used throughout this report for the purposes of describing the impacts of the proposal in the context of a biodiversity assessment in accordance with the NSW Biodiversity Assessment Method 2020. This terminology may or may not align with other technical documents associated with the proposed development.

Terminology	Definition
Accredited person	A person accredited under section 6.10 of the BC Act to prepare those reports in accordance with the biodiversity assessment method.
Assessment area	Includes the subject land and the area of land within the 1500 m buffer zone surrounding the subject land (or 500 m buffer zone for linear proposals)
Biodiversity credit report	The report produced by the Credit Calculator that sets out the number and class of biodiversity credits required to offset the remaining adverse impacts on biodiversity values at a development site, or on land to be biodiversity certified, or that sets out the number and class of biodiversity credits that are created at a biodiversity stewardship site.
BioNet Atlas	The BioNet Atlas (formerly known as the NSW Wildlife Atlas) is the OEH database of flora and fauna records. The Atlas contains records of plants, mammals, birds, reptiles, amphibians, some fungi, some invertebrates (such as insects and snails) and some fish
Connectivity	The measure of the degree to which an area(s) of native vegetation is linked with other areas of vegetation.
Credit Calculator	The computer program that provides decision support to assessors and proponents by applying the BAM, and which calculates the number and class of biodiversity credits required to offset the impacts of a development or created at a biodiversity stewardship site.
Development	Has the same meaning as development at section 4 of the EP&A Act, or an activity in Part 5 of the EP&A Act. It also includes development as defined in section 115T of the EP&A Act.
Development footprint	The area of land that is directly impacted on by a proposed development, including access roads, and areas used to store construction materials.
Development site	An area of land that is subject to a proposed development that is under the EP&A Act.
Ecosystem credits	A measurement of the value of EECs, CEECs and threatened species habitat for species that can be reliably predicted to occur with a PCT. Ecosystem credits measure the loss in biodiversity values at a development site and the gain in biodiversity values at a biodiversity stewardship site.
Hollow bearing tree	A living or dead tree that has at least one hollow. A tree is considered to contain a hollow if: (a) the entrance can be seen; (b) the minimum entrance width is at least 5 cm; (c) the hollow appears to have depth (i.e. you cannot see solid wood beyond the entrance); (d) the hollow is at least 1 m above the ground. Trees must be examined from all angles.
Linear shaped development	Development that is generally narrow in width and extends across the landscape for a distance greater than 3.5 kilometres in length
Local population	The population that occurs in the study area. In cases where multiple populations occur in the study area or a population occupies part of the study area, impacts on each subpopulation must be assessed separately.
Local wetland	Any wetland that is not identified as an important wetland (refer to definition of Important wetland).
Mitchell landscape	Landscapes with relatively homogeneous geomorphology, soils and broad vegetation types, mapped at a scale of 1:250,000.

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Terminology	Definition
Multiple fragmentation impact development	Developments such as wind farms and coal seam gas extraction that require multiple extraction points (wells) or turbines and a network of associated development including roads, tracks, gathering systems/flow lines, transmission lines
Operational Manual	The Operational Manual published from time to time by OEH, which is a guide to assist assessors when using the BAM
Patch size	An area of intact native vegetation that: a) occurs on the development site or biodiversity stewardship site, and b) includes native vegetation that has a gap of less than 100 m from the next area of native vegetation (or ≤30 m for non-woody ecosystems). Patch size may extend onto adjoining land that is not part of the development site or stewardship site..
Proponent	A person who intends to apply for consent to carry out development or for approval for an activity.
Reference sites	The relatively unmodified sites that are assessed to obtain local benchmark information when benchmarks in the Vegetation Benchmarks Database are too broad or otherwise incorrect for the PCT and/or local situation. Benchmarks can also be obtained from published sources.
Regeneration	The proportion of over-storey species characteristic of the PCT that are naturally regenerating and have a diameter at breast height <5 cm within a vegetation zone.
Remaining impact	An impact on biodiversity values after all reasonable measures have been taken to avoid and minimise the impacts of development. Under the BAM, an offset requirement is calculated for the remaining impacts on biodiversity values.
Retirement of credits	The purchase and retirement of biodiversity credits from an already-established biobank site or a biodiversity stewardship site secured by a biodiversity stewardship agreement.
Riparian buffer	Riparian buffers applied to water bodies in accordance with the BAM
Sensitive biodiversity values land map	Development within an area identified on the map requires assessment using the BAM.
Site attributes	The matters assessed to determine vegetation integrity. They include: native plant species richness, native over-storey cover, native mid-storey cover, native ground cover (grasses), native ground cover (shrubs), native ground cover (other), exotic plant cover (as a percentage of total ground and mid-storey cover), number of trees with hollows, proportion of over-storey species occurring as regeneration, and total length of fallen logs.
Site-based development	a development other than a linear shaped development, or a multiple fragmentation impact development
Species credits	The class of biodiversity credits created or required for the impact on threatened species that cannot be reliably predicted to use an area of land based on habitat surrogates. Species that require species credits are listed in the Threatened Biodiversity Data Collection.
Subject land	Is land to which the BAM is applied in Stage 1 to assess the biodiversity values of the land. It includes land that may be a development site, clearing site, proposed for biodiversity certification or land that is proposed for a biodiversity stewardship agreement.
Threatened Biodiversity Data Collection	Part of the BioNet database, published by OEH and accessible from the BioNet website.
Threatened species	Critically Endangered, Endangered or Vulnerable threatened species as defined by Schedule 1 of the BC Act, or any additional threatened species listed under Part 13 of the EPBC Act as Critically Endangered, Endangered or Vulnerable.

Terminology	Definition
Vegetation Benchmarks Database	A database of benchmarks for vegetation classes and some PCTs. The Vegetation Benchmarks Database is published by OEH and is part of the BioNet Vegetation Classification.
Vegetation zone	A relatively homogenous area of native vegetation on a development site, land to be biodiversity certified or a biodiversity stewardship site that is the same PCT and broad condition state.
Wetland	An area of land that is wet by surface water or ground water, or both, for long enough periods that the plants and animals in it are adapted to, and depend on, moist conditions for at least part of their life cycle. Wetlands may exhibit wet and dry phases and may be wet permanently, cyclically or intermittently with fresh, brackish or saline water
Woody native vegetation	Native vegetation that contains an over-storey and/or mid-storey that predominantly consists of trees and/or shrubs

Appendix B Vegetation Plot Data

Scientific name	Common name	Native, Exotic, High Threat Exotic	Growth form group	Stratum	Plot 1 Cover	Abundance
Anagallis spp.	Scarlett pimpernel	E	Forb (FG)	g	0.1	1
Angophora costata	Smooth-barked Apple	N	Tree (TG)	u	10	2
Araujia sericifera	Moth vine	E		g	0.1	100
Bidens pilosa var. *pilosa*	Farmer's friends	E		g	0.1	1
Chloris truncata	Windmill grass	N	Grass & grasslike (GG)	g	5	500
Corymbia maculata	Spotted Gum	N	Tree (TG)	u	10	2
Cynodon dactylon	Couch grass	E	Grass & grasslike (GG)	g	5	500
Dichondra repens	Kidney Weed	N	Forb (FG)	g	0.1	100
Ehrharta erecta	Veldt Grass	E		g	50	2000
Elymus spp.		E	Grass & grasslike (GG)	g	5	500
Eragrostis curvula	African Lovegrass	E		g	2	100
Eucalyptus microcorys	Tallowwood	N	Tree (TG)	u	5	1
Hypochaeris radicata	Flatweed	E		g	1	20
Lespedeza spp.	Bush clovers	E	Forb (FG)	g	1	20
Malva spp.	Mallow	E	Forb (FG)	g	1	20
Microlaena stipoides var. *stipoides*	Weeping Grass	N	Grass & grasslike (GG)	g	1	100
Modiola caroliniana	Carolina Mallow	E		g	0.2	20
Oxalis spp.	-	-	Forb (FG)	g	5	500
Paspalum spp.	Paspalum	E	Grass & grasslike (GG)	g	2	100
Pennisetum spp.	Fountain grass	E	Grass & grasslike (GG)	g	5	500
Plantago lanceolata	Plantain	E		g	1	50
Pseudognaphalium luteoalbum	Cudweed	N	Forb (FG)	g	5	100
Setaria spp.	-	E	Grass & grasslike (GG)	g	2	100
Sonchus oleraceus	Sowthistle	E		g	1	20
Sporobolus africanus	Rat's tail grass	E		g	2	100
Tribulus terrestris	Bindi	E		g	1	20
Wahlenbergia spp.	Bluebells	N	Forb (FG)	g	0.1	5

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Appendix C Likelihood of Occurrence

An assessment of likelihood of occurrence was made for threatened and migratory species identified from the database search. Five terms for the likelihood of occurrence of species are used in this report. This assessment was based on database or other records, presence or absence of suitable habitat, features of the proposal site, results of the site inspection and professional judgement. Some migratory, marine and aquatic species identified from the Commonwealth database search have been excluded from the assessment, due to lack of habitat. The terms for likelihood of occurrence are defined below:

- "Yes" - the species was or has been observed on the site.
- "Likely" = a medium to high probability that a species uses the site.
- "Potential" = suitable habitat for a species occurs on the site, but there is insufficient information to categorise the species as likely to occur, or unlikely to occur
- "Unlikely" = a very low to low probability that a species uses the site.
- "No" = habitat on site and in the vicinity is unsuitable for the species.

An assessment of significance was conducted for threatened species or ecological communities that were recorded within the site or had a higher likelihood of occurring and were not recorded during the site visit and that potential to be significantly impacted. It is noted that some threatened fauna species that are highly mobile, wide ranging and vagrant may use portions of the site intermittently for foraging. For these fauna species, the habitat present and likely to be impacted is not considered to be important to the threatened species, particularly in relation to the amount of similar habitat remaining in the surrounding landscape. As such, an assessment of significance in reference to State or Commonwealth legislation was not considered necessary.

The records column refers to the number of records occurring within 5 km of the subject site, as provided by the NSW Wildlife Atlas (BioNet) database search.

Information provided in the habitat associations' column has primarily been extracted (and modified) from the Commonwealth Species Profile and Threats Database (DAWE 2021b) and the NSW Threatened Species Profiles (DPIE 2021a).

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Table 11: Threatened ecological communities (TECs) likelihood table

Name	EPBC Act	Habitat Associations	Likelihood of Occurrence	Assessment of Significance required
Castlereagh Scribbly Gum and Agnes Banks Woodland	EEC	Occurs almost exclusively on soils derived from Tertiary alluvium, or on sites located on adjoining shale or Holocene alluvium. Often adjacent to and on slightly higher ground than Castlereagh Ironbark Forest or Shale Gravel Transition Forest in the Sydney Basin Bioregion. Dominated by *Eucalyptus parramattensis* subsp. *parramattensis*, *Angophora bakeri* and *E. sclerophylla.* A small tree stratum of *Melaleuca decora* is sometimes present, generally in areas with poorer drainage. It has a well-developed shrub stratum consisting of sclerophyllous species such as *Banksia spinulosa* var. *spinulosa, Melaleuca nodosa, Hakea sericea* and *H. dactyloides* (multi-stemmed form). The ground stratum consists of a diverse range of forbs including *Themeda australis, Entolasia stricta*, *Cyathochaeta diandra, Dianella revoluta* subsp. *revoluta, Stylidium graminifolium*, *Platysace ericoides*, *Laxmannia gracilis* and *Aristida warburgii.*	No	No
Coastal Upland Swamps in the Sydney Basin Bioregion	EEC	Endemic to NSW and confined to the Sydney Basin Bioregion. It occurs in the eastern Sydney Basin from the Somersby district in the north (Somersby-Hornsby plateaux) to the Robertson district in the south (n the Woronora plateau). Occurs primarily on impermeable sandstone plateaux with shallow groundwater aquifers in the headwaters and impeded drainage lines of streams, and on sandstone benches with abundant seepage moisture. Generally associated with acidic soils. May include tall open scrubs, tall closed scrubs, closed heaths, open graminoid heaths, sedgelands and fernlands. Larger examples may include a complex of these structural forms.	No	No

Name	EPBC Act	Habitat Associations	Likelihood of Occurrence	Assessment of Significance required
Cooks River / Castlereagh Ironbark Forest	CEEC	Associated with silts, clay-loams and sandy loams, on periodically inundated alluvial flats, drainage lines and river terraces associated with coastal floodplains. The structure of the community may vary from tall open forests (>40m) to woodlands. The most widespread and abundant dominant trees include *Eucalyptus tereticornis* (forest red gum), *E. amplifolia* (cabbage gum), *Angophora floribunda* (rough-barked apple) and *A. subvelutina* (broad-leaved apple). *Eucalyptus baueriana* (blue box), *E. botryoides* (bangalay) and *E. elata* (river peppermint) may be common south from Sydney. *E. ovata* (swamp gum) occurs on the far south coast, *E. saligna* (Sydney blue gum) and *E. grandis* (flooded gum) may occur north of Sydney, while *E. benthamii* is restricted to the Hawkesbury floodplain. A layer of small trees may be present, including *Melaleuca decora, M. styphelioides* (prickly-leaved teatree), *Backhousia myrtifolia* (grey myrtle), *Melia azadarach* (white cedar), *Casuarina cunninghamiana* (river oak) and *C. glauca* (swamp oak). Scattered shrubs include *Bursaria spinosa, Solanum prinophyllum, Rubus parvifolius, Breynia oblongifolia, Ozothamnus diosmifolius, Hymenanthera dentata, Acacia floribunda* and *Phyllanthus gunnii.* The groundcover is composed of abundant forbs, scramblers and grasses.	No	No
Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	CEEC	Has an open forest structure and occurs primarily where shallow deposits from ancient river systems overlay shale soils, but also associated with localised concentrations of iron-hardened gravel. A transition plant community which grades into Cumberland Plain Woodland where the influence of gravel soil declines, and grades into Cooks River/Castlereagh Ironbark Forest or Castlereagh Scribbly Gum Woodland where gravel deposits are thick.	No	No

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Name	EPBC Act	Habitat Associations	Likelihood of Occurrence	Assessment of Significance required
River-flat Eucalypt Forest	CEEC	The structure of the community may vary from tall open forests (>40m) to woodlands. The most widespread and abundant dominant trees include *Eucalyptus tereticornis* (forest red gum), *E. amplifolia* (cabbage gum), *Angophora floribunda* (rough-barked apple) and *A. subvelutina* (broad-leaved apple). Associated with silts, clay-loams and sandy loams, on periodically inundated alluvial flats, drainage lines and river terraces associated with coastal floodplains.	No	No
Shale Gravel Transition Forest	CEEC	Has an open forest structure with a canopy dominated by *Eucalyptus fibrosa* (Broad-leaved Ironbark) with *E. moluccana* (Grey Box)and *E. tereticornis* (Forest Red Gum) occurring less frequently. *Melaleuca decora* (Paperbark) is common in the small tree layer. A sparse shrub layer is usually present which includes *Bursaria spinosa (*Blackthorn), *Daviesia ulicifolia* and *Lissanthe strigose* (Peach Heath). Contains many more species and other references should be consulted to identify these. Mainly found in the northern section of the Cumberland Plain, western Sydney, in the Richmond, Marsden Park and Windsor districts. Also appears in the Liverpool/ Holsworthy area, and there are small occurrences at Bankstown, Yennora and Villawood and the Kemps Creek area. Occurs primarily where shallow deposits from ancient river systems overlay shale soils, but also associated with localised concentrations of iron-hardened gravel.	No	No
Shale Sandstone Transition Forest	CEEC	Occurs at the edges of the Cumberland Plain, where clay soils from the shale rock intergrade with earthy and sandy soils from sandstone, or where shale caps overlay sandstone. The boundaries are indistinct, and the species composition varies depending on the soil influences. It typically occurs in moderately wet sites, with an annual rainfall of 800-1100mm per year, and on clay soils derived from Wianamatta shale. The tree canopy is dominated by Turpentine and a variety of eucalypt species. Its distribution is	No	No

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Name	EPBC Act	Habitat Associations	Likelihood of Occurrence	Assessment of Significance required
		mainly on the Cumberland Plain of the Sydney region. Was not recorded during the site inspection s.		
Subtropical and Temperate Coastal Saltmarsh	V	Characteristic plants include Baumea juncea, Juncus kraussii subsp. australiensis (Sea Rush), Sarcocornia quinqueflora subsp. quinqueflora (Samphire), Sporobolus virginicus (Marine Couch), Triglochin striata (Streaked Arrowgrass), Ficinia nodosa (Knobby Club-rush), Samolus repens (Creeping Brookweed), Selliera radicans (Swamp Weed), Suaeda australis (Seablite) and Zoysia macrantha (Prickly Couch).	No	No
Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	EEC	The structure of the community may vary from open forests to low woodlands, scrubs or reedlands with scattered trees. It has a dense to sparse tree layer in which *Casuarina glauca* (Swamp Oak) is the dominant species northwards from Bermagui. Other trees including *Acmena smithii* (Lilly Pilly), *Glochidion* spp. (Cheese Tree) and *Melaleuca* spp. (Paperbark) may be present as subordinate species, and are found most frequently in stands of the community northwards from Gosford. *Melaleuca ericifolia* is the only abundant tree in this community south of Bermagui. The understorey is characterised by frequent occurrences of vines, *Parsonsia straminea, Geitonoplesium cymosum* and *Stephania japonica* var. *discolor*, a sparse cover of shrubs, and a continuous groundcover of forbs, sedges, grasses and leaf litter. The composition of the ground stratum varies depending on levels of salinity in the groundwater."	No	No

Name	EPBC Act	Habitat Associations	Likelihood of Occurrence	Assessment of Significance required
Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion	CEEC	Open forest, with dominant canopy trees including *Syncarpia glomulifera* (Turpentine), *Eucalyptus punctata* (Grey Gum), *Eucalyptus paniculata* (Grey Ironbark) and *E. eugenioides* (Thin-leaved Stringybark). In areas of high rainfall (over 1050 mm per annum) *E. saligna* (Sydney Blue Gum) is more dominant. The shrub stratum is usually sparse and may contain mesic species such as *Pittosporum undulatum* (Sweet Pittosporum) and *Polyscias sambucifolia* (Elderberry Panax). Occurs close to the Shale/Sandstone boundary on the more fertile shale influenced soils, in higher rainfall areas on the higher altitude margins of the Cumberland Plain, and on the shale ridge caps of sandstone plateaux. A transitional community, between Cumberland Plain Woodland in drier areas and Blue Gum High Forest on adjacent higher rainfall ridges.	No	No
Western Sydney Dry Rainforest and Moist Woodland on Shale	CEEC	A dry vine scrub community of the Cumberland Plain, western Sydney. Canopy trees include *Melaleuca styphelioides* (Prickly Paperbark), *Acacia implexa* (Hickory Wattle) and *Alectryon subcinereus* (Native Quince) . Many rainforest species occur in the shrub layer, such as *Notelaea longifolia* (Mock Olive) *(*, *Clerodendrum tomentosum* (Hairy Clerodendrum) and *Pittosporum revolutum* (Yellow Pittosporum). The shrub layer combines with vines, such as *Aphanopetalum resinosum (*Gum Vine), *Pandorea pandorana* (Wonga Vine) and *Cayratia clematidea (*Slender Grape) to form dense thickets in sheltered locations.	No	No

E= Endangered Ecological Community, CEEC = Critically Endangered Ecological Community.

Table 12: Threatened flora species likelihood table

Scientific Name	Common Name	EPBC Act	Habitat Associations	Records	Likelihood of Occurrence	Assessment of Significance required
Acacia bynoeana	Bynoe's Wattle	V	*Acacia bynoeana* is found in central eastern NSW, from the Hunter District (Morisset) south to the Southern Highlands and west to the Blue Mountains and has recently been found in the Colymea and Parma Creek areas west of Nowra. It is found in heath and dry sclerophyll forest, typically on a sand or sandy clay substrate, often with ironstone gravels.	23	Unlikely. Suitable habitat not present. Not recorded during survey.	No
Acacia pubescens	Downy Wattle	V	*Acacia pubescens* occurs on the NSW Central Coast in Western Sydney, mainly in the Bankstown-Fairfield-Rookwood area and the Pitt Town area, with outliers occurring at Barden Ridge, Oakdale and Mountain Lagoon. It is associated with Cumberland Plains Woodlands, Shale / Gravel Forest and Shale / Sandstone Transition Forest growing on clay soils, often with ironstone gravel.	2472	Unlikely. Suitable habitat not present, no remnant native vegetation present. Not recorded during survey.	No
Allocasuarina glareicola	-	E	*Allocasuarina glareicola* is primarily restricted to the Richmond district on the north-west Cumberland Plain, with an outlier population found at Voyager Point. It grows in Castlereagh woodland on lateritic soil.	0	Unlikely Suitable habitat not present. No local records.	No
Cryptostylis hunteriana	Leafless Tongue Orchid	V	It is known from a range of vegetation communities including swamp-heath and woodland. The larger populations typically occur in woodland dominated by *Eucalyptus sclerophylla* (Scribbly Gum), *E. sieberi* (Silvertop Ash), *Corymbia gummifera* (Red Bloodwood) and *Allocasuarina littoralis* (Black Sheoak); where it appears to prefer open areas in the understorey of this community and is often found in association with the (*Cryptostylis subulata (*Large Tongue Orchid) and *C. erecta* (Tartan Tongue Orchid).	0	Unlikely. Suitable habitat not present.	No
Cynanchum elegans	White-flowered Wax Plant	E	Restricted to eastern NSW where it is distributed from Brunswick Heads on the north coast to Gerroa in the Illawarra region. The species has been recorded as far west as Merriwa in the upper Hunter River valley. The White-flowered Wax Plant usually occurs on the edge of dry rainforest vegetation.	0	Unlikely. Suitable habitat not present.	No

Scientific Name	Common Name	EPBC Act	Habitat Associations	Records	Likelihood of Occurrence	Assessment of Significance required
			Other associated vegetation types include littoral rainforest; *Leptospermum laevigatum* (Coastal Tea-tree), *Banksia integrifolia* subsp. *integrifolia* (Coastal Banksia) coastal scrub; *Eucalyptus tereticornis* (Forest Red Gum) aligned open forest and woodland; *Corymbia maculata* (Spotted Gum) aligned open forest and woodland; and *Melaleuca armillaris* (Bracelet Honeymyrtle0 scrub to open scrub.			
Diuris aequalis	Buttercup Doubletail	V	Forest, low open woodland and secondary grassland on the higher parts of the Southern and Central Tablelands.	1	Unlikely. Suitable habitat not present.	No
Eucalyptus nicholii	Narrow-leaved Black Peppermint	V	New England Tablelands from Nundle to north of Tenterfield. Dry grassy woodland, on shallow soils of slopes and ridges.	2	Unlikely. Suitable habitat not present.	No
Genoplesium baueri	Bauer's Midge Orchid	E	Has been recorded from locations between Nowra and Pittwater and may occur as far north as Port Stephens. Dry sclerophyll forest and moss gardens over sandstone.		Unlikely. Suitable habitat not present.	No
Grevillea parviflora subsp. parviflora	Small-flower Grevillea	V	Sporadically distributed throughout the Sydney Basin and in the Hunter in the Cessnock - Kurri Kurri area. Also known from Putty to Wyong and Lake Macquarie on the Central Coast. Heath and shrubby woodland to open forest on sandy or light clay soils usually over thin shales.	849	Unlikely. Suitable habitat not present.	No
Hibbertia sp. Bankstown		CE	Known to occur in only one population, at Bankstown Airport in Sydney's southern suburbs. Heavily modified low grass/shrub association (ex Cooks River/Castlereagh Ironbark Forest) on sandy alluvium with a high silt content.	216	Unlikely. Suitable habitat not present.	No
Leucopogon exolasius	Woronora Beard-heath	V	Upper Georges River area and in Heathcote National Park. Woodland on sandstone.	2	Unlikely. Suitable habitat not present.	No
Melaleuca deanei	Deane's Paperbark	V	Ku-ring-gai/Berowra area, Holsworthy/Wedderburn area, Springwood (in the Blue Mountains), Wollemi National Park, Yalwal (west of Nowra) and Central Coast (Hawkesbury River) areas. Heath on sandstone.	0	Unlikely. Suitable habitat not present.	No

Scientific Name	Common Name	EPBC Act	Habitat Associations	Records	Likelihood of Occurrence	Assessment of Significance required
Persicaria elatior	Tall Knotweed	V	This species normally grows in damp places, especially beside streams and lakes. Occasionally in swamp forest or associated with disturbance.	0	Unlikely. Suitable habitat not present.	No
Persoonia hirsuta	Hairy Geebung	E	Scattered distribution around Sydney, from Singleton in the north, along the east coast to Bargo in the south and the Blue Mountains to the west. Sandy soils in dry sclerophyll open forest, woodland and heath on sandstone.	0	Unlikely. Not recorded during survey. Understorey degraded by mowing and past land clearance.	No
Persoonia nutans		E	Restricted to the Cumberland Plain in western Sydney, between Richmond in the north and Macquarie Fields in the south. Northern populations are confined to aeolian and alluvial sediments and occur in a range of sclerophyll forest and woodland vegetation communities, with the majority of individuals occurring within Agnes Banks Woodland or Castlereagh Scribbly Gum Woodland and some in Cooks River / Castlereagh Ironbark Forests. Southern populations also occupy tertiary alluvium but extend onto shale sandstone transition communities and into Cooks River / Castlereagh Ironbark Forest.	93	Unlikely. Suitable habitat not present.	No
Pimelea curviflora var. curviflora	-	V	Confined to the coastal area of the Sydney and Illawarra regions between northern Sydney and Maroota in the north-west and Croom Reserve near Albion Park in the south. Woodland, mostly on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes.	0	Unlikely. Suitable habitat not present.	No
Pimelea spicata	Spiked Rice-flower	E	In western Sydney, *Pimelea spicata* occurs on an undulating topography of well-structured clay soils, derived from Wianamatta shale. It is associated with Cumberland Plains Woodland, in open woodland and grassland often in moist depressions or near creek lines. Has been located in disturbed areas that would have previously supported	0	Unlikely. Suitable habitat not present.	No

Scientific Name	Common Name	EPBC Act	Habitat Associations	Records	Likelihood of Occurrence	Assessment of Significance required
Pomaderris brunnea	Brown Pomaderris	V	In NSW, found around the Colo, Nepean and Hawkesbury Rivers, including the Bargo area and near Camden. It also occurs near Walcha on the New England tablelands. Moist woodland or forest on clay and alluvial soils of flood plains and creek lines.	5	Unlikely. Suitable habitat not present.	No
Pterostylis gibbosa	Illawarra Greenhood	E	Known from a small number of populations in the Hunter region (Milbrodale), the Illawarra region (Albion Park and Yallah) and the Shoalhaven region (near Nowra). Open forest or woodland, on flat or gently sloping land with poor drainage.	0	Unlikely. Suitable habitat not present.	No
Rhizanthella slateri	Eastern Australian Underground Orchid	E	In NSW, currently known from fewer than 10 locations, including near Bulahdelah, the Watagan Mountains, the Blue Mountains, Wiseman's Ferry area, Agnes Banks and near Nowra. Sclerophyll forest in shallow to deep loams.	0	Unlikely. Suitable habitat not present.	No
Syzygium paniculatum	Magenta Lillypilly	V	This species occupies a narrow coastal area between Bulahdelah and Conjola State Forests in NSW. On the Central Coast, it occurs on Quaternary gravels, sands, silts and clays, in riparian gallery rainforests and remnant littoral rainforest communities. In the Ourimbah Creek valley, *S. paniculatum* occurs within gallery rainforest with *Alphitonia excelsa*, *Acmena smithii*, *Cryptocarya glaucescens*, *Toona ciliata*, *Syzygium oleosum* with emergent *Eucalyptus saligna*. At Wyrrabalong NP, *S. paniculatum* occurs in littoral rainforest as a co-dominant with *Ficus fraseri*, *Syzygium oleosum*, *Acmena smithii*, *Cassine australe*, and *Endiandra sieberi*.	1	Unlikely. Suitable habitat not present.	No
Thelymitra kangaloonica	Kangaloon Sun Orchid	CE		0	Unlikely. Suitable habitat not present.	No
Thesium australe	Austral Toadflax	V	Widespread throughout the eastern third of NSW but most common on the North Western Slopes, Northern Tablelands and North Coast. Occurs in grassland or grassy woodland. Often found in damp sites in association with Kangaroo Grass (*Themeda australis*) (DECC 2007). The preferred soil type is	0	Unlikely. Suitable habitat not present.	No

Scientific Name	Common Name	EPBC Act	Habitat Associations	Records	Likelihood of Occurrence	Assessment of Significance required
			a fertile loam derived from basalt although it occasionally occurs on metasediments and granite.			

Table 13: Threatened fauna species likelihood table

Scientific Name	Common Name	EPBC Act	Habitat Associations	Records	Likelihood of occurrence	Assessment of Significance required
Heleioporus australiacus	Giant Burrowing Frog	V	Forages in woodlands, wet heath, dry and wet sclerophyll forest (Ehmann 1997). Associated with semi-permanent to ephemeral sand or rock-based streams, where the soil is soft and sandy so that burrows can be constructed.	0	No. Suitable habitat not present due to absence of suitable streams. Not known from the locality	No
Litoria aurea	Green and Golden Bell Frog	V	It can utilise a variety of natural and man-made waterbodies such as coastal swamps, marshes, lakes, other estuary wetlands, riverine floodplain wetlands, stormwater detention basins, farm dams, bunded areas, drains, ditches and other structures capable of storing water. Permanent swamps and ponds with established fringing vegetation (e.g. *Typha* sp. and spikerushes–*Eleocharis* sp.) adjacent to open grassland areas for foraging and free from predatory fish such as *Gambusia holbrooki* (Mosquito Fish) are also.	0	No. Suitable habitat not present due to lack of waterbodies.	No

Scientific Name	Common Name	EPBC Act	Habitat Associations	Records	Likelihood of occurrence	Assessment of Significance required
Meridolum corneovirens	Cumberland Plain Land Snail	E	Primarily inhabits Cumberland Plain Woodland. Also known from Shale Gravel Transition Forests, Castlereagh Swamp Woodlands and the margins of River-flat Eucalypt Forest. Lives under litter of bark, leaves and logs, or shelters in loose soil around grass clumps. Can dig several centimetres into soil to escape drought. It is a fungus specialist and is generally active at night. Little is known of its breeding biology. It is known to be hermaphroditic, laying clutches of 20-25 small, round, white eggs in moist, dark areas (such as under logs).	29	Unlikely. Not recorded during survey. Understorey degraded by mowing and past land clearance. Groundcover dominated by exotic species or bare ground, limited leaf litter or logs for shelter.	No
Anthochaera phrygia	Regent Honeyeater	CE	Associated with temperate eucalypt woodland and open forest including forest edges, wooded farmland and urban areas with mature eucalypts, and riparian forests of *Casuarina Cunninghamiana* (River Oak). It primarily feeds on nectar from box and ironbark eucalypts and occasionally from Banksia's and mistletoes. It is reliant on locally abundant nectar sources with different flowering times to provide reliable supply of nectar.	5	Unlikely Very limited foraging resources isolated from any nearby available habitat. .	No. Marginal foraging habitat only, unlikely to be used on a regular basis. No loss of habitat.

Scientific Name	Common Name	EPBC Act	Habitat Associations	Records	Likelihood of occurrence	Assessment of Significance required
			Suitable habitat likely to be present within the Precinct.			
Botaurus poiciloptilus	Australasian Bittern	E	Occurs in terrestrial wetlands with tall dense vegetation, occasionally estuarine habitats, reedbeds, swamps, streams, and estuaries.	0	No. Suitable habitat not present	No.
Falco hypoleucos	Grey Falcon	V	Arid and semi-arid zones. In NSW, found chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. Shrubland, grassland and wooded watercourses, occasionally in open woodlands near the coast, and near wetlands.	0	Unlikely Suitable habitat not present.	No
Grantiella picta	Painted Honeyeater	V	A nomadic species that typically inhabits Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests with abundant mistletoe (DECC 2007). It is a specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias, preferring *Amyema* sp mistletoe (DECC 2007).	0	Unlikely Suitable habitat not present. Not known from the locality.	No.

Scientific Name	Common Name	EPBC Act	Habitat Associations	Records	Likelihood of occurrence	Assessment of Significance required
Lathamus discolor	Swift Parrot	CE	Breeds in Tasmania between September and January. Migrates to mainland in autumn, where it forages on profuse flowering Eucalypts. Hence, in this region, autumn and winter flowering eucalypts are important for this species. Favoured feed trees include winter flowering species such as *Eucalyptus robusta* (Swamp Mahogany), *Corymbia maculata* (Spotted Gum), *C. gummifera*, (Red Bloodwood) *E. sideroxylon* (Mugga Ironbark), and *E. albens* (White Box).	9	Unlikely Low quality foraging habitat may be used on a rare basis however any potential impacts would be negligible.	No.
Numenius madagascariensis	Eastern Curlew	CE, M	Estuaries, bays, harbours, inlets and coastal lagoons, intertidal mudflats or sandflats, ocean beaches, coral reefs, rock platforms, saltmarsh, mangroves, freshwater/brackish lakes, saltworks and sewage farms.	0	Unlikely. Suitable foraging habitat not available within the subject site	No.
Pandion cristatus	Eastern Osprey	M	Rocky shorelines, islands, reefs, mouths of large rivers, lagoons and lakes.	1	Unlikely. Suitable foraging habitat not available within the subject site	No.
Dasyurus maculatus	Spotted-tailed Quoll	E	The Spotted-tailed Quoll inhabits a range of forest communities including wet and dry sclerophyll forests, coastal heathlands and rainforests (Mansergh 1984; DECC 2007j), more frequently recorded	0	Unlikely. Suitable habitat not present. No nesting available within the subject site	No

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Scientific Name	Common Name	EPBC Act	Habitat Associations	Records	Likelihood of occurrence	Assessment of Significance required
			near the ecotones of closed and open forest and in NSW within 200km of the coast. Preferred habitat is mature wet forest (Belcher 2000b; Green & Scarborough 1990; Watt 1993), especially in areas with rainfall 600 mm/year (Edgar & Belcher 2008; Mansergh 1984). Unlogged forest or forest that has been less disturbed by timber harvesting is also preferable (Catling et al. 1998, 2000). This species requires habitat features such as maternal den sites, an abundance of food (birds and small mammals) and large areas of relatively intact vegetation to forage in (DECC 2007). Maternal den sites are logs with cryptic entrances; rock outcrops; windrows; burrows (Environment Australia 2000).			
Petauroides volans	Greater Glider	V	The greater glider is an arboreal nocturnal marsupial, largely restricted to eucalypt forests and woodlands. It is typically found in highest abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows. The greater glider favours forests with a diversity of eucalypt species, due	0	Unlikely. Suitable habitat not present. No nesting available within the subject site. Not known from the locality.	No

Scientific Name	Common Name	EPBC Act	Habitat Associations	Records	Likelihood of occurrence	Assessment of Significance required
			to seasonal variation in its preferred tree species.			
Petrogale penicillata	Brush-tailed Rock Wallaby	V	In NSW they occur from the Qld border in the north to the Shoalhaven in the south, with the population in the Warrumbungle Ranges being the western limit. Rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges.	0	Unlikely. Suitable habitat not present. Not known from the locality.	No
Phascolarctos cinereus	Koala	V	Associated with both wet and dry Eucalypt forest and woodland that contains a canopy cover of approximately 10 to 70%, with acceptable Eucalypt food trees. Some preferred Eucalyptus species are: *Eucalyptus tereticornis, E. punctata, E. cypellocarpa, E. viminalis.*	27	Unlikely. Suitable habitat not present due to high level of fragmentation of habitat and limited foraging habitat.	No
Pseudomys novaehollandiae	New Holland Mouse	V	A small burrowing native rodent with a fragmented distribution across Tasmania, Victoria, New South Wales and Queensland. Inhabits open heathlands, open woodlands with a heathland understorey and vegetated sand dunes. A social animal, living predominantly in burrows shared with other individuals. The home range of the New Holland Mouse ranges from 0.44 ha to 1.4 ha and	0	Unlikely. Suitable habitat not present within the subject site. Not known from the locality.	No

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Scientific Name	Common Name	EPBC Act	Habitat Associations	Records	Likelihood of occurrence	Assessment of Significance required
			the species peaks in abundance during early to mid-stages of vegetation succession typically induced by fire.			
Chalinolobus dwyeri	Large-eared Pied Bat	V	Wet and dry sclerophyll forests, Cyprus Pine dominated forest, woodland, sub-alpine woodland, edges of rainforests and sandstone outcrop country. Roosts in caves, rock overhangs and disused mine shafts.	1	Unlikely. Suitable habitat not present. Not known from the locality.	No
Pteropus poliocephalus	**Grey-headed Flying-Fox**	**V**	**Inhabits a wide range of habitats including rainforest, mangroves, paperbark forests, wet and dry sclerophyll forests and cultivated areas. Camps are often located in gullies, typically close to water, in vegetation with a dense canopy.**	**237**	**Potential.** **Marginal foraging habitat available within subject site.**	**Yes**
Hoplocephalus bungaroides	Broad-headed Snake	V	Dry eucalypt forests and woodlands, cypress forest, rainforest and moist eucalypt forest.	0	Unlikely Suitable habitat not present.	No
Actitis hypoleucos	Common Sandpiper	M	Coastal wetlands and some inland wetlands, especially muddy margins or rocky shores. Also estuaries and deltas, lakes, pools, billabongs, reservoirs, dams and claypans, mangroves.	2	Unlikely Suitable habitat not present due to absence of waterbodies.	No
Apus pacificus	Fork-tailed Swift	M	Sometimes travels with Needletails. Varied habitat with a possible tendency to more arid	0	No. Suitable habitat not present.	No.

Scientific Name	Common Name	EPBC Act	Habitat Associations	Records	Likelihood of occurrence	Assessment of Significance required
			areas but also over coasts and urban areas.			
Cuculus optatus	Oriental Cuckoo	M	Rainforest, eucalypt forests and woodlands, clearings in secondary growth, swamp woodlands and timber along watercourses.	0	No. Not known within locality. Suitable habitat not available within the study area.	No.
Gallinago hardwickii	Latham's Snipe	M	A variety of permanent and ephemeral wetlands, preferring open freshwater wetlands with nearby cover. Occupies a variety of vegetation around wetlands including wetland grasses and open wooded swamps. Can occur in habitats that have saline or brackish water, such as saltmarsh, mangrove creeks, around bays and beaches, and at tidal rivers. They are regularly recorded in or around modified or artificial habitats including pasture, ploughed paddocks, irrigation channels and drainage ditches and sewage and dairy farms. They can also occur in various sites close to humans or human activity (e.g. near roads, railways, airfields, commercial or industrial complexes).	54	No. Suitable habitat not present.	No.
Hirundapus caudacutus	White-throated Needletail	M	Forages aerially over a variety of habitats usually over coastal and mountain areas, most likely with a preference for wooded areas. Has been observed roosting in dense	3	No. Suitable habitat not present.	No.

Scientific Name	Common Name	EPBC Act	Habitat Associations	Records	Likelihood of occurrence	Assessment of Significance required
			foliage of canopy trees and may seek refuge in tree hollows in inclement weather.			
Monarcha melanopsis	Black-faced Monarch	M	In NSW, occurs around the eastern slopes and tablelands of the Great Divide, inland to Coutts Crossing, Armidale, Widden Valley, Wollemi National Park and Wombeyan Caves. It is rarely recorded farther inland. Rainforest, open eucalypt forests, dry sclerophyll forests and woodlands, gullies in mountain areas or coastal foothills, Brigalow scrub, coastal scrub, mangroves, parks and gardens.	0	No. Not known within locality. Suitable habitat not available within the study area.	No.
Motacilla flava	Yellow Wagtail	M	An insectivorous bird, inhabiting open country near water, such as wet meadows. It nests in tussocks.	0	No. Not known within locality. Suitable habitat not available within the study area.	No.
Myiagra cyanoleuca	Satin Flycatcher	M	Habitat typically includes wetter, denser forest, often at high elevations.	0	No. Not known within locality. Suitable habitat not available within the study area.	No.
Numenius minutus	Eastern Curlew	M	Estuaries, bays, harbours, inlets and coastal lagoons, intertidal mudflats or sandflats, ocean beaches, coral reefs, rock platforms, saltmarsh, mangroves, freshwater/brackish lakes, saltworks and sewage farms.	0	No. Not known within locality. Suitable habitat not available within the study area.	No.

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Scientific Name	Common Name	EPBC Act	Habitat Associations	Records	Likelihood of occurrence	Assessment of Significance required
Rhipidura rufifrons	Rufous Fantail	M	It is a summer breeding migrant to southeastern Australia. It is found in rainforest, dense wet eucalypt and monsoon forests, paperbark and mangrove swamps and riverside vegetation. Open country may be used by the Rufous Fantail during migration.	0	No. Not known within locality. Suitable habitat not available within the study area.	No.
Tringa nebularia	Common Greenshank	M	Terrestrial wetlands (swamps, lakes, dams, rivers, creeks, billabongs, waterholes and inundated floodplains, claypans, saltflats, sewage farms and saltworks dams, inundated rice crops and bores) and sheltered coastal habitats (mudflats, saltmarsh, mangroves, embayments, harbours, river estuaries, deltas, lagoons, tidal pools, rock-flats and rock platforms).	1	No. Suitable habitat not present.	No.

M = Migratory, V= Vulnerable; E= Endangered, E2 = Endangered Population, CE = Critically Endangered, PE= Presumed extinct.

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