200 Aldington Road Industrial Estate
Biodiversity Development Assessment Report

Fife Kemps Creek Pty Ltd

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1300 646 131
www.ecoaus.com.au

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Project Name	200 Aldington Road BDAR
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Project Manager	Kirsten Velthuis
Prepared by	Kirsten Velthuis BAAS 19048 and Stacey Wilson
Reviewed by	Nicole McVicar BAAS 18077
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Template 2.8.1

Executive Summary

Eco Logical Australia Pty Ltd was engaged by Fife Kemps Creek to prepare a Biodiversity Development Assessment Report for a proposed development at 200 Aldington Road in the Penrith City Council local government area. The subject land is the assessable area which includes the area of land defined by land title boundaries of Lot 20 DP 255560; Lot 21 DP 255560; Lot 22 DP 255560; Lot 23 DP 255560 and Lot 30 DP 258949 between 144-228 Aldington Road, Kemps Creek. The proposed development is for the construction of an industrial estate and associated infrastructure on the site. The development is classified as a Part 4.1 State Significant Development under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

This report has followed the Biodiversity Assessment Method 2017 (BAM) established under Section 6.7 of the NSW *Biodiversity Conservation Act 2016* (BC Act) and responds to the following SEARs for project SSD-10479 issued July 2020:

- *an assessment of the biodiversity impacts in accordance with the Biodiversity Assessment Method and documented in a Biodiversity Development Assessment Report (BDAR);*

This report describes the biodiversity values within the subject land and development site, describes the impacts and outlines the measures to be taken to avoid, minimise and mitigate impacts to the Plant Community Types and threatened species habitat present within the development footprint and development site.

The report provides the number of biodiversity credits that would need to be retired to offset the residual loss of biodiversity if the development proceeds as described.

The proposed development involves direct impacts to the biodiversity values within the development footprint, and indirect impacts within the development site. Following avoidance and mitigation, the residual direct impacts were calculated in accordance with the BAM by utilising the BAM Credit Calculator.

It is important to note that the entire development site is mapped as Urban Capable land in the Draft Cumberland Plain Conservation Plan 2020, and the site has been subject to biodiversity assessment under the Draft Cumberland Plain Assessment Report prepared by Biosis and Open Line in 2020.

The proposed development site is approximately 72.09 ha in size and consists largely of rural housing and market gardens, with low to moderate condition remnant vegetation. Three Plant Community Types (PCTs), comprising five vegetation zones, are present within the development site and development footprint. A summary of the areas of each zone within the development footprint is provided below.

Vegetation Zone	PCT ID	PCT Name	Condition	Direct impact (ha)
1	835	Forest Red Gum – Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion	Moderate	0.22
2	835	Forest Red Gum – Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion	Low - Moderate	1.12
3	850	Grey Box – Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion	low	0.12
4	1232	Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion	low	0.67
5	1232	Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion	moderate	0.67
Total				2.80

A total of 23 ecosystem credits will be required for the removal of vegetation within the development footprint.

Below are details how each of the three PCTs correspond to threatened ecological communities as listed under the BC Act and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). It also provides a breakdown of the number of ecosystem credits required per PCT for the removal of vegetation within the development footprint.

PCT ID	PCT Name	BC Act listing	EPBC Act listing	Direct impact (ha)	Credits required
835	Forest Red Gum – Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion	Endangered	Not Listed	1.34	16
850	Grey Box – Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion	Critically Endangered	The community on site does not meet the condition thresholds for listing under the EPBC Act	0.12	0
1232	Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion	Endangered	The community on site does not meet the condition thresholds for listing under the EPBC Act	1.34	7

A total of 27 species credit species will be required for the removal of threatened species habitat within the development footprint. A summary of the species credits requirements is provided below.

Species	Common Name	Presence	Direct impact (ha)	Credits required
Myotis macropus	Southern Myotis	Assumed	2.73	27

Serious and Irreversible Impact (SAII) values have also been considered in this assessment. *Cumberland Plain Woodland of the Sydney Basin Bioregion* is listed as a SAII in the BioNet Threatened Biodiversity Data Collection. According to the Threatened Biodiversity Data Collection, the SAII thresholds for this community are still under development.

Matters of National Environmental Significance (MNES) identified as having potential to be adversely affected by the proposed works include:

- *Anthochaera phrygia* (Regent Honeyeater)
- *Pteropus poliocephalus* (Grey-headed Flying-fox)
- *Lathamus discolor* (Swift Parrot)
- *Litoria aurea* (Green and Golden Bell Frog)
- *Phascolarctos cinereus* (Koala)
- *Gallinago hardwickii* (Latham's Snipe).

Assessments of the Commonwealth Significant Impact Criteria was undertaken for the above MNES and concluded that the project is unlikely to have a significant impact on any of the MNES.

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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
BSSAR	Biodiversity Stewardship Site Assessment Report
CEEC	Critically Endangered Ecological Community
DAWE	Commonwealth Department of Agriculture, Water and Environment (formally Department of Environment and Energy (DoEE)
DNG	Derived Native Grassland
DPE	NSW Department of Planning 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
LLS	Local Land Service
NSW	New South Wales
NOW	NSW Office of Water
OEH	NSW Office of Environment and Heritage
PCT	Plant Community Type
PMST	Protected Matters Search Tool
SEPP	State Environmental Planning Policy
SSD	State Significant Development
TBDC	Threatened Biodiversity Data Collection
TEC	Threatened Ecological Community
VIS	Vegetation Information System
WM Act	NSW Water Management Act 2000

1. Introduction

Eco Logical Australia was engaged to provide a biodiversity assessment of the proposed Industrial Estate at 200 Aldington Road, Kemps Creek. This section of the report describes the project evolution from initial lodgement, through to the assessment of the final design.

1.1 Summary of project as lodged and publicly exhibited (October 2020)

As lodged and exhibited, the SSDA sought approval for the following development:

A concept masterplan with an indicative total building area of 375,755 sqm, comprising:

- 357,355 sqm of warehouse gross floor area (**GFA**)
- 18,200 sqm of ancillary office GFA
- 200 sqm of café GFA
- 13 individual development lots for warehouse buildings with associated hardstand areas and two lots for drainage infrastructure purposes
- Internal road layouts and road connections to Aldington Road
- Provision for 1700 car parking spaces
- Associated concept site landscaping.

Detailed consent for progressive delivery of site preparation, earthworks and infrastructure works (i.e., Stage 1 works) on the site, including:

- Demolition and clearing of all existing built form structures
- Drainage and infill of existing farm dams and any ground dewatering
- Clearing of all existing vegetation
- Subdivision of the site into 15 individual lots
- Construction of a warehouse building with a total of 50,930 sqm of GFA, including:
- 48,430 sqm of warehouse GFA
- 2,500 sqm of ancillary office GFA
- 231 car parking spaces
- Bulk earthworks including ‘cut and fill’ to create flat development platforms for the warehouse buildings, and site stabilisation works (if required)
- Roadworks and access infrastructure
- Stormwater and drainage works including stormwater basins, diversion of stormwater lines, gross pollutant traps and associated swale works
- Sewer and potable water reticulation
- Inter-allotment, road and boundary retaining walls.

1.2 Response to Submissions (March 2021)

Following the public exhibition of the Project, changes were undertaken in response to the issues raised during the public exhibition. This included a full assessment of the Project against the Mamre Road

Precinct Development Control Plan (MRP DCP) which was released subsequent to lodgement of the SSDA.

The key changes and additional information on the Project included:

- A revised riparian solution in the north east corner of the site which relocated the existing first order water course and re-established the riparian corridor with a 10-metre buffer on each side in accordance with the Natural Resources Access Regulator (NRAR) guidelines.
- An evidence-based case for the proposed location of the high order road south of the site's northern boundary which was seen to provide a more logical and feasible road network outcome (for both FKC and its northern neighbour) compared to that envisioned under the MRP DCP.
- Revised technical inputs for the flood assessment to address the submissions raised, including revised flood modelling which addresses post development conditions in the 2-, 20- and 100-year ARI events, and providing further commentary on the flooding impacts of surrounding and downstream land.
- An integrated water management solution which can effectively allow the progressive redevelopment of the site to occur while still recognising and meeting stormwater runoff targets set out in the MRP DCP.
- A revised Visual Impact Assessment showing the impact of proposed landscaping mitigation over time.
- Rationale for minor departures from the MRP DCP in relation to building design and sitting, pylon signage and retaining walls.

1.3 Request for Additional Information from DPIE (April 2021)

Further changes to the Project (which are the subject of this RTS Report) are the result of correspondence received from DPIE (dated 28 April 2021). The changes to the Project further align the proposed development with the relevant provisions of the MRP DCP (especially in relation to the proposed road network) and exclude prohibited components of development from the RE2 Private Recreation zone. The Summary of key changes to the project are:

Concept Master Plan:

- Reconfiguration of the internal road network and external road connections to be generally consistent with the Mamre Road Precinct DCP including:
  - Provision of a land reservation corridor along the northern boundary to facilitate half the required future DCP road and intersection with Aldington Road
  - Inclusion of the open space edge road in the north-east section of the site with connections through to the adjoining properties to the north and east
  - Intersections with Aldington Road; signalised south intersection and roundabout northern intersection
  - Amendments to road corridor widths.
- Reconfiguration of Lot G to facilitate the open space edge road to the adjoining eastern property and to locate the proposed warehouse footprint wholly within the IN1 zone

- Relocation of on-site detention basin within Lot D to be outside the RE2 Private Recreation zone in within the IN1 zone;
- Retention of existing farm dams within the RE2 zoned area in the north-east corner of the site;
- Consequential amendments to bulk earthwork pads, retaining walls, lot and future warehouse layout, car parking and landscaping.

Stage 1 works:

- Overall revisions to site preparation, earthworks and infrastructure consistent with the revised concept master plan.
- Inclusion of an interim access road and temporary junction connecting to Aldington Road in the northern portion of the site to facilitate site access prior to the implementation of the northern boundary road.
- Revision to the internal road network in line with the concept master plan revisions with the provision of temporary turning heads at the site boundary where those roads will connect to properties to the east and north in the future. The road levels at the boundary interface of the site will align with existing ground level (or as required to contain stormwater).

1.4 Request for Additional Information from DPE (November 2021)

Additional changes to the Project were made as the result of further correspondence from DPE (dated 15 November 2021) based in Responses to Submission raised by public authorities. These include:

- Further consideration of the performance of Mamre Road/Abbotts Road intersection, including the extent of upgrades required, and the cumulative impacts of the development and other approved or proposed developments using the intersection, in consultation with Transport for NSW.
- Compliance with the waterway health controls established in the MRP DCP, to be applied on an on-lot basis or estate basis.
- Greater consistency with the MRP DCP, including road widths and retaining wall design.
- Addressing of section 270 of the Environmental Planning and Assessment Regulation 2000 and that Council is satisfied with the provision of local infrastructure contributions and the delivery of infrastructure supporting the development.

1.5 Description of Project, as amended, for which development consent is now sought

The amended SSDA seeks approval for the following development:

A concept masterplan with an indicative total building area of 347,955 sqm comprising:

- 330,950 sqm of warehouse gross floor area (**GFA**)
- 17,005 sqm of ancillary office GFA
- 13 individual development lots for warehouse buildings with associated hardstand areas and two lots for drainage infrastructure purposes (each including a bio-retention basin)
- Roads, including:
- Internal road layouts

- Southern road connection to Aldington Road
- Northern boundary road (half road corridor) connecting to Aldington Road
- Road connections to adjoining landholdings to the north and east
- Provision for 1549 car parking spaces and
- Associated concept site landscaping

Detailed consent for progressive delivery of site preparation, earthworks and infrastructure works (i.e., Stage 1 works) on the site, including:

- Demolition and clearing of all existing built form structures
- Drainage and infill of existing farm dams and any ground dewatering
- Clearing of all existing vegetation
- Subdivision of the site into 15 individual lots
- Construction of a warehouse building with a total of 50,930 sqm of GFA, including:
- 48,430 sqm of warehouse GFA
- 2,500 sqm of ancillary office GFA and
- 219 car parking spaces
- Bulk earthworks including 'cut and fill' to create flat development platforms for the warehouse buildings, and site stabilisation works (if required)
- Roadworks and access infrastructure, including an interim access road and temporary junction with Aldington Road
- Stormwater and drainage works including stormwater basins, diversion of stormwater lines, gross pollutant traps and associated swale works
- Sewer and potable water reticulation and
- Inter-allotment, road and boundary retaining walls

This report addresses the amended project for which development consent is now sought. It is a stand-alone report and supersedes the previous reports and supplementary information prepared for the original development application and subsequent response to submissions.

1.6 Response to submissions

The following table responds to the issues raised by Penrith City Council and NSW EES in April 2021.

Agency	Comment	Response
Penrith City Council	It is recommended that further design refinement is undertaken which addresses the following: - The proposal should relocate the bio-retention basin outside both the E2 and RE2 land as zoned to meet the objectives and strategic intent of the SEPP instrument. - The proposal should ensure that the entirety of land zoned E2 and RE2, and the required vegetated landscape buffers are considered within the Vegetation Management Plan	Redesign has moved the basin such that it will not directly impact the existing watercourse. The E2 and RE2 land will be subject to a Vegetation Management Plan as pre the Riparian Assessment.

Agency	Comment	Response
	- The proposal should ensure the minimum distance of 10m VRZ from top of bank are maintained. An extended area at one location does not offset the requirement elsewhere	Addressed in the Riparian Assessment Report. A 10m vegetated riparian zone will be provided and rehabilitated in accordance with a Vegetation Management Plan.
	- Retention and protection of the dam identified as suitable Green and Golden Bell Frog habitat. While the Ecologists have assessed that one dam provides suitable habitat for this species, it is important to this species' persistence that their overall ecological requirements including options for colonisation are provided for. While the Ecologist assessed the habitat potential of the site and concluded that the potential habitat did not extend 200m from the dam, the buffer must still be applied and its protection and enhancement prioritised. It is recommended that expert consultation should be undertaken to inform the habitat requirements of this species, to be incorporated within the site plans and the VMP. Further, as a mitigation effort, the applicant could be encouraged to prepare/collaborate with experts to produce an insitu conservation plan for this species.	See response to GGBF issue below.
EES	Biodiversity EES has reviewed the Response to Submissions (RTS) report prepared by Ethos Urban (23 March 2021), Revised Concept Masterplan (SBA Architects, 19 March 2021), and Biodiversity and Riparian Addendum (Eco Logical Australia, 22 March 2021). EES considers that the revised proposal and additional information do not address concerns raised, and that the proposal does not adequately assess the biodiversity impacts of the development.	
	Assessment of impacts EES previously advised that the proposal did not adequately assess impacts on biodiversity, and concerns were raised regarding encroachments of warehouse W6, carparking and a stormwater detention basin into the riparian area at the north eastern corner of the site. EES notes that the RTS proposes the following amendments to the design of the north eastern corner of the development: • riparian corridor recreated and first order stream redirected with a 10m buffer on each side (Figure 12, p14), and • the open space edge road deleted and landscaped edge solution proposed which "provides an acceptable buffer to the riparian corridor" (p22). It isn't clear from Figure 12 of the RTS (below) if the alteration of the first order watercourse will impact River-flat Eucalypt Forest and Swamp Oak Floodplain Swamp Forest, and this has not been documented in the BDAR.	The amended project does not encroach on or alter the proposed first order watercourse. There are some negligible impacts to native vegetation in this area and are accounted for in the BDAR.
	Further, the BDAR states that vegetation on Lot D will be retained, restored and managed under a Vegetation Management Plan. However, the original Bushfire Protection Assessment (Appendix P of	As described in the Riparian Assessment Report, a Vegetation Management Plan is proposed to be prepared for this area. 10m

Agency	Comment	Response
	EIS) and Revised Concept Masterplan – Fire Protection Plan indicates that all of Lot D must be managed as a 'defendable space' or Asset Protection Zone (APZ). Vegetation management for an APZ involves the removal and trimming of vegetation, and can impact on biodiversity values.	from the top of bank will be revegetated. In the remaining areas of the VMP, native vegetation communities will be maintained with weed treatment, but re-establishment of native vegetation on grassland areas is not proposed.
	EES recommends the BDAR be revisited to ensure that the impacts of the proposed works within and adjacent to Lot D are accurately assessed and presented. The assessment must include: • realignment of the watercourse and recreation of the riparian corridor • construction of stormwater detention basin • retaining walls, and • APZs.	BDAR accurately describes the extent of works in this area. Due to redesign, the watercourse is not being realigned. The stormwater detention basin is located outside the Vegetated Riparian Zone Retaining walls will not impact on the watercourse
	BAM-C to be finalised This has been addressed, with the exception of the following: • The GIS shapefile for Myotis habitat has not been received by EES • EES now has access to the calculator data and the Green and Golden Bell Frog (GGBF) habitat shapefile and notes that data in the BDAR is inconsistent with data in the GIS file and calculator, i.e: • GGBF polygon is 0.598 ha but the BDAR says the impact is 0.342 ha and the calculator says 0.93 ha • Data on the size of the Myotis polygon is not available (as above) but the BDAR says the impact is 2.975 ha and the calculator says 3.02 ha. • However, it is acknowledged that the number of credits required for these species is consistent between the BDAR and the calculator (5 and 29 for GGBF and Myotis respectively).	GIS shapefile for Southern Myotis will be uploaded. The GGBF issue has been revised in the final BDAR. Reference is made to the Expert Report for GGBF prepared by Francis Lemckert for the Draft Cumberland Plain Conservation Plan Assessment Report. The Expert Report noted: *It has been determined that there is not likely to be a population of the GGBF currently present within the WSAGA (Western Sydney Aerotropolis Growth Area). There are no records from within the GA, despite the presence of suitable habitat in rural areas in the form of a high density of water bodies. There is no evidence that it is currently present and the distance to the coast indicates it is unlikely that the GGBF would persist in this area. The two most closely associated records are single records not closely aligned with other records and so it is unlikely that a larger stable population has been or is present within the WSAGA* The draft Cumberland Plain Conservation Plan acknowledges there may be a population of GGBF along Ropes Creek in the Greater Penrith to Eastern Creek Corridor. The proposed development is not within that area. The GGBF Expert Report did note that a future movement corridor (if the species is found in the GPEC) could cross the north east corner of the site. This area is being retained and not impacted by the development.

Agency	Comment	Response
		Therefore, the GGBF has been excluded from further assessment and no credits required.
	Candidate species credit species assessment This has not been adequately addressed. For the reasons previously given, Acacia pubescens, Grevillea juniperina subsp. Juniperina, Marsdenia viridiflora subsp. Viridiflora, Meridolum corneovirens, and Pimelea spicata need to be assessed in accordance with Step 4 of section 6.4 of the BAM.	Survey for Meridolum corneovirens was undertaken in June 2021, with no individuals found. The BDAR provides additional information on the other species, including reference to the Expert Reports prepared for the draft Cumberland Plan Conservation Plan.
	Regarding the assertion that "the listed species are not cryptic", P. spicata is cryptic and M. corneovirens may not be readily observed because: Bionet states for P. spicata "use flowers to locate and identify as species is inconspicuous" https://www.environment.nsw.gov.au/AtlasApp/UI_Modules/TSM_/ProfileEdit.aspx?pId=10 632&pType=SpeciesCode the environmental impact assessment guidelines for this species state "Pimelea spicata is cryptic and difficult to detect, particularly when not in flower, so surveys should not be relied upon unless undertaken whilst the species is flowering" https://www.environment.nsw.gov.au/resources/nature/PimeleaSpicata0805EIA.pdf for M. corneovirens, Bionet states "Identification of live specimens is required early morning or in the evening during or after rain, while the ground and vegetation surfaces are still wet from the rain" and "shelters in loose soil around grass clumps" and "can dig several centimetres into soil to escape drought" https://www.environment.nsw.gov.au/AtlasApp/UI_Modules/TSM_/ProfileEdit.aspx?pId=10 526&pType=SpeciesCode.	As above
	Inconsistencies in the assessment for the Green and Golden Bell Frog This has not been adequately addressed. EES does not agree with the conclusion in the Biodiversity and Riparian Addendum that only one dam on the site provides suitable habitat for GGBF. Based on Table 6 of the Aldington Road Kemps Creek Riparian Assessment (Eco Logical Australia, 15 October 2020) (the riparian assessment), dams 2, 3, 4, 6, 7 and 10 provide potential habitat for this species. The information in the riparian assessment needs to be considered when determining the species polygon for GGBF, and when updating the BDAR. EES also recommends the BDAR be updated to report a consistent figure for direct impacts to GGBF habitat. Buffers for Green and Golden Bell Frog This has not been adequately addressed because it has not been explained why the ecologists concluded that potential habitat did not extend 200m from the dam. The photos in the BDAR and the riparian assessment, along with aerial imagery (Nearmap, dated Friday March 26 2021), show potential habitat in cleared areas, and: the environmental impact assessment guidelines state (page 2) "… drains, scrapes, depressions and farm dams along with the more natural coastal or floodplain wetland features…are all candidate sites	See response above in relation to GGBF.

Agency	Comment	Response
	for occupation by this species…Such sites are occupied and used mainly as breeding habitat. Foraging habitat requirements include tall, dense, grassy vegetation and tussock forming vegetation is known to be used for foraging and shelter…Over-wintering sites are another important habitat component that requires consideration in any site assessment…Such sites include the bases of dense vegetation tussocks, beneath rocks, timber, within logs or beneath ground debris including human refuse such as sheet iron etc.", https://www.environment.nsw.gov.au/resources/nature/GAndGbellfrogEia0703.pdf Bionet identifies habitat constraints to be within 1km of semi-permanent/ephemeral wet areas, swamps, and waterbodies https://www.environment.nsw.gov.au/AtlasApp/UI_Modules/TSM_/ProfileEdit.aspx?pId=10 483&pType=Species Code This species is also known to occur in highly disturbed areas, particularly in Greater Sydney https://www.environment.nsw.gov.au/AtlasApp/UI_Modules/TSM_/LinksEdit.aspx?pId=104 83&pType=Specie As such, EES' previous comment applies, and a 200m buffer should be applied around waterbodies.	
	Prescribed impacts This has not been adequately addressed because: • fauna can use buildings and other human-made structures that are abandoned and in use, and in a range of conditions • sections 6.7.1.3(b) and 9.2.1.3 of the BAM have not been applied • section 9.3.1.1 of the BAM states "The proponent must identify measures to mitigate or manage impacts in accordance with the guidelines for mitigating and managing impacts on biodiversity values at Subsection 9.3.2 and Subsection 9.3.3", with subsection 9.3.3 being "mitigating prescribed biodiversity impacts" • As such, EES' previous comment remains relevant and the following further assessment is required: • application of sections 6.7.1.3(b) and 9.2.1.3 of the BAM, and • reconsideration of the types of habitat available for microbats on the site.	The BDAR acknowledges that human made structures may provide habitat for species including microbats. The study area contains dwellings, sheds and shade structures as well as farm dams. The BDAR proposes a mitigation measure of preparing and implementing a Fauna Management Plan that would involve: • Dam dewatering and relocation of native fauna • Inspection of buildings prior to demolition to determine whether they contain microbats or other fauna. If microbats are found, an exclusion process would be followed. Microbats using human made structures can move their use of building. Therefore, rather than surveying now and having to re-survey again when it is time to demolish buildings, the practical approach is to survey for microbat use of structures prior to demolition and then implement exclusion techniques if required.
	Avoiding and minimising impacts on biodiversity This has not been adequately addressed. In accordance with section 8 of the BAM, more information is needed to document and justify the location and design of the project, particularly in relation to the location of the proposed bio-retention basin in the north eastern corner of the site. This basin will remove a portion of the endangered	Redesign of the north east corner has resulted in all riparian zones being avoided The BDAR has included a 5m construction buffer

Agency	Comment	Response
	Swamp Oak floodplain swamp forest, which forms part of, and is contiguous with, the riparian vegetation in the proposed VMP area.	
	Mitigation measures Comment: This has been partly addressed. Table 27 in the BDAR needs to be updated to cover: • the construction buffer • all of the vegetation to be included in the VMP area • dam dewatering, and searching human-made structures for fauna before they are demolished.	Mitigation measures include proposed Fauna Management Plan that would include dam dewatering and pre-demolition survey of man-made structures. The Fauna Management Plan would be prepared post-approval but prior to any works taking place. The VMP can be prepared post-approval and will cover riparian areas in the north east corner of the site

2. Stage 1: Biodiversity assessment

2.1 Introduction

This Biodiversity Development Assessment Report (BDAR) has been prepared by Kirsten Velthuis (BAAS 19048) who is an Accredited Person under the NSW *Biodiversity Conservation Act 2016* (BC Act). The report has been peer reviewed by Accredited Assessor Nicole McVicar (18077). The contents of this BDAR comply with the minimum requirements outlined in Table 25 of the Biodiversity Assessment Method (BAM) (Office of Environment and Heritage (OEH) 2020) and address the Secretary's Environmental Assessment Requirement for '*An assessment of the biodiversity impacts in accordance with the Biodiversity Assessment Method and documented in a Biodiversity Development Assessment Report*'.

Definitions relevant to the report are provided in Appendix A.

2.1.1 General description of the development site

The proposed development site, defined as the area of land that is subject to the proposed development application, is 72.09 ha and located within the Penrith City Council local government area (LGA). The development site is bordered by Aldington Road to the west, and rural, residential properties to the north, east and south. The development site currently contains market gardens, rural/residential properties, native vegetation and regenerating native vegetation. The development site consists of the following adjoining parcels of land:

Address	Title
106-124 Aldington Road, Kemps Creek	Lot 32 DP258949
126-142 Aldington Road, Kemps Creek	Lot 31 DP258949
144-160 Aldington Road, Kemps Creek	Lot 30 DP258949
162-178 Aldington Road, Kemps Creek	Lot 23 DP255560
180-196 Aldington Road, Kemps Creek	Lot 22 DP255560
198-212 Aldington Road, Kemps Creek	Lot 21 DP255560
214-228 Aldington Road, Kemps Creek	Lot 20 DP255560

The general description of the development site and development footprint is displayed on the following maps:

- Site Map (Figure 1)
- Location Map (Figure 2)
- Development footprint (Figure 3).

2.1.2 Sources of information used

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

- BioNet Vegetation Classification (accessed between August 2019 and August 2020)
- BioNet / Atlas of NSW Wildlife 5 km database search (Department of Planning Industry and Environment (DPIE), August 2019 and August 2020)
- Commonwealth *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Search Tool 5 km database search (DAWE, accessed between August 2019 and August 2020). Likelihood of occurrence table has been provided in Appendix C.
- NSW Government Biodiversity Values Map and Threshold Tool (BV Map). The subject land is mapped on BV Map (accessed August 2020)
- CTENVIRONMENTAL (2020). Mamre Road Precinct Rezoning: Waterway Assessment– Kemps Creek and Mount Vernon. Prepared for Sydney Water.
- Waterway Assessment– Kemps Creek and Mount Vernon. Prepared for Sydney Water.
- Aerial mapping (SIXMaps and NearMaps) (accessed between August 2019 and August 2020)
- Additional geographic information system (GIS) datasets including soil, topography, geology and drainage
- Draft Cumberland Plain Conservation Plan 2020, Department of Planning, Industry and Environment
- Draft Cumberland Plain Assessment Report 2020, Biosis and Open Lines Environmental Consulting

Figure 1: Site Map

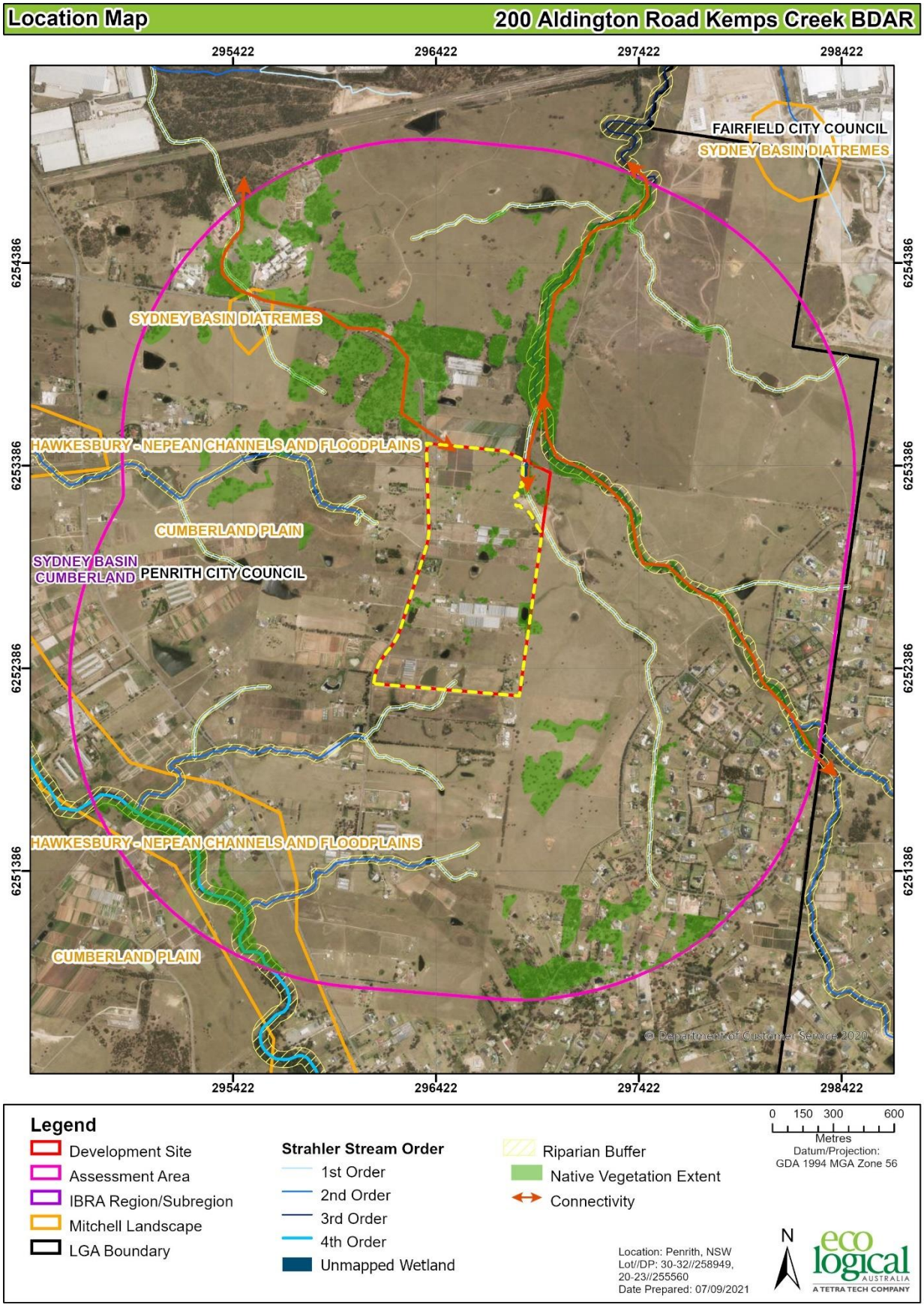


Figure 2: Location Map

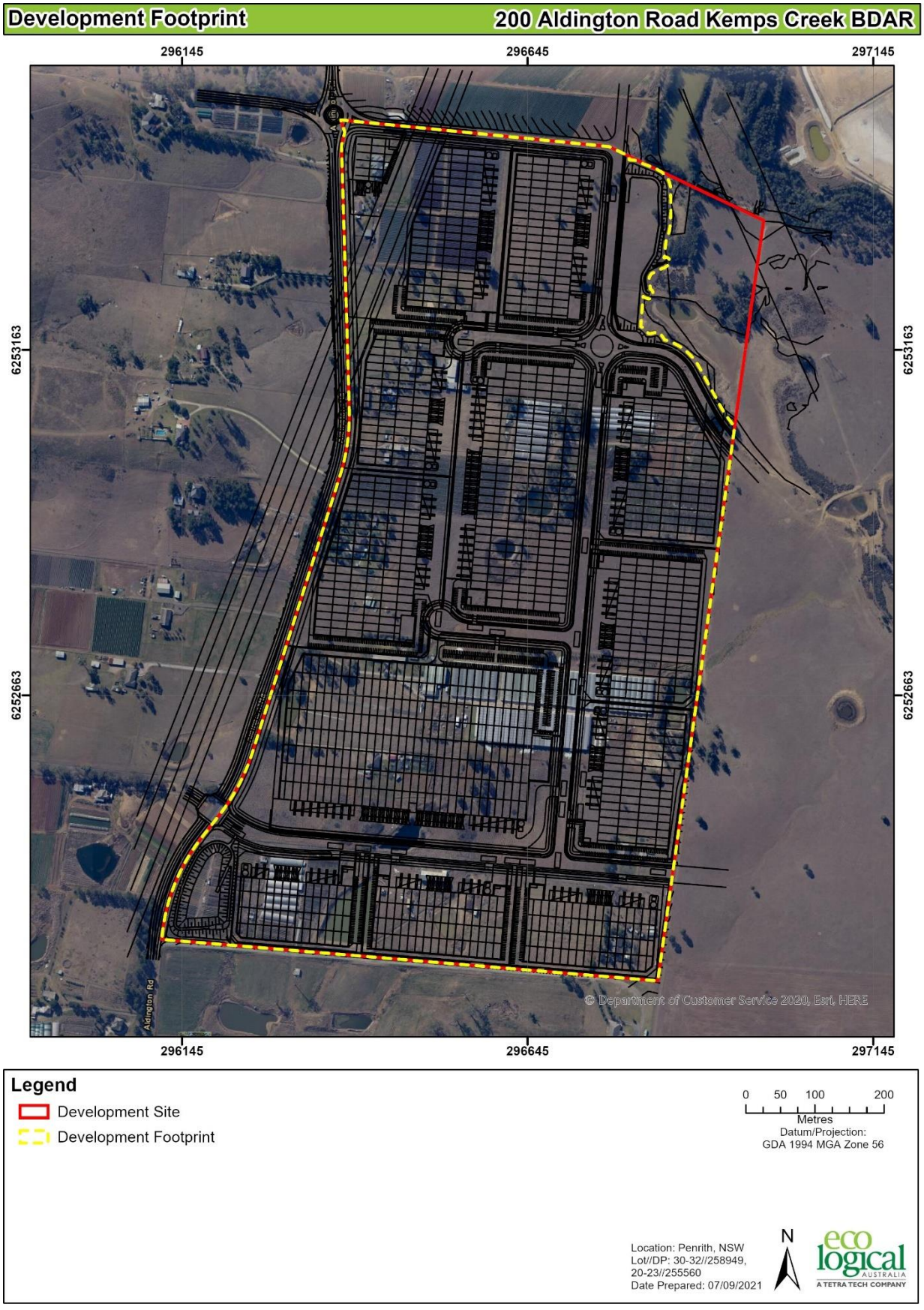


Figure 3: Development footprint

2.2 Legislative context

Table 1: Legislative context

Name	Relevance to the project
Commonwealth	
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.
State	
Environmental Planning and Assessment Act 1979 (EP&A Act)	The proposed development is State Significant Development (SSD) and is to be assessed under Part 4.1 of the EP&A Act. Secretary's Environmental Assessment Requirements (SEARS) have been issued (SSD-10479 issued July 2020) and the relevant SEARs are as follows: *The EIS must address the following specific matters:* *Biodiversity – including:* • *the biodiversity impacts in accordance with the Biodiversity Assessment Method and documented in a Biodiversity Development Assessment Report (BDAR); and* • *the development's impacts on the riparian corridor and wetland on site, including detailed interface management measures.*
Biodiversity Conservation Act 2016 (BC Act)	The proposed development is SSD and thus requires the submission of a Biodiversity Development Assessment Report in accordance with Part 7 Division 2 Section 7.9 (2) of the BC Act: *Any such application is to be accompanied by a biodiversity development assessment report unless the Planning Agency Head and the Environment Agency Head determine that the proposed development is not likely to have any significant impact on biodiversity values.*
*Fisheries Management Act 1994 (*FM Act)	The 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.
Local Land Services Amendment Act 2016 (LLS Act)	The LLS Act does not apply to areas of the state to which the Vegetation in Non Rural Area State Environmental Planning Policy 2017 (Vegetation SEPP) applies. The Vegetation SEPP applies to the City of Penrith local government area.
Water Management Act 2000 (WM Act)	The WM Act is administered by Natural Resources Access Regulator (NRAR) and establishes an approval regime for activities within waterfront land, defined as the land 40 m from the highest bank of a river, lake or estuary. In accordance with Part 4, Division 4.7, Section 4.41 (1) (g) of the EP&A Act, a water use approval under Section 89, a water management work approval under Section 90 or an activity approval (other than an aquifer interference approval) under Section 91 of the WM Act is not required for SSD. However, the regulatory framework of the WM Act and associated guidelines should be used to guide assessments for these developments.
Planning Instruments	
Vegetation in Non Rural Area State Environmental Planning Policy 2017 (Vegetation SEPP)	The Vegetation SEPP applies to development in urban areas and environmental conservation zones that does not require consent. As this project requires consent under the EP&A Act, the Vegetation SEPP does not apply.

Name	Relevance to the project
SEPP (Koala Habitat Protection) 2021 (Koala Habitat Protection SEPP)	The SEPP does not apply to Penrith LGA.
Coastal Management 2018	SEPP Coastal Management 2018 consolidated SEPP 14 Coastal Wetlands, SEPP 26 Littoral Rainforests and SEPP 71 Coastal Protection. The proposed development is not located on or adjacent to land subject to this SEPP therefore this SEPP is not applicable.
SEPP (Western Sydney Employment Area) 2009	The subject site is zoned IN1 General Industrial, RE2 Private Recreation and E2 Environmental Conservation under the SEPP.
Mamre Road Precinct DCP (Nov 2021)	The DCP contains Precinct Planning outcomes for Environmental Conservation and Recreation Zonesand Riparian Land.
Draft Cumberland Plain Conservation Plan 2020 (CPCP)	The Draft Cumberland Plain Conservation Plan establishes long-term certainty for biodiversity conservation and development in Western Sydney. The Plan supports the delivery of infrastructure, housing and jobs for Western Sydney in a planned and strategic way that also protects and maintains key biodiversity values of Western Sydney. Urban capable lands are the areas directly impacted by the proposed strategic urban and agricultural development as covered in the Report. Urban capable lands refers to nominated areas where the NSW Government has streamlined the delivery of priority housing and infrastructure through the biodiversity certification process. The proposed development site is categorised as 'Urban Capable'. The draft CPCP was supported by a Cumberland Plain Assessment Report (Biosis and Open Lines, 2020). The Assessment Report includes Expert Reports for several species of relevance to this BDAR.

2.3 Landscape features

2.3.1 Interim Biogeographic Regionalisation for Australia (IBRA) regions and subregions

The development site falls entirely within the Sydney Basin IBRA region and Cumberland subregion.

2.3.2 Mitchell Landscapes

The development site falls within the Cumberland Plain Mitchell Landscapes as outlined in Table 2.

Table 2: Mitchell Landscapes

Mitchell landscape	Description
Cumberland Plain	Low rolling hills and valleys in a rain shadow area between the Blue Mountains and the coast on horizontal Triassic shales and lithic sandstones forming a down-warped block on the coastal side of the Lapstone monocline. Intruded by a small number of volcanic vents and partly covered by Tertiary river gravels and sands (Hawkesbury-Nepean Terrace Gravels ecosystem). Quaternary alluvium along the mains streams. General elevation 30 to 120m, local relief 50m and sometimes affected by salt in tributary valley floors. Pedal uniform red to brown clays on volcanic hills. Red and brown texture-contrast soils on crests grading to yellow harsh texture-contrast soils in valleys Woodlands and open forest of *Eucalyptus moluccana* (Grey Box), *Eucalyptus tereticornis* (Forest Red Gum), *Eucalyptus crebra* (Narrow-leaved Ironbark), *Eucalyptus eugenioides* (Thin-leaved Stringybark), *Eucalyptus amplifolia* (Cabbage Gum) and *Angophora subvelutina* (Broad-leaved Apple). Grassy to

Mitchell landscape	Description
	shrubby understorey often dominated by blackthorn, poorly drained valley floors, often salt affected with swamp oak and paperbark (Department of Environment and Climate Change (now DPIE) 2002).

2.3.3 Native vegetation extent

The current percent native vegetation cover in the landscape was assessed using a Geographic Information System (GIS) and aerial imagery sourced from NearMaps using increments of 5%. The extent of native vegetation within the development site and 1500 m buffer is outlined below in Table 3.

Table 3: Native vegetation extent

Area within the 1,500 m buffer area	Native vegetation within the 1,500 m buffer area	Area of native vegetation within the development site	Percent native vegetation within the 1,500 m buffer area (%)
1335 ha	130 ha	3.71 ha	10%

2.3.4 Rivers and streams

The development site contains rivers and streams as outlined in Table 4.

Table 4: Rivers and streams

River/stream	Order	Riparian buffer (m)
Unnamed	1st order	10
Unnamed	1st order	10
Ropes Creek	3rd order	30

2.3.5 Wetlands

There were 11 farm dams identified within and adjacent to the study area, and the development site contains one unnamed local wetland. This is displayed on Figure 1.

2.3.6 Connectivity features

The development site contains limited connectivity features outlined in Table 5 and shown in Figure 1 and Figure 2.

A vegetated corridor exists along the Ropes Creek riparian corridor to the north west. This vegetation remains connected both north and south of the development site until it becomes fragmented by roads, namely Capitol Hill Drive and residential areas in the south-east. It is also fragmented by private roads and industrial areas in the suburb of Orchard Hills in the north-east. Patches of native vegetation to the north-west of the development site also provides connectivity for highly mobile species such as birds or bats moving through the landscape.

Table 5 Connectivity features

Connectivity feature name	Feature type
Ropes Creek riparian corridor to the north and south east	Connectivity links
Patches of native vegetation to the north-west	Connectivity links

2.3.7 Areas of geological significance and soil hazard features

The development site does not contain areas of geological significance and soil hazard features.

2.3.8 Site context

2.3.8.1 Method applied

The site based method has been applied to this development.

2.3.8.2 Patch size

Patch size was calculated using available vegetation mapping for all patches of intact native vegetation on and adjoining the development site. The patch size area was <5ha for each vegetation zone.

2.4 Native vegetation

2.4.1 Survey effort

Vegetation survey and BAM plots were undertaken within the development site by ELA ecologists Kirsten Velthuis, Stacey Wilson and Claire Wheeler on 21 July 2020. A total of six (6) full-floristic and vegetation integrity plots were undertaken in accordance with the BAM.

The site visit also included an assessment of habitat features within the development footprint but did not include targeted threatened species searches. All field data collected, and full-floristic and vegetation integrity plots are included in Appendix B and C. Plot photos are included in Table 9 -13.

2.4.2 Plant Community Types present

A total of three PCTs were identified on the development site (Table 6, Figure 4).

A total of six full-floristic and vegetation integrity plots were surveyed to identify vegetation zones, PCTs and TECs within the development site. Five vegetation zones were identified in the development site (Table 7, Figure 5).

All three PCTs are threatened ecological communities (TECs) listed under the BC Act.

Justification for the selection of PCTs occurring on the development site is based on a qualitative assessment and quantitative analysis of full-floristic plot data and is provided in Section 2.4.3.4.

Table 6: Plant Community Types within the development footprint

PCT ID	PCT Name	Vegetation Class	Vegetation Formation	Area within the development site (ha)	Percent cleared
835	Forest Red Gum – Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion	Coastal Floodplain Wetlands	Forested Wetlands	1.69	93
850	Grey Box – Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion	Coastal Valley Grassy Woodlands	Grassy Woodlands	0.12	88

PCT ID	PCT Name	Vegetation Class	Vegetation Formation	Area within the development site (ha)	Percent cleared
1232	Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion	Coastal Swamp Forests	Forested Wetlands	1.91	95

Table 7: Vegetation integrity plots

Veg Zone	PCT ID	PCT Name	Condition	Area with the development site (ha)	Plots required	Plots surveyed
1	835	Forest Red Gum – Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion	Moderate	0.54	1	1
2	835	Forest Red Gum – Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion	Low - Moderate	1.15	1	2
3	850	Grey Box – Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion	low	0.12	1	1
4	1232	Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion	low	1.24	1	1
5	1232	Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion	moderate	0.67	1	1
Totals				3.71	**5**	**6**

2.4.3 Threatened Ecological Communities

TECs present within the development site are summarised in Table 8 and display in Figure 6.

2.4.3.1 River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions

Through floristic analysis it was determined that PCT 835 (River- Flat Eucalypt Forest) does correspond to the NSW BC Act definition of *River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions.*

River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions is associated with silts, clay-loams and sandy loams, on periodically

inundated alluvial flats, drainage lines and river terraces associated with coastal floodplains, below 50m elevation and is known to occur within the Penrith local government area. The best-fit PCT – PCT 835 was determined using a quantitative analysis of floristic plot data from three sample plots undertaken in the vegetation community, and a qualitative analysis of the site's characteristics (such as soil type, position in the landscape, and elevation). The quantitative analysis resulted in a very strong match to PCT 835 based purely on the species composition. This site's abiotic characteristics (soil type, landscape position etc.) also provide strong justification for assigning this vegetation to PCT 835.

2.4.3.2 Cumberland Plain Woodland in the Sydney Basin Bioregion

The BioNet Vegetation Classification lists PCT 850 Grey Box – Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion as a component of *Cumberland Plain Woodland in the Sydney Basin Bioregion* which is listed as critically endangered under the BC Act and as critically endangered as part of *Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest* under the Commonwealth EPBC Act.

The final determination for Cumberland Plain Woodland listed under the BC Act states:

"*Native grassland derived from clearing of the woodland and forest are also part of this community if they contain characteristic non-woody species listed in paragraph 3.*" (Scientific Committee 2009).

PCT 850 mapped in the development site contains native shrubs *Dillwynia retorta*, native grasses *Aristida ramosa, Themeda triandra* and native herbs. Therefore, it satisfies the criteria for listing as part of the Cumberland Plain Woodland under the BC Act.

PCT 850 may also correspond with *Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest* listed as a critically endangered ecological community, provided it satisfied the listing criteria under the EPBC Act (Threatened Species Scientific Committee 2009) However, PCT 850 vegetation did not meet the threshold criteria for listing under the EPBC Act as the patch size is less than 0.5 ha and the ground cover comprised > 30% exotic species. Therefore it was determined that PCT 850 does not correspond with the Commonwealth definition of *Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest.*

2.4.3.3 Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner Bioregion

Through floristic analysis it was determined that PCT 1232 Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion does correspond to the NSW BC Act definition of the TEC *Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner Bioregions*.

The PCT on the development site does not correspond to the Commonwealth definition of Co*astal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community.* The approved conservation and listing advice for the Commonwealth definition of the community was consulted to determine if PCT 1232 within the development site corresponds with the Commonwealth definition of Coastal Swamp Oak Forest. PCT 1232 identified on site occurs as two discrete patches: vegetation zone 5 and vegetation zone 6. The sizes of these patches are 1.26 and 0.68 respectively. While both patches meet the small patch criteria, non-native species comprise of over 20% of the total understorey vegetation cover within both patches. Further to this, neither patch is

connected to a larger area of contiguous native vegetation >5 ha. As such, it has been determined that PCT 1232 does not correspond with the Commonwealth definition of Coastal Swamp Oak Forest.

Table 8: Threatened Ecological Communities

PCT ID	BC Act			EPBC Act		
	Listing status	Name	Area (ha) within development site	Listing status	Name	Area (ha)
835	Endangered	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	1.69	Not listed	N/A	N/A
850	Critically Endangered	Cumberland Plain Woodland of the Sydney Basin Bioregion	0.12	The community on site does not meet the condition thresholds for listing under the EPBC Act	N/A	N/A
1232	Endangered	Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	1.91	The community on site does not meet the condition thresholds for listing under the EPBC Act	N/A	N/A

2.4.3.4 PCT Selection Justification and Vegetation Zone Description

Table 9 to Table 13 provide a detailed description and justification of the PCT assignment for each of the vegetation zones within the development site.

Table 9: PCT 835 Vegetation Zone 1

VEGETATION ZONE 1	
PCT	835
PCT Name	Forest Red Gum – Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion
Condition	Moderate
Area	0.54 ha
TEC	NSW BC Act River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions
Plots	1
Vegetation Integrity Score	34.9
PCT Selection criteria	Soil type, dominant canopy, midstorey and groundcover species, vegetation formation and class, IBRA subregion, landscape position
Diagnostic tools	The Native Vegetation of Sydney Metropolitan Area 2016 V 3.1 diagnostic species list, BioNet Vegetation Classification
Description/ justification	Open woodland structure comprising primarily regrowth canopy species *Casuarina glauca* (Swamp Oak) and *Angophora subvelutina* (Broad-leaved Apple). The native midstorey was absent from this zone and the native groundcover comprised a dense cover of *Einadia nutans* subsp. *nutans.* The remainder of the understorey cover comprised weeds and exotic species including *Bidens pilosa* var. *pilosa* (Cobbler's Peg), *Capsella bursa-pastoris* (Shepherd's Purse), *Setaria pumila* (Pale Pigeon Grass) and *Sida rhombifolia* (Paddy's Lucerne).
Photo	

Table 10: PCT 835 Vegetation Zone 2

VEGETATION ZONE 2	
PCT	835
PCT Name	Forest Red Gum – Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion
Condition	Low - Moderate
Area	1.15 ha
TEC	NSW BC Act River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions
Plots	2
Vegetation Integrity Score	21.3
PCT Selection criteria	Soil type, dominant canopy, midstorey and groundcover species, vegetation formation and class, IBRA subregion, landscape position
Diagnostic tools	The Native Vegetation of Sydney Metropolitan Area 2016 V 3.1 diagnostic species list, BioNet Vegetation Classification
Description/ justification	Open woodland structure comprising *Eucalyptus tereticornis* (Forest Red Gum), *Corymbia intermedia* (Pink Bloodwood), *Eucalyptus amplifolia* (Cabbage Gum). A native midstorey was absent from this zone and native groundcover comprised *Dichondra repens* (Kidney Weed), *Glycine tabacina*, *Microlaena stipoides* var. *stipoides*, *Lomandra filiformis* subsp. *filiformis* (Wattle mat-rush). The remainder of the understorey cover comprised weeds and exotic species including *Sida rhombifolia., Oxalis* sp., *Solanum nigrum* (Blackberry Nightshade), *Phytolacca octandra* (Inkweed) and *Senecio madagascariensis* (Fireweed).
Photo	

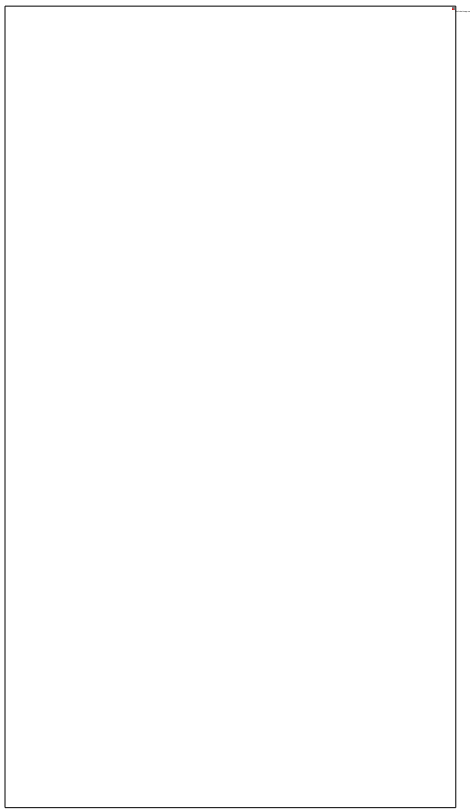
Table 11: PCT 850 Vegetation Zone 3

VEGETATION ZONE 3	
PCT	850
PCT Name	Grey Box – Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion
Condition	Low
Area	0.12 ha
TEC	NSW BC Act Cumberland Plain Woodland of the Sydney Basin Bioregion
Plots	1
Vegetation Integrity Score	1.5
PCT Selection criteria	Soil type, dominant canopy, midstorey and groundcover species, vegetation formation and class, IBRA subregion, landscape position
Diagnostic tools	The Native Vegetation of Sydney Metropolitan Area 2016 V 3.1 diagnostic species list, BioNet Vegetation Classification
Description/ justification	The native canopy was absent within this vegetation zone. The native midstorey contained *Acacia decurrens* (Black Wattle), *Acacia implexa* (Hickory Wattle) and native groundcover consisted of *Einadia polygonoides* (Knotweed Goosefoot). The groundcover was highly disturbed and contains exotic grasses including *Cenchrus clandestinus* (Kikuyu Grass), *Ehrharta erecta* (Panic Veldtgrass), *Eragrostis curvula* (African Lovegrass) and *Seteria pumila* (Pale Pigeon Grass), *Foeniculum vulgare* (Fennel), and *Anredera cordifolia* (Madeira vine).
Photo	

Table 12: PCT 1232 Vegetation Zone 4

VEGETATION ZONE 4	
PCT	1232
PCT Name	Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion
Condition	Low
Area	1.24 ha
TEC	NSW BC Act Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner Bioregions
Plots	1
Vegetation Integrity Score	11
PCT Selection criteria	Soil type, dominant canopy, midstorey and groundcover species, vegetation formation and class, IBRA subregion, landscape position
Diagnostic tools	The Native Vegetation of Sydney Metropolitan Area 2016 V 3.1 diagnostic species list, BioNet Vegetation Classification.
Description/ justification	Canopy solely comprised *Casuarina glauca* (Swamp Oak). No midstorey was present. A highly disturbed groundcover with few native species was present including *Persicaria decipiens (Slender Knotweed); Digitaria parviflora (Native Summer Grass)* and *Cynodon dactylon* (Common Couch).
Photo	

Table 13: PCT 1232 Vegetation Zone 5

VEGETATION ZONE 5	
PCT	1232
PCT Name	Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion
Condition	Moderate
Area	0.67 ha
TEC	NSW BC Act Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner Bioregions
Plots	1
Vegetation Integrity Score	21.4
PCT Selection criteria	Soil type, dominant canopy, midstorey and groundcover species, vegetation formation and class, IBRA subregion, landscape position
Diagnostic tools	The Native Vegetation of Sydney Metropolitan Area 2016 V 3.1 diagnostic species list, BioNet Vegetation Classification.
Description/ justification	The canopy comprised *Casuarina glauca* (Swamp Sheoak). No midstorey was present. A moderately disturbed ground cover was present containing *Dichondra repens* (Kidney Weed), *Geranium homeanum, Alternanthera denticulata* (Lesser Joyweed) and *Persicaria decipiens* (Slender Knotweed).
Photo	

2.4.4 Vegetation integrity assessment

The vegetation integrity assessment using the Credit Calculator (BAMC) was undertaken and the results are outlined in Table 14.

Table 14: Vegetation integrity

Veg Zone	PCT ID	Condition	Composition Condition Score	Structure Condition Score	Function Condition Score	Current vegetation integrity score
1	835	Moderate	11.9	51.1	70.4	34.9
2	835	Low - Moderate	19.1	11.4	44.5	21.3
3	850	Low	3.6	1	0	1.5
4	1232	Low	19.6	2.4	28.8	11
5	1232	Moderate	16.9	12.7	45.9	21.4

Use of local data

The use of local data is not proposed as part of this assessment.

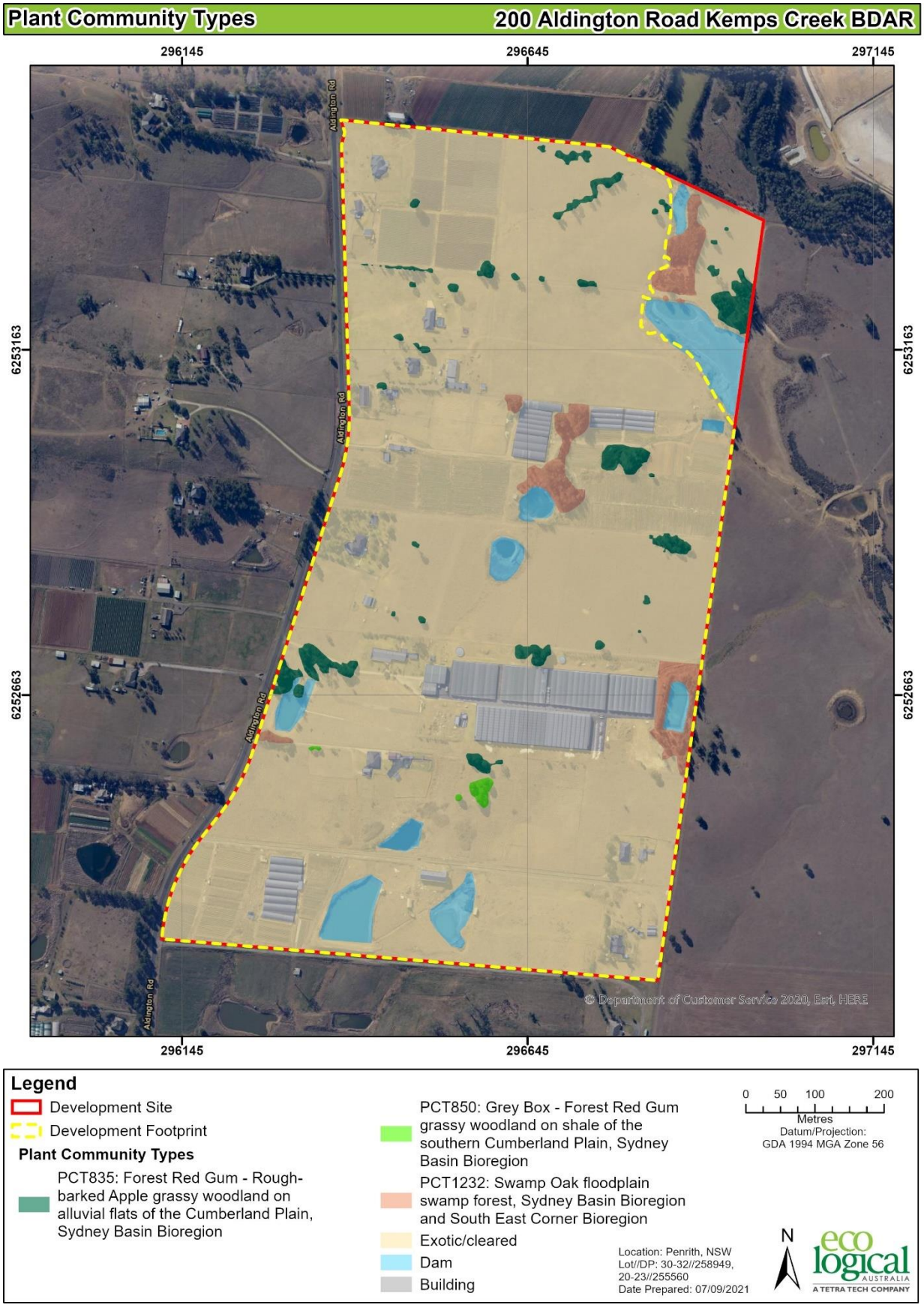


Figure 4: Plant Community Types within the development site

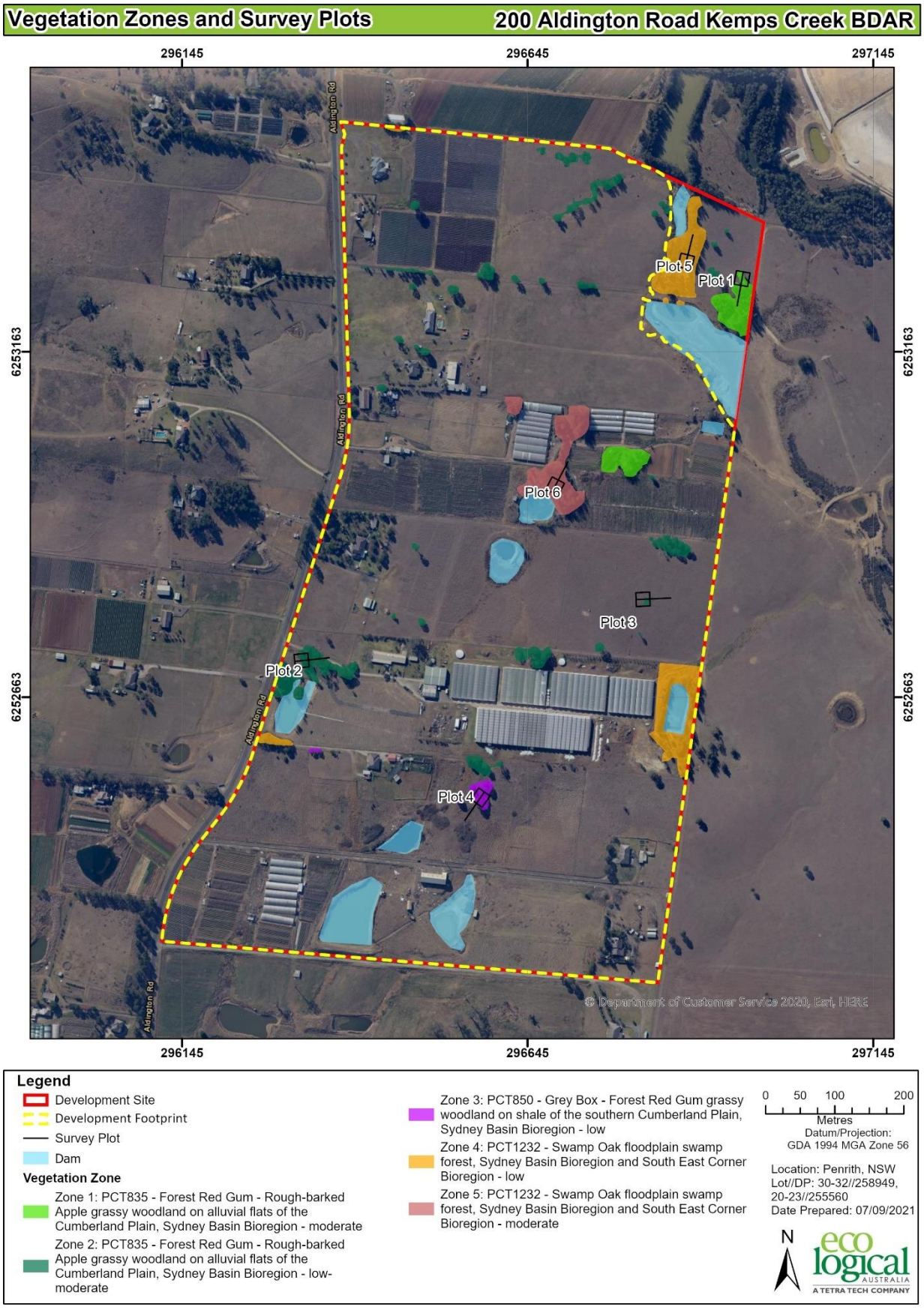


Figure 5: Vegetation zones and plot locations within the development site

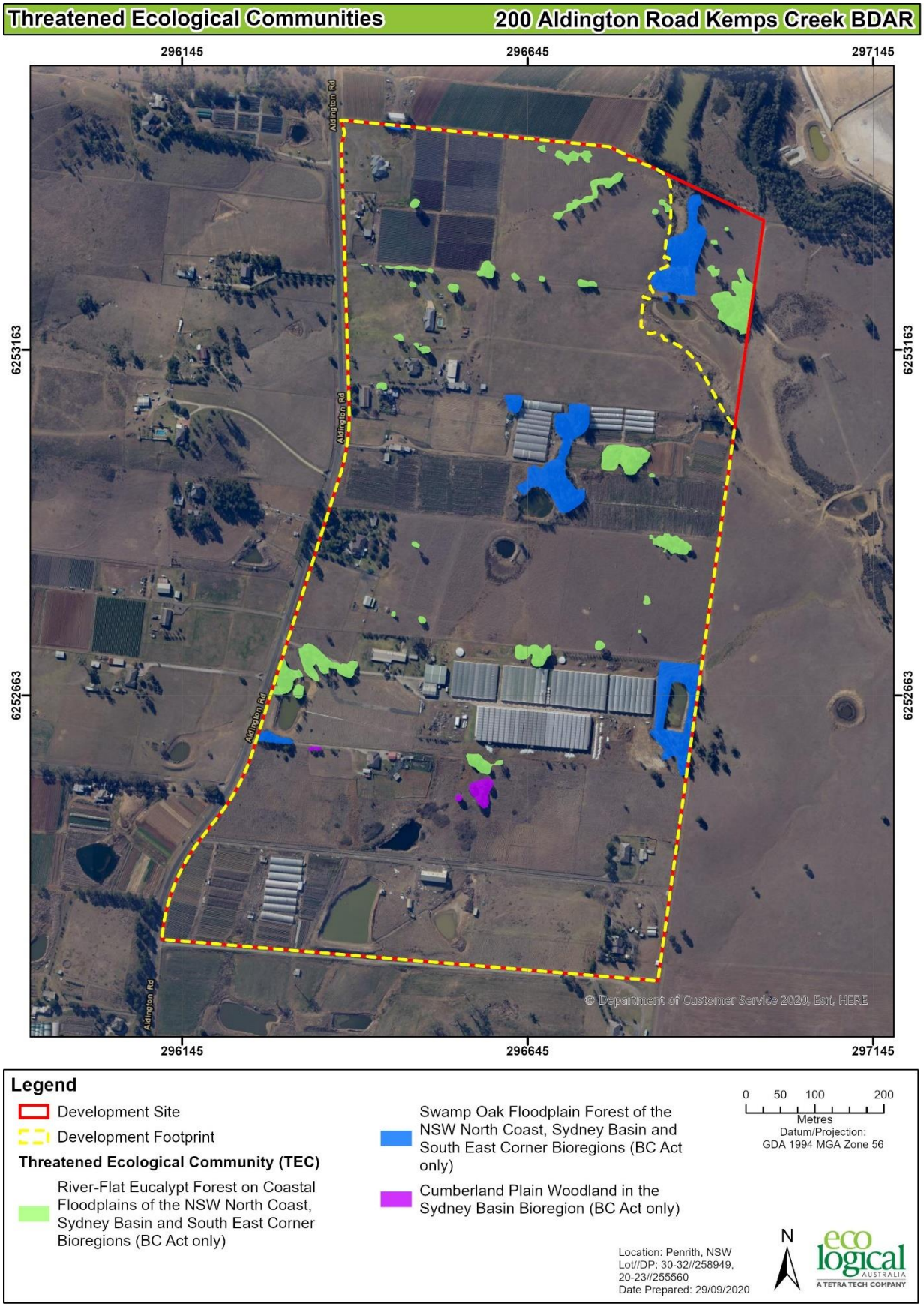


Figure 6: Threatened Ecological Communities

2.5 Threatened species

Habitat assessments were undertaken during the field survey to determine the likelihood of threatened flora and fauna species occurring within the development site on an intermittent or permanent basis. Habitat assessments for fauna species involved a search for hollow-bearing trees within the development site, and a search for evidence of fauna foraging such as chewed cones, sap trees or roosting habitat in the form of whitewash/pellets.

It was found that hollow bearing trees were present within the development site. Multiple artificial structures such as houses and sheds (which may contain microbat habitat) were present within the development site. Additionally, the development site contained riparian areas and dams.

The development site contains habitat for threatened species as detailed in section 1.5.1 and 1.5.2 below.

2.5.1 Ecosystem credit species

Ecosystem credit species predicted to occur at the development site, their associated habitat constraints, geographic limitations and sensitivity to gain class is included in Table 15.

Ecosystem credit species which have been excluded from the assessment and relevant justification is also included in Table 15.

Table 15: Justification for exclusion of predicted ecosystem credit species

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
Anthochaera phrygia	Regent Honeyeater (Foraging)	N/A	High	CE	CE	Included Occasional seasonal foraging habitat features associated with this species were identified within the development site.
Artamus cyanopterus cyanopterus	Dusky Woodswallow	N/A	Moderate	V	Not Listed	Included Occasional foraging habitat features associated with this species were identified within the development site.
Botaurus poiciloptilus	Australasian Bittern	N/A	Moderate	E	E	Included Habitat for this species was marginal and poor in condition in the development site
Calyptorhynchus lathami	Glossy Black-Cockatoo (Foraging)	Other Presence of Casuarina species	High	V	Not Listed	Included The development site contains *Casuarina* species, which comprise suitable foraging habitat for this species.

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
Chthonicola sagittata	Speckled Warbler	N/A	High	V	Not Listed	Excluded Large, relatively undisturbed remnants are absent within the development site.
Climacteris picumnus victoriae	Brown Treecreeper	N/A	High	V	Not Listed	Included Foraging habitat features associated with this species were identified within the development site.
Dasyurus maculatus	Spotted-tailed Quoll	N/A	High	V	E	Excluded 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. While the development site has some connectivity to vegetation areas, habitat within the development site is minimal and vegetated areas it is connected to are small and not intact.
Glossopsitta pusilla	Little Lorikeet	N/A	High	V	Not Listed	Included The development site contains flowering eucalypts and riparian habitats which comprise suitable foraging habitat for this species.
Haliaeetus leucogaster	White-bellied Sea-Eagle (Foraging)	n/a	High	V	Not Listed	Excluded Large waterbodies which are habitat features associated with this species were not identified within the development site.
Lathamus discolor	Swift Parrot (Foraging)	N/A	Moderate	E	CE	Included Foraging habitat features associated with this species were identified within the development site.
Melanodryas cucullate cucullate	Hooded Robin (South-eastern form)	N/A	Moderate	V	Not Listed	Included Foraging habitat features associated with this species were identified within the development site.
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	N/A	High	V	Not Listed	Included Foraging features associated with this species were identified within the development site.

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
Miniopterus australis	Little Bentwing-bat (Foraging)	N/A	High	V	Not Listed	Included Foraging habitat features associated with this species were identified within the development site.
Miniopterus orianae oceanensis	Large Bentwing-bat (Foraging)	N/A	High	V	Not Listed	Included Foraging habitat features associated with this species were identified within the development site.
Pandion cristatus	Eastern Osprey (Foraging)	N/A	Moderate	V	Not Listed	Excluded Habitat features for this species are not present within the development site.
Petroica boodang	Scarlet Robin	N/A	Moderate	V	Not Listed	Included Foraging habitat features associated with this species were identified within the development site.
Petroica phoenicea	Flame Robin	N/A	Moderate	V	Not Listed	Included Foraging habitat features associated with this species were identified within the development site.
Phascolarctos cinereus	Koala (Foraging)	N/A	High	V	V	Included The development site contains koala multiple feed tree species as identified in the Koala SEPP.
Pteropus poliocephalus	Grey-headed Flying-fox (Foraging)	N/A	High	V	V	Included Seasonal foraging habitat was identified within the development site.
Rostratula australis	Australian Painted Snipe	N/A	Moderate	E	E	Excluded Habitat for this species was not considered suitable in the development site
Stagonopleura guttata	Diamond Firetail	N/A	Moderate	V	Not Listed	Included Foraging habitat features associated with this species were identified within the development site.
Stictonetta naevosa	Freckled Duck	N/A	Moderate	V	Not listed	Included Habitat for this species was marginal and in poor condition in the development site

2.5.2 Species credit species

Species credit species predicted to occur at the development site (i.e. candidate species), their associated habitat constraints, geographic limitations and sensitivity to gain class are included in Table 16.

Species credit species which have been excluded from the assessment and relevant justification are also included in Table 16.

Table 16: Candidate species credit species

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
Acacia pubescens	Downy Wattle	N/A	High	V	V	Excluded Suitable habitat was not present within the development site.
Anthochaera phrygia	Regent Honeyeater (Breeding)	N/A	High	CE	CE	Excluded This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site is not within an important breeding area for this species as per the BAM Important Areas map in BOAMS (date accessed 23 September 2020)
Caladenia tessellata	Thick Lip Spider Orchid	N/A	Moderate	E	V	Excluded Habitat for this species was not considered suitable in the development site due to the level of disturbance. Furthermore, this species is only known from old records in Sydney area.
Callistemon linearifolius	Netted Bottle Brush	N/A	Moderate	V	Not Listed	Excluded This species is only known in the Sydney area within the Hornsby Plateau area near the Hawkesbury River.
Calyptorhynchus lathami	Glossy Black-Cockatoo (Breeding)	Hollow bearing trees Living or dead tree with hollows greater than 15 cm diameter and greater than 5 m above ground	High	V	Not Listed	Excluded This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The presence of this species was not identified and it was determined that the habitat is substantially disturbed such that this species is unlikely to occur in the development site.
Cynanchum elegans	White-flowered Wax Plant	N/A	High	E	E	Excluded

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
						No suitable habitat within the development site, no local records.
Eucalyptus benthamii	Camden White Gum	N/A	High	E	E	Excluded The presence of this species was not identified and it was determined that the habitat is substantially disturbed such that this species is unlikely to occur in the development site.
Grevillea juniperina subsp. juniperina	Juniper-leaved Grevillea	N/A	Mod	V	Not Listed	Excluded The presence of this species was not identified (conspicuous species) and it was determined that the habitat is substantially disturbed such that this species is unlikely to utilise the development site.
Haliaeetus leucogaster (Breeding)	White-bellied Sea-Eagle	Other. Living or dead mature trees within suitable vegetation within 1km of rivers, lakes, large dams or creeks, wetlands and coastlines.	High	V	Not Listed	Excluded This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. No presence of large stick nests within the development site.
Hibbertia sp Bankstown	-	N/A	High	CE	CE	Excluded Known only from one population at Bankstown Airport in the Bankstown local government area.
Lathamus discolor	Swift Parrot (Breeding)	Other As per mapped areas	Moderate	E	CE	Excluded Seasonal foraging habitat features associated with this species were identified within the development site and has been included as an ecosystem credit species only. The development site is not within an important breeding area for this species as per the BAM Important Areas map in BOAMS (date accessed 23 September 2020)

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
Litoria aurea	Green and Golden Bell Frog (GGBF)	Semi-permanent/ephemeral wet areas Within 1km of wet areas/Swamps Within 1km of swamp/Waterbodies Within 1km of waterbody	High	E	V	Excluded Habitat features documented in the Threatened Biodiversity Data Collection (TBDC) associated with this species were present within the development site. This included three dams containing *Typha* spp. The development site is located within the Western Sydney Aerotropolis Growth Area (WSAGA) under the Draft Cumberland Plain Conservation Plan 2020 (CPCP). Supporting the Draft CPCP is the Cumberland Plain Assessment Report prepared by Open Lines and Biosis in 2020. As part of this assessment, Expert Reports have been prepared for particular species credit species that are predicted to occur within the Growth Areas. The Expert Report for *Litoria aurea* (pg. 2007) prepared by Francis Lemckert, states that the Growth Areas *do contain suitable habitat in the form of rural areas with numerous waterbodies in close proximity (< 500 m).* Therefore the habitat identified within the development site is considered suitable habitat for GGBF. The development site has also been mapped as an indicative GGBF migratory corridor should the species return to the area in the future (Lemckert in Biosis and Open Lines 2020) In the Expert Report Section 4.4 Assessment of Species Presence (pg. 2035). it is stated: *It has been determined that there is not likely to be a population of the GGBF currently present within the WSAGA. There are no records from within the GA, despite the presence of suitable habitat in rural areas in the form of a high density of water bodies. There is no*

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
						evidence that it is currently present and the distance to the coast indicates it is unlikely that the GGBF would persist in this area. The two most closely associated records are single records not closely aligned with other records and so it is unlikely that a larger stable *population has been or is present within the WSAGA* The development site has also been mapped as an indicative GGBF migratory corridor should the species return to the area in the future (Lemckert in Biosis and Open Lines 2020).. It should be noted that the area which is covered by this map is the retained vegetation in the north-east corner that will be managed under a Vegetation Management Plan. Based on this recently prepared Expert Report which covers the land at 200 Aldington Road, Kemps Creek, it has been determined that whilst suitable habitat may be present, and future migratory corridors may be reinstated in the north-east VMP area, expert advice has stated that GGBF is unlikely to be present in the development site. Therefore, GGBF has been excluded from further assessment under the BAM.
Marsdenia viridiflora subsp. viridiflora-endangered population	Marsdenia viridiflora R. Br. subsp. viridiflora population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd,	Blacktown, Camden, Campbelltown, Canterbury-Bankstown, Cumberland, Fairfield, Liverpool and Penrith LGAs (as amended from the Determination))	Moderate	EP	Not Listed	Excluded Habitat features associated with this species were not present on the development site.

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
	Liverpool and Penrith local government areas					
Maundia triglochinoides	-	Other. Riparian areas/drainage lines, water ponding, man-made dams and drainage channels up to 1 m deep/Semi-permanent/ephemeral wet areas/Swamps Shallow swamps up to 1 m deep/Waterbodies Shallow waterbodies up to 1 m deep	High	V	Not Listed	Excluded The presence of this species was not identified and it was determined that the habitat is substantially disturbed such that this species is unlikely to utilise the development site.
Melaleuca biconvexa	Biconvex Paperbark	N/A	High	V	V	Excluded The presence of this species was not identified (conspicuous species); known only from populations in Jervis Bay and Gosford-Wyong.
Meridolum corneovirens	Cumberland Plain Land Snail	N/A	High	E	Not Listed	Excluded The Draft Cumberland Plain Assessment report mapped potential habitat within the vicinity of the development site (pg. 1971). Survey for Cumberland Land Snail was undertaken on 21 June 2021. No evidence of Cumberland Land Snail was detected. Habitat within the development site associated with this species is considered substantially disturbed such that this species was considered unlikely to occur within the development site. Therefore, Cumberland Plain Land Snail has been excluded from further assessment under the BAM.
Miniopterus australis	Little Bentwing-bat (Breeding)	Caves	Very High	V	Not Listed	Excluded

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
		Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records in BioNet with microhabitat code 'IC – in cave' Observation type code 'E nest-roost' With numbers of individuals >500 Or from the scientific literature				This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site does not contain breeding habitat for this species.
Miniopterus orianae oceanensis	Large Bent-winged Bat (Breeding)	Caves Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records in BioNet with microhabitat code 'IC – in cave' Observation type code 'E nest-roost' With numbers of individuals >500 Or from the scientific literature	Very High	V	Not Listed	Excluded This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site does not contain breeding habitat for this species.
Myotis macropus	Southern Myotis	Hollow bearing trees within 200 m of riparian zone/Other Bridges, caves or artificial structures within 200 m of riparian zone	High	V	Not Listed	Included This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site contains potential breeding habitat (hollow-bearing trees and structures) for this species along the riparian zone in the north-eastern corner of the site.
Pandion cristatus	Eastern Osprey (Breeding)	Other Presence of stick-nests in living and dead trees (>15m) or artificial structures within 100m of a floodplain for nesting	High	V	Not Listed	Excluded This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site does not contain suitable breeding habitat.

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
Persicaria elatior	Tall Knotweed	Semi-permanent/ephemeral wet areas or within 50m from swamps/ wetlands/ waterbodies	High	V	V	Excluded Habitat features for this species were not present within the development site; known from records in northern and south eastern NSW only.
Persoonia hirsuta	Hairy Geebung	N/A	High	E	E	Excluded Habitat features for this species were not present within the development site. The presence of this species was not identified and it was determined that the habitat is substantially disturbed such that this species is unlikely to occur within the development site.
Petaurus norfolcensis	Squirrel Glider	N/A	High	V	Not Listed	Excluded It was determined that the habitat is substantially disturbed such that this species is unlikely to occur within the development site.
Phascolarctos cinereus	Koala (Breeding)	Other Areas identified via survey as important habitat (see comments)	High	V	V	Excluded This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. It was determined that the habitat is substantially disturbed such that this species is unlikely to occur as breeding within the development site.
Pilularia novae-hollandiae	Austral Pillwort	N/A	High	E	Not Listed	Excluded Habitat features associated with this species were not present on the development site
Pimelea spicata	-	N/A	High	E	E	Excluded It was determined that the habitat (0.12 ha of cleared, fragmented PCT 850) is highly disturbed such that this species is unlikely to occur within the development site. As stated in Table 11:

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
						The groundcover was highly disturbed and contained exotic grasses including Cenchrus clandestinus (Kikuyu Grass), Ehrharta erecta (Panic Veldtgrass), Eragrostis curvula (African Lovegrass) and Seteria pumila (Pale Pigeon Grass), Foeniculum vulgare (Fennel), and Anredera cordifolia (Madeira vine). The plot data shown the vegetation zone contained one species of native tree, one native shrub, and one native forb. Whilst it is acknowledged that *Pimelea spicata* can occur in cleared or regrowth area areas of native vegetation, It is considered highly unlikely that *Pimelea spicata* would be present in this small, highly fragmented patch of cleared PCT 850 with no canopy, minimal midstorey and predominantly exotic pastures grasses and weeds in the groundcover. Further to this, the Expert Report for *Pimelea spicata* prepared by Teresa James in 2019 for the Draft Cumberland Plain Assessment Report did not map the subject site as potential habitat for *Pimelea spicata* (page 2951). One unconfirmed record was reported to the west of the site in the CPCP Expert Report, but no individuals were recorded in the BAM plots undertaken in the vicinity of the site, nor in the BAM plots undertaken by the Accredited Assessor for this BDAR. Therefore, *Pimelea spicata* has been excluded from further assessment under the BAM.
Pomaderris brunnea	Brown Pomaderris	N/A	high	E	V	Excluded It was determined that the habitat is substantially disturbed such that this species is unlikely to occur within the development site.

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
Pommerhelix duralensis	Dural Woodland Snail	Other Leaf litter and shed bark or within 50m of litter or bark/Rocky areas Rocks or within 50m of rocks/Fallen/standing dead timber including logs Including logs and bark or within 50m of logs or bark	High	E	E	Excluded It was determined that the habitat is substantially disturbed such that this species is unlikely to occur within the development site
Pteropus poliocephalus	Grey-headed Flying-fox (Breeding)	Other Breeding camps	High	V	V	Excluded This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site does not contain suitable breeding habitat.
Pultenaea pedunculata	Matted Bush-pea	N/A	High	E	V	Excluded It was determined that the habitat is substantially disturbed such that this species is unlikely to utilise the development site.
Thesium austral	Austral Toadflax	N/A	Moderate	V	V	Excluded Known in the area only from old records. It was determined that the habitat is substantially disturbed such that this species is unlikely to utilise the development site.
Wahlenbergia multicaulis- endangered population	Tadgell's Bluebell in the local government areas of Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby,	N/A	High	EP	Not Listed	Excluded No known sites within the Kemps Creek area. It was determined that the habitat is substantially disturbed such that this species is unlikely to utilise the development site.

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
	Parramatta and Strathfield					

2.5.3 Targeted surveys

Targeted survey was undertaken for *Meridolum corneovirens* (Cumberland Plain Land Snail) on 21 June 2021 by ecologist Melinda Westcook for a total of 3.25 person hours. Weather conditions were cool, with a range of 7.9 – 12.9 degrees and a maximum of 0.8 mm of rainfall. No Cumberland Plain Land Snail specimens were identified during the survey.

A map of survey effort is shown below in Figure 7.

No targeted surveys for any other species credit species were undertaken at the development site. Species credit species assumed present are outlined in Table 17.

Table 17: Species credit species included in the assessment

Species	Common Name	Species presence	Geographic limitations	Habitat (ha)	Biodiversity Risk Weighting
Myotis macropus	Southern Myotis	Assumed	Hollow bearing trees within 200 m of riparian zone.	2.73	2.00

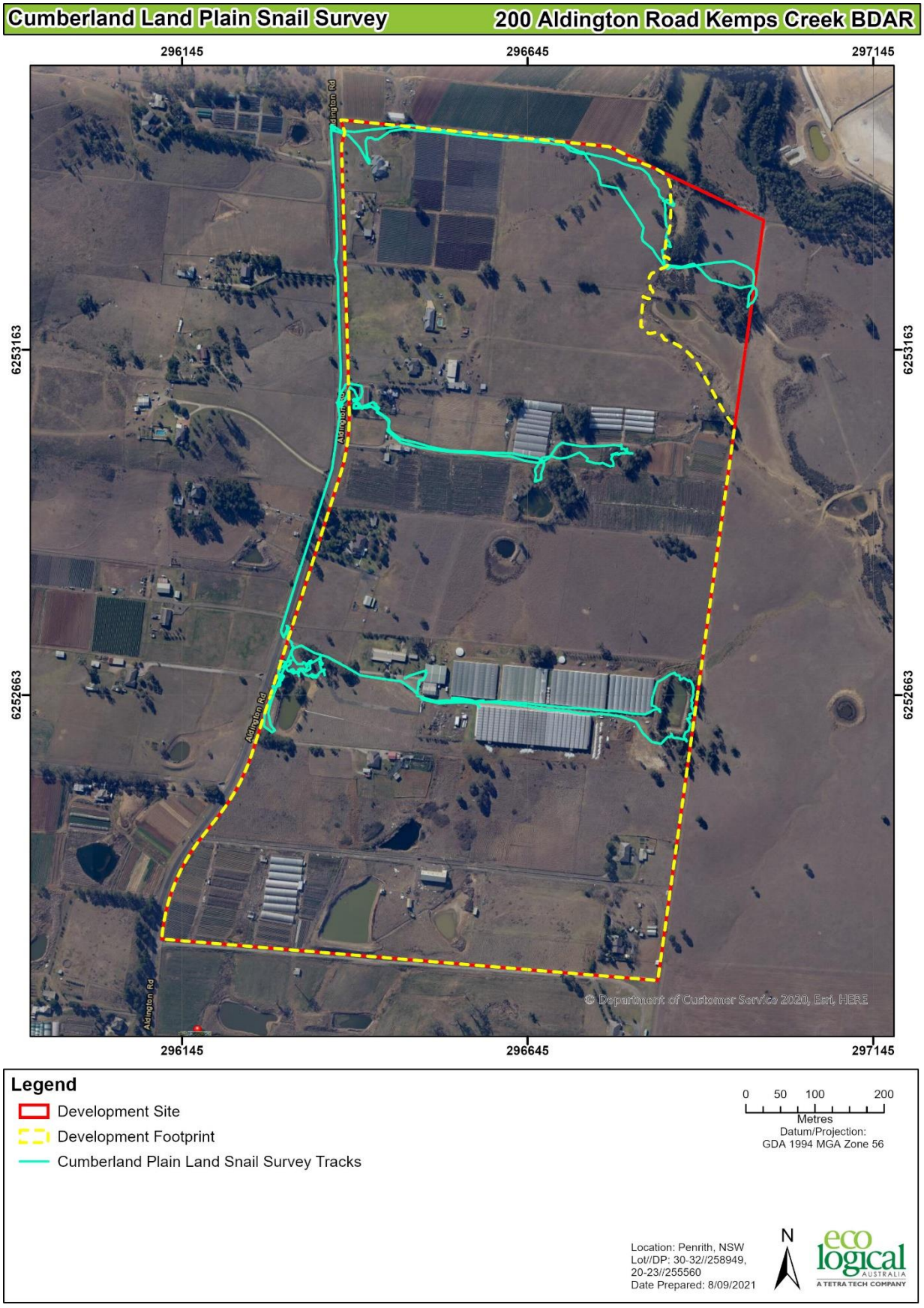


Figure 7: Survey effort for Cumberland Plain Land Snail

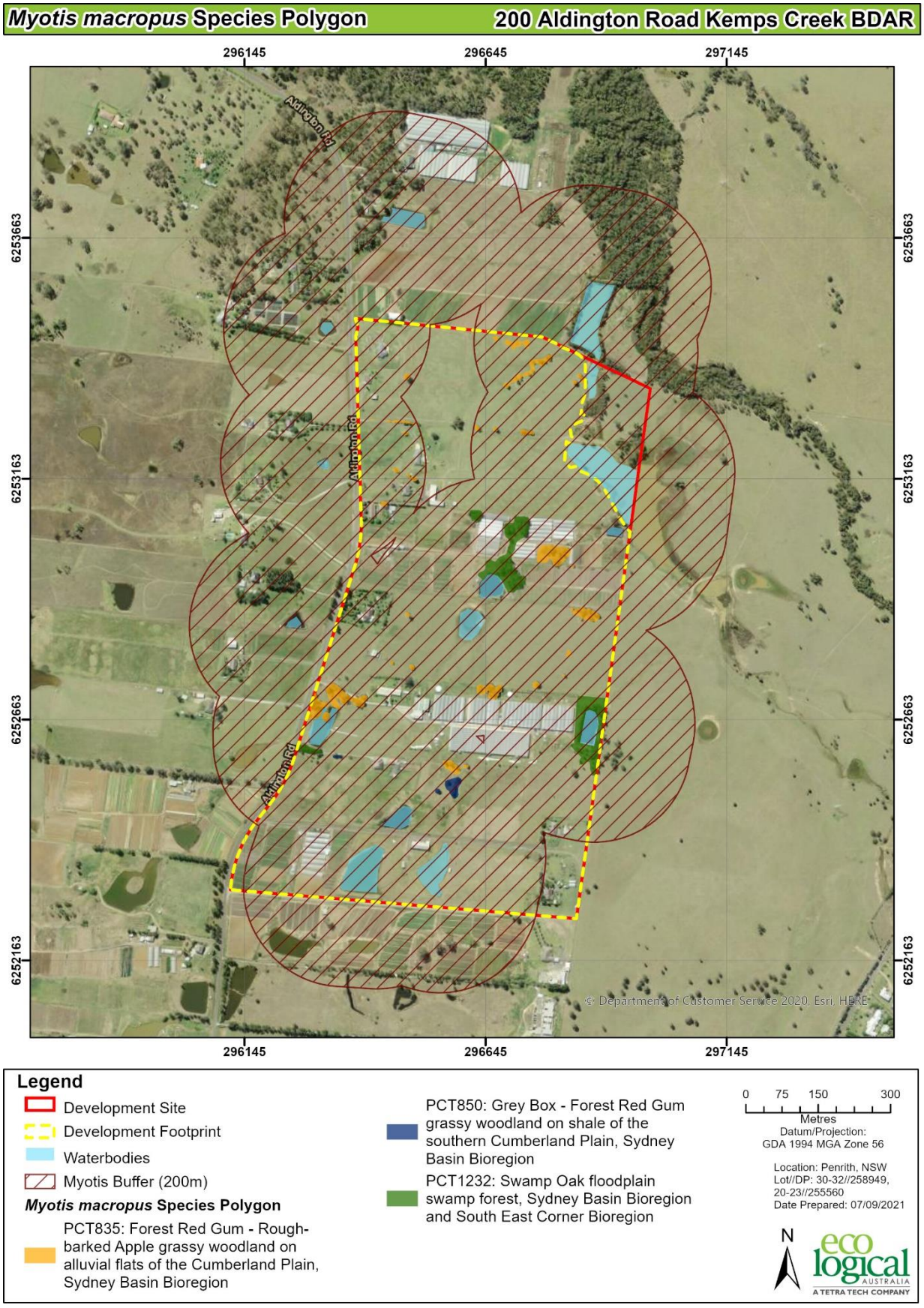


Figure 8: Species polygon *Myotis macropus* (Southern Myotis)

3. Stage 2: Impact assessment (biodiversity values)

3.1 Avoiding impacts

3.1.1 Locating and designing a project to avoid and minimise impacts on vegetation and habitat

The development has been located and designed in a way which avoids and minimises impacts as outlined in Table 18.

Table 18: Locating and designing a project to avoid and minimise impacts on vegetation and habitat

Approach	How addressed and justification
Locating and designing the project in areas where there are no biodiversity values. Locating and designing the project in areas where the native vegetation or threatened species habitat is in the poorest condition Designing the project to reduce the clearing footprint of the project	The proposal is located within a rural landscape which consists largely of areas of non-native vegetation. Native vegetation to be impacted is generally disturbed and of low or moderate condition. The impact of the proposal on native vegetation has been reduced by locating the sediment dam in a way that minimises impact to PCT 835.
Designing the project to locate ancillary facilities in areas where there are no biodiversity values. Designing the project to locate ancillary facilities in areas where the native vegetation or threatened species habitat is in the poorest condition (i.e. areas that have a lower vegetation integrity score)	Through a number of design changes, the vegetation management area in the north east has been increased in size, and the development footprint reduced by approximately 2 ha to avoid impacts to the existing vegetation and farm dams in this area. Riparian buffers around first order creeklines in this area have also been proposed as part of a Vegetation Management Plan. More detail is provided in the Riparian Assessment.
Locating and designing the project in areas that avoid habitat for species and vegetation in high threat categories (e.g. an EEC or CEEC), indicated by the biodiversity risk weighting for a species.	The proposal is located within a rural landscape which consists largely of areas of non-native vegetation. TEC vegetation to be impacted is generally disturbed and of low or moderate condition. Impact to a CEEC is limited to 0.12 ha of a CEEC of a very low integrity score of 1.5. The TEC vegetation in the north east has been avoided in order to retain some habitat in the development site.
Locating and designing the project such that connectivity enabling movement of species and genetic material between areas of adjacent or nearby habitat is maintained.	Through a number of design changes, the vegetation management area in the north east has been increased in size, and the development footprint reduced by approximately 2 ha to avoid impacts to the existing farm dam and vegetation in the north-east of the development site. This design change also avoids any impacts to upstream water flow (refer to Riparian Assessment for details). The existing riparian corridor connectivity to nearby habitat along Ropes Creek riparian corridor to the north and south east of the development site will not be impacted by the development and therefore will not reduce movement of species to areas of nearby habitat.

Approach	How addressed and justification
	The retained area of vegetation and farm dams are proposed to be managed under a Vegetation Management Plan, and part of the vegetation management will include restoration of first order creekline riparian buffers. This will further improve connectivity within the corridor. Therefore, the vegetation management area in the north east (which has increased in size by 2 ha and will be subject to replanting and restoration of riparian buffers, plus upstream flows will not be impacted) will continue to facilitate movement, connectivity and genetic exchange between areas of adjacent habitat.
Providing structures to enable species and genetic material to move across barriers or hostile gaps	Structures to enable species and genetic materials to move across barriers or hostile gaps have not been considered for this development.
Making provision for the demarcation, ecological restoration, rehabilitation and/or ongoing maintenance of retained native vegetation habitat on the development site	As discussed It is recommended that a Vegetation Management Plan for all vegetation within the vegetation management zone is undertaken. This will include the restoration of riparian buffers.

3.1.2 Prescribed biodiversity impacts

The list of potential prescribed biodiversity impacts as per the BAM is provided below:

- Occurrences of karst, caves, crevices and cliffs - none occur within the development site
- Occurrences of rock - no rock outcrops or scattered rocks occur within the development site
- Occurrences of human made structures and non-native vegetation – **Yes, both are present, and impacts are detailed below**.
- Hydrological processes that sustain and interact with the rivers, streams and wetlands – **yes, removal of farm dams will occur.**

Table 19: Prescribed biodiversity impacts

Prescribed biodiversity impact	Description in relation to the development site	Threatened species or ecological communities effected
Impacts of development on the habitat of threatened species or ecological communities associated with: • **human made structures, or** • **non-native vegetation**	The development site contains human made structures and non-native vegetation which will be removed.	Non-native vegetation (incl fruit trees and market gardens) provides potential habitat for Grey-headed Flying-fox. Human-made structures such as houses, sheds and shade structures may provide potential habitat for microbat species.
Impacts of development on water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities	Farm dams will be removed by the proposed development, other than farm dams in the north east corner of the site.	Swamp Oak Floodplain Forest; River-Flat Eucalypt Forest, Southern Myotis.

3.1.2.1 Locating and designing a project to avoid and minimise prescribed biodiversity impacts

The development has been located and designed in a way which avoids and minimises prescribed biodiversity impacts as outlined in Table 20.

Table 20: Locating and designing a project to avoid and minimise prescribed biodiversity impacts

Approach	How addressed and justification
Locating the envelope of surface works to avoid direct impacts on the habitat features	Due to the nature of the development, no human made structures will be retained. A small area of exotic grassland vegetation will be retained in the north-eastern section of the development site. The vegetation management area in the north east has not been impacted. This area has increased in size by 2 ha during design changes to avoid and minimise impacts. It will be subject to replanting and restoration of riparian buffers, plus upstream flows will not be impacted.
Locating the project to avoid direct impacts on water bodies. **Design of the project to maintain hydrological processes that sustain threatened species and TECs**	There were 11 farm dams identified within and adjacent to the development site. Most of these had limited aquatic habitat and nine are to be removed as part of the proposed development. The dam in the northern-most section of the site had moderate levels of aquatic habitat and was representative of a wetland environment. This dam will be retained after development, and the surrounding vegetation managed to maintain habitat values. This area has increased in size by 2 ha during design changes to avoid and minimise impacts. It will be subject to replanting and restoration of riparian buffers, plus upstream flows will not be impacted.
Design of the project to avoid and minimise downstream impacts on rivers, wetlands and estuaries by control of the quality of water released from the site.	Through a number of design changes, the vegetation management area in the north east has been increased in size, and the development footprint reduced by approximately 2 ha to avoid and minimise impacts to the remaining farm dams. This design change also avoids and minimises impacts to upstream water flow (refer to Riparian Assessment for details). The existing riparian corridor will not be impacted by the development and therefore will not reduce movement of species to areas of nearby habitat. Permanent sediment and water quality control measures are to be implemented during and after construction to prevent offsite impacts to downstream waterways and water dependent communities. It is recommended to install stormwater quality improvement devices to prevent long-term impacts to downstream waterbodies.

3.2 Assessment of Impacts

3.2.1 Direct impacts

The direct impacts of the development on:

- native vegetation are outlined in Table 21
- threatened ecological communities are outlined in Table 22

- threatened species and threatened species habitat is outlined in Table 23
- prescribed biodiversity impacts is outlined in Section 3.2.2

Direct impacts including the final project footprint (construction and operation) are shown on Figure 9.

Table 21: Direct impacts to native vegetation

PCT ID	PCT Name	Vegetation Class	Vegetation Formation	Direct impact (ha)
835	Grey Box – Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion	Coastal Floodplain Wetlands	Forested Wetlands	1.33
850	Grey Box – Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion	Coastal Valley Grassy Woodlands	Grassy Woodlands	0.12
1232	Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion	Coastal Swamp Forests	Forested Wetlands	1.34

Table 22: Direct impacts on threatened ecological communities

PCT ID	BC Act			EPBC Act	
	Listing status	Name	Direct impact (ha)	Listing status	Direct impact (ha)
835	Endangered	NSW BC Act River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	1.33	Not Listed	N/A
850	Critically Endangered	Cumberland Plain Woodland of the Sydney Basin Bioregion	0.12	The community on site does not meet the condition thresholds for listing under the EPBC Act	N/A
1232	Endangered	Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	1.34	The community on site does not meet the condition thresholds for listing under the EPBC Act	N/A

Table 23: Direct impacts on threatened species and threatened species habitat

Species	Common Name	Direct impact number of individuals / habitat (ha)	NSW listing status	EPBC Listing status
Myotis Macropus	Southern Myotis	2.73	V	Not Listed

3.2.2 Change in vegetation integrity

The change in vegetation integrity as a result of the development is outlined in Table 24.

Table 24: Change in vegetation integrity

Veg Zone	PCT ID	Condition	Area (ha)	Current vegetation integrity score	Future vegetation integrity score	Change in vegetation integrity
1	835	Moderate	0.22	34.9	0	-34.9
2	835	Low - Moderate	1.12	21.3	0	-21.3
3	850	low	0.12	1.5	0	-1.5
4	1232	low	0.67	11	0	-11
5	1232	moderate	0.67	21.4	0	-21.4

3.2.3 Indirect impacts

The development site comprises the development footprint and additional areas subject to indirect impacts. Indirect impacts are described in the BAM Operational Manual Stage 2 (DPIE 2020) as *development related activities not associated with clearing for the development footprint. Examples include increased noise, dust, light spill, weeds and pathogens and edge effects that can be reasonably attributed to the development. Indirect impacts often occur beyond the development footprint or even the development site, have a lower or variable intensity of impact compared to direct impacts, may be harder to predict spatially and temporally, may have unclear boundaries of responsibility.*

The indirect impacts of the development are outlined in Table 25.

Table 25: Indirect impacts

Indirect impact	Project phase	Nature	Extent	Frequency	Duration	Timing
Sedimentation and contaminated and/or nutrient rich run-off	Construction and operation	Runoff during construction and operation resulting in pollution and degradation of adjacent creeklines	Potential sedimentation and contaminated runoff into adjacent creeks	During rainfall events	During construction and operational phase of project	Potentially long-term impacts
Noise, dust or light spill	Construction and operation	Noise and dust from machinery, light spill during operational phase disturbing fauna activity in adjacent vegetation.	Adjacent vegetation	Daily, during construction works and operational phase	During construction and operational phase of project	Potentially long-term impacts
Inadvertent impacts on adjacent habitat or vegetation	Construction and operation	Damage to adjacent habitat and vegetation including riparian areas and TECs as a result of construction or	Adjacent vegetation	Daily, during construction works and operational phase	During construction and operational	Potentially long-term impacts

Indirect impact	Project phase	Nature	Extent	Frequency	Duration	Timing
		operation of the development.			phase of project	
Transport of weeds and pathogens from the site to adjacent vegetation	Construction and operation	Spread of weed seed and pathogens from incoming machinery and equipment	Potential spread into nearby habitat	Daily, during construction and operational phases	During construction and operational phase of project	Potentially long-term impacts
Vehicle strike	Construction and operation	Potential for native fauna to be struck by working machinery and moving vehicles	Within construction and operational area	Daily, during construction and operational phases	During construction and operational phase of project	Potentially long-term impacts
Rubbish dumping	Construction and operation	Unauthorised rubbish dumping by workers and public leading to degradation of adjacent vegetation	Potential for rubbish to spread into adjacent vegetation in the indirect impact areas and outside development site	Daily, during construction and operational phases	During construction and operational phase of project	Potentially long-term impacts
Increase in predatory species populations	Construction and operation	Potential to increase if food scraps/rubbish is left on or adjacent to site. Potential to increase -/+ decrease due to disturbance to existing vegetation resulting in increased predation on native fauna	Within the development and throughout indirect impact areas and adjacent vegetation	Potential to occur gradually after disturbance to habitat and vegetation takes place	During construction and operational phase of project	Potentially long-term impacts
Increase in pest animal populations	Construction and operation	Potential to increase if food scraps/rubbish is left on or adjacent to site. Potential to increase -/+ decrease due to disturbance to existing vegetation.	Within the development and throughout indirect impact areas and adjacent vegetation	Potential to occur gradually after disturbance to habitat and vegetation takes place	During construction and operational phase of project	Potentially long-term impacts
Increased risk of fire	Construction and operation	Potential for fire to spark during construction and operation from any machinery or electrical works	Throughout adjacent vegetation	Potential to occur at any time throughout the operational or	During operating/ construction hours	Potentially long-term impacts

Indirect impact	Project phase	Nature	Extent	Frequency	Duration	Timing
				construction phases		

3.2.4 Prescribed biodiversity impacts

The development site has the prescribed biodiversity impacts as outlined in Table 26.

3.2.5 Mitigating and managing impacts

Measures proposed to mitigate and manage impacts at the development site before, during and after construction are outlined in Table 27.

Table 26: Direct impacts on prescribed biodiversity impacts

Prescribed biodiversity impact	Nature	Extent	Frequency	Duration	Timing
Impacts of development on the habitat of threatened species or ecological communities associated with removal of human made structures and non-native vegetation	Removal of human made structures and non-native vegetation	Removal of all buildings and majority of non-native vegetation onsite	Single event.	Permanent removal	Long term impacts
Impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range	Reduced connectivity of vegetation and habitat for threatened species this reducing their ability to move across their range.	Removal of all buildings and majority of non-native vegetation onsite; removal of nine dams.	Single event	Permanent removal	Long term impacts
Impacts of development on movement of threatened species that maintains their lifecycle	Reduced connectivity of vegetation and habitat for threatened species thus reducing their ability to maintain their lifecycle.	Removal of all buildings and majority of non-native vegetation onsite; removal of nine dams.	Single event	Permanent removal of remnant, naturally occurring bushland and riparian habitat which provides habitat to maintain lifecycle of threatened species.	Long Term Impacts
Impacts of development on water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities	Reduction in water quality due to runoff. Clearing of native vegetation within riparian buffers.	Removal of nine dams.	Daily, during construction and operational phases. During heavy rainfall events	Single event during construction. During rainfall events.	Long-term impacts

Table 27: Measures proposed to mitigate and manage impacts

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
Prepare and implement a Fauna Management Plan.	High	Medium	Fauna Management Plan is to include measures for: • dam dewatering and removal of native fauna • pre-demolition inspection of human made structures for microbats. If microbats are detected, exclusion measures should be implemented prior to demolition.	Successful identification and management of aquatic fauna and microbats prior to and during construction	Prior to the commencement of construction	Client
Timing works to avoid critical life cycle events such as breeding or nursing	High	Low	Tree felling of hollow bearing trees should be undertaken outside of spring and summer (main breeding season for native birds and microbats). If this is not possible, strict pre-clearing protocols must be observed when removing tree hollows. The exclusion of microbats from roosting habitat must occur during non-breading or maternity seasons or overwinter hibernation and extended torpor seasons for microbats. Suitable time periods are late March to end of May; as a less ideal timeframe in September.	Prevent disturbance to fauna during breeding.	During tree felling and during building demolition	Contractor, Project Ecologist
Instigating clearing protocols including pre-clearing surveys, daily surveys and staged clearing, the presence of a trained ecological or licensed wildlife handler during clearing events	High	Medium	All hollow-bearing trees within the footprint will be removed. Pre-clearance and clearance survey to be undertaken by suitably qualified ecologists to relocate potential fauna inhabitants. Pre-clearance and clearance survey to be undertaken by suitably qualified ecologists to relocate potential fauna inhabitants. It is recommended that at a minimum, two ecologists are present at the clearing site at all times. The exclusion of microbats from roosting habitat, to be undertaken prior to construction, using roost exclusion methodology described in the MMP.	Prevent injury or death to native fauna.	Prior to and during felling and building demolition.	Project Ecologists, Project Manager

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
Clearing protocols that identify vegetation to be retained, prevent inadvertent damage and reduce soil disturbance	High	Low	Boundaries of the impact area to be clearly delineated with heavy duty fencing, retained areas marked with "No Go" signage, in particular in the areas adjacent to PCT 835 which is being retained.	Protection of retained vegetation with heavy duty fencing.	Throughout the life of the project	Project Manager in consultation with the ecologist
Sediment barriers or sedimentation ponds to control the quality of water released from the site into the receiving environment	High	Moderate	Install sediment barriers and erosion control during and post construction to prevent runoff into adjacent creeklines and wetlands, maintain controls throughout construction and undertake regular inspections (weekly – or daily if raining).	Control of erosion, sedimentation and runoff of contaminated substances into adjacent waterways	Throughout life of project	Project Manager
Noise barriers or daily/seasonal timing of construction and operational activities to reduce impacts of noise	Low	Very Low	Daily timing of construction activities is recommended in accordance with Table 1 of Interim Noise Guidelines (2009).	Noise impacts associated with the development will be managed in accordance with guidelines.	Throughout life of project	Project Manager
Light shields or daily/seasonal timing of construction and operational activities to reduce impacts of light spill	Low	Very Low	Conduct works during daylight hours.	Avoid light disturbance to native fauna during construction	Throughout life of project	Project Manager
Adaptive dust monitoring programs to control air quality	High	Moderate	Dust management controls to be implemented during construction and operations. If water is being used to manage dust, ensure contaminated water in managed appropriately on and off site in accordance with a water management plan or similar.	Control dust and maintain air quality during construction.	During construction and operations.	Project Manager, Contractor.
On site water management	High	Moderate	All water being used onsite (e.g. dust management, cleaning, processes) is to be managed appropriately on site in accordance with a water management plan or similar.	Control contaminated water on site and prevent from leaving the site.	Throughout like of the project	Project Manager, Contractor

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
Programming construction activities to avoid impacts; for example, timing construction activities for when migratory species are absent from the site, or when particular species known to or likely to use the habitat on the site are not breeding or nesting	Medium	Low	Impacts to vegetation during the Spring Summer breeding period should be minimised to avoid disrupting the breeding cycles of threatened species.	Avoid disruption of breeding cycle of threatened species.	During construction	Project Manager
Temporary fencing to protect significant environmental features such as riparian zones	High	Low	Temporary fencing and signage to be installed at the edge of the development site to prevent entry into the adjacent retained vegetation.	No unintended clearing or trampling of adjacent vegetation to be retained.	During construction.	Project Manager
Hygiene protocols to prevent the spread of weeds or pathogens between infected areas and uninfected areas	Medium	Low	Phytophthora control measures must be undertaken from the commencement of the project to minimise the risk of spread and to the site. The following guidelines should be followed: https://www.rbgsyd.nsw.gov.au/science/plants/pests-diseases/phytophthora-dieback/disinfection-procedures http://www.environment.gov.au/biodiversity/invasive-species/publications/management-phytophthora-cinnamomi-biodiversity-conservation Vehicles, machinery and building refuse should remain only within the development site and disposed of at an appropriate waste management facility. Weed management to be undertaken where required. Vehicles should be washed down before entering and exiting the site to prevent the spread of weeds to or from the development site and adjacent vegetation. In particular, machinery work on or nearby dams are required to be washed down in order to	Spread of weeds /pathogens between unaffected areas prevented.	During construction.	Project Manager / Contractors

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
			prevent the spread of chytrid fungus into or from the development site. If water trucks are being used for dust control, implement procedures such as daily cleaning of the water truck and equipment.			
Staff training and site briefing to communicate environmental features to be protected and measures to be implemented	Medium	Low	All staff working on the project will undertake an environmental induction as part of their site familiarisation. Site briefings should be updated based on phase of the work. This induction will include items such as: • Site environmental procedures (vegetation management, sediment and erosion control, exclusion fencing) • Threatened species habitat and TECs • What to do in case of environmental emergency (chemical spills, fire, injured fauna) • Key contacts in case of environmental emergency • What to do in the case of finding a threatened species • What to do in the case of finding fauna on the site	All staff entering the site are fully aware of all environmental aspects relating to the development and know what to do in case of any environmental emergencies	To occur for all staff entering / working at the site and when environmental issues become apparent	Project Manager, all staff
Making provision for the ecological restoration, rehabilitation and/or ongoing maintenance of retained native vegetation habitat on or adjacent to the development site	High	Medium	A Vegetation Management Plan should be prepared which covers the retained bushland in the north east corner of the development site. The development site is partially mapped within the 8-13 Km Wildlife Buffer Zone Map of the Aerotropolis SEPP for the Western Sydney International (Nancy- Bird Walton) Airport. Careful consideration of plant species must be given for any proposed landscaping or revegetation. These items will be considered and assessed when preparing the VMP for the north-east corner.	Protection of flora and fauna outside of the development footprint	Prior to the commencement of construction	Client

3.2.6 Serious and Irreversible Impacts (SAII)

The development has candidate Serious and Irreversible Impacts (SAII) values as outlined in Table 28. Detailed consideration of whether impacts on candidate species are serious and irreversible is included in Table 31 and on TECs is included in Table 30.

Table 28: Candidate Serious and Irreversible Impacts

Species / Community	Common Name	Principle	Direct impact individuals / area (ha)	Threshold
Cumberland Plain Woodland of the Sydney Basin Bioregion	Cumberland Plain Woodland	1	0.12	Under development

Table 29: Determining whether impacts are serious and irreversible

Determining whether impacts are serious and irreversible	Assessment
Principle 1	
Does the proposal impact on a species, population or ecological community that is a candidate entity because it is in a rapid rate of decline?	Yes
If yes, is the impact in excess of any threshold identified and therefore likely to be serious and irreversible? Note: where candidate entities have no listed threshold, any impact is considered likely to be serious and irreversible	The thresholds for this TEC have not been published yet according to the Threatened Biodiversity Data Collection provided in DPIE BioNet.
Principle 2	
Does the proposal impact on a species that is a candidate entity because it has been identified as having a very small population size?	Yes
If yes, is the impact in excess of any threshold identified and therefore likely to be serious and irreversible? Note: where candidate entities have no listed threshold, any impact is considered likely to be serious and irreversible	The thresholds for this TEC have not been published yet according to the Threatened Biodiversity Data Collection provided in DPIE BioNet
Principle 3	
Does the proposal impact on the habitat of a species or an area of an ecological community that is a candidate entity because it has a very limited geographic distribution?	No
If yes, is the impact in excess of any threshold identified and therefore likely to be serious and irreversible? Note: where candidate entities have no listed threshold, any impact is considered likely to be serious and irreversible.	N/A
Principle 4	
Does the proposal impact on a species, a component of species habitat or an ecological community that is a candidate entity because it is irreplaceable?	No
b. If yes, is the impact in excess of any threshold identified and therefore likely to be serious and irreversible? Note: where candidate entities have no listed threshold, any impact is considered likely to be serious and irreversible.	N/A

Table 30: Evaluation of an impact on a TEC

Impact Assessment Provisions	Assessment
1. The area and condition of the TEC to be impacted directly and indirectly by the proposed development	The proposed development will remove 0.12 ha of this TEC which is in a low condition with a vegetation integrity score of 1.5. The TEC affected within the development site is present as lacking a canopy, containing two native midstorey species and a highly disturbed groundcover.
2. The extent and overall condition of the TEC within an area of 1500 metres, and then 5000 metres, surrounding the proposed development footprint. In the case of strategic biodiversity certification projects, the extent and overall condition of the TEC may be assessed across the IBRA sub region	There is an estimated 33.9 ha of this TEC within a 1,500m radius of the development site (mapped by OEH 2016). There is an estimated 285.8 ha of this TEC within a 5000m radius of the development site (mapped by OEH 2016).
3. An estimate of the extant area and overall condition of the TEC remaining before and after the impact of the proposed development has been taken into consideration	The removal of 0.12 ha of this TEC within the development site represents 0.34% of the mapped TEC extent within the 1,500 m radius and 0.04% of the mapped TEC extent within the 5,000 m radius. The development will not result in the overall decline of the condition of the TEC remaining in the locality after development.
4. The development proposal's impact on:	
a. Abiotic factors critical to the long-term survival of the TEC; for example, will the impact lead to a reduction of groundwater levels or substantial alteration of surface water patterns; will it alter natural disturbance regimes that the TEC depends upon, e.g. fire, flooding etc.?	The development will not affect abiotic factors critical to the long-term survival of the TEC. The proposal will not result in a reduction in ground water levels or substantial alteration of surface water patterns or natural disturbance regimes of which the TEC depends upon outside of the development site.
b. Characteristic and functionally important species through impacts such as, but not limited to, inappropriate fire/flooding regimes, removal of under-storey species or harvesting of plants	The proposed development will not affect characteristic and functionally important species outside of the proposed impact area.
c. The quality and integrity of an occurrence of the TEC through threats and indirect impacts including, but not limited to, assisting invasive flora and fauna species to become established or causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants which may harm or inhibit growth of species in the TEC	The development site is located within a modified rural area with areas affected by weeds which will be removed during the proposed works. The proposed development has the potential to result in the introduction of new weed plumes into and adjacent to the development site. These potential impacts will be controlled during the construction phase of the proposed development.
5. Direct or indirect fragmentation and isolation of an area of the TEC	The development will result in a very minor increase in the direct or indirect fragmentation or isolation of areas of the TEC
6. The measures proposed to contribute to the recovery of the TEC in the IBRA subregion.	In its current form, the proposed development does not contribute to the recovery of this TEC in the IBRA subregion.

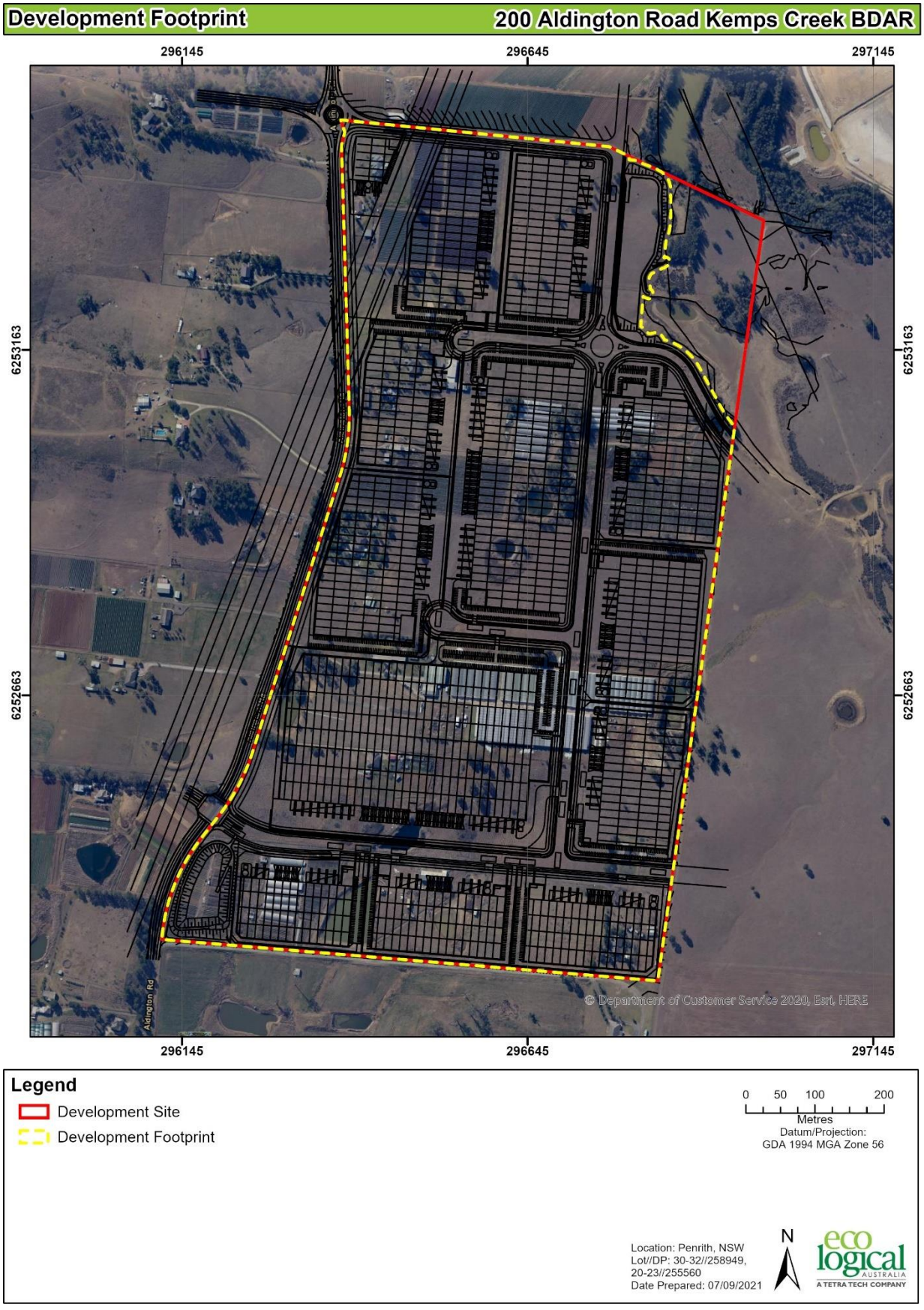


Figure 9: Final project footprint including construction and operation

3.3 Impact summary

Following implementation of the BAM and the BAMC, the following impacts have been determined.

3.3.1 Serious and Irreversible Impacts (SAII)

The development has candidate Serious and Irreversible Impacts (SAII) values as outlined in Table 28, 29, 30 and 31 and shown on Figure 10.

Table 31: Serious and Irreversible Impacts Summary

Species / Community	Common Name	Principle	Direct impact (ha)
Cumberland Plain Woodland of the Sydney Basin Bioregion	Cumberland Plain Woodland	1	0.12

3.3.2 Impacts requiring offsets

The impacts of the development requiring offset for native vegetation are outlined in Table 32 and shown on Figure 11. The impacts of the development requiring offset for threatened species and threatened species habitat are outlined in Table 33 and on Figure 11.

3.3.3 Credit summary

The number of ecosystem credits required for the development are outlined in Table 34. The number of species credits required for the development are outlined in Table 35. A biodiversity credit report is included in Appendix D:.

Table 32: Impacts to native vegetation that require offsets

PCT ID	PCT Name	Vegetation Class	Vegetation Formation	Direct impact (ha)	Credits required
835	Grey Box – Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion	Coastal Floodplain Wetlands	Forested Wetlands	1.33	16
1232	Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion	Coastal Swamp Forests	Forested Wetlands	0.67	7

Table 33: Impacts on threatened species and threatened species habitat that require offsets

Species	Common Name	Direct impact (ha)	NSW listing status	EPBC Listing status	Credits required
Myotis Macropus	Southern Myotis	2.73	V	Not Listed	29

3.3.4 Impacts not requiring offsets

The impacts of the development not requiring offset for native vegetation are outlined in Table 34 and shown on Figure 12.

Table 34: Impacts to native vegetation that do not require offsets

PCT ID	PCT Name	Vegetation Class	Vegetation Formation	Direct impact (ha)
850	Grey Box – Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion	Coastal Valley Grassy Woodlands	Grassy Woodlands	0.12
1232	Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion	Coastal Swamp Forests	Forested Wetlands	0.67

3.3.5 Areas not requiring assessment

Areas not requiring assessment are shown on Figure 13.

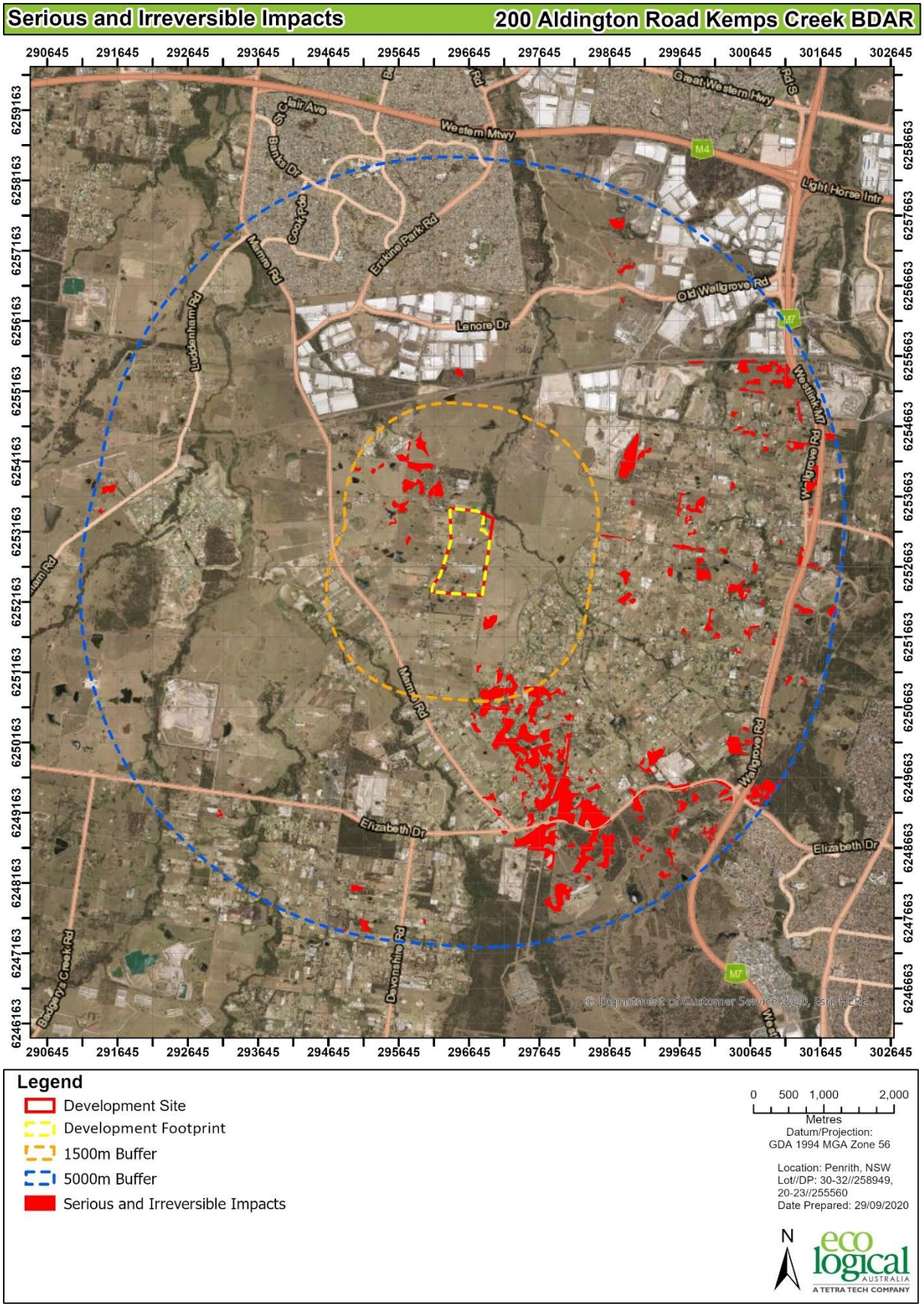


Figure 10: Serious and Irreversible Impacts

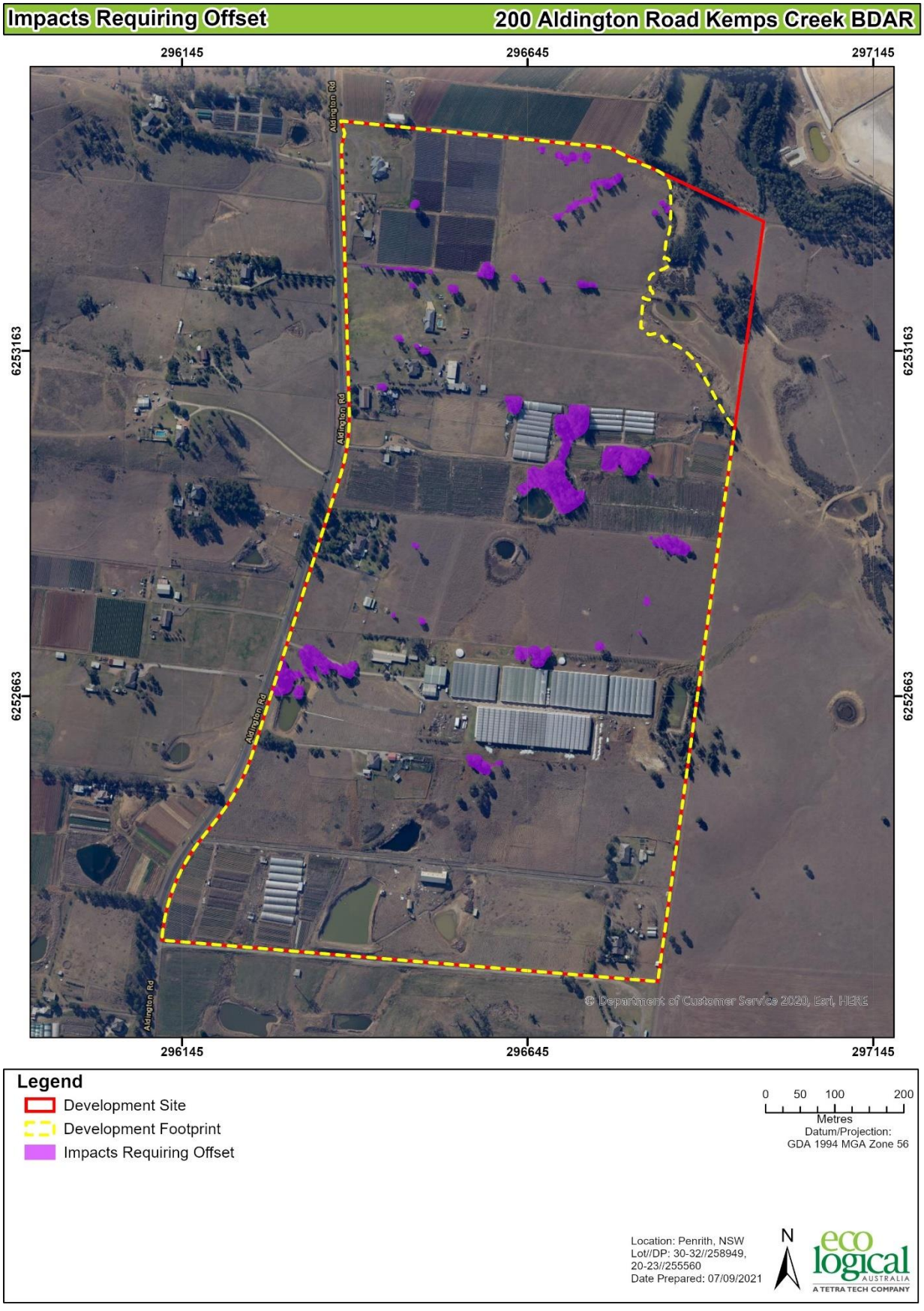


Figure 11: Impacts requiring offset

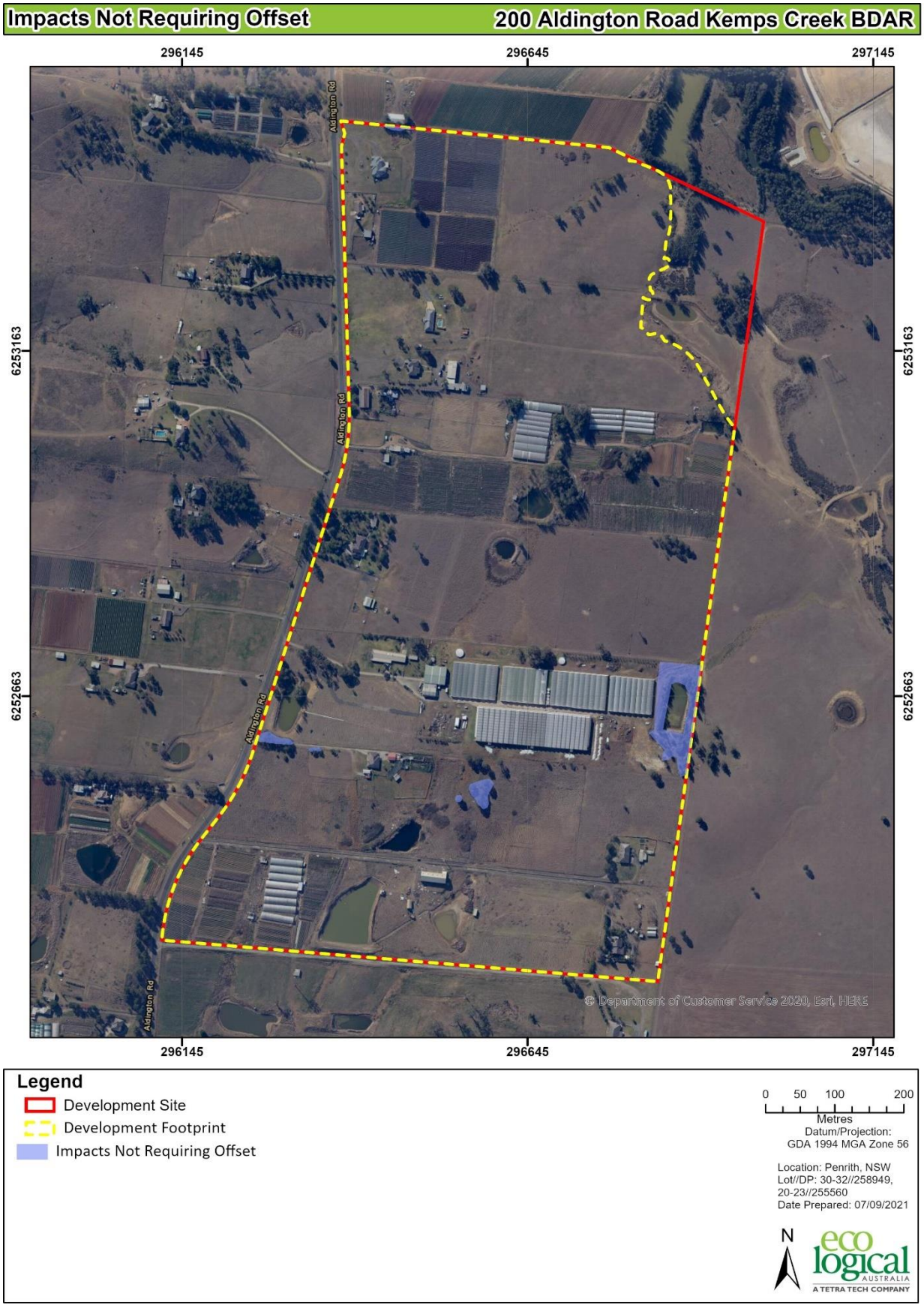


Figure 12: Impacts not requiring offset

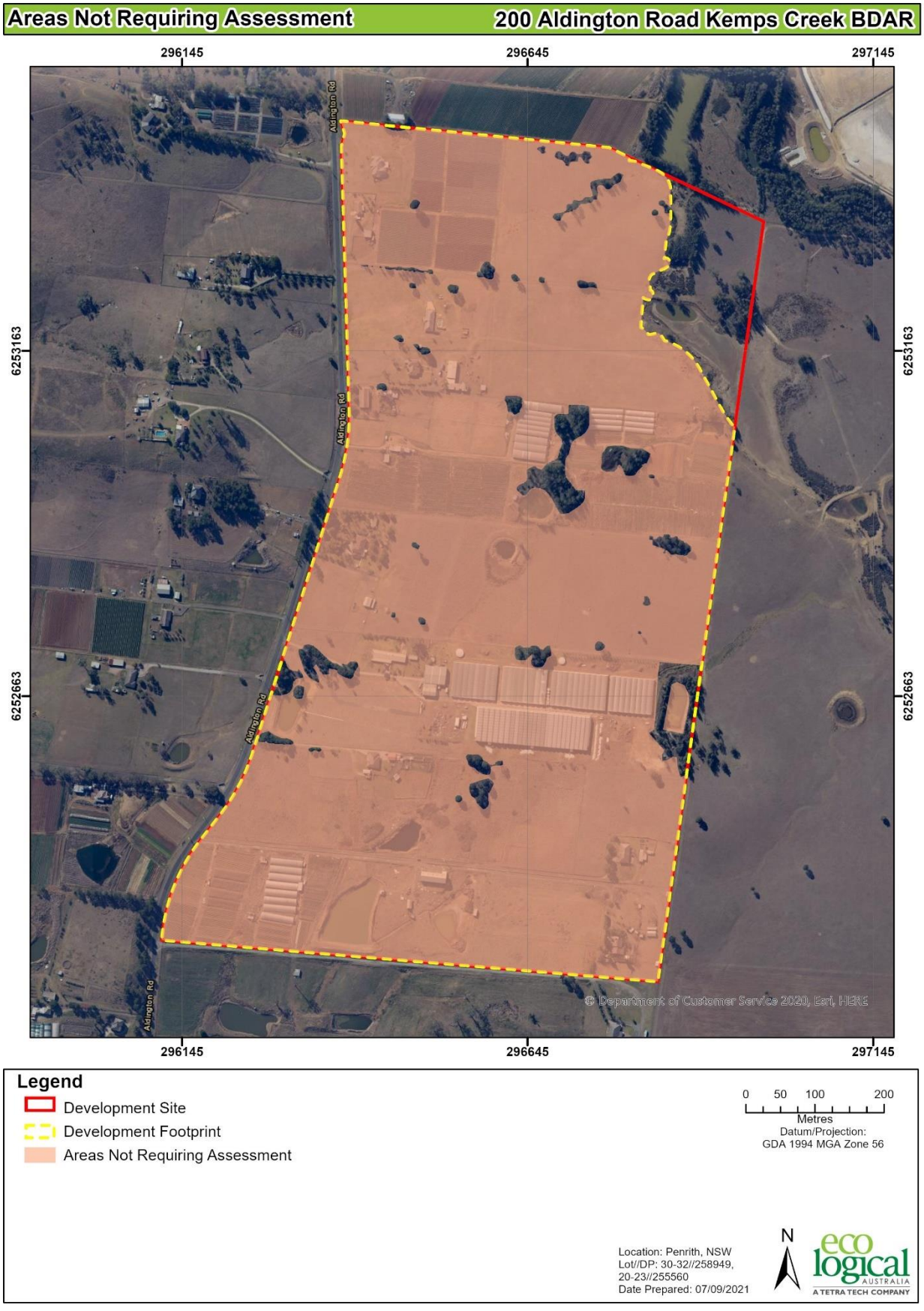


Figure 13: Areas not requiring assessment

3.4 Consistency with legislation and policy

Additional matters relating to impacts on flora and fauna which are not covered by the BC Act must also be addressed for the proposed development. Potential MNES in accordance with the Commonwealth EPBC Act have been addressed in Section 3.4.1.

3.4.1 Commonwealth *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act)

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

A habitat assessment and Likelihood of Occurrence was completed for listed threatened species that represent MNES (Appendix F). The following MNES were assessed as either having the potential to occur within the development site, likely to occur or known from the development site:

- *Anthochaera phrygia* (Regent Honeyeater)
- *Pteropus poliocephalus* (Grey-headed Flying-fox)
- *Lathamus discolor* (Swift Parrot)
- *Litoria aurea* (Green and Golden Bell Frog)
- *Phascolarctos cinereus* (Koala)
- *Gallinago hardwickii* (Latham's Snipe).

The assessments in this section were prepared in accordance with the EPBC Act Matters of National Environmental Significance: Significant Impact Guidelines 1.1 (Department of Environment 2009). These guidelines were established to assist proponents to determine whether a proposed action is likely to result in a significant impact on a matter of national environmental significance.

It was determined that the action will not have or is unlike to have a significant impact on the above MNES.

3.4.1.1 Forest birds *(Anthochaera phrygia* (Regent Honeyeater) *and Lathamus discolor* (Swift Parrot)*)*

The Regent Honeyeater and Swift Parrot are both listed as critically endangered under the EPBC Act. The distribution and habitat associations of this threatened species are presented in Appendix C:. Due to similar habitat requirements of these species, a single test was undertaken for both. These species were not recorded within the development site during survey. The proposed action will impact 2.8 ha of potential foraging habitat for both the Regent Honeyeater and Swift Parrot. The development site is not included within the DPIE mapped breeding areas for the threatened species (as accessed on BOAMS on 6 July and 23 September 2020).

Criterion	Question	Response
An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility of the following:		
1)	will the action lead to a long-term decrease in the size of a population *Note: A 'population of a species' is defined under the EPBC Act as an occurrence of the species in a particular area.*	The Regent Honeyeater and Swift Parrot comprise single populations of each respective species (DAWE 2020c). The proposed action will not affect breeding habitat for either threatened species but will remove 2.8 ha of vegetation, including potential foraging habitat. Given the proximity of suitable habitat in connective vegetation within the assessment area and beyond, the removal of this potential foraging habitat would not lead to the long-term decrease in the size of a population of either species.
2)	will the action reduce the area of occupancy of the species	The proposed action would reduce the amount of potential foraging habitat for these species by up to 2.8 ha. Neither species are known to occupy the development site, but the Regent Honeyeater and Swift Parrot may occasionally forage within the development site. Both the Regent Honeyeater and Swift Parrot are recorded as travelling long distances and would likely utilise the potential foraging habitat outside of the development site on feeding forays.
3)	will the action fragment an existing population into two or more populations	The proposed action will not fragment an existing population into two or more populations.
4)	will the action adversely affect habitat critical to the survival of a species	The National Recovery Plan for the Regent Honeyeater lists habitat critical to the survival of the species as: "any breeding or foraging areas where the species is likely to occur. Any newly discovered breeding or foraging locations". The National Recovery Plan for the Swift Parrot 2011 lists priority habitats as those which are used for nesting, by large proportions of the population, repeatedly between seasons or for prolonged periods of time. Based on the records of these species observed within 5 km of the development site (2 Regent Honeyeater, 0 Swift Parrot), the development site is not considered habitat critical to the survival of either species. Furthermore, similar foraging habitat is available directly adjacent to the development site.
5)	will the action disrupt the breeding cycle of a population	The proposed action will not disrupt the breeding cycle of either threatened species given that no breeding habitat will be affected by the proposed action and suitable

Criterion	Question	Response
		foraging habitat is available adjacent to the development site.
6) i	will the action modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposed action will remove 2.8 ha of vegetation, including foraging habitat for the Regent Honeyeater and Swift Parrot. It is unlikely that the extent of this vegetation removal will cause either species to decline because suitable habitat is available adjacent to the development site.
6) ii	will the action result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	The proposed action is unlikely to result in the establishment of an invasive species that is harmful to either threatened species.
7)	will the action introduce disease that may cause the species to decline	The proposed action is unlikely to introduce disease that may cause either threatened species to decline.
8)	will the action interfere with the recovery of the species	The proposed action will remove suitable foraging habitat for these species; however this will not interfere substantially with recovery objectives listed in their National Recovery Plans. The proposed action will not affect any breeding habitat and suitable foraging habitat is available adjacent to the development site.
Conclusion	Is there likely to be a significant impact?	No. The proposed action is unlikely to have a significant impact on the Regent Honeyeater or Swift Parrot for the following reasons: • No known breeding habitat will be removed by the proposed action. • Extensive areas of more suitable foraging habitat for these highly mobile species is available adjacent to the development site.

3.4.1.2 *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 C:. This species was not identified within the development site during survey. The proposed action will impact 2.8 ha of native vegetation, some of which comprises suitable foraging habitat for this species. No camps were identified within the development site, the nearest Grey-headed Flying-fox camp is located approximately 11 km east of the development site at Wetherill Park and has a count of 500-2,499 individuals. No camps will be affected by the proposed action.

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. The proposed action will affect 2.8 ha of native vegetation, some of which comprises suitable foraging habitat for the Grey-headed Flying-fox. The Grey-headed Flying-fox is recorded as travelling long distances (up to 50 km) on feeding forays. Given the proximity of more suitable habitat in connective vegetation within the assessment area, the removal of this potential foraging habitat would not lead to the long-term decrease in the size of an important population of Grey-headed Flying-fox.
2)	reduce the area of occupancy of an important population	The proposed action would affect 2.8 ha of potential foraging habitat for this species. The Grey-headed Flying-fox is not known to occupy the development site in the form of a camp but may occasionally forage within the development site. The Grey-headed Flying-fox is recorded as travelling long distances on feeding forays and would likely utilise the potential foraging habitat outside of the development site.
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 other areas of foraging habitat are 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 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. The proposed action will affect 2.8 ha of native vegetation, some of which may represent habitat critical survival to this species. However, this impact is considered unlikely to have an adverse effect given that the species is recorded as travelling long distances (50 km) on feeding forays and similar habitat is available adjacent to the development site.

Criterion	Question	Response
	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.*	
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 suitable foraging habitat is available adjacent to the development site.
6)	modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposed action will affect 2.8 ha of vegetation, including foraging habitat for the Grey-headed Flying-fox. It is unlikely that the extent of this vegetation removal will cause the species to decline because suitable habitat is available adjacent to the development site.
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 reservoirs for the Australian bat lyssavirus, Hendra Virus and Menangle virus, and can cause clinical disease and mortality in Grey-headed Flying-fox. The proposed action would not increase the incidence of this disease.
9)	interfere substantially with the recovery of the species.	The proposed action will remove suitable foraging habitat for this species; however this will not interfere substantially with recovery objectives listed in the Draft National Recovery Plan for the Grey-headed Flying-fox 2017. The proposed action will not affect any camps and suitable foraging habitat is available adjacent to the development site.
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 for the following reasons: • No camps will be removed by the proposed action. • More suitable foraging habitat for this highly mobile species is available adjacent to the development site.

3.4.1.3 Litoria aurea (Green and Golden Bell Frog)

The Green and Golden Bell Frog is listed as vulnerable under the EPBC Act. The distribution and habitat associations for this threatened species are presented in Table 16. Targeted survey was not undertaken for this species, however the development site contains 0.34 ha of potential habitat for this species, associated with dams with *Typha* sp.

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.*	The proposed action will impact up to 0.34 ha of potential habitat for the Green and Golden Bell Frog in the form of farm dams and associated vegetation. Based on the records of this species observed within 5 km of the development site (1 record), the proposed action would not lead to the long-term decrease in the size of an important population of Green and Golden bell Frog.
2)	Reduce the area of occupancy of an important population	The action would reduce the potential area of occupancy available for this species by removing up to 0.34 ha of potential habitat. However, given the number of records and marginal quality of potential habitat, it is considered unlikely that an important population would occupy this area.
3)	Fragment an existing important population into two or more populations	The proposed action will not fragment an existing population into two or more populations.
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 proposed action would impact 0.34 ha of native vegetation and associated dams that represent potential habitat. The area of potential habitat to be impacted is of marginal quality and only one individual has been recorded within 1 km of the development site. Therefore, it is unlikely that the proposed action will adversely affect potential habitat to the detriment of the survival of the species.
5)	Disrupt the breeding cycle of an important population	The proposed action is unlikely to result in the loss of a large number of individuals that would disrupt the life cycle of this species.
6)	Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposed action will decrease the availability of habitat for the species within the development site by 0.34 ha. However, it is unlikely that the extent of this habitat removal will cause the species to decline because similar habitat is

Criterion	Question	Response
		available within the assessment area and only one individual is known from the region.
7)	Result in an invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	A number of invasive fish species, especially *Gambusia holbrooki* (Eastern Mosquitofish), have been identified as main threats to the Green and Golden Bell Frog. The proposed action is unlikely to result in harmful invasive species becoming established in existing habitat for the Green and Golden Bell Frog.
8)	Introduce disease that may cause the species to decline	Infection with *Batrachochytrium dendrobatidis* (Chytrid Fungus) is listed as a main threat to the Green and Golden Bell Frog. The proposed action is unlikely to introduce the Chytrid Fungus.
9)	Interfere substantially with the recovery of the species	The proposed action will remove potential habitat for this species. However, the action will not interfere substantially with the recovery of the species.
Conclusion	Is there likely to be a significant impact?	No. The proposed action is unlikely to have a significant impact on the Green and Golden Bell Frog for the following reasons: • The 0.34 ha of potential Green and Golden Bell Frog habitat to be removed is considered marginal in quality. • Similar habitat is available within the assessment area.

3.4.1.4 *Phascolarctos cinereus* (Koala)

The Koala is listed as vulnerable under the EPBC Act. The distribution and habitat associations of this threatened species are presented in Table 16. This species was not identified within the development site during survey. The proposed action will affect 2.8 ha of native vegetation, some of which comprises suitable foraging habitat for this species. No breeding habitat will be affected by the proposed action.

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.*	The proposed action will affect 2.8 ha of native vegetation, some of which contains potential foraging habitat for the Koala. No evidence of breeding habitat was detected within the development site during survey. This impact would not lead to a long-term decrease in the size of a population of the species, given the proximity of similar habitat adjacent to the development site.
2)	reduce the area of occupancy of an important population	The proposed action would affect up to 2.8 ha of native vegetation, some of which represents potential foraging habitat for this species. The Koala is not known to occupy the development site but may occasionally forage within the development site.
3)	fragment an existing important population into two or more populations	The proposed action will not fragment an existing important population into two or more populations.
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.*	No habitat critical to the survival has been identified for this species. The development site contains feed trees considered foraging habitat for this species, however this habitat is not considered critical to the survival of the species. Furthermore, the development site is not mapped under the Koala Habitat Protection SEPP 2019. The proposed action may affect up to 2.8 ha of native vegetation, some of which represents potential foraging habitat for this species, however similar habitat is available adjacent to the development site.
5)	disrupt the breeding cycle of an important population	The proposed action will not disrupt the breeding cycle of the Koala given that no breeding habitat will be affected by the proposed action and suitable foraging habitat is available adjacent to the development site.

Criterion	Question	Response
6)	modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposed action will affect up to 2.8 ha of native vegetation, including foraging habitat for the Koala. It is unlikely that the extent of this vegetation removal will cause the species to decline because suitable, more extensive habitat is available adjacent to the development site.
7)	result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The proposed works are unlikely to result in the establishment of an invasive species in the habitat of the Koala.
8)	introduce disease that may cause the species to decline, or	The action is unlikely to introduce disease that would cause this species to decline.
9)	interfere substantially with the recovery of the species.	The Approved Conservation Advice for this species identifies the following main threats: loss and fragmentation of habitat, vehicle strike, disease and predation by dogs. The proposed action will impact foraging habitat; however the action is unlikely to exacerbate these threats to the extent that it would interfere substantially with the recovery of the species.
Conclusion	Is there likely to be a significant impact?	No. The proposed action is unlikely to have a significant impact on the Koala for the following reasons: • No breeding habitat will be impacted by the action. • More suitable habitat for this species is available adjacent to the development site.

3.4.1.5 Gallinago hardwikii (Latham's Snipe)

Latham's Snipe is listed as a migratory species under the EPBC Act. The distribution and habitat associations for this threatened species are presented in Table 16. This species was not identified within the development site during survey, however the proposed development will remove farm dams which represent foraging and roosting habitat for this species. Latham's Snipe does not breed in Australia.

Criterion	Question	Response
An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:		
1)	Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species *Note: An area of 'important habitat' for a migratory species is:* • *habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species, and/or* • *habitat that is of critical importance to the species at particular life-cycle stages, and/or* • *habitat utilised by a migratory species which is at the limit of the species range, and/or* • *habitat within an area where the species is declining.*	The proposed action will affect dams considered potential foraging and roosting habitat for Latham's Snipe. The species does not breed in Australia. Latham's Snipe prefers bodies of fresh water that contain low, dense vegetation which provides shelter for roosting purposes. The structure and composition of the fringing vegetation is a high determinant in the suitability of the habitat for foraging and roosting purposes. The dams within the development site are only considered marginal habitat for this species.
2)	Result in invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species	Predation by *Vulpes* (European Red Fox) is considered a threat to Latham's Snipe. The proposed action is unlikely to exacerbate predation of Latham's Snipe by the European Red Fox.
3)	Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species *Note: Listed migratory species cover a broad range of species with different life cycles and population sizes. Therefore, what is an 'ecologically significant proportion' of the population varies with the species (each circumstance will need to be evaluated). Some factors that should be considered include the species' population status, genetic*	The global population of Latham's Snipe is estimated to be between 25,000 and 100,000 individuals (DAWE 2020c). The species' extent of occurrence is estimated at 300,000 km^2 and the area of occupancy at 3000 km^2. An area of habitat is considered important if it supports >1% of the current population. Given only four individuals have been recorded within 5 km of the development site, the development site is not considered important habitat or likely to support a significant proportion of the population. Latham's Snipe does not breed in Australia but migrates after the breeding season anywhere between July – November, leaving by February. The species migrates to Australia for foraging and roosting purposes and would rely on the resources in the development site only occasionally.

Criterion	Question	Response
	distinctiveness and species specific behavioural patterns (for example, site fidelity and dispersal rates). *'Population', in relation to migratory species, means the entire population or any geographically separate part of the population of any species or lower taxon of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries including Australia.*	
Conclusion	Is there likely to be a significant impact?	No. The proposed action is unlikely to have a significant impact on Latham's Snipe for the following reasons: • The action will not affect breeding habitat for the species • The habitat in the development site is considered marginal and would only be used occasionally in a transient manner by species • The species is highly mobile and will readily move roosting locations as habitat becomes less / more suitable • The species' range is widespread and the proposed action would not impact the species at the extent of its range.

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Appendix A: Definitions

Terminology	Definition
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
Broad condition state:	Areas of the same PCT that are in relatively homogenous condition. Broad condition is used for stratifying areas of the same PCT into a vegetation zone for the purpose of determining the vegetation integrity score.
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.
High threat exotic plant cover	Plant cover composed of vascular plants not native to Australia that if not controlled will invade and outcompete native plant species.
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.
Important wetland	A wetland that is listed in the Directory of Important Wetlands of Australia (DIWA) and SEPP 14 Coastal Wetlands
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.

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

Table 35: Species matrix (species recorded by plot)

Stratum	Form	Scientific name	Exotic (*)	High Threat Weed (*)	Cover (%)					
					Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6
U	TG	*Acacia decurrens*			0	0	0	0.2	0	0
M	SG	*Acacia implexa*			0	0	0	0.5	0	0
G	FG	*Alternanthera denticulata*			0	0	0	0	0	0.1
G		*Lysimachia arvensis*.	*		0	0	0.1	0	0.1	0
U	TG	*Angophora subvelutina*			8	0	0	0	0	0
G		*Anredera cordifolia*	*	*	0	0	0	0.1	0	0
G		*Araujia sericifera*	*	*	0	0	0	0.1	0	0.1
G	GG	*Aristida* spp.			0	0	0.1	0	0	0
G		*Bidens pilosa* var. *pilosa*			5	0	0	0	0	10
G		*Briza subaristata*	*	*	0	0	0	0	0.1	0
G		*Capsella bursa-pastoris*	*		0.1	0	30	0	0	0
U	TG	*Casuarina glauca*			20	0	0	0	5	10
G		*Cenchrus clandestinus*	*	*	0	0	0	50	0	0
G	FG	*Centella asiatica*			0	0.1	0	0	0	0
G		*Cerastium vulgare*	*		0	0	0	0	0	1
G		*Cestrum parqui*	*	*	0	0	0	0.1	0	1
G		*Chenopodium album*	*		0	0	0	0	0	0.5
G		*Chloris gayana*	*	*	0	0	0	0.1	0	0
G		*Conyza bonariensis*	*		1	0	0	0	0.1	2
U	TG	*Corymbia intermedia*			0	1	0	0	0	0
G		*Cotula coronopifolia*	*		0	0	0	0	0.2	0
G	GG	*Cynodon dactylon*			15	0	5	0	2	3
G		*Cyperus eragrostis*	*	*	0	0	0	0	0	0.5
G		*Daucus carota*	*		0	0	0	0	0	2
G	FG	*Daucus* spp.			0	0	0	0	0.1	0
G	FG	*Dichondra repens*			0	1	0	0	0	5
G	GG	*Digitaria parviflora*			0	0	0	0	0.1	0
M	SG	*Dillwynia retorta*			0	0	1	0	0	0
G		*Ehrharta erecta*	*	*	20	0	0	1	0	25
M	FG	*Einadia nutans* subsp. *nutans*			0.1	0	0	0	0	0

Stratum	Form	Scientific name	Exotic (*)	High Threat Weed (*)	Cover (%)					
					Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6
G	FG	*Einadia polygonoides*			0	0	0	0.3	0	0
G		*Eragrostis curvula*	*	*	0	0	0	0.2	0	0
U	TG	*Eucalyptus amplifolia* subsp. *amplifolia*			0	8	0	0	0	0
U	TG	*Eucalyptus tereticornis*			0	1	0	0	0	0
G		*Foeniculum vulgare*	*		0	0	0	1	0	0
G	FG	Forb			0	0	0	0	0.2	0
G	FG	*Geranium homeanum*			0	0	0	0	0	0.1
G	OG	*Glycine tabacina*			0	0.5	0	0	0	0
G		*Gomphocarpus fruticosus*	*		0	0	0	0.1	0	0
G		*Juncus acutus* subsp. *acutus*	*	*	0	0	0	0	30	0
G	GG	*Lomandra filiformis* subsp. *filiformis*			0	0.1	1	0	0	0
G	GG	Microlaena stipo*ides* var. *stipoides*			0	0.1	0	0	0	0
G		*Modiola caroliniana*	*		0.1	0.1	0.1	0	0	0
G		*Onopordum* spp.	*		0	0	0	0.1	0	0.5
G		*Opuntia stricta* var. *stricta*	*	*	0	0.1	0.1	0	0	0
G	FG	*Oxalis* spp.			0	0.1	0	0	0.1	0
G	GG	*Paspalidium distans*			0	0.1	0	0	0	0
G		*Paspalum dilatatum*	*	*	0	0	30	0.1	0	0.5
G	GG	*Pennisetum* spp.			20	0	0	0	0	0
G	FG	*Persicaria decipiens*			0	0	0	0	0.1	25
G		*Phytolacca octandra*	*		0	0.1	0	0	0	0.1
G		*Plantago lanceolata*	*		0	0.1	0.2	0.1	0.1	0
G	SG	*Rubus* spp.			0	0	0	3	0	0.1
G		*Senecio madagascariensis*	*	*	0	0.5	0.1	0	0.1	1
G		*Setaria pumila*	*		2	0	5	0.2	0.1	0
G		*Sida rhombifolia*	*		15	10	0	0.2	0.1	0.5
G		*Solanum linnaeanum*	*		0.1	3	0.1	0.1	0	0
G		*Solanum nigrum*	*		0.2	0.1	0	0.1	0	0.1
G		*Sonchus oleraceus*	*		0	0	0.1	0.1	0	0.1
G	GG	*Themeda triandra*			0	0	30	0	0	0
G		*Vicia sativa* subsp. *nigra*	*		0	0	0.2	0.1	0	0

Key: U = Upper, M= Middle, G = Ground. EG = Fern, FG = Forb, GG = Grass & grasslike, OG = Other, SG = Shrub, TG = Tree.

Table 36: Plot location data

Plot no.	PCT	Vegetation Zone	Condition	Zone	Easting	Northing	Bearing (°)
1	835	1	Moderate	56	296956	6253275	183
2	835	2	Low-Moderate	56	296308	6252714	84
3	835	2	Low-Moderate	56	296803	6252798	85
4	850	3	Low	56	296539	6252465	72
5	1232	4	Low	56	296866	6253285	8
6	1232	5	Moderate	56	296679	6252962	33

Table 37: Vegetation integrity data (Composition, Structure and function)

Composition (number of species)						
Plot no.	Tree	Shrub	Grass	Forb	Fern	Other
1	2	0	2	1	0	0
2	3	0	3	3	0	1
3	0	1	4	0	0	0
4	1	2	0	1	0	0
5	1	0	2	4	0	0
6	1	1	1	4	0	0

Structure (Total cover %)						
Plot no.	Tree	Shrub	Grass	Forb	Fern	Other
1	28.0	0.0	35.0	0.1	0.0	0.0
2	10.0	0.0	0.3	1.2	0.0	0.5
3	0.0	1.0	36.1	0.0	0.0	0.0
4	0.2	3.5	0.0	0.3	0.0	0.0
5	5.0	0.0	2.1	0.5	0.0	0.0
6	10.0	0.1	3.0	30.2	0.0	0.0

Function											
Plot no.	Large Trees (DBH > 50 cm)	Hollow trees	Litter Cover (%)	Length Fallen Logs (m)	Tree Stem 5-9 cm	Tree Stem 10-19 cm	Tree Stem 20-29 cm	Tree Stem 30-49 cm	Tree Stem 50-79 cm	Tree Regen	High Threat Weed Cover (%)
1	2	1	5	50	1	1	1	1	1	0	20.0
2	1	3	39	0	1	1	1	1	0	1	0.6
3	0	0	44	0	0	0	0	0	0	0	30.2

Function										
4	0	0	0	0	0	0	0	0	0	51.7
5	0	0	56	0	1	1	1	0	0	30.2
6	0	0	27	13	1	1	1	1	0	1	28.1

Note: For stem size classes: 0 = Absence, 1 = Presence.

Plot number	Photo
Plot 1	
2	

Plot number	Photo
3	
4	
5	

Plot number	Photo
6	

Appendix C: EPBC Act Likelihood of Occurrence

An assessment of likelihood of occurrence was made for threatened and migratory species identified from the database search. Only species listed under the EPBC Act were included in the assessment. Species listed only under the BC Act were assessed as part of determining credit species included in the BAMC. 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 or Marine 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:

- "known" = 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.

A test of significance was conducted for threatened species that were recorded within the study area or had a higher likelihood of occurring and were not recorded during the site visit. It is noted that some threatened fauna species that are highly mobile, wide ranging and vagrant may use portions of the study area 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, a test of significance in reference to Commonwealth legislation was not considered necessary.

The records column refers to the number of records occurring within 5 km of the study area, as provided by the Atlas of NSW Wildlife (BioNet) and Protected Matters Search Tool database search.

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

Table 38: Likelihood of occurrence assessment for threatened flora and fauna species

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	BioNet Records within 5 km	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact assessment required
FLORA							
Acacia bynoeana	Bynoe's Wattle	V	Found in central eastern NSW, from the Hunter District (Morisset) south to the Southern Highlands and west to the Blue Mountains. Found in heath or dry sclerophyll forest on sandy soils.	0	No – lack of suitable habitat recorded within the development site, species not observed during surveys, no local records.	N/A	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.	7	No – lack of suitable habitat recorded within the development site, species not observed during surveys.	N/A	No
Allocasuarina glareicola	-	E	Primarily restricted to the Richmond (NW Cumberland Plain) district, but with an outlier population found at Voyager Point, Liverpool.	0	No – lack of suitable habitat recorded within the development site, species not observed during surveys, no local records.	N/A	No
Cynanchum elegans	White-flowered Wax Plant	E	Restricted to eastern NSW, from Brunswick Heads on the north coast to Gerroa in the Illawarra region, and as far west as Merriwa in the upper Hunter River valley. Dry rainforest; littoral rainforest; *Leptospermum laevigatum-Banksia integrifolia* subsp. *integrifolia* (Coastal	0	No - suitable habitat not recorded within the development site, species not observed during surveys, no local records.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	BioNet Records within 5 km	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact assessment required
			Tea-tree– Coastal Banksia) coastal scrub; *Eucalyptus tereticornis* (Forest Red Gum) or *Corymbia maculata* (Spotted Gum) open forest and woodland; and *Melaleuca armillaris* (Bracelet Honeymyrtle) scrub.				
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.	0	No – potential habitat available within development site, however species not observed during survey and no local records present.	Yes	No
Grevillea parviflora subsp. *parviflora*	Small-flower Grevillea	V	Heath and shrubby woodland to open forest on sandy or light clay soils usually over thin shales.	14	No – lack of suitable habitat recorded within the development site, species not observed during surveys.	N/A	No
Haloragis exalata subsp. *exalata*	Square Raspwort	V	Disjunct distribution in the Central Coast, South Coast and North Western Slopes botanical subdivisions of NSW. Protected and shaded damp situations in riparian habitats.	0	No - suitable habitat not recorded within the development site, species not observed during surveys, no local records.	N/A	No
Isotoma fluviatilis subsp. *fluviatilis*	-	X	Damp places on the Cumberland Plain, including freshwater wetland, grassland/alluvial woodland, and alluvial woodland/shale plains woodland.	7	No – lack of suitable habitat recorded within the development site, species not observed during surveys.	N/A	No
Persicaria elatior	Tall Knotweed	V	In south-eastern NSW recorded from Mt Dromedary, Moruya State Forest near Turlinjah, the Upper Avon River catchment north of Robertson, Bermagui, and Picton Lakes. In northern NSW known from Raymond Terrace (near Newcastle) and the Grafton area (Cherry	0	No - suitable habitat not recorded within the development site, species not observed during surveys, no local records.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	BioNet Records within 5 km	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact assessment required
			Tree and Gibberagee State Forests). Beside streams and lakes, swamp forest or disturbed areas.				
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	No - suitable habitat not recorded within the development site, species not observed during surveys, no local records.	N/A	No
Persoonia nutans	Nodding Geebung	E	Northern populations: sclerophyll forest and woodland (Agnes Banks Woodland, Castlereagh Scribbly Gum Woodland and Cooks River / Castlereagh Ironbark Forest) on aeolian and alluvial sediments. Southern populations: tertiary alluvium, shale sandstone transition communities and Cooks River / Castlereagh Ironbark Forest.	13	No – lack of suitable habitat recorded within the development site, species not observed during surveys.	N/A	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	No - suitable habitat not recorded within the development site, species not observed during surveys, no local records.	N/A	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	20	No – lack of suitable habitat recorded within the development site, species not observed during surveys.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	BioNet Records within 5 km	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact assessment required
			in disturbed areas that would have previously supported.				
Pomaderris brunnea	Brown Pomaderris	V	Moist woodland or forest on clay and alluvial soils of flood plains and creek lines.	0	No - suitable habitat not recorded within the development site, species not observed during surveys, no local records.	N/A	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	No - suitable habitat not recorded within the development site, species not observed during surveys, no local records.	N/A	No
Pterostylis saxicola	Sydney Plains Greenhood	E	Restricted to western Sydney between Freemans Reach in the north and Picton in the south. Small pockets of shallow soil in depressions on sandstone rock shelves above cliff lines, adjacent to sclerophyll forest or woodland on shale/sandstone transition soils or shale soils.	0	No – potential habitat recorded within the development site, however species not observed during surveys and no local records.	N/A	No
Pultenaea parviflora	-	V	Dry sclerophyll forest, especially Castlereagh Ironbark Forest, Shale Gravel Transition Forest and transitional areas where these communities adjoin Castlereagh Scribbly Gum Woodland.	97	No – lack of suitable habitat recorded within the development site, species not observed during surveys.	N/A	No
Syzygium paniculatum	Magenta Lilly Pilly	V	Only in NSW, in a narrow, linear coastal strip from Upper Lansdowne to Conjola State Forest. Subtropical and littoral rainforest on gravels, sands, silts and clays.	0	No - suitable habitat (rainforest) not recorded within the development site, species not observed during surveys, no local records.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	BioNet Records within 5 km	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact assessment required
Thesium australe	Austral Toadflax	V	In eastern NSW it is found in very small populations scattered along the coast, and from the Northern to Southern Tablelands. Grassland on coastal headlands or grassland and grassy woodland away from the coast.	0	No - suitable habitat not recorded within the development site, species not observed during surveys, no local records.	N/A	No
Thesium australe	Austral Toadflax	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.	0	No - suitable habitat not recorded within the development site, species not observed during surveys, no local records.	N/A	No
FAUNA							
Amphibians							
Heleioporus australiacus	Giant Burrowing Frog	V	South eastern NSW and Victoria, in two distinct populations: a northern population in the sandstone geology of the Sydney Basin as far south as Ulladulla, and a southern population occurring from north of Narooma through to Walhalla, Victoria. Heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based.	0	No – suitable habitat not present within the development site, no local records.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	BioNet Records within 5 km	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact assessment required
Litoria aurea	Green and Golden Bell Frog	V	Since 1990, recorded from about 50 scattered sites within its former range in NSW, from the north coast near Brunswick Heads, south along the coast to Victoria. Records exist west to Bathurst, Tumut and the ACT region. Marshes, dams and stream-sides, particularly those containing *Typha* sp. (bullrushes) or *Eleocharis* sp. (spikerushes). Some populations occur in highly disturbed areas.	1	Potential, farm dams may provide potential habitat for this species.	Yes	Yes
Litoria raniformis	Growling Grass Frog	V	Permanent or ephemeral Black Box/Lignum/Nitre Goosefoot swamps, Lignum/Typha swamps and River Red Gum swamps or billabongs along floodplains and river valleys. Also found in irrigated rice crops.	0	No – suitable habitat not present within the development site, no local records.	N/A	No
Aves							
Actitis hypoleucos	Common Sandpiper	M	Summer migrant. In NSW, widespread along coastline and also occurs in many areas inland. Coastal wetlands and some inland wetlands, especially muddy margins or rocky shores. Also estuaries and deltas, lakes, pools, billabongs, reservoirs, dams and claypans, mangroves.	0	Unlikely – potential habitat present within the development site, no local records	Yes	No
Anthochaera phrygia	Regent Honeyeater	CE	Inland slopes of south-east Australia, and less frequently in coastal areas. In NSW, most records are from the North-West Plains, North-West and South-West Slopes, Northern Tablelands, Central Tablelands and Southern Tablelands regions; also recorded in the Central Coast and Hunter Valley regions. Eucalypt woodland and open forest, wooded farmland	2	Likely – suitable foraging habitat detected within the development site. Development site not within DPIE mapped areas (as accessed on BOAMS on 6 July 2020).	Yes (foraging only)	Yes

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	BioNet Records within 5 km	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact assessment required
			and urban areas with mature eucalypts, and riparian forests of *Casuarina cunninghamiana* (River Oak).				
Apus pacificus	Fork-tailed Swift	M	Recorded in all regions of NSW. Riparian woodland, swamps, low scrub, heathland, saltmarsh, grassland, Spinifex sandplains, open farmland and inland and coastal sand-dunes.	1	Unlikely – suitable habitat not present within the development site.	N/A	No
Apus pacificus	Fork-tailed Swift	C, J, K	Sometimes travels with Needletails. Varied habitat with a possible tendency to more arid areas but also over coasts and urban areas.	2	Unlikely – suitable habitat not present within the development site.	N/A	No
Ardea ibis	Cattle Egret	Mar	Grasslands, wooded lands and terrestrial wetlands.	29	Potential – suitable habitat present within the development site.	Yes	No – not required of Marine listed species
Botaurus poiciloptilus	Australasian Bittern	E	Found over most of NSW except for the far north-west. Permanent freshwater wetlands with tall, dense vegetation, particularly *Typha* sp. (bullrushes) and *Eleocharis* sp. (spikerushes).	0	Unlikely – suitable habitat not present within the development site, no local records.	N/A	No
Calidris acuminata	Sharp-tailed Sandpiper	M	Summer migrant. Widespread in most regions of NSW, especially in coastal areas, but sparse in the south-central Western Plain and east Lower Western Regions. Shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation.	1	Unlikely – suitable habitat not present within the development site.	N/A	No
Calidris ferruginea	Curlew Sandpiper	CE, M	Occurs along the entire coast of NSW, and sometimes in freshwater wetlands in the Murray-Darling Basin. Littoral and estuarine habitats, including intertidal mudflats, non-tidal	0	Unlikely – suitable habitat not present within the development site, no local records.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	BioNet Records within 5 km	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact assessment required
			swamps, lakes and lagoons on the coast and sometimes inland. Littoral and estuarine habitats, including intertidal mudflats, non-tidal swamps, lakes and lagoons on the coast and sometimes inland.				
Calidris melanotos	Pectoral Sandpiper	M	Summer migrant to Australia. Widespread but scattered in NSW. East of the Great Divide, recorded from Casino and Ballina, south to Ulladulla. West of the Great Divide, widespread in the Riverina and Lower Western regions. Shallow fresh to saline wetlands, including coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands.	0	Unlikely – suitable habitat not present within the development site, no local records.	N/A	No
Dasyornis brachypterus	Eastern Bristlebird	E	Central and southern populations inhabit heath and open woodland with a heathy understorey. In northern NSW, habitat comprises open forest with dense tussocky grass understorey.	0	Unlikely – suitable habitat not present within the development site, no local records.	N/A	No
Gallinago hardwickii	Latham's Snipe	C, J, K	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	4	Likely – suitable habitat present within the development site.	Yes	yes

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	BioNet Records within 5 km	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact assessment required
			various sites close to humans or human activity (e.g. near roads, railways, airfields, commercial or industrial complexes).				
Grantiella picta	Painted Honeyeater	V	Widely distributed in NSW, predominantly on the inland side of the Great Dividing Range but avoiding arid areas. Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests.	0	No – suitable habitat not present within the development site, no local records.	N/A	No
Haliaeetus leucogaster	White-bellied Sea-Eagle	C	Freshwater swamps, rivers, lakes, reservoirs, billabongs, saltmarsh and sewage ponds and coastal waters. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, forest and urban areas.	6	Unlikely – suitable habitat not present within the development site.	N/A	No
Hirundapus caudacutus	White-throated Needletail	C, J, K	All coastal regions of NSW, inland to the western slopes and inland plains of the Great Divide. Occur most often over open forest and rainforest, as well as heathland, and remnant vegetation in farmland.	0	Unlikely – potential habitat present within the development site, no local records	Yes	No
Lathamus discolor	Swift Parrot	CE	Migrates from Tasmania to mainland in Autumn-Winter. In NSW, the species mostly occurs on the coast and south west slopes. Box-ironbark forests and woodlands.	0	Likely – suitable foraging habitat detected within the development site. Development site not within DPIE mapped breeding areas (as confirmed by the DPIE BAM support 23 July 2020).	Yes (foraging only)	Yes
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	0	Unlikely – potential habitat present within the development site, no local records	Yes	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	BioNet Records within 5 km	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact assessment required
			eucalypt forests, dry sclerophyll forests and woodlands, gullies in mountain areas or coastal foothills, Brigalow scrub, coastal scrub, mangroves, parks and gardens.				
Motacilla flava	Yellow Wagtail	M	Regular summer migrant to mostly coastal Australia. In NSW recorded Sydney to Newcastle, the Hawkesbury and inland in the Bogan LGA. Swamp margins, sewage ponds, saltmarshes, playing fields, airfields, ploughed land, lawns.	0	Unlikely – potential habitat present within the development site, no local records	Yes	No
Myiagra cyanoleuca	Satin Flycatcher	M	In NSW, widespread on and east of the Great Divide and sparsely scattered on the western slopes, with very occasional records on the western plains. Eucalypt-dominated forests, especially near wetlands, watercourses, and heavily-vegetated gullies.	0	Unlikely – potential habitat present within the development site, no local records	Yes	No
Numenius madagascariensis	Eastern Curlew	CE, M	Summer migrant to Australia. Primarily coastal distribution in NSW, with some scattered inland records. 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 – potential habitat present within the development site, no local records	Yes	No
Rostratula australis	Australian Painted Snipe	E	In NSW most records are from the Murray-Darling Basin. Other recent records include wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys.	1	Unlikely -limited habitat present within the development site, limited local records	Yes	No
Rjipidura rufifrons	Rufous Fantail	M	Wet sclerophyll forests, subtropical and temperate rainforests. Sometimes drier sclerophyll forests and woodlands.	0	Unlikely – suitable habitat not present within the development site, no local records.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	BioNet Records within 5 km	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact assessment required
Tringa nebularia	Common Greenshank	M	Summer migrant to Australia. Recorded in most coastal regions of NSW; also widespread west of the Great Dividing Range. Found in terrestrial wetlands and sheltered coastal habitats.	0	Unlikely – suitable habitat not present within the development site, no local records.	N/A	No
Insects							
Synemon plana	Golden Sun Moth	CE	NSW populations are found in the area between Queanbeyan, Gunning, Young and Tumut. Natural Temperate Grasslands and grassy Box-Gum Woodlands in which groundlayer is dominated by *Austrodanthonia* spp. (wallaby grasses).	0	Unlikely – suitable habitat not present within the development site, no local records.	N/A	No
Mammals							
Chalinolobus dwyeri	Large-eared Pied Bat	V	Recorded from Rockhampton in Qld south to Ulladulla in NSW. Largest concentrations of populations occur in the sandstone escarpments of the Sydney basin and the NSW north-west slopes. Wet and dry sclerophyll forests, Cyprus Pine dominated forest, woodland, sub-alpine woodland, edges of rainforests and sandstone outcrop country.	0	Unlikely – suitable habitat not present within the development site, no local records.	N/A	No
Dasyurus maculatus	Spotted-tailed Quoll	E	Found on the east coast of NSW, Tasmania, eastern Victoria and north-eastern Qld. Rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline.	0	Unlikely – suitable habitat not present within the development site, no local records.	N/A	No
Petauroides volans	Greater Glider	V	Eastern Australia, from the Windsor Tableland in north Queensland through to central Victoria (Wombat State Forest). Eucalypt forests and woodlands. It is typically found in highest	0	No – preferred habitat not present within the development site, no local records.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	BioNet Records within 5 km	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact assessment required
			abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows.				
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	No – preferred habitat not present within the development site, no local records.	N/A	No
Phascolarctos cinereus	Koala	V	In NSW it mainly occurs on the central and north coasts with some populations in the west of the Great Dividing Range. There are sparse and possibly disjunct populations in the Bega District, and at several sites on the southern tablelands. Eucalypt woodlands and forests.	3	Unlikely – potential habitat & feed trees present within the development site, but site is within largely cleared & disturbed rural/ semi industrial area	Yes (foraging only)	Yes
Pseudomys novaehollandiae	New Holland Mouse	V	Fragmented distribution across eastern NSW. Open heathlands, woodlands and forests with a heathland understorey, vegetated sand dunes.	0	Unlikely – suitable habitat not present within the development site, no local records.	N/A	No
Pteropus poliocephalus	Grey-headed Flying-fox	V	Along the eastern coast of Australia, from Bundaberg in Qld to Melbourne in Victoria. Subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.	31	Seasonal foraging habitat available within the site. No camps observed within study area.	Yes (foraging only)	Yes

Appendix D: Biodiversity credit report

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id 00021253/BAAS18077/20/00021831	Proposal Name 200 Aldington Road Kemps Creek	BAM data last updated * 24/11/2021
Assessor Name Nicole McVicar	Assessor Number BAAS18077	BAM Data version * 50
Proponent Names David Pintos-Oliver	Report Created 25/11/2021	BAM Case Status Finalised
Assessment Revision 2	Assessment Type Part 4 Developments (General)	Date Finalised 25/11/2021
BOS entry trigger	* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.	

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Cumberland Plain Woodland in the Sydney Basin Bioregion	Critically Endangered Ecological Community	850-Cumberland shale hills woodland

Species
Nil

Additional Information for Approval

BAM Biodiversity Credit Report (Like for like)

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
Dasyurus maculatus / Spotted-tailed Quoll
Haliaeetus leucogaster / White-bellied Sea-Eagle
Pandion cristatus / Eastern Osprey
Chthonicola sagittata / Speckled Warbler

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

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
835-Cumberland riverflat forest	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	1.3	16	0	16
850-Cumberland shale hills woodland	Cumberland Plain Woodland in the Sydney Basin Bioregion	0.1	0	0	0
1232-Coastal freshwater swamp forest	Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	1.3	0	7	7

BAM Biodiversity Credit Report (Like for like)

835-Cumberland riverflat forest

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 686, 828, 835, 941, 1108, 1109, 1212, 1228, 1293, 1318, 1326, 1386, 1504, 1556, 1594, 1618, 1720, 1794	-	835_Moderate	Yes	4	Cumberland, Burragorang, Pittwater, Sydney Cataract, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Assessment Id
00021253/BAAS18077/20/00021831

Proposal Name
200 Aldington Road Kemps Creek

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BAM Biodiversity Credit Report (Like for like)

	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 686, 828, 835, 941, 1108, 1109, 1212, 1228, 1293, 1318, 1326, 1386, 1504, 1556, 1594, 1618, 1720, 1794	-	835_Low_mod	Yes	12	Cumberland, Burragorang, Pittwater, Sydney Cataract, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
850-Cumberland shale hills woodland	**Like-for-like credit retirement options**					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
	Cumberland Plain Woodland in the Sydney Basin Bioregion This includes PCT's: 849, 850	-	850_Low	No	0	Cumberland, Burragorang, Pittwater, Sydney Cataract, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Like for like)

1232-Coastal freshwater swamp forest	Like-for-like credit retirement options					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
	Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 915, 916, 917, 918, 919, 1125, 1230, 1232, 1234, 1235, 1236, 1726, 1727, 1728, 1729, 1731, 1800, 1808	-	1232_Low	No	0	Cumberland, Burragorang, Pittwater, Sydney Cataract, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 915, 916, 917, 918, 919, 1125, 1230, 1232, 1234, 1235, 1236, 1726, 1727, 1728, 1729, 1731, 1800, 1808	-	1232_Moderate	No	7	Cumberland, Burragorang, Pittwater, Sydney Cataract, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Like for like)

1232-Coastal freshwater swamp forest	

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Myotis macropus / Southern Myotis	**835_Moderate, 835_Low_mod, 850_Low, 1232_Low, 1232_Moderate**	2.7	27.00

Credit Retirement Options

Like-for-like credit retirement options

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