Biodiversity Development Assessment Report

Industrial Development

4 Minna Close, Belrose

NSW 2107

16 November 2023

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Executive Summary

Land Eco Consulting (Land Eco) was commissioned by Wu Properties Pty Ltd ATF Wu Family Trust ('the proponent') to prepare this Biodiversity Development Assessment Report (BDAR) for the proposed industrial development at 4 Minna Close, Belrose, NSW 2085 (Lot 502/-/DP875858) (the 'Subject Property'). The extent of the development is referred to as 'The Subject Land'.

The Subject Property is a landholding within an existing commercial estate situated in the Northern Beaches Local Government Area of Sydney. The Subject Land is dominated by dense remnant native vegetation.

The proposed development includes the construction of a large industrial facility and associated infrastructure. The development will comprise of one large format warehouse building including covered loading hardstand, mezzanine office area, under croft carparking for 25 cars including provision for motorcycle parking and bicycle storage. At the completion of the proposal, the development is to provide a total of 1,550m² warehousing, 175m² office floor space and 808m² car parking.

Primary vehicular access will be provided off Minna Close; no access is provided off Mona Vale Road. Provision for heavy vehicles up to Heavy Rigid Vehicles will be via a shared driveway with 3 Minna Close at the south-east corner of the site and egress via the south-west corner of the site. Entry to the under croft parking is separated from heavy vehicles and is located 16.5m from the west boundary. The proposed development considers the unique topography of the site and utilises the existing shared access with 3 Minna Close. The development footprint carefully considers the biodiversity constraints of the site through maximising tree retention and minimising excavation into the rising landform of the site.

The warehouse development will be serviced by new civil and stormwater infrastructure including on-site OSD and rainwater tanks, retaining earthworks and appropriate sediment and erosion control. Landscape buffer zones will be provided along the south and west boundaries and will be comprised only of species endemic to Duffy's Forest.

The site planning and design of the building is contextually appropriate in relation to immediate surrounds being predominantly light industry development. The contemporary architectural expression both through building form and façade detail creates a strong presence to Minna Close. The primary material selection is of muted bushland tones which help enhance the natural bushland setting.

The proposed development is a local development application (DA) subject to approval under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The proponent has commissioned this BDAR to accompany the proposal and address the requirements of the NSW Biodiversity Offset Scheme (BOS) and requires submission of a streamlined 'Small Areas' BDAR as stipulated under the *Biodiversity Conservation Act 2016* (BC Act) and in accordance with Appendix C of the Biodiversity Assessment Method (BAM) 2020. The BDAR is required to be undertaken by an Accredited Biodiversity Assessor to assess the impacts of the proposal upon biodiversity including native vegetation, threatened species and habitat.

Two plant community type (PCT) within the Subject Land:

- PCT 3593: Sydney Coastal Sandstone Bloodwood Shrub Forest, and
- PCT 3586: Northern Sydney Scribbly Gum Woodland

The dominant PCT is 3593. The entire extent of this PC on the Subject Property forms part of the '*Duffys Forest Ecological Community in the Sydney Basin Bioregion*' (Duffys Forest) listed as an Endangered Ecological Community (EEC) under Schedule 2 of the BC Act. In accordance with BAM Chapter 4 Section 4.2 of Appendix C in the BAM, the dominant, most conservation significant PCT has been selected to represent all vegetation in the Subject Land, therefore, all areas of PCT 3586 will be assessed, and offset as PCT 3593. Thus, while only 0.23 ha of vegetation representative of PCT 3593 is present within the Subject Land, a total of 0.35 ha of vegetation will be assessed under PCT 3593 (including 0.01 of Canopy Overhang) to offset the total impact of the proposed development. In essence, this means the applicant will be over assessing the extent of impact to Duffys Forest EEC, and overcompensating for the loss of Duffys Forest EEC through devising a larger offset obligation for this TEC. This is an effective implementation of the 'precautionary principle'.

The proposed development has been designed to avoid and minimise impacts on biodiversity values in keeping with the purposeful use of the Subject Land. This has been accomplished by positioning the industrial development along the frontage of Minna Close where the non-threatened vegetation (not dominant through the remainder of the Subject Land) occurs and where the vegetation is in the poorest condition. By doing this, the proponent intends on retaining 0.17 ha of the Duffys Forest EEC at the rear of the Subject Property, which represents approximately 43% of the existing EEC within the Subject Property, maintaining a habitat connectivity corridor in this way. The native vegetation to be retained will be managed and enhanced in accordance with a Biodiversity Management Plan (BMP). This will assist in further avoidance and minimisation of impacts.

The following threatened species were recorded on the Subject Property by Land Eco:

- Large Bent-winged Bat (*Miniopterus orianae oceanensis*) which is listed Vulnerable under the BC Act.

The Large Bent-winged Bat is a 'Dual Credit' Species. However, as it was only recorded briefly foraging around the Subject Land and not breeding (Balance! Environmental 2022), it will only be assessed as an 'Ecosystem Credit' Species for the purpose of this development.

No 'Species Credit' Species were identified on or near the Subject Land. This was despite extensive targeted survey effort. Therefore, no Species Credits are required to be retired to offset the biodiversity impacts of the proposal.

Direct vegetation impacts from the development will be limited to the removal of 0.35 ha of native vegetation including 150 trees (Urban Arbor 2023), at least 15 of which are hollow bearing.

Minor indirect impacts are likely to influence the vegetation to be retained within the Subject Property, however these are unlikely to degrade the habitat further than the status quo as the Subject Property is within an existing industrial complex. There will be no Serious and Irreversible Impacts (SAII) as a result of the proposed development.

In addition to offsetting, the BC Act *Biodiversity Conservation Act 2016* and its regulations requires that an applicant takes all reasonable effort to avoid and minimise potential impacts of the proposal on local biodiversity values. A series of mitigation and management measures have been identified, which are to be implemented as part of any construction environmental management plan produced for the site. These include measures to:

- Ensure all contractors employed to work within the Subject Land are suitably qualified, experienced and informed of the sensitive ecological features and potentially occurring threatened species;
- Assign a Project Ecologist to conduct and oversee all ecological compliance requirements associated with conducting a proposed development in line with all relevant state and commonwealth legislation and guidelines;
- Have an ecologist present during the clearing of threatened species habitat required for the proposed activity;
- Incorporate locally indigenous flora species representative of Duffys Forest EEC in soft landscaping associated with the development;
- Implement vertebrate pest control during construction and operation of the development;
- Implement all relevant biological hygiene protocols and requirements as per NSW Government guidelines;
- Implement ongoing management of priority weeds according to statutory requirements; and
- Implement appropriate sound barriers, vegetation protection fencing, stockpiling and sediment control during construction.

The proponent is required to retire biodiversity offset credits to meet their obligations to offset the residual impacts of the proposed DA. The proponent may purchase and retire the appropriate biodiversity offset credits from holders of such credits, if these credits comply with the trading rules of the BOS in accordance with the 'like for like' report generated by the BAM Calculator. Alternatively, the proponent can meet their offset obligations by making a payment directly into the NSW Biodiversity Offsets Payment Fund.

Seventeen (17) Ecosystem Credits will be retired to offset the residual biodiversity impacts of the proposal (**Table 1**).

Table 1. Impacts that require an offset - ecosystem credits

Vegetation zone	PCT	TEC/EC	Impact area (ha)	Number of ecosystem credits required
Remnant	3593 - Sydney Coastal Sandstone Bloodwood Shrub Forest	Duffys Forest Ecological Community in the Sydney Basin Bioregion	0.34	16
Canopy Overhang	3593 - Sydney Coastal Sandstone Bloodwood Shrub Forest	Duffys Forest Ecological Community in the Sydney Basin Bioregion	0.01	1

No 'Species Credit' species will need to be retired to offset the residual biodiversity impacts of the proposal (**Table 2**).

Table 2. Impacts that require an offset - species credits

Common name	Scientific name	Loss of habitat (ha) or individuals	Number of species credits required
N/A	N/A	N/A	N/A

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Acronym/ Term	Definition
BAM	New South Wales Biodiversity Assessment Method
BOS	New South Wales Biodiversity Offset Scheme
BOSET	New South Wales Biodiversity Offset Scheme Entry Tool
BC Act	New South Wales Biodiversity Conservation Act 2016
BDAR	Biodiversity Development Assessment Report
CEEC	Critically Endangered Ecological Community
DA	Development Application pursuant to section 4 of the NSW Environmental Planning and Assessment Act 1979
DCP	Development Control Plan
Development	The use of land, and the subdivision of land, and the carrying out of a work, and the demolition of a building or work, and the erection of a building, and any other act, matter or thing referred to in section 26 that is controlled by an environmental planning instrument but does not include any development of a class or description prescribed by the regulations for the purposes of this definition (Environmental Planning and Assessment Act 1979).
DPIE	Department of Planning Industry and Environment
EEC	Endangered Ecological Community
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
EP&A Act	NSW Environmental Planning and Assessment Act 1979
GIS	Geographic Information System
ha	Hectares
km	Kilometre
KTP	Key Threatening Process (as listed in the BC Act)
LEP	Local Environment Plan
LGA	Local Government Area
Locality	The area within a 10km radius of the Subject Land. The same meaning when describing a local population of a species or local occurrence of an ecological community.
m	Metres
mm	Millimetres
NPWS	NSW National Parks and Wildlife Services
NSW	New South Wales
OEH	Office of Environment and Heritage (now the Department of Planning Industry and Environment)
Proposal	The development, activity or action proposed.
ROTAP	Rare or Threatened Australian Plants
SEPP	State Environmental Planning Policy
Subject Land	Development footprint of the proposed development within the Subject Property includes all native vegetation clearing and tree clearing, including tree canopy that overhangs neighbouring properties.
Subject Property	4 Minna Close, Belrose, NSW 2085 (Lot 502/-/DP875858)
Threatened species, populations and ecological communities	Species, populations and ecological communities specified in Schedules 1, 1A and 2 and *threatened species, population or ecological community* means a species, population or ecological community specified in any of those Schedules.

Declarations

i. Certification under clause 6.15 Biodiversity Conservation Act 2016

I certify that this report has been prepared based on the requirements of, and information provided under, the Biodiversity Assessment Method and clause 6.15 of the Biodiversity Conservation Act 2016 (BC Act).

Signature: 

Date: 16/11/23

BAM Assessor Accreditation no: #BAAS18059

This BDAR has been prepared to meet the requirements of BAM 2020.

ii. Details and experience of author/s and contributors

Authors and Contributors

Name	BAM Assessor Accreditation no.	Position/Role	Tasks Performed	Relevant Qualifications
Kurtis Lindsay	#BAAS18059	Principal Ecologist	BAM Plot Surveys Targeted threatened flora survey Document Review Figure Preparation	*BSc (Hons)*
Semonn Oleksyn		Project Manager Ecologist	Report Preparation BAM-C Data entry and analysis Targeted threatened flora surveys Figure Preparation	*BAdvSci* *MRes*
Nick Henson		Ecologist	Targeted threatened flora surveys Targeted threatened fauna surveys	*BbioCons*
Serene White		Ecologist	BAM Plot Surveys Report Preparation Figure Preparation BAM-C Data entry and analysis	*BSc* *BNatSc* *MRes*
Joseph Crane		Ecologist	Targeted threatened fauna surveys	*BSc (Hons)* *GradCertEnvMgt*
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Stage 1: Biodiversity Assessment

1. Introduction

1.1 Proposed Development

1.1.1 Development Overview

Land Eco Consulting (Land Eco) was commissioned by Wu Properties Pty Ltd ATF Wu Family Trust ('the proponent') to prepare this Biodiversity Development Assessment Report (BDAR) for the proposed industrial development at 4 Minna Close, Belrose, NSW 2085 (Lot 502/-/DP875858) (the 'Subject Property'). The extent of the development is referred to as 'the 'Subject Land'.

The requirements of the *Biodiversity Assessment Method* (BAM) *2020*, *Biodiversity Conservation Act 2016* (BC Act) and *Biodiversity Conservation Regulation 2017* are assessed in this BDAR pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act). The proposed development is subject to approval under the *Warringah Development Control Plan (DCP) 2011* and the *Warringah Local Environmental Plan 2011*.

Land Eco have produced this report to assess any potential biodiversity impacts associated with the development application (DA) and recommend appropriate measures to mitigate any potential ecological impacts in line with the requirements of the Consent Authority, Northern Beaches Council.

1.1.2 Location

The Subject Property is situated at 4 Minna Close, Belrose NSW 2085 (Lot 502/-/DP875858) and occurs in the Northern Sydney suburb of Belrose within the Warringah division of the Northern Beaches Council Local Government Area.

This focus of this BDAR is only the proposed development footprint, hereafter referred to as the 'Subject Land'. The Subject Land occupies the south-eastern portion of the Subject Property (**Figure 1; Figure 2**).

1.1.3 Proposed Development and Subject Land

The proposed DA is for the construction and operation of an industrial development and associated infrastructure including driveways, stormwater drains and landscaping. This will include the clearing of native vegetation and earthworks (**Figure 2**).

The Subject Land occurs in the south of the Subject Property. The Subject Land is densely vegetated and has not been historically developed.

The proposed development will require the removal of 0.35 ha of native vegetation. This includes 0.23 ha of native vegetation belonging to:

- PCT 3593: Sydney Coastal Sandstone Bloodwood Shrub Forest

This PCT forms part of the 'Duffys Forest Ecological Community in the Sydney Basin Bioregion' (Duffys Forest) listed as an Endangered Ecological Community (EEC) under Schedule 2 of the BC Act.

1.1.4 Land Zoning

The Subject Land along with the majority of the Subject Property is zoned as 'SP4 – Enterprise' (**Figure 3**). This zone provides for development and land uses that support enterprise and productivity, such as the proposed warehouse development that is assessed in this report. The northern edge of the Subject Property, outside of the Subject Land, is zoned as 'C2 – Environmental Conservation' (**Figure 3**) which indicates that the area is of high ecological value that must be protected, managed and restored. Council have identified this area as containing connected Duffys Forest EEC and a habitat corridor.

Figure 1. The location of the Subject Property, Subject Land and BAM Plot.

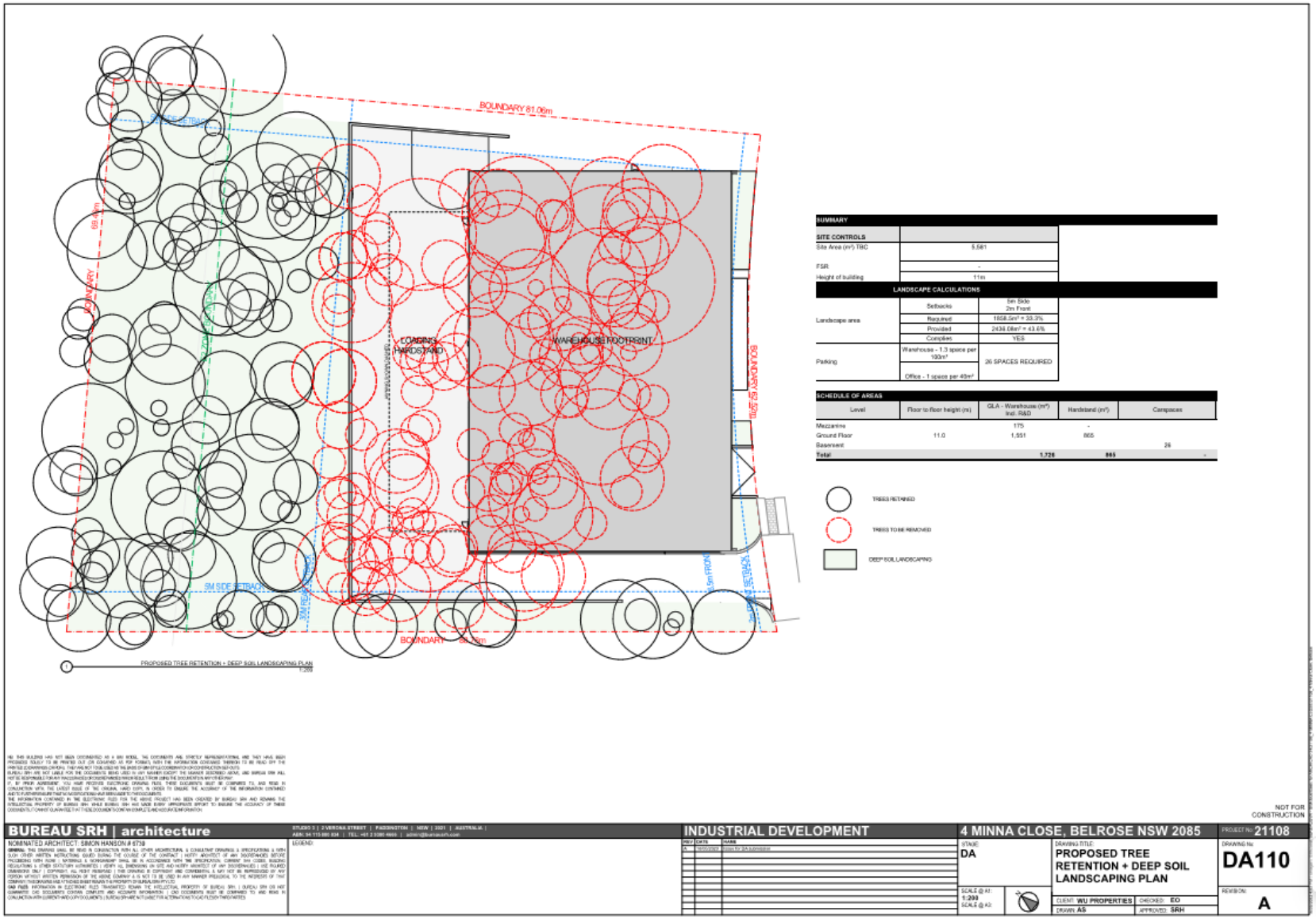

Figure 2. Proposed Development Plan with Proposed Tree Retention and Deep Soil Landscaping Plan (Bureau SRH 2023)

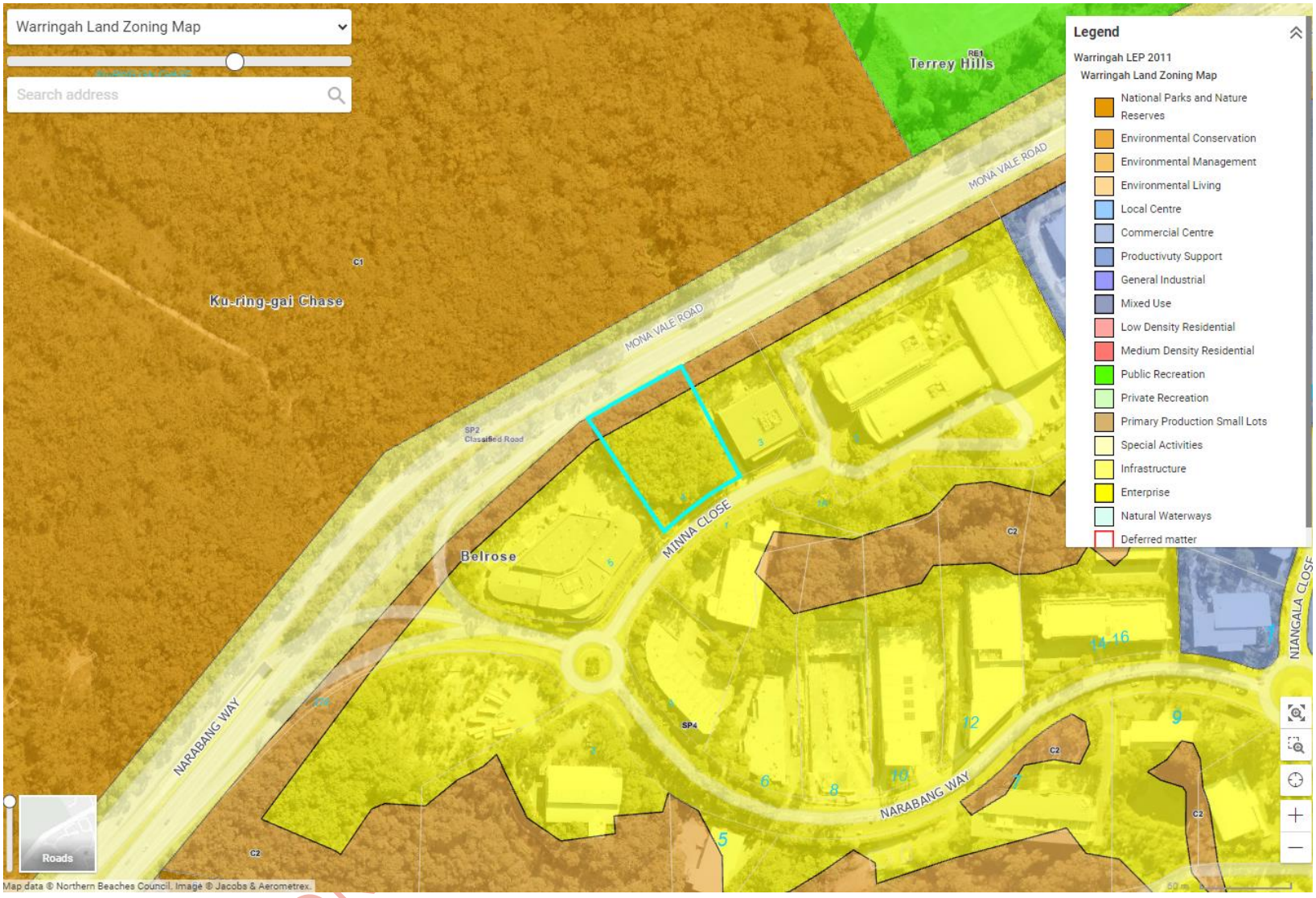

Figure 3. Land Zoning across the Subject Property and surrounding locality (Northern Beaches Council 2023)

1.1.5 Other documentation

Other documentation relevant to biodiversity to be submitted with the proposed development include:

- Landscape Plan (Ben Kaye Garden Design 2023)
- Arboricultural Impact Assessment (Urban Arbor 2023)
- Development Plans (Bureau SRH 2023)
- Bushfire Risk Assessment (Bushfire Consultancy Australia 2023)

1.2 Biodiversity Offset Scheme Entry

The proposed development is a local development application and is subject to approval under Part 4 of the EP&A Act. The proponent has commissioned this BDAR to accompany the proposal and address the requirements of the BOS and requires submission of a streamlined 'Small Areas' BDAR as stipulated under the BC Act and in accordance with the BAM. The BDAR is required to be undertaken by an accredited assessor to assess the impacts of the proposal.

1.2.1 Area Clearing Threshold

The BC Act and its regulations stipulate the native vegetation clearing 'area threshold' values that determine whether a development is required to be assessed in accordance with the BOS. Minimum entry thresholds for native vegetation clearing depend on the minimum lot size (shown in the Lot Size Maps made under the relevant Local Environmental Plan [LEP]), or actual lot size (where there is no minimum lot size provided for the relevant land under the LEP). The term 'vegetation clearing' includes all lopping, felling, slashing, or mowing of native trees, shrubs, or groundcover for the purpose of construction, landscaping, excavation or bushfire Asset Protection Zone (APZ) works.

Developments that trigger the BOS will require a 'Biodiversity Development Assessment Report' (BDAR) (this report) that addresses the Biodiversity Assessment Method and the retiring of Biodiversity Offset Credits.

The minimum lot size for the Subject Property under the Warringah Local Environmental Plan 2014 is 4000m^2 (0.4 ha). This means the 'native vegetation clearing threshold' trigger for this BOS is 0.25ha (**Table 3**). The proposed development will require the removal of 0.35ha of native vegetation. As such, this is a trigger for the BOS.

Table 3. Biodiversity Offset Scheme Entry Thresholds

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

1.2.2 Biodiversity Value Mapping

At the time of preparing this report, the Subject Land contained land mapped as 'Biodiversity Value' (**Figure 4**) (DPE 2023d). This 'Biodiversity Value' was associated with the Duffys Forest EEC.

Native vegetation is proposed for removal from the Biodiversity Values Mapped Land. As such, this has triggered the BOS.

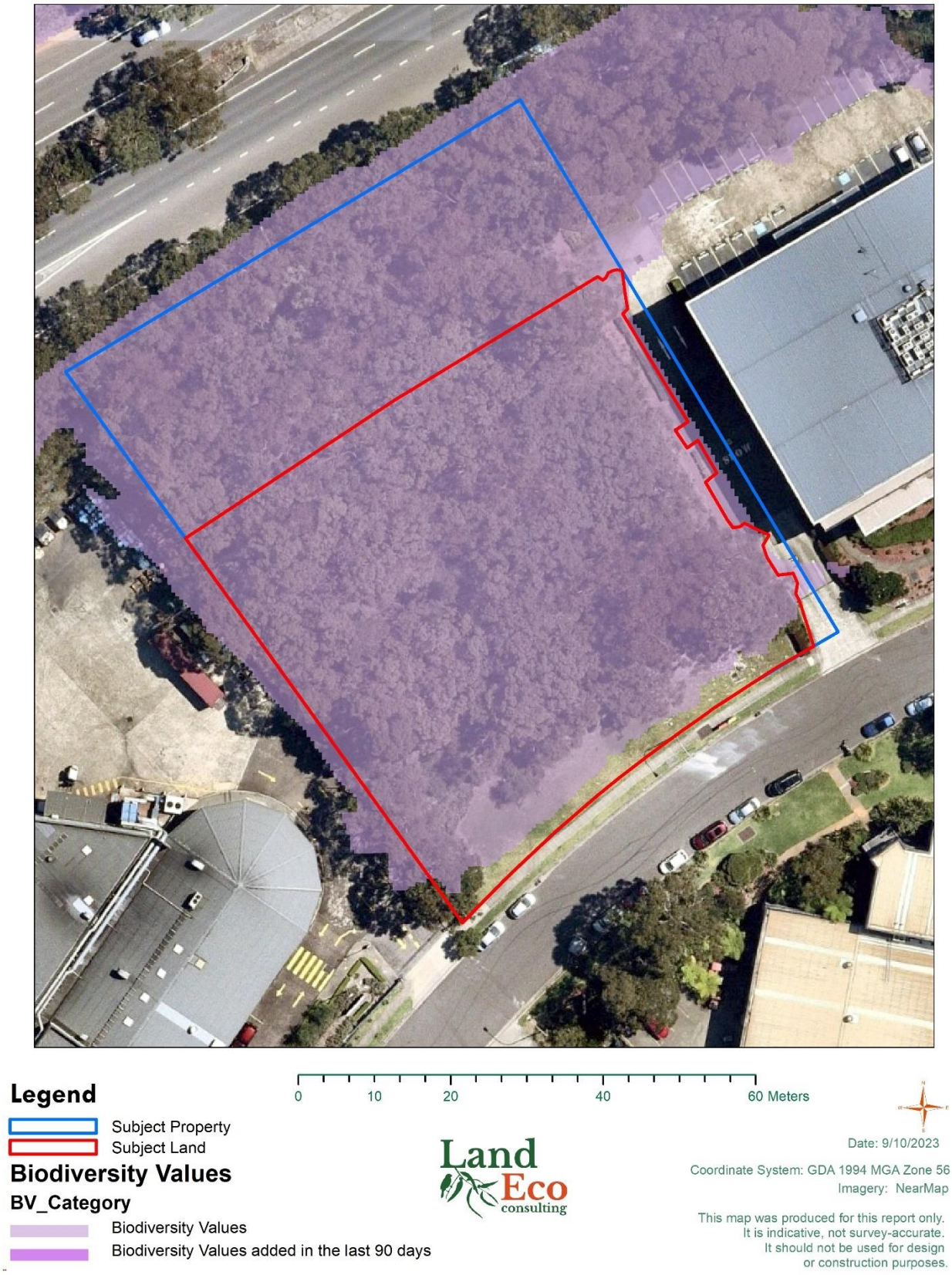

Figure 4. Biodiversity Values Mapping (DPE 2023d) in relation to the Subject Land

1.3 Excluded Impacts

1.3.1 Native Vegetation Regulatory Map

The entirety of the Subject Property is mapped as 'Land excluded from the LLS Act' by the Native Vegetation Regulatory Map (DPE 2023c). Therefore *Chapter 2 Vegetation in non-rural areas of the State Environmental Planning Policy (Biodiversity and Conservation) 2021* applies to this development.

1.4 Matters of National Environmental Significance

No Matters of National Environmental Significance were found to occur within the Subject Land.

Commonwealth listed threatened species that are MNES have potential to occur in the Subject Land on occasion. This includes, nomadic nectivorous flying-foxes and birds such as Grey-headed Flying-fox (*Pteropus poliocephalus*) and Swift Parrot (*Lathamus discolor*) that may forage within the Subject Land on occasion, though are unlikely to rely heavily upon the vegetation within the Subject Land owing to its small overall area in a disturbed industrialised locality.

No Matters of National Environmental Significance are likely to be significantly impacted by the proposed development. No referral to the Commonwealth is recommended for the proposed development.

1.5 Information Sources

A detailed list of all sources utilised in the preparation of this BDAR is presented in the 'References' (**Section 13**) of this report.

2. Method

2.1 Site Context Methods

2.1.1 Landscape Features

The Subject Land occurs on a remnant bushland lot situated in an industrial complex in the suburb of Belrose. It is located on a broad ridgetop adjacent to Mona Vale Road and Minna Close.

NSW Soil Profile describes the soil landscape of the Subject Land as occurring on Hawkesbury Sandstone (DPE 2023a). During the site visit, Land Eco Consulting identified lateritic Hawkesbury Formation sediments within the Subject Land.

NSW Spatial Services did not identify any mapped watercourses within the Subject Land (NSW Government Spatial Services 2023).

This section details the landscape features and associated habitat values in and around the Subject Land. A table is provided which details the Landscape Features as required by the BAM **(Table 5)**.

2.2 Native vegetation, threatened ecological communities and vegetation integrity methods

2.2.1 Existing Information

Broad mapping of vegetation communities (**Figure 10**) have been undertaken as follows:

- NSW State Vegetation Type Map (DPE 2022a)
- The Native Vegetation of the Sydney Metropolitan Area (OEH 2016)

These public mapping resources identified one vegetation community within the Subject Property:

- PCT 3593: Sydney Coastal Sandstone Bloodwood Shrub Forest

2.2.2 Mapping Native Vegetation Extent

Land Eco mapped the native vegetation extent within the Subject Land by:

- Viewing recent aerial imagery (Nearmap 2023) for differences in texture that would suggest different vegetation zones, followed by;

- conducting a ground-based meandering transect, identifying native vegetation and marking the extent using a Garmin 65S hand-held GPS.

Recording the dominant flora species in each stratum and comparing these with species lists in the BioNet Plant Community Type dataset (DPE 2022b).

2.2.3 Plot-based Vegetation Survey

One representative BAM Vegetation Integrity (VI) Survey irregular plot was randomly allocated to the Subject Land using GIS (**Figure 1**).

Two Ecologists then visited the Subject Land and sampled a 400m^2 floristic plot. The full species name, percentage cover, and estimate of abundance all native and exotic vascular plant species was recorded.

2.2.4 Vegetation Integrity Survey

One irregularly shaped VI plot was conducted across the Subject Land (**Figure 1**). It was located to provide a representative assessment of vegetation integrity through random location of a waypoint and bearing and establishing a plot at this waypoint. This survey plot was established as follows:

- one 400 m^2 plot, to assess all the composition and structure attributes
- one 1000 m^2 plot, to assess the function attributes (number of large trees, stem size classes, tree regeneration and length of logs)
- five 1 m^2 subplots, to assess average litter cover (and other optional ground cover components) for the plot.

The presence of hollow-bearing trees, the composition, the vegetation structure and vegetation function were all assessed according to the protocol outlined in Section 4.3.4 of the BAM (DPIE 2020a).

2.3 Threatened Flora Survey Methods

2.3.1 Review of Existing Information

Land Eco reviewed any existing information on native vegetation relevant to the subject land and land within the 1500 m buffer area. This includes:

- individual species records that are held in the NSW Wildlife Atlas BioNet (DPE 2023b);
- existing maps of native vegetation in the area such as those held by the Department, or a local government authority;
- information from publicly accessible ecological reports, soil surveys or previous native vegetation surveys that is relevant to the subject land (where available).

2.3.2 Habitat Constraints Assessment

Land Eco compiled a detailed summary of potential microhabitats for threatened fauna species as well as habitat constraints present on the Subject Land. Where relevant, habitat features were mapped and photographed.

2.3.3 Field Surveys

A suite of Flora Species Credit species was identified within the BAMC (OEH 2023) and NSW Wildlife Atlas (DPE 2023b) as having the potential to occur within the Subject Land (**section 5.1.2**). Targeted surveys were undertaken for all species that were considered likely to occur (**Table 20**).

2.4 Threatened Fauna Survey Methods

2.4.1 Review of Existing Information

Land Eco reviewed any existing information on threatened fauna relevant to the subject land and land within the 1500 m buffer area. This includes:

- survey data or individual species records that are held in NSW Wildlife Atlas BioNet (DPE 2023b);
- information in ecological reports, soil surveys or previous fauna surveys that is relevant to the Subject Land (where available).

2.4.2 Habitat Constraints Assessment

During each site visit, Land Eco Consulting Ecologists compiled a detailed summary of potential microhabitats for threatened fauna species as well as habitat constraints present on the Subject Land, including both Species Credit and Ecosystem Credit threatened fauna species.

2.4.3 Field Surveys

A suite of Fauna Species Credit species was identified within the BAMC (OEH 2023) and NSW Wildlife Atlas (DPE 2023b) as having the potential to occur within the Subject Land (**Table 17**). Targeted surveys were undertaken for all species that were considered likely to occur (**Table 21**).

2.5 Weather Conditions

Targeted surveys, particularly in early 2022, were conducted following a period of high rainfall caused by *La Nina* conditions which were optimal growing conditions to detect seasonal flora species. Weather data older than 13 months at the time this BDAR was drafted (i.e. prior to April 2022) is no longer publicly available on the BOM database (BOM 2023), and consequently, are not displayed in **Table 4**. Monthly averages are displayed in **Table 4** to demonstrate the climatic conditions and suitability for threatened species.

Table 4. Environmental conditions during threatened species surveys recorded at the Terrey Hills Weather Station (BOM 2023). Monthly temperature averages (min – max) and total monthly rainfall are shown in bold.

Survey undertaken (e.g. method / targeted species)	Date	Time	Temperature (°C) (min. & max.)	Wind (light, mod…)	Rainfall (mm)
Targeted Fauna Survey (Microbats – Anabat Installed)	27/1/22	14:00 – 15:00	-	-	-
Targeted Fauna Survey (Microbats – Anabat Retrieval) Targeted Flora Survey (Flowering Threatened Flora)	3/2/22	10:00 – 12:00	-	-	-
Opportunistic Fauna Survey Targeted Flora Survey (Flowering Threatened Flora)	11/2/22	10:45 – 12:30	-	-	-
Opportunistic Fauna Survey Opportunistic Flora Survey VIS Plot Survey	16/2/22	9:00 – 12:00	-	-	-
N/A	**September 2022**	**N/A**	**11.0 – 18.6**	**N/A**	**132**
Opportunistic Fauna Survey Targeted Flora Survey (Flowering Threatened Flora)	15/9/22	12:00 – 14:00	10.4 – 17.5	Low	1.0
Opportunistic Fauna Survey Targeted Flora Survey (Flowering Threatened Flora)	29/9/22	16:00 – 17:00	10.4 – 18.0	High	1.0
N/A	**October 2022**	**N/A**	**11.0 – 18.6**	**N/A**	**217.4**
Opportunistic Fauna Survey Targeted Flora Survey (Flowering Threatened Flora)	18/10/22	14:00 – 15:30	13.1 – 17.5	Low	2.6
N/A	**November 2022**	**N/A**	**7.6 – 18.0**	**N/A**	**22.4**
Opportunistic Fauna Survey Targeted Flora Survey (Flowering Threatened Flora)	18/11/22	12:00 – 14:00	11.2 – 19.8	Low	0
Opportunistic Fauna Survey Targeted Flora Survey (Flowering Threatened Flora)	24/11/22	14:00 – 15:30	13.6 – 24.0	Low	0
Opportunistic Fauna Survey Targeted Flora Survey (Flowering Threatened Flora)	28/11/22	14:00 – 15:30	15.8 – 20.5	Low	6.4
N/A	**December 2022**	**N/A**	**14.6 – 23.7**	**N/A**	**34.6**
Opportunistic Fauna Survey Targeted Flora Survey (Flowering Threatened Flora)	14/12/22	10:00 – 12:00	13.1 – 23.6	High	0

Survey undertaken (e.g. method / targeted species)	Date	Time	Temperature (°C) (min. & max.)	Wind (light, mod…)	Rainfall (mm)
N/A	**July 2023**	**N/A**	**8.7-18.5**	**N/A**	**32.0**
Targeted Fauna Survey (Nocturnal Fauna Survey)	25/7/23	17:45-19:00	6.8-17.5	Low	0
Targeted Fauna Survey (Nocturnal Fauna Survey)	28/7/23	17:55-19:45	10.7-22.7	Moderate	0
Targeted Fauna Survey (Nocturnal Fauna Survey)	31/7/23	17:25-19:18	11.5-21.8	Low	0
N/A	**August 2023**	**N/A**	**9.6-18.8**	**N/A**	**116.8**
Targeted Fauna Survey (Nocturnal Fauna Survey)	1/8/23	17:45-19:45	7.7-19.4	Moderate	0
Targeted Fauna Survey (Nocturnal Fauna Survey)	2/8/23	18:14-20:20	11.3-17.8	Low	0
Targeted Fauna Survey (Nocturnal Fauna Survey)	9/8/23	17:45-19:45	9.2-18.9	Low	0.2
Targeted Fauna Survey (Nocturnal Fauna Survey)	10/8/23	18:40-20:30	10.4-22.4	High	0
Targeted Fauna Survey (Nocturnal Fauna Survey)	17/8/23	18:10-19:35	7.8-19.9	Low	0

2.6 Limitations

There were no limitations to the survey regime.

3. Site Context

3.1 Assessment Area

The Assessment Area includes a 1500m buffer zone surrounding the Subject Land (**Figure 5**).

3.2 Landscape Features

Landscape features identified within the Subject Land and assessment are present (**Figure 5 - Figure 9**). A discussion of relevant landscape features is provided below.

3.2.1 IBRA Bioregions and Subregions

In accordance with BAM Subsection 3.1.3(2) the Subject Land has been mapped to IBRA Bioregion and Subregion. The Subject Land occurs within the 'Sydney Basin' Interim Biogeographic Regionalisation for Australia ver. 7 (IBRA) bioregion, and 'Pittwater' IBRA subregion (DEE 2016; **Figure 6** and **Figure 9**).

3.2.2 Rivers, Streams, Estuaries and Wetlands

This subsection details wetlands, rivers and streams classified according to stream order (as described in BAM Subsection 3.1.3(3.) and Appendix E).

There are no mapped watercourses within the Subject Property. The nearest watercourse occurs approximately 340m south-east of the Subject Land. The proposed development does not include works within 40m of a mapped watercourse, waterbody or shoreline and therefore is not considered a Controlled Action under the *Water Management Act 2000* (**Figure 7**).

3.2.3 Habitat Connectivity

In accordance with connectivity of different areas of habitat (as described in BAM Subsection 3.1.3(5–6)), the assessor must identify the connectivity of different areas of habitat that may facilitate the movement of threatened species across their range and identify these on the Location Map (**Figure 8**).

Significant biodiversity links are those that connect different areas of habitat, facilitating movement of threatened species across their distribution. The presence of significant biodiversity links on a site contributes to the biodiversity value of that subject land at the landscape scale. Connectivity can be identified at different scales depending on the target species and can include recognised biodiversity corridors in a plan approved by DPIE (e.g. priority investment areas), a local corridor identified by a local council, flyways for migratory species or a riparian buffer of a stream, wetland or estuary.

Land Eco has identified routes of habitat connectivity between the Subject Land and adjoining landscape and has classified them into two categories:

- Habitat Connection – a local-scale habitat connection consisting of a narrow or disturbed vegetation corridor (i.e. canopy connectivity); and
- Major Biodiversity Link – a locally significant habitat connection consisting of remnant vegetation, reserves, densely vegetation riparian corridors or wetlands.

The locality forms part of a major habitat corridor matrix for wildlife (**Figure 8**). Major habitat corridors run through nearby Garigal National Park and Ku-ring-gai National Park with smaller habitat links connecting these corridors throughout the existing industrial precinct where remnant native vegetation has been retained. Several obstacles disrupt the habitat connectivity in the locality including Mona Vale Road, Minna Close and Forest Way, along with existing industrial and commercial developments.

The Subject Property forms a peninsula to an existing habitat connection that runs along the southern side of Mona Vale Road. Northern Beaches Council have identified this connection and have zoned it accordingly as 'C2 – Environmental Conservation' (**Figure 3**). In accordance with the zone objectives 'protect, manage and restore areas of high ecological values' the proposed development seeks to retain this corridor. The remnant bushland to be retained within the Subject Property is approximately 25m wide which exceeds the Environmental Conservation zone mapped by Council that is 14m wide.

Impacts of development on the connectivity of different forms of habitat have been considered by the assessor (see **section 8**).

3.2.4 Karst, Caves, Crevices, Cliffs, Rocks or Other Geological Features of Significance

In accordance with BAM Subsections 3.1.3(7.) and 3.1.3(12.) the assessor must detail karst, caves, crevices, cliffs, rocks and other geological features of significance and for vegetation clearing proposals, soil hazard features.

The Subject Land occurs on a broad ridgetop, gently sloping down towards Minna Close. Scattered laterite occurs across the Subject Property. Sandstone cliffs and caves may occur within 2km of the Subject Land.

The Subject Land occurs at the shale-sandstone interface of two soil landscapes (DPE 2023a). The Subject Land is predominantly mapped to occur on the sandstone dominant 'Lambert' Soil Landscape transitioning to the 'Blacktown' Soil Landscape to the east where shale influence increases.

- The 'Lambert' Soil Landscape is described as Undulating to rolling low hills. Local relief 20–120 m and slopes <20%. Broad convex crests and plateau surfaces. Gently to moderately inclined sideslopes, often associated with small hanging valleys. Characteristic sandstone bedrock that outcrops as wide benches (10–100 m), with broken scarps 1–4 m high. Small, poorly drained seepage areas are common. Geology dominated by Hawkesbury Sandstone, which consists of medium to coarse-grained quartz sandstone with minor shale and laminite lenses (DPE 2023a).
- The 'Blacktown' Soil Landscape is described as gently undulating rises on Wianamatta Shale with local relief 10–30 m and slopes generally <5% but up to 10%. Crests and ridges are broad (200–600 m) and rounded with convex upper slopes grading into concave lower slopes. Rock outcrop is absent. Wianamatta Group– Ashfield Shale consisting of laminite and dark grey siltstone and Bringelly Shale which consists of shale, with occasional calcareous claystone, laminite and coal. This unit is occasionally underlain by claystone and laminite lenses within the Hawkesbury Sandstone such as at Duffys Forest (DPE 2023a.

All of the rock on the Subject Property is highly laterised, except for the south-western portion which has little to no lateritic influence.

3.2.5 Areas of Outstanding Biodiversity Value

No areas of Outstanding Biodiversity Value occur within the Subject Land or Assessment Area.

3.2.6 Mitchell Landscapes

Mitchell (2002) and OEH (2016a) groups ecosystems into meso-ecosystems representing larger natural entities based on topography and geology. The naming of ecosystems and meso-ecosystems was standardised so that each name provided location information and a meaningful descriptive landscape term. The Subject Land occurs over the 'Hornsby Plateau' Mitchell Landscape (**Figure 9**).

3.2.6.1 Landscape Ecosystem – Hornsby Plateau

Hornsby Plateu is defined by benched hill slopes and steep hills with narrow flat-topped ridges and broader plateau tops on horizontal Triassic quartz sandstone with occasional conglomerate and thin discontinuous shales. Isolated thicker shales and areas of 'laterite' development on plateaus. General elevation 0 to 220m, local relief 30 to 120m. Shallow uniform sands amongst rock outcrops. Deep gradational yellow earths on some plateau areas, yellow texture-contrast soils on benches, deep uniform sands, organic sands and limited podsols in depositional areas. Very diverse vegetation related to site and soil conditions. Crests and ridges, scribbly gum (*Eucalyptus haemostoma*), red bloodwood (*Corymbia gummifera*), brown stringybark (*Eucalyptus capitellata*), silvertop ash (*Eucalyptus sieberi*) and old man banksia (*Banksia serrata*) with a high proportion of Proteaceae and Acacia in the understorey. Slopes; smoothbarked apple (*Angophora costata*), Sydney peppermint (*Eucalyptus piperita*), yellow bloodwood (*Corymbia eximia*), Leptospermum sp., and forest oak (*Allocasuarina torulosa*); protected valley floors with rainforest elements including turpentine (*Syncarpia glomulifera*), Sydney blue gum (*Eucalyptus saligna*), blackbutt (*Eucalyptus pilularis*), water gum (*Tristaniopsis laurina*), coachwood (*Ceratopetalum apetalum*), cabbage-tree palm (*Livistona australis*). Extensive wet and dry heaths on plateau, Sydney blue gum, blackbutt, turpentine tall forest on thicker shale ridge tops with deep gradational red clay loam to clay soil (Mitchell 2002; OEH 2016a).

Table 5. Summary of Landscape features identified within the Subject Land and surrounding 1500m buffer.

Landscape Feature	Identification of Landscape Feature on Site
Rivers and Streams (classified according to stream order)	There are no mapped watercourses within the Subject Property. The nearest watercourse occurs approximately 340m south-east of the Subject Land. The proposed development does not include works within 40m of a mapped watercourse and therefore is not considered a Controlled Action under the *Water Management Act 2000* (**Figure 7**).
Wetlands (within, adjacent to and downstream of site)	The Subject Land does not contain any areas of native vegetation identified on the Coastal Wetlands and Littoral Rainforest Area Map (DPE 2020) as per the *State Environmental Planning Policy (Coastal Management) 2018*. The Subject Land is not within the Coastal Environment Area or Coastal Use Area.
Connectivity features	The Subject Property contains a network of terrestrial habitat connections associated with the native remnant vegetation that occurs across the Subject Property and contributes to a habitat corridor along Mona Vale Road (**Figure 8**). While roads either side of the Subject Property and surrounding industrial and commercial developments disrupt landscape connectivity, mobile fauna have the potential to travel between the Subject Property and surrounding vegetation within Garigal National Park.
Areas of geological significance and soil hazard features	The Subject Land occurs on a broad ridgetop, gently sloping down towards Minna Close. Scattered laterite occurs across the Subject Property. Sandstone cliffs and caves may occur within 2km of the Subject Land.

3.2.7 Additional Landscape Features Identified

No additional landscape features are identified in the Subject Land for the proposed development.

3.2.8 Soil Hazard Features

The proposed development does not require approval from the Native Vegetation Panel under Part 5A of the LLS Act or the Vegetation SEPP therefore the soil hazard features are not relevant to this development.

3.3 Native Vegetation Cover

A 1500m 'assessment circle' surrounding the outside boundary of the Subject Land was prepared in order to determine the extent of native vegetation within the surrounding locality of the Subject Land (**Figure 5**). Native vegetation was determined from aerial imagery and local knowledge of the locality. The results are presented in **Table 6**.

Table 6. Native vegetation cover in the Assessment Area

Assessment area (ha)	749
Total area of native vegetation cover (ha)	604
Percentage of native vegetation cover	81%
Class (0-10, >10-30, >30-70 or >70%)	>70%

Figure 5. Native vegetation patches within the area surrounding the Subject Land (1500m buffer)

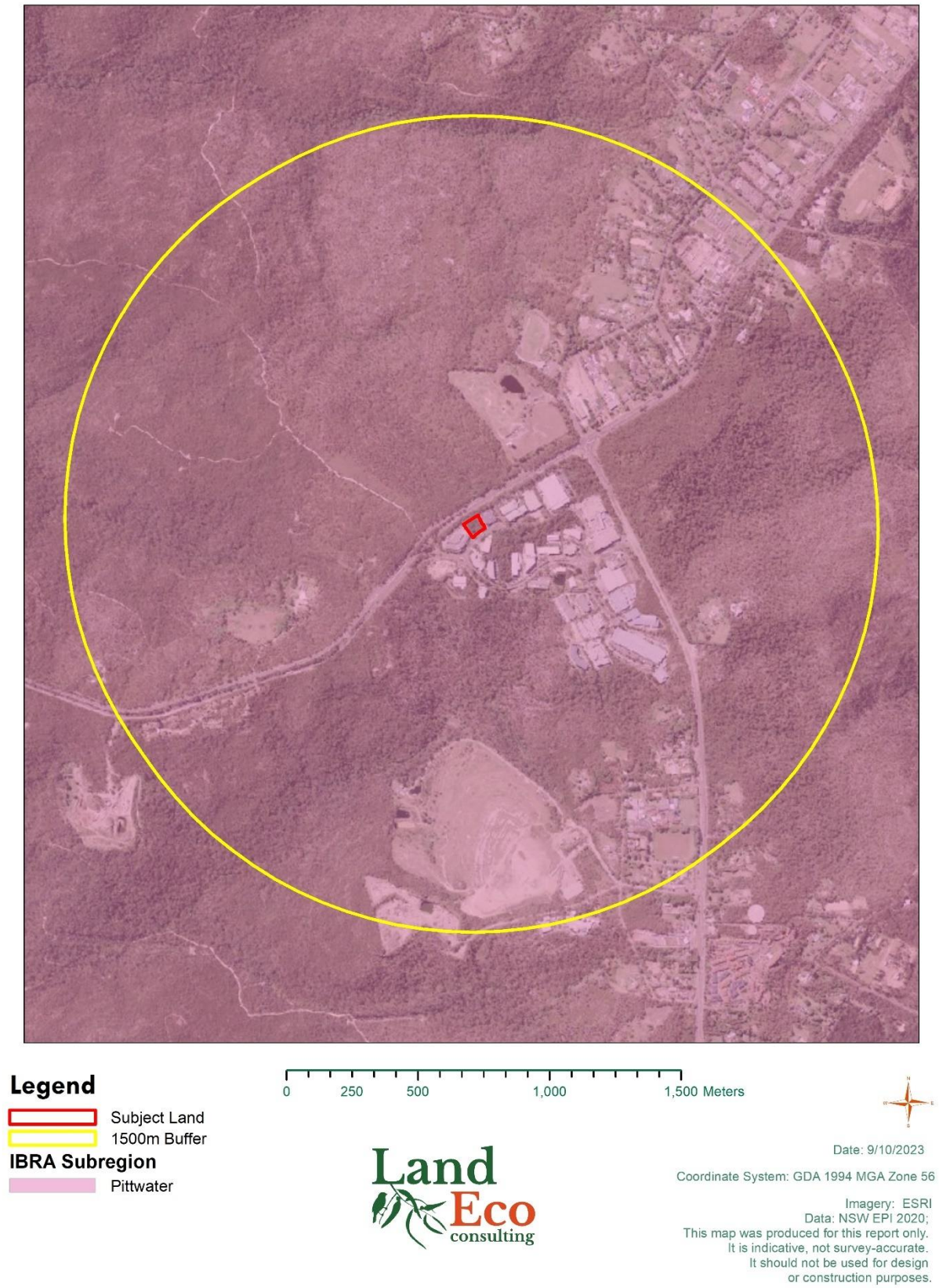

Figure 6. The assessment buffer surrounding the Subject Land lies entirely within the Pittwater IBRA 7 Subregion of the Sydney Basin IBRA7 Bioregion.

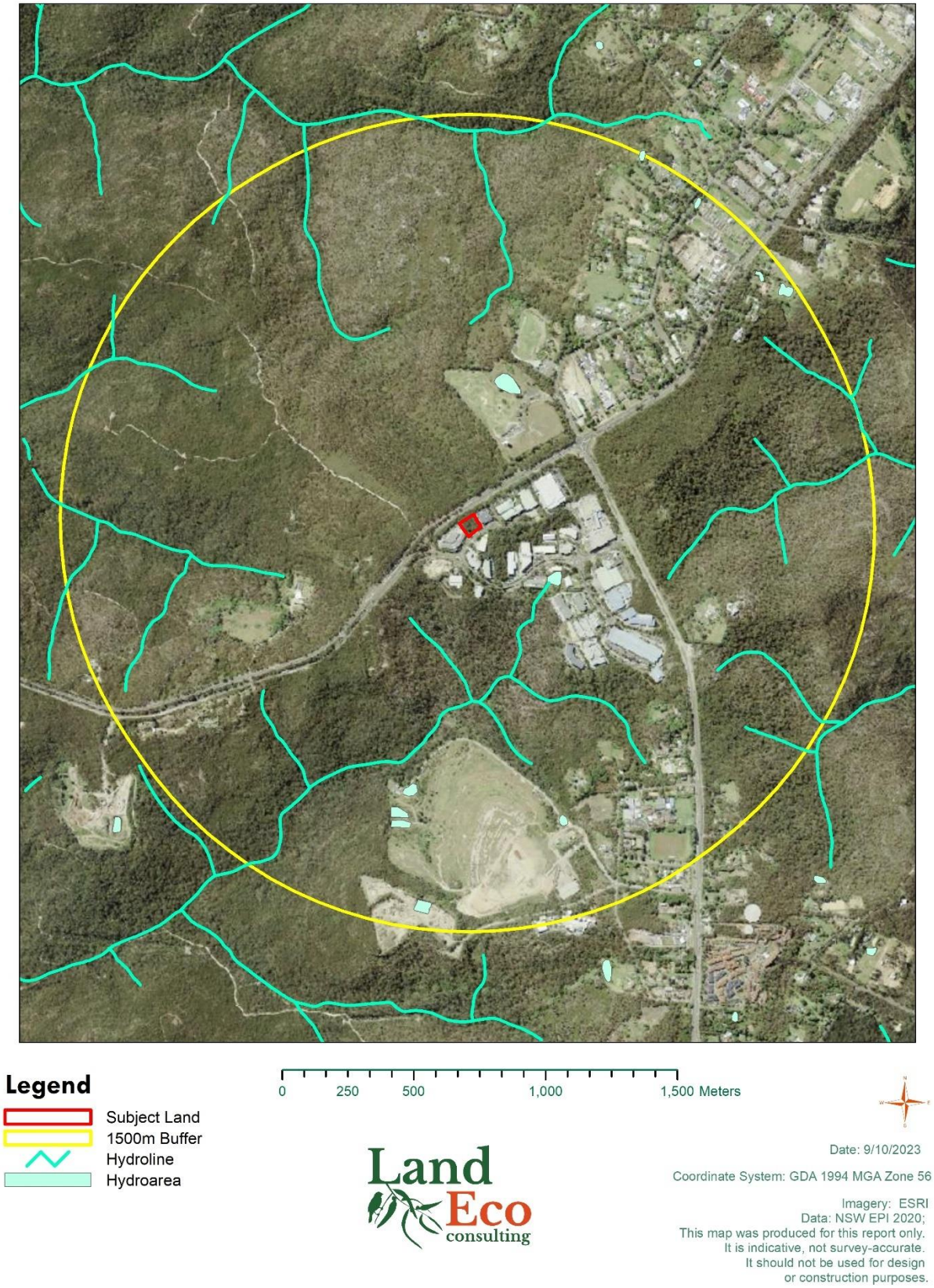

Figure 7. Watercourses (streams and waterbodies) within the vicinity of the Subject Land.

Figure 8. Terrestrial habitat connectivity links within the Subject Land and surrounding area.

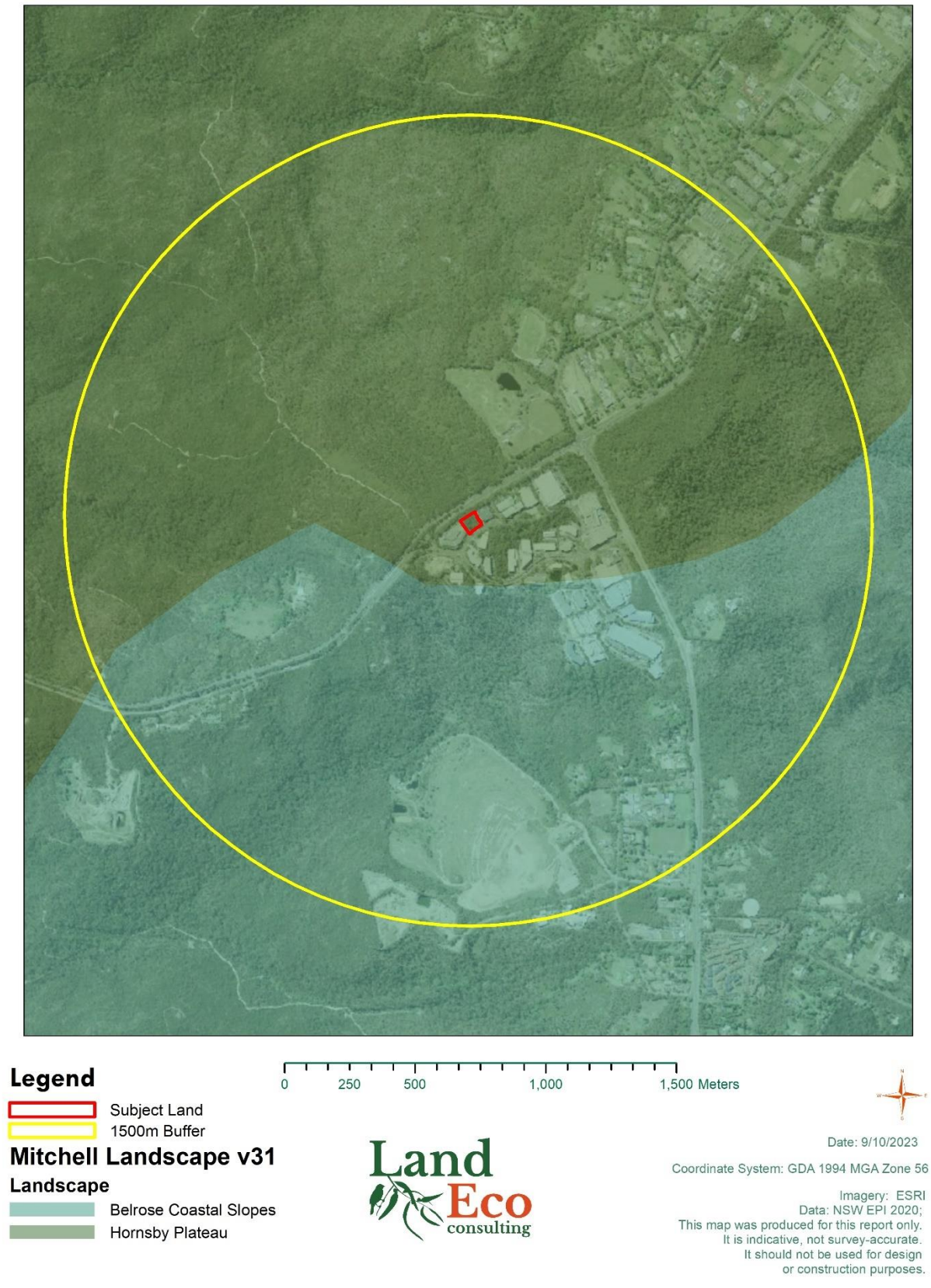

Figure 9. The Mitchell Landscapes that comprise the Subject Land and the surrounding assessment area.

4. Native Vegetation, Threatened Ecological Communities and Vegetation Integrity

4.1 Native Vegetation Extent

Land Eco mapped the native vegetation extent within the Subject Land (as described in BAM Section 4.1(1–3.) and BAM Subsection 4.1.1). Impacts to vegetation required to facilitate the proposed development are presented in **Table 7**.

Table 7. Impacts to vegetation to facilitate development

Vegetation type	Area to be removed (ha) for Development
Native vegetation	0.35
Non-native vegetation	0
Total Vegetation	0.35
Total Assessable Under BAM	0.35

4.1.1 Changes to the Mapped Native Vegetation Extent

The actual native vegetation extent matches that shown on the aerial imagery used in the figures of this report.

4.1.2 Non-native Vegetation

All parts of the Subject Land that supported vegetation have been mapped (**Figure 11**). There is no non-native vegetation within the Subject Land.

4.2 Plant Community Types

4.2.1 Overview

The vegetation within the Subject Property has been historically mapped by *The Native Vegetation of the Sydney Metropolitan Area - Version 3.1 (OEH, 2016) VIS_ID 4489* (OEH 2016) as 'Sydney Ironstone Bloodwood-Silvertop Ash Forest' (**Figure 10**). This vegetation community is associated with Duffys Forest EEC as listed under the BC Act.

Vegetation within the Subject Land has been assessed by Land Eco Consulting as aligning with the BioNet Vegetation Classification PCTs identified within **Table 8** and their extent is shown in **Figure 11**. Detailed descriptions of each PCT are provided in the following subsections.

The vegetation in the south-west of the Subject Property is representative of '*PCT 3586 Northern Sydney Scribbly Gum Woodland*'.

The dominant PCT within the Subject Property is '*PCT 3593 Sydney Coastal Sandstone Bloodwood Shrub Forest*' which is associated with Duffys Forest EEC. In accordance with Appendix C of the BAM 2020, '*the dominant PCT on the Subject Land has been identified by collecting a plot-based survey and analysis of the plot data*.' Therefore, only the dominant PCT has been used when assessing the impacts to the Subject Land in this BDAR.

Land Eco confirmed that two condition class (zone) of 'PCT 3593 Sydney Coastal Sandstone Bloodwood Shrub Forest' exists in the Subject Land, '*Remnant*' and '*Canopy Overhang*'.

Table 8. Vegetation Condition Class and Zones identified within the Subject Land

PCT ID	PCT name	Condition Class	Subject Land Area (ha)	Assessable Zone in BAMC	Total area assessable under BAM (ha)
3593	Sydney Coastal Sandstone Bloodwood Shrub Forest	Canopy Overhang	0.01	3593-Canopy Overhang	0.01
3593	Sydney Coastal Sandstone Bloodwood Shrub Forest	Remnant	0.22	3593-Remnant	0.34
3586	Northern Sydney Scribbly Gum Woodland	Remnant	0.07		
3586	Northern Sydney Scribbly Gum Woodland	Derived Grassland	0.03		
3586	Northern Sydney Scribbly Gum Woodland	Regrowth on Imported Fill	0.02		

4.2.2 PCT 3593: Sydney Coastal Sandstone Bloodwood Shrub Forest

The majority of the remnant native vegetation on the property is dominated by *Corymbia gummifera* and *Eucalyptus capitellata* with *Angophora costata, E. sieberi and occasional E. haemastoma* over *Banksia serrata, Ceratopetalum gummiferum* and a diverse shrubby understorey on lateritic Hawkesbury formation sediments. (**Table 9**).

Table 9. PCT 3593: Sydney Coastal Sandstone Bloodwood Shrub Forest within the Subject Land

PCT ID	3593
PCT name	Sydney Coastal Sandstone Bloodwood Shrub Forest
Vegetation formation	Dry Sclerophyll Forests (Shrubby sub-formation)
Vegetation class	Sydney Coastal Dry Sclerophyll Forests
Per cent cleared value (%)	19.25
Extent within Subject Land (ha)	0.23
Condition State 1	Remnant
Condition State 2	Canopy Overhang
Justification of PCT Selection	• Canopy dominated by *Corymbia gummifera* with *Eucalyptus capitellata*. *Angophora costata, E. haemastoma* and *E. sieberi* also present. • Sparse cover of small trees including *Banksia serrata* • Dense, diverse heath shrub layer including *Leptospermum trinervium, Lambertia formosa* and *Persoonia levis* • Mid-dense ground layer characterised by grasses, graminoids and small forbs. • Occurs on the Hornsby Plateau on a broad Hawkesbury Sandstone crest with scattered laterite.
Alignment with TECs	Duffys Forest Ecological Community in the Sydney Basin Bioregion (see **section 4.3**)
Photo	**Plate 1**

Plate 1. Representative photograph of PCT 3593 within the Subject Land. Photo taken from 0m (beginning) of BAM VIS Plot 1.

4.2.3 PCT 3586: Northern Sydney Scribbly Gum Woodland

The remnant native vegetation on the south-western edge of property is dominated by *Eucalyptus haemastoma* and was found to constitute PCT 3586: Northern Sydney Scribbly Gum Woodland (**Table 10**)

Table 10. PCT 3586: Northern Sydney Scribbly Gum Woodland within the Subject Land

PCT ID	3586
PCT name	Northern Sydney Scribbly Gum Woodland
Vegetation formation	Dry Sclerophyll Forests (Shrubby sub-formation)
Vegetation class	Sydney Coastal Dry Sclerophyll Forests
Per cent cleared value (%)	14.99
Extent within Subject Land (ha)	0.12
Condition State 1	Remnant
Condition State 2	Derived Grassland
Condition State 3	Regrowth on Imported Fill
Justification of PCT Selection	• Canopy dominated by *Eucalyptus haemastoma* • Dense, diverse, heathy shrub layer including *Banksia ericifolia* • Dense low shrub layer containing *Bauera rubioides* • Dense sedge cover with abundant *Empodisma minus and Gahnia spp.* • Occurs on a Hawkesbury Sandstone Ridgetop
Alignment with TECs	N/A
Photo	**Plate 2**

Plate 2. Representative photograph of PCT 3586 within the Subject Land.

4.3 Threatened Ecological Communities (TECs)

All of the PCT 3593 on the Subject Property corresponds to Duffys Forest EEC (**Table 11**; **Table 12**).

Table 11. Characteristics of Duffys Forest Ecological Community in the Sydney Basin Bioregion within the Subject Land.

Key Diagnostic Characteristic (NSW Threatened Species Scientific Committee 2011; NPWS 2004)	Subject Land
Occurs on the ridgetops, plateaus, upper slopes and occasionally mid slopes on Hawkesbury sandstone geology, typically in association with laterite soils and soils derived from shale and laminite lenses.	Occurs on broad ridgetop on Hawkesbury sandstone geology with laterite and shale influenced soils.
Structural form predominantly of open-forest to woodland.	Open forest vegetation structure.
The tree canopy layer is dominated by Red Bloodwood (*Corymbia gummifera*), Black Ash (*Eucalyptus sieberi*), Smooth-barked Apple (*Angophora costata*), and frequently a stringybark (*E. capitellata or E. oblonga*). Scribbly Gum (*E. haemastoma)* is common in the community, but at lower densities than in surrounding sandstone vegetation.	Tree canopy dominated by *Corymbia gummifera* and *Eucalyptus capitellata* with associated *E. sieberi* and occasional *E. haemastoma* and *Angophora costata*.
Dominant shrub species include Myrtle Wattle (*Acacia myrtifolia*), Hairpin Banksia (*Banksia spinulosa*), Rusty Velet-bush (*Lasiopetalum ferrugineum*), Crinkle Bush (*Lomatia silaifolia*) and Broad-leaf Geebung (*Persoonia levis*).	Shrub layer includes *Persoonia levis, Lomatia silaifolia, Lasiopetalum ferrugineum* and *Banksia spinulosa*.
Common ground layer and climber species include Apple–berry (*Billardiera scandens*), Wiry Panic (*Entolasia stricta*), Twisted Mat-rush (*Lomandra obliqua*), *Micrantheum ericoides* and *Xanthorrhoea media*.	Ground layer includes *Billardiera scandens, Entolasia stricta, Lomandra obliqua, Micrantheum ericoides* and *Xanthorrhoea media*.

Table 12. TECs within the Subject Land

TEC name	Profile ID (from TBDC)	BC Act status	Associated vegetation zones within the subject land	Area within Subject Land (ha)
Duffys Forest Ecological Community in the Sydney Basin Bioregion	10254	Endangered Ecological Community	PCT 3593: Remnant PCT 3593: Canopy Overhang	0.23

4.4 Vegetation Zones

Two vegetation zones within the dominant PCT were identified for assessment within the Subject Land (**Table 13**):

- PCT 3593: Remnant
- PCT 3593: Canopy Overhang

In accordance with BAM Chapter 4 Section 4.2 of Appendix C in the BAM, the dominant, most conservation significant PCT has been selected to represent all vegetation in the Subject Land, therefore, all areas of PCT 3586 will be assessed, and offset as PCT 3593. Thus, while only 0.23 ha of vegetation representative of PCT 3593 is present within the Subject Land, a total of 0.35 ha of vegetation will be assessed under PCT 3593 (including 0.01 of Canopy Overhang) to offset the total impact of the proposed development. In essence, this means the applicant will be over assessing the extent of impact to Duffys Forest EEC, and overcompensating for the loss of Duffys Forest EEC through devising a larger offset obligation for this TEC. This is an effective implementation of the 'precautionary principle'.

4.4.1 Patch Size

Patch size is defined by the BAM as an area of native vegetation that:

- occurs on the development site or biodiversity stewardship site, and
- includes native vegetation that has a gap of less than 100m from the next area of moderate to good condition native vegetation (or ≤30m for non-woody ecosystems).

Patch size may extend onto adjoining land that is not part of the development site (OEH 2020a). Patch size was calculated according to the above guidelines. Despite occurring alongside roads and other industrial developments, the retention of habitat corridors maintains connectivity to the surrounding remnant vegetation in Garigal National Park. As such, Land Eco confirmed the Subject Land must be assessed under the >100 ha patch size category (**Figure 8**).

For the purpose of the report and the BAM calculator we have assumed 604ha patch size which is the vegetation cover in 1500m buffer area. The actual patch size is likely to be substantially larger than this, however there is little point quantifying the full extent since we can confirm that the development must be assessed under the >100 ha patch size category.

Table 13. Vegetation Zones and Patch Sizes

Vegetation zone ID	PCT ID number and name	Condition / other defining feature	Area (ha)	Patch size class (select multiple if areas of native vegetation are discontinuous)	No. vegetation integrity plots required	No. vegetation integrity plots completed	No. vegetation integrity plots used in assessment	Plot IDs of vegetation integrity plots used in assessment
Remnant	PCT 3593	Dense remnant vegetation	0.34	☐ <5 ha ☐ 5–24 ha ☐ 25–100 ha ☒ >100 ha	1	1	1	Plot 1
Canopy Overhang	PCT 3593	Remnant trees overhanging cleared land	0.01	☐ <5 ha ☐ 5–24 ha ☐ 25–100 ha ☒ >100 ha	1	1	1	Plot 1

4.5 Vegetation Integrity (Vegetation Condition)

4.5.1 Vegetation Integrity Survey Plots

A total of one (1) BAM Vegetation Integrity Score (VIS) Plot was sampled within the 'Remnant' vegetation zone which occurs across the entirety of the Subject Land (**Figure 11**). The plot was a standard sized 20m x 20m (400m^2) floristic plot nested in an irregular 1000m^2 plot. Composition, structural and function data was collected across the entire plot. Plot data gathered for each attribute used to assess the function of the Subject Land vegetation is detailed in **Appendix C.** Vegetation Integrity Survey Scores, represented by existing vegetation within each vegetation zone, are detailed in **Table 14.** The future VIS Scores post development have been assigned to zero. This equates to total clearing.

In accordance with section 9.2. of the BAM (DPIE 2020a) if, during the assessment of biodiversity values for any type of development, clearing or biodiversity certification proposal, the assessor determines that:

(a) an area of land does not contain native vegetation, or

(b) a vegetation zone has a vegetation integrity score <15 where the PCT is representative of an endangered or critically endangered ecological community, or

(c) a vegetation zone has a vegetation integrity score <17 where the PCT is associated with threatened species habitat (as represented by ecosystem credits), or is representative of a vulnerable ecological community, or

(d) a vegetation zone has a vegetation integrity score <20 where the PCT is not representative of a TEC or associated with threatened species habitat then for that vegetation zone:

(e) assessment of native vegetation is not required beyond Section 5.4, and

An offset is not needed for impacts on native vegetation if the vegetation integrity score is below those listed in subsection 9.2.1(1.) of the BAM (see above); however, if the entity is at risk of an SAII the assessor will need to address the relevant criteria in Section 9.1 of the BAM and include this in the BDAR.

4.5.2 Scores

Table 14. Vegetation Integrity Scores

Vegetation zone ID	Composition condition score	Structure condition score	Function condition score (where relevant)	Vegetation integrity score	Hollow bearing trees present?
PCT 3593: Remnant	100	98.5	84.4	94	Yes
PCT 3593: Canopy Overhang	12.3	31.1	48.8	26.5	Yes

4.5.3 Use of Benchmark Data

The benchmark data was sourced from the BAMC (NSW OEH 2023). No changes were made to the benchmark data.

Figure 10. Historically Mapped Vegetation in the vicinity of the Subject Land

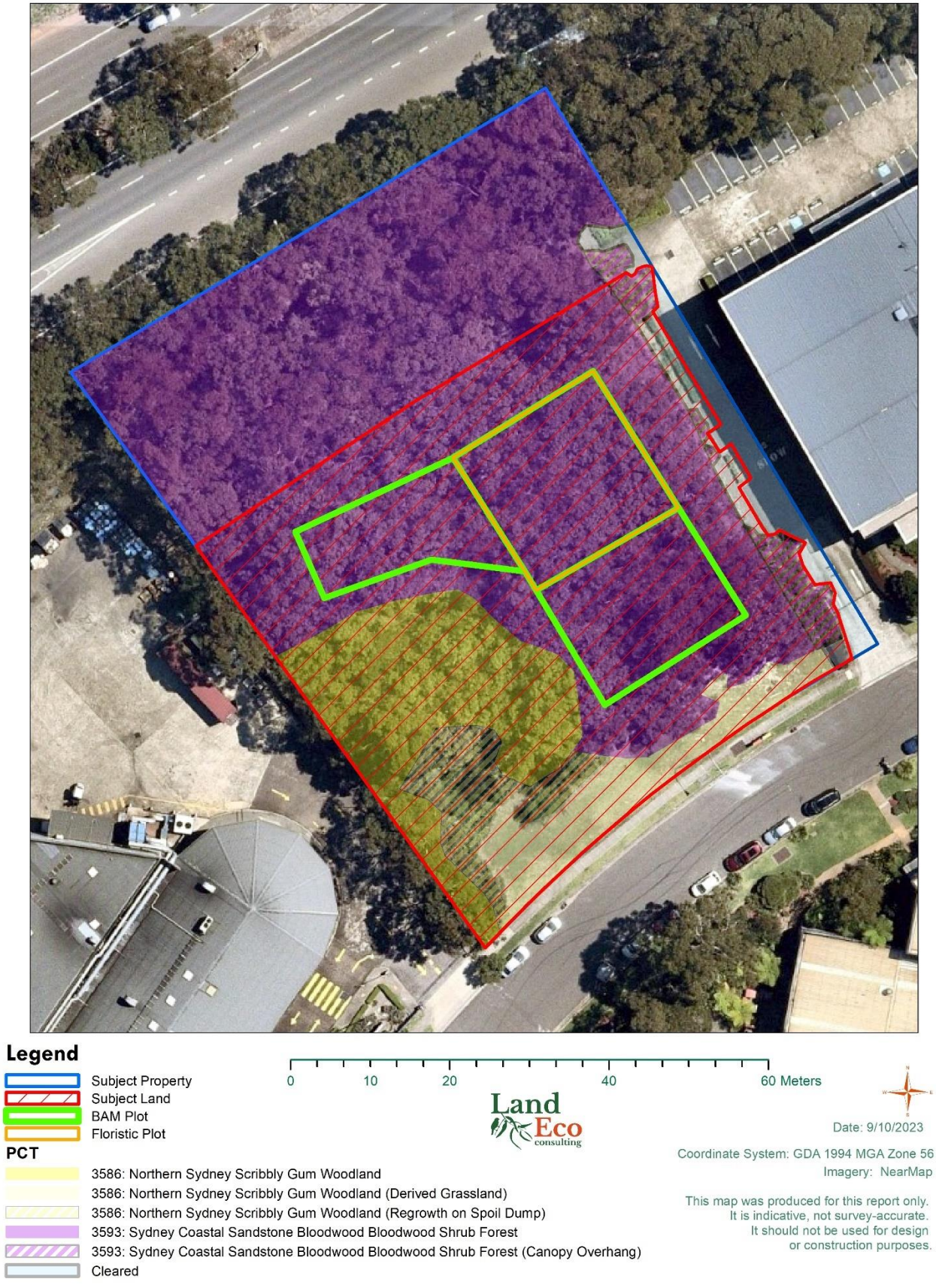

Figure 11. Field validated vegetation mapping within the Subject Property and BAM VIS Plot 1 including the Floristic Plot.

5. Habitat Suitability for Threatened Species

5.1 Identification Of Threatened Species for Assessment

5.1.1 Ecosystem Credit Species

The assessor must determine an offset for the impacts of proposals on the habitat of Ecosystem Credit species associated with a PCT in a vegetation zone with a vegetation integrity score (VIS) of ≥17. This VIS threshold reduces to ≥15 when the vegetation is an EEC or CEEC.

This section provides a summary of the candidate Ecosystem Credit Species for the Subject Land derived from BAMC (OEH 2023) and a 10km BioNet Atlas Search (DPE 2023b). Ecosystem credit species associated with the Subject Land are listed below in **Table 15**.

Table 15. Predicted ecosystem credit species

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act					
Regent Honeyeater (Foraging)	*Anthochaera phrygia*	Critically Endangered	Critically Endangered	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
Dusky Woodswallow	*Artamus cyanopterus cyanopterus*	Vulnerable	-	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
Gang-gang Cockatoo (Foraging)	*Callocephalon fimbriatum*	Vulnerable	-	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
Glossy Black-Cockatoo (Foraging)	*Calyptorhynchus lathami*	Vulnerable	-	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act					
Brown Treecreeper (eastern subspecies)	*Climacteris picumnus victoriae*	Vulnerable	-	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
Varied Sittella	*Daphoenositta chrysoptera*	Vulnerable	-	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
Spotted-tailed Quoll	*Dasyurus maculatus*	Vulnerable	Endangered	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
Beach Stone-curlew (Foraging)	*Esacus magnirostris*	Critically Endangered	-	Yes	☐ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey	No	No suitable coastal habitat.	N/A
Eastern False Pipistrelle	*Falsistrellus tasmaniensis*	Vulnerable	-	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
Little Lorikeet	*Glossopsitta pusilla*	Vulnerable	-	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
White-bellied Sea-Eagle (Foraging)	*Haliaeetus leucogaster*	Vulnerable	-	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang

Common name	Scientific name	Listing status BC Act	 EPBC Act	Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
Little Eagle (Foraging)	*Hieraaetus morphnoides*	Vulnerable	-	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
White-throated Needletail	*Hirundapus caudacutus*	-	Vulnerable	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
Broad-headed Snake (Foraging)	Hoplocephalus bungaroides	Endangered	Vulnerable	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
Black Bittern	*Ixobrychus flavicolis*	Vulnerable	-	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	No	No waterbodies within Subject Land No land within 40 m of freshwater and estuarine wetlands, in areas of permanent water and dense vegetation	N/A
Swift Parrot (Foraging)	*Lathamus discolor*	Endangered	Critically Endangered	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
Square-tailed Kite (Foraging)	*Lophoictinia isura*	Vulnerable	-	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
Black-chinned Honeyeater (eastern subspecies)	*Melithreptus gularis gularis*	Vulnerable	-	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act					
Eastern Coastal Free-tailed Bat	*Micronomuc norfolkensis*	Vulnerable	-	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
Little Bent-winged Bat (Foraging)	*Miniopterus australis*	Vulnerable	-	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
Large Bent-winged Bat (Foraging)	*Miniopterus orianae oceanensis*	Vulnerable	-	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
Turquoise Parrot	*Neophema pulchella*	Vulnerable	-	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
Barking Owl (Foraging)	*Ninox connivens*	Vulnerable	-	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
Powerful Owl (Foraging)	*Ninox strenua*	Vulnerable	-	Yes	☐ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
Eastern Osprey (Foraging)	*Pandion cristatus*	Vulnerable	-	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhangnm999

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act					
Scarlet Robin	*Petroica boodang*	Vulnerable	-	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
Flame Robin	*Petroica phoenicea*	Vulnerable	-	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
Golden-tipped Bat	*Phoniscus papuensis*	Vulnerable	-	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
New Holland Mouse	*Pseudomys novaehollandiae*	-	Vulnerable	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
Grey-headed Flying-fox (Foraging)	*Pteropus poliocephalus*	Vulnerable	Vulnerable	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
Rose-crowned Fruit-Dove	*Ptilinopus regina*	Vulnerable	-	No	☐ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
Superb Fruit-Dove	*Ptilinopus superbus*	Vulnerable	-	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang

Common name	Scientific name	Listing status BC Act	 EPBC Act	Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	Vulnerable	-	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
Greater Broad-nosed Bat	*Scoteanax rueppellii*	Vulnerable	-	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
Masked Owl (Foraging)	*Tyto novaehollandiae*	Vulnerable	-	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
Sooty Owl (Foraging)	*Tyto tenebricosa*	Vulnerable	-	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
Rosenberg's Goanna	*Varanus rosenbergi*	Vulnerable	-	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang

5.1.2 Species Credit Species

This section provides a summary of the candidate Species Credit flora (**Table 16**) and fauna species (**Table 17**) for the Subject Land derived from BAMC (OEH 2023) and a 10km BioNet Atlas Search (DPE 2023b). A summary of the targeted survey effort applied to each species is provided along with the results of the survey effort, specifically whether or not the Species Credit needs to be offset through retiring of Biodiversity Offset Credits (**Table 18;Table 19;Table 20;Table 21**). Where a species is assumed to be present on the Subject Land, the species polygon must encompass the entire vegetation zone/s within which the candidate species is predicted to use/occur.

The assessor must determine an offset for the impacts of proposals on the habitat of threatened species assessed for ecosystem credits and associated with a PCT in a TEC vegetation zone with a vegetation integrity score of ≥17. The assessor must determine an offset for the impacts of proposals on threatened species that require species credits, identified in accordance with Chapter 5 of the BAM (DPIE 2020a).

Table 16. Predicted flora species credit species

Common name	Scientific name	Listing status		Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act				
Thick-leaf Star-hair	*Astrotricha crassifolia*	Vulnerable	Vulnerable	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
-	*Darwinia peduncularis*	Vulnerable	-	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	No	The Subject Land is not a rocky area or within 50m of rocky areas.	N/A
-	*Deyeuxia appressa*	Endangered	Endangered	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
-	*Diuris bracteata*	Endangered	Endangered	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	"*Following the latest taxonomy, this species is thought to be extinct or at least there are no known extant plants or populations.*" (TBDC)	N/A
Wallangarra White Gum	*Eucalyptus scoparia*	Endangered	Vulnerable	☐ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey	No	The Subject Land is not within the native range of this species, which naturally occurs in the New England Tableland Bioregion.	N/A

Common name	Scientific name	Listing status		Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act				
Bauer's Midge Orchid	*Genoplesium baueri*	Endangered	Endangered	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
Caley's Grevillea	*Grevillea caleyi*	Critically Endangered	Critically Endangered	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
-	*Haloragodendron lucasii*	Endangered	Endangered	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	No	No seepage zones within the Subject Land or within 100m.	N/A
Deane's Paperbark	*Melaleuca deanei*	Vulnerable	Vulnerable	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
Angus's Onion Orchid	*Microtis angusii*	Endangered	Endangered	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
Hairy Geebung	*Persoonia hirsuta*	Endangered	Endangered	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	-	PCT 3593: Remnant PCT 3593: Canopy Overhang
Seaforth Mintbush	*Prostanthera marifolia*	Critically Endangered	Critically Endangered	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	-	PCT 3593: Remnant PCT 3593: Canopy Overhang
Eastern Australian Underground Orchid	*Rhizanthella slateri*	Vulnerable	Endangered	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	-	PCT 3593: Remnant PCT 3593: Canopy Overhang

Common name	Scientific name	Listing status		Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act				
Scrub Turpentine	*Rhodamnia rubescens*	Critically Endangered	Critically Endangered	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
Native Guava	*Rhodomyrtus psidioides*	Critically Endangered	Critically Endangered	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang

Table 17. Predicted fauna species credit species

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act					
Regent Honeyeater (Breeding)	*Anthochaera phrygia*	Critically Endangered	Critically Endangered	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	No	Subject Land not mapped on the Important Habitat Map.	N/A
Large-eared Pied Bat	*Chalinolobus dwyeri*	Vulnerable	Vulnerable	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
Beach Stone-curlew (Breeding)	*Esacus magnirostris*	Critically Endangered	-	Yes	☐ BAM-C ☒ TBDC ☐ Previous survey ☐ Current survey	No	No suitable coastal habitat.	N/A
Broad-headed Snake (Breeding)	*Hoplocephalus bungaroides*	Endangered	Vulnerable	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	No	No rocky areas, escarpments, outcrops or pogodas suitable for this species.	N/A

Common name	Scientific name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act					
Swift Parrot (Breeding)	*Lathamus discolor*	Endangered	Critically Endangered	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	No	Subject Land not mapped on the Important Habitat Map.	N/A
Little Bent-winged Bat (Breeding)	*Miniopterus australis*	Vulnerable	-	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	No	No suitable limestone caves, tunnels, mines, culverts or other suspected breeding habitat within the Subject Land or adjacent areas.	PCT 3593: Remnant PCT 3593: Canopy Overhang
Large Bent-winged Bat (Breeding)	*Miniopterus orianae oceanensis*	Vulnerable	-	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	No	No suitable limestone caves, tunnels, mines, culverts or other suspected breeding habitat within the Subject Land or adjacent areas.	PCT 3593: Remnant PCT 3593: Canopy Overhang
Sooty Owl (Breeding)	*Tyto tenebricosa*	Vulnerable	-	Yes	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang
Eastern Cave Bat	*Vespadelus troughtoni*	Vulnerable	-	No	☒ BAM-C ☐ TBDC ☐ Previous survey ☐ Current survey	Yes	N/A	PCT 3593: Remnant PCT 3593: Canopy Overhang

5.2 Presence of Candidate Species Credit Species

The presence or absence of candidate species credit species are presented below (**Table 18;Table 19**).

Table 18. Determine the presence of candidate flora species credit species on the Subject Land

Common name	Scientific name	Listing status		Method used to determine presence	Present?	Further assessment required? (BAM Subsections 5.2.5 and 5.2.6)
		BC Act	EPBC Act			
Thick-leaf Star-hair	*Astrotricha crassifolia*	Vulnerable	Vulnerable	Targeted threatened species survey	No	No
-	*Deyeuxia appressa*	Endangered	Endangered	Targeted threatened species survey	No	No
-	*Diuris bracteata*	Endangered	Extinct	Targeted threatened species survey	No	No
Bauer's Midge Orchid	*Genoplesium baueri*	Endangered	Endangered	Targeted threatened species survey	No	No
Caley's Grevillea	*Grevillea caleyi*	Critically Endangered	Critically Endangered	Targeted threatened species survey	No	No
-	*Haloragodendron lucasii*	Endangered	Endangered	Targeted threatened species survey	No	No
Deane's Paperbark	*Melaleuca deanei*	Vulnerable	Vulnerable	Targeted threatened species survey	No	No
Angus's Onion Orchid	*Microtis angusii*	Endangered	Endangered	Targeted threatened species survey	No	No
Hairy Geebung	*Persoonia hirsuta*	Endangered	Endangered	Targeted threatened species survey	No	No
Seaforth Mintbush	*Prostanthera marifolia*	Critically Endangered	Critically Endangered	Targeted threatened species survey	No	No
Eastern Australian Underground Orchid	*Rhizanthella slateri*	Vulnerable	Endangered	Targeted threatened species survey	No	No
Scrub Turpentine	*Rhodamnia rubescens*	Critically Endangered	Critically Endangered	Targeted threatened species survey	No	No
Native Guava	*Rhodomyrtus psidioides*	Critically Endangered	Critically Endangered	Targeted threatened species survey	No	No

Table 19. Determine the presence of candidate fauna species credit species on the Subject Land

Common name	Scientific name	Listing status		Method used to determine presence	Present?	Further assessment required? (BAM Subsections 5.2.5 and 5.2.6)
		BC Act	EPBC Act			
Large-eared Pied Bat	*Chalinolobus dwyeri*	Vulnerable	Vulnerable	Targeted threatened species survey	No	No
Sooty Owl	*Tyto tenebricosa*	Vulnerable	-	Targeted threatened species survey	No	No
Eastern Cave Bat	*Vespadelus troughtoni*	Vulnerable	-	Targeted threatened species survey	No	No

5.3 Candidate Species Credit Species

The survey methods for the candidate flora and fauna species credit species is presented below (**Table 20; Table 21**).

Land Eco deployed four Ultrasonic recording devices (Anabat Express) detector between the 27th January 2022 and the 3rd February 2022. The resulting data was analysed by Greg Ford of Balance! Environmental (Balance! Environmental 2022). One Ecosystem Credit microbat species was recorded, *Miniopterus orianae oceanensis* (Large Bent-winged Bat). This is species is not a Species Credit or at risk of an SAII due to the absence of suitable breeding habitat (i.e. limestone caves). Some calls representative of bats within the *Vespadelus* genus were recorded though could not be distinguished from *Chalinolobus morio*. There is a low possibility that these calls may include *Vespadelus troughtoni*. However due to the low number of calls and absence of suitable breeding habitat, no SAII was deemed likely to occur and was not retained for further assessment (Balance! Environmental 2022).

Table 20. Threatened species surveys for candidate flora species credit species on the Subject Land

Common name	Scientific name	Threatened flora species surveys				Present	Further assessment required (BAM Subsections 5.2.5 and 5.2.6)
		Survey method (transects or grids)	Timing of survey – within recommended period? (BAM-C / TBDC)		Effort (hours & no. people)		
Thick-leaf Star-hair	*Astrotricha crassifolia*	Transects	☒ Yes 15/9/22 29/9/22 18/10/22 18/11/22 24/11/22 28/11/11 14/12/22	☐ No	Transects were conducted 5m apart across the Subject Property (DPIE 2020b).	No	No
-	*Deyeuxia appressa*	Transects	☒ Yes 14/12/22	☐ No	Transects were conducted 5m apart across the Subject Property (DPIE 2020b).	No	No
-	*Diuris bracteata*	Transects	☒ Yes 15/9/22 29/9/22	☐ No	Transects were conducted 5m apart across the Subject Property (DPIE 2020b).	No	No
Bauer's Midge Orchid	*Genoplesium baueri*	Transects	☒ Yes 3/2/22 11/2/22 16/2/22	☐ No	Transects were conducted 5m apart across the Subject Property (DPIE 2020b).	No	No
Caley's Grevillea	*Grevillea caleyi*	Transects	☒ Yes 3/2/22 11/2/22 16/2/22 15/9/22 29/9/22 18/10/22 18/11/22 24/11/22 28/11/11 14/12/22	☐ No	Transects were conducted 5m apart across the Subject Property (DPIE 2020b).	No	No
-	*Haloragodendron lucasii*	Transects	☒ Yes 3/2/22 11/2/22 16/2/22 15/9/22 29/9/22 18/10/22 18/11/22 24/11/22 28/11/11 14/12/22	☐ No	Transects were conducted 5m apart across the Subject Property (DPIE 2020b).	No	No
Deane's Paperbark	*Melaleuca deanei*	Transects	☒ Yes 3/2/22 11/2/22 16/2/22 15/9/22 29/9/22 18/10/22	☐ No	Transects were conducted 5m apart across the Subject Property (DPIE 2020b).	No	No

Common name	Scientific name	Threatened flora species surveys				Present	Further assessment required (BAM Subsections 5.2.5 and 5.2.6)
		Survey method (transects or grids)	Timing of survey – within recommended period? (BAM-C / TBDC)		Effort (hours & no. people)		
			18/11/22 24/11/22 28/11/11 14/12/22				
Angus's Onion Orchid	*Microtis angusii*	Transects	☒ Yes 18/10/22	☐ No	Transects were conducted 5m apart across the Subject Property (DPIE 2020b).	No	No
Hairy Geebung	*Persoonia hirsuta*	Transects	☒ Yes 3/2/22 11/2/22 16/2/22 15/9/22 29/9/22 18/10/22 18/11/22 24/11/22 28/11/11 14/12/22	☐ No	Transects were conducted 5m apart across the Subject Property (DPIE 2020b).	No	No
Seaforth Mintbush	*Prostanthera marifolia*	Transects	☒ Yes 3/2/22 11/2/22 16/2/22 15/9/22 29/9/22 18/10/22 18/11/22 24/11/22 28/11/11 14/12/22	☐ No	Transects were conducted 5m apart across the Subject Property (DPIE 2020b).	No	No
Eastern Australian Underground Orchid	*Rhizanthella slateri*	Transects	☒ Yes 15/9/22 29/9/22 18/10/22 18/11/22 24/11/22 28/11/22	☐ No	Transects were conducted 5m apart across the Subject Property (DPIE 2020b).	No	No
Scrub Turpentine	*Rhodamnia rubescens*	Transects	☒ Yes 3/2/22 11/2/22 16/2/22 15/9/22 29/9/22 18/10/22 18/11/22 24/11/22 28/11/11 14/12/22	☐ No	Transects were conducted 5m apart across the Subject Property (DPIE 2020b).	No	No
Native Guava	*Rhodomyrtus psidioides*	Transects	☒ Yes 3/2/22 11/2/22 16/2/22 15/9/22 29/9/22 18/10/22 18/11/22 24/11/22 28/11/11 14/12/22	☐ No	Transects were conducted 5m apart across the Subject Property (DPIE 2020b).	No	No

Table 21. Threatened species surveys for candidate fauna species credit species on the Subject Land

Common name	Scientific name	Threatened fauna species surveys				Present	Further assessment required (BAM Subsections 5.2.5 and 5.2.6)
		Survey method (e.g. harp trap, Elliott trap, bioacoustics, etc.)	Timing of survey – within recommended period? (BAM-C / TBDC)		Effort (hours & no. people)		
Large-eared Pied Bat	*Chalinolobus dwyeri*	Bioacoustics (Anabat)	☒ Yes	☐ No	4 Anabat Express detectors, 4	No	No

Common name	Scientific name	Threatened fauna species surveys				Present	Further assessment required (BAM Subsections 5.2.5 and 5.2.6)
		Survey method (e.g. harp trap, Elliott trap, bioacoustics, etc.)	**Timing of survey – within recommended period?** (BAM-C / TBDC)		**Effort** (hours & no. people)		
			27/1/22 to 3/2/22		consecutive nights		
Sooty Owl	*Tyto tenebricosa*	Spotlighting with Call Playback and Stag Watch	☒ Yes 25/7/23, 28/7/23, 31/7/23, 1/8/23, 2/8/23, 9/8/23, 10/8/23 and 17/8/23	☐ No	8 nights	No	No
Eastern Cave Bat	*Vespadelus troughtoni*	Bioacoustics (Anabat)	☒ Yes 27/1/22 to 3/2/22	☐ No	4 Anabat Express detectors, 4 consecutive nights	No	No

5.4 Expert Reports

One expert report was sought in the preparation of this BDAR. A Microbat Call Identification Report was prepared by Balance! Environmental (2022) to analyse the bat call sequence files (ZC files) from the four Anabats.

5.5 More Appropriate Local Data

No additional local data has been used to assess habitat suitability.

5.6 Area or Count, and Location of Suitable Habitat for a Species Credit Species (A Species Polygon)

Where a Species credit species is confirmed present or assumed to be present within the Subject Land, the assessor must assign species polygon that encompasses the entire vegetation zone(s) within which the candidate species is predicted to occur based on the correct application of the BAM (DPIE 2020a). The species polygons for the Subject Land are presented (**Appendix D**).

No Species Credit species are present within the Subject Land (**Table 22; Table 23**).

Table 22. Results for present species (recorded within the Subject Land)

Common name	Scientific name	Biodiversity risk weighting (BAM-C & TBDC*)	SAII entity** (BAM-C & TBDC)	Habitat constraints / microhabitats present on the subject land / vegetation zone	Abundance – No. individual plants present on subject land (flora with unit of measure of count)	Extent (ha) of suitable habitat present on site (flora or fauna with unit of measure of area)	TBDC species specific recommendations e.g. buffers, general comments (where relevant)	Habitat condition (vegetation integrity score for each vegetation zone in the polygon – area species only)
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 23. Results for EPBC Act listed species present (recorded within the Subject Land)

Common name	Scientific name	Abundance – No. individual plants present on subject land (flora with unit of measure as count)	Extent (ha) of suitable habitat present on site (flora or fauna with unit of measure as area)
N/A	N/A	N/A	N/A

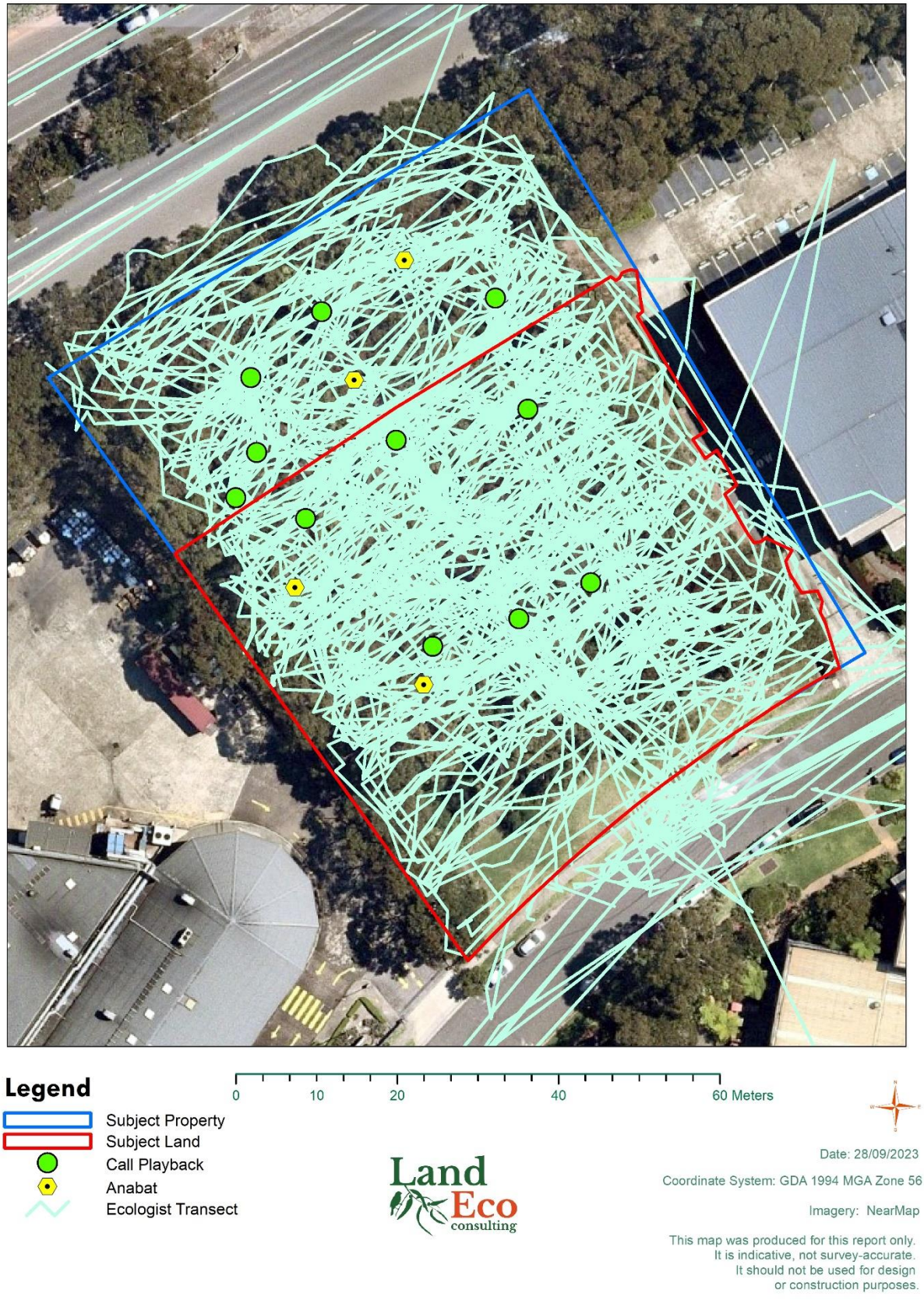

Figure 12. Targeted Species Credit Flora and Fauna survey effort undertaken by Land Eco Ecologists in 2022 and 2023. Ecologist transects have an accuracy error of between 1 and 10m.

6. Identifying Prescribed Impacts

This chapter of the report details the type and extent of impacts to biodiversity that will occur as a result of the proposed development (**Table 24**). Prescribed additional biodiversity impacts (prescribed impacts) must be assessed as part of the BOS, as per clause 6.1 of the BC Regulation. Such prescribed impacts (including direct and indirect impacts) are impacts:

a. on the habitat of threatened entities including:

i. karst, caves, crevices, cliffs, rocks and other geological features of significance, or

ii. human-made structures, or

iii. non-native vegetation

b. on areas connecting threatened species habitat, such as movement corridors

c. that affect water quality, water bodies and hydrological processes that sustain threatened entities (including from subsidence or upsidence from underground mining)

d. on threatened and protected animals from turbine strikes from a wind farm

e. on threatened species or fauna that are part of a TEC from vehicle strikes.

If relevant, these features must be identified on a map.

Table 24. Prescribed impacts identified

Feature	Present	Description of feature characteristics and location	Threatened entities that use, are likely to use, or are part of the habitat feature.	Describe how these features provide habitat for, or are used by, each threatened entity
Karst, caves, crevices, cliffs, rocks or other geological features of significance	☐Yes / ☒No	Lateritic Hawkesbury formation sediments are present in the Subject Property. However, there are no significant karst, caves, crevices, cliffs rocks or other geological features of significance for threatened microbats to roost/breed within the Subject Property.	N/A	N/A
Human-made structures	☐Yes / ☒No	The Subject Property is an undeveloped bushland block with no human-made structures.	N/A	N/A
Non-native vegetation	☒Yes / ☐No	The vegetation along the frontage of Minna Close is edge effected and contains non-native vegetation within the native vegetation such as weeds.	All Ecosystem Credit Species	Threatened species may forage within and around this non-native vegetation.
Habitat connectivity	☒Yes / ☐No	The Subject Property contains a network of terrestrial habitat connections associated with the native remnant canopy	All Ecosystem Credit Species Duffys Forest EEC	This corridor contributes foraging habitat and a fly-way corridor, providing resource and genetic connectivity

Feature	Present	Description of feature characteristics and location	Threatened entities that use, are likely to use, or are part of the habitat feature.	Describe how these features provide habitat for, or are used by, each threatened entity
		of *Eucalyptus spp.*, *Corymbia gummifera* and *Angophora costata* over dense understorey vegetation.		between bushland fragments across the landscape.
Waterbodies, water quality and hydrological processes	☐Yes / ☒No	No waterbodies occur within the Subject Land.	N/A	N/A
Wind turbine strikes (wind farm development only)	☐Yes / ☒No	N/A	N/A	N/A
Vehicle strikes	☒Yes / ☐No	Low-speed vehicle and heavy vehicle access points (driveways) are part of the proposed development. These are unlikely to adversely impact any threatened species as the Subject Land is in an industrial area surrounded by roads.	N/A	N/A

Stage 2: Impact Assessment (Biodiversity Values and Prescribed Impacts)

7. Avoid and Minimise Impacts

7.1 Avoid and Minimise Direct and Indirect Impacts

7.1.1 Project Location

The following summary of the design process of the chosen design location (Option 4) was provided by the project architect, SRH Architecture (2023 (see **Appendix E**):

- *"Design option 1 optimises the development potential of the subject site. The proposed building footprint is optimised by building to the allowable front, side and rear setbacks whilst also respecting the E2 Environmental Conservation zone. The proposed hardstand to the north of the site allows for rear semi-trailer vehicle access which is an operational requirement. Heavy vehicle entry and egress driveways flank east and west boundaries and enable vehicle movements in the required forward direction."*

- *"Design option 2 maintains a similar building footprint site coverage as the optimal design however an increased setback to the E2 conservation zone allows for higher tree retention. An increased setback to the west boundary also provides higher tree retention although reduces overall building footprint as heavy vehicle egress driveways have been maintained as previously proposed."*

- *Design 3 is a result of advice and comments received from the DSAP meeting held 02.06.22. As suggested by Council, this scheme looks to provide warehouse access through loading and docks to the Minna Close street frontage and reduced setback from 6.5m to 2m. despite this scheme increasing tree retention to the north and west, it requires increased excavation to accommodate required number of car spaces in a basement carpark. Providing parking grade is not feasible with the loading hardstand located at the front of the site. Furthermore, due to the restriction of heavy vehicle turning circles, heavy vehicle access has been reduced from semi-trailers to heavy rigid vehicles and is a departure from the client's operation requirements."*

- *"Design Option 4 takes into consideration a 2m front setback as put forward by Council but maintains heavy vehicle hardstand to the north of the site. The required number of car spaces is provided in an under croft parking level access on grade from Minna Close. As a result of these design moves both site excavation and clearing of vegetation is reduced compared to Design option 1. To achieve this balance of building footprint, minimal excavation and tree removal, the client is only proposing access for HRV vehicles in lieu of semi-trailer access. Design 4 option is the preferred option and is detailed in the DA submission architectural plan set."*

The proposed development has been designed to avoid and minimise impacts on biodiversity values in keeping with the purposeful use of the Subject Land. The development footprint carefully considers the biodiversity constraints of the site through maximising tree retention and minimising excavation into the rising landform of the site. This has been accomplished by positioning the industrial development along the frontage of Minna Close where the non-threatened vegetation occurs and where the vegetation is in the poorest condition, and by retaining a portion of the Duffys Forest EEC at the rear of the Subject Property, maintaining a habitat connectivity corridor in this way.

7.1.2 Project Design

The Subject Land is located along the frontage of Minna Close where the non-threatened vegetation occurs and where the vegetation is in the poorest condition. The portion of the Duffys Forest EEC at the rear of the Subject Property including within the Environmental Conservation Area (zone C2) is to be retained, maintaining a habitat connectivity corridor in this way.

All landscaping associated with the development will include locally indigenous flora representative of Duffys Forest EEC. No non-native or non-indigenous flora species will be planted in the Subject Property.

7.2 Avoid and Minimise Prescribed Impacts

7.2.1 Project Location

Impacts from clearing native vegetation and threatened species habitat can be avoided or minimised by locating the proposal in areas as detailed (**Table 25**). When selecting a proposal's location, all of the following have been analysed.

The proposed development will impact human-made structures, non-native vegetation, habitat connectivity and increase the risk of vehicle strikes, though these impacts have been avoided where possible and minimised to avoid significant impacts on any threatened entities.

Table 25. Measures to locate the proposal to avoid or minimise direct and indirect impacts on native vegetation, threatened species, threatened ecological communities and their habitat

How has the proposal has been located in areas lacking biodiversity values?	The Subject Land has been located along the frontage of Minna Close where the non-threatened vegetation (representative of PCT 3586) occurs and where the vegetation is in the poorest condition which has been mapped purple on the BV Map (**Figure 4**). The portion of the Duffys Forest EEC at the rear of the Subject Property is to be retained, maintaining a habitat connectivity corridor in this way including 130 trees (Urban Arbor 2023). At least 15 hollow-bearing trees of varying hollow sizes will be removed for the proposed development including two trees with large-sized hollows. However targeted surveys did not indicate the presence of any hollow-dwelling species.
How has the proposal has been located in areas where the native vegetation or threatened species habitat is in the poorest condition (i.e. areas that have a low vegetation integrity score)?	The vegetation across the majority of the Subject Property is species rich and structurally diverse. The vegetation occurs in its poorest conditions along the frontage of Minna Close where non-threatened vegetation (representative of PCT 3586) occurs.
How does the proposal avoid habitat for species with a high biodiversity risk weighting or land mapped on the important habitat map, or native vegetation that is a TEC or a highly cleared PCT.	The majority of the Subject Property is covered by Duffys Forest EEC. The development footprint is situated along Minna Close where the non-threatened vegetation (representative of PCT 3586) occurs to minimise the encroachment into Duffys Forest EEC. No known important breeding habitat to any species with a high biodiversity risk weighting is likely to be significantly impacted by the proposed development.
Has the proposal been located outside of the buffer area around breeding habitat features such as nest trees or caves?	At least 15 hollow-bearing trees of varying hollow sizes including two trees with large-sized hollows will be directly impacted by the proposed development. Targeted surveys during the appropriate survey period did not identify any threatened hollow-breeding bats or other hollow-dwelling species within the Subject Property. Although threatened cave-breeding bats were detected, no cave habitat will be directly impacted by the proposed development.
Has the proposal sought alternative:	
• **modes or technologies that would avoid or minimise impacts on biodiversity values**	The proposed development includes a retaining wall that will reduce the impact upon retained vegetation (Bureau SRH 2023).
• **routes that would avoid or minimise impacts on biodiversity values**	Site access should be undertaken from Minna Close and the existing driveway at 3 Minna Close to minimise potential inadvertent vegetation impacts.
• **locations that would avoid or minimise impacts on biodiversity values**	The Subject Property occurs on a patch of native vegetation in an urbanised locality surrounding by other industrial development.

• sites within a property on which the proposal is located that would avoid or minimise impacts on biodiversity values.	The proposed development has minimised impacts on biodiversity by electing to site the access driveways onto Minna Close and the existing driveway at 3 Minna Close, reducing the need for excavation and adverse impacts to remnant Duffys Forest EEC that connects to remaining Duffys Forest EEC along Mona Vale Road.
• flood planning levels	The Subject Property does not contains land mapped on the Flood Planning Map.
• servicing constraints.	The proposed development is situated within an existing industrial complex. The proposed development will utilise the existing roads, and council services (e.g. sewage and rubbish collection).

7.2.2 Project Design

This BDAR documents the reasonable measures taken by the proponent to avoid or minimise clearing of native vegetation and threatened species habitat during proposal design (**Table 26**).

The proposed development has been designed to avoid and minimise avoid significant prescribed impacts on any threatened entities.

Table 26. Design the proposal to avoid or minimise direct and indirect impacts on native vegetation, threatened species, threatened ecological communities and their habitat

Efforts to reduce the proposal's clearing footprint by minimising the number and type of facilities	The proposed development has been designed to limit disturbance to Duffys Forest EEC by minimising the building footprint within the Duffys Forest EEC area of the Subject Property. Although the building footprint does encroach into Duffys Forest EEC, the direct impact is minimised by situating the development along Minna Close where the non-threatened vegetation occurs.
Efforts to locate ancillary facilities in areas that have no biodiversity values	The Subject Property is covered by BV mapping. A new driveway has been positioned on the southern boundary, providing direct access to Minna Close and avoiding the need for vegetation removal in the biodiversity corridor along Mona Vale Road. Further to this, the existing driveway at 3 Minna Close Belrose will also be utilised as a second access point. The facilities are located outside of the land zoned 'E2 – Environmental Conservation'.
Efforts to locate ancillary facilities in areas where the native vegetation or threatened species habitat is in the poorest condition (i.e. areas with the lowest vegetation integrity scores)	The majority of the Subject Property is covered in remnant Duffys Forest EEC, however non-threatened vegetation occurs towards Minna Close. The Subject Land including ancillary facilities are located outside of the connected Duffys Forest EEC along Mona Vale Road. The access points are located along the frontage of Minna Close where the non-threatened vegetation occurs and where the vegetation is in the poorest condition. A new driveway has been positioned on the south-western boundary of the Subject Property, providing the shortest direct access to Minna Close. The existing driveway at 3 Minna Close will also be utilised.
Efforts to locate ancillary facilities in areas that avoid habitat for species and vegetation that has a high threat status (e.g. an endangered ecological community (EEC) or critically endangered ecological community (CEEC) or is an entity at risk of a serious and irreversible impact (SAII)	Duffys Forest EEC covers the majority of the Subject Property. The proposed development including ancillary structures have been located towards the frontage of Minna Close where the vegetation occurs in its poorest condition.

Actions and activities that provide for rehabilitation, ecological restoration and/or ongoing maintenance of retained areas of native vegetation, threatened species, threatened ecological communities and their habitat on the subject land.	The proposed development will involve landscaping that includes locally indigenous species representative of Duffys Forest EEC. The vegetation within the Subject Property is required to be managed in accordance with a Biodiversity Management Plan.

8. Impact Assessment

8.1 Direct Impacts

Residual direct impacts from the proposed development are presented in **Table 27.** Changes in vegetation integrity scores as a result of the proposed development presented in **Table 28.**

8.1.1 Residual Direct Impacts

An assessment of residual direct impacts is detailed in **Table 27.**

Table 27. Summary of residual direct impacts

Direct impact (Describe the impact on PCT/TEC/EC or threatened species and their habitat)	BC Act status	EPBC Act status	SAII entity	Project phase/timing of impact (e.g. construction, operation, rehabilitation)	Extent (ha, number of individuals)
PCT 3593: Sydney Coastal Sandstone Bloodwood Shrub Forest (which forms part of the 'Duffys Forest Ecological Community in the Sydney Basin Endangered Ecological Community') (Duffys Forest EEC)	Endangered Ecological Community	-	Yes	Construction, Operation	0.35ha
Large Bent-winged Bat (*Miniopterus orianae oceanensis*)	Vulnerable	-	No	Construction, Operation	0.35ha of foraging and potential roosting habitat (no breeding habitat will be directly impacted)

8.1.2 Change in Vegetation Integrity Scores

The change in VIS caused by the development in summarised in **Table 28**Table 28.

Table 28. Impacts to vegetation integrity

Vegetation zone	PCT ID	Management zone	Area (ha)	Before development				After development				Change
				Composition	Structure	Function	VI score	Composition	Structure	Function	VI score	Change in VI score
Remnant	3593	N/A	0.34	100	98.5	84.4	94	0	0	0	0	-94
Canopy Overhang	3593	N/A	0.01	12.3	31.1	48.8	26.5	0	0	0	0	-26.5

8.2 Indirect Impacts

An assessment of indirect impacts is detailed in **Table 29.**

Table 29. Summary of residual indirect impacts

Indirect impact (Describe impact, e.g. transport of weeds and pathogens form the site to adjacent vegetation)	Impacted entities (PCT/threatened entity and their habitats and where relevant, EPBC Act listing)	Extent (ha or zone reference)	Frequency	Duration (long-term/ short-term/ medium-term)	Project phase/ timing of impact (e.g. construction, operation, rehabilitation)	Likelihood and consequences
(a) inadvertent impacts on adjacent habitat or vegetation	Duffys Forest EEC All Ecosystem Credit species	Vegetation adjacent to Subject Land	During Construction	Long-term	Construction, Operation	Tree protection zones and no-go areas will minimise the potential for clearing of adjacent vegetation. In the unlikely event adjacent vegetation is cleared it is unlikely that this would cause significant impacts to threatened ecological communities or threatened species.
(b) reduced viability of adjacent habitat due to edge effects	Duffys Forest EEC All Ecosystem Credit species	Vegetation adjacent to Subject Land	During Construction	Long-term	Construction, Operation	The Subject Land and the surrounding vegetation is situated alongside Mona Vale Road and Minna Close. Therefore, the vegetation already persists whilst being subject to potential edge effects due to its situation in an urbanised locality surrounded by roads. The proposed development will not introduce novel edge effects. Increased lighting from the proposed development may discourage the use of the Subject Land for foraging/roosting microbats however this is unlikely exacerbate edge effects significantly beyond the status quo.
(c) reduced viability of adjacent habitat due to noise, dust or light spill	Duffys Forest EEC All Ecosystem Credit species	Vegetation adjacent to the Subject Land	During Construction and Ongoing	Long-term	Construction, Operation	The proposed development may result in the increase of noise, dust or light spill associated with the construction activities and operation of the Industrial dwelling. However, the Subject Property is already impacted in these ways by the existing industrial complex in the suburb of Belrose. The proposed development is unlikely to exacerbate this reality beyond the current condition. Shading diagrams show that the building will not cast substantial shadow upon the vegetation such that its microclimate will change in a detrimental way (**Figure 13**).

Indirect impact (Describe impact, e.g. transport of weeds and pathogens form the site to adjacent vegetation)	Impacted entities (PCT/threatened entity and their habitats and where relevant, EPBC Act listing)	Extent (ha or zone reference)	Frequency	Duration (long-term/ short-term/ medium-term)	Project phase/ timing of impact (e.g. construction, operation, rehabilitation)	Likelihood and consequences
(d) transport of weeds and pathogens from the site to adjacent vegetation	Duffys Forest EEC All Ecosystem Credit species	Vegetation adjacent to the Subject Land	During Construction and Ongoing	Long-term	Construction, Operation	The proposed development will result in soil disturbance on the Subject Land which may result in the propagation and spread of seeds from the soil bank to adjacent native vegetation. The majority of the Subject Land is remnant bushland that is largely not weed-infested. Given that the Subject Property is situated in an industrial complex that is subject to the spread of weeds, the proposed development is unlikely to significantly increase the risks of weeds in adjacent properties, though may promote colonisation of weed species within the vegetation to be retained within the Subject Property as a result of disturbance from the proposed development.
(e) increased risk of starvation, exposure and loss of shade or shelter	Duffys Forest EEC All Ecosystem Credit species	Vegetation adjacent to the Subject Land	During construction and Ongoing	Short-term, Possible long-term	Construction, Operation	The proposed development will remove vegetation that may reduce shelter and increase the risk of exposure. Although the proposed development will remove 15 hollows, hollows are likely to continue to occur in surrounding vegetation in the locality.
(f) loss of breeding habitats	All Ecosystem Credit species	Hollow-bearing trees within the Subject Property	During construction and Ongoing	Long term	Construction, Operation	Threatened species may utilise the hollows within the Subject Property for shelter, roosting or breeding. The proposed development will remove 15 hollows, including two trees with large-sized hollows. Four hollow-bearing trees, with small-sized hollows will be retained within the Subject Property and more substantial hollows are likely to continue to occur in surrounding vegetation in the locality. This habitat to be removed is not considered likely to form regular or important breeding habitat for threatened species as no threatened hollow-breeding species were identified during the targeted surveys.
(g) trampling of threatened flora species	N/A	N/A	N/A	N/A	N/A	N/A

Indirect impact (Describe impact, e.g. transport of weeds and pathogens form the site to adjacent vegetation)	Impacted entities (PCT/threatened entity and their habitats and where relevant, EPBC Act listing)	Extent (ha or zone reference)	Frequency	Duration (long-term/ short-term/ medium-term)	Project phase/ timing of impact (e.g. construction, operation, rehabilitation)	Likelihood and consequences
(h) inhibition of nitrogen fixation and increased soil salinity	Duffys Forest EEC	Vegetation adjacent to the Subject Land	During construction and Ongoing	Long-term	Construction, Operation	The proposed development will remove a small area of nitrogen fixing vegetation however this is unlikely to substantially exacerbate the status quo in this urbanised locality. Soil salinity is not a significant issue in this part of Sydney and is unlikely to be adversely impacted by the proposed development.
(i) fertiliser drift	Duffys Forest EEC	Vegetation to retained within the Subject Land and adjacent vegetation	During construction and Ongoing	Long-term	Construction, Operation	The use of fertiliser within landscaped gardens is likely to negligibly increase as a result of the proposed development. The Subject Property is likely to be already impacted by fertiliser drift from surrounding urban gardens. The proposed development is unlikely to significantly alter this reality.
(j) rubbish dumping	Duffys Forest EEC All Ecosystem Credit species	Vegetation to retained within the Subject Land and adjacent vegetation	During construction and Ongoing	Short-term, Possible long-term	Construction, Operation	The proposed development may inadvertently result in the stockpiling of construction waste on adjacent land and increased dumping of urban waste. The Subject Land has been exposed to rubbish and litter dumping from surrounding industrial properties. The proposed development is unlikely to disturb the adjacent habitat significantly in this way.
(k) wood collection	N/A	N/A	N/A	N/A	N/A	The proposed development is unlikely to increase the prevalence of wood collection.
(l) bush rock removal and disturbance	N/A	Scattered lateritic Hawkesbury formation sediments	During construction	Long-term	Construction	The proposed development will require disturbance of some lateritic Hawkesbury formation sediments (bush rock) within the Subject Land. It is not considered likely that any threatened species would be impacted by removal

Indirect impact (Describe impact, e.g. transport of weeds and pathogens form the site to adjacent vegetation)	Impacted entities (PCT/threatened entity and their habitats and where relevant, EPBC Act listing)	Extent (ha or zone reference)	Frequency	Duration (long-term/ short-term/ medium-term)	Project phase/ timing of impact (e.g. construction, operation, rehabilitation)	Likelihood and consequences
		scattered throughout the Subject Land				of this sandstone as they are small sediments and contains no evident breeding habitat.
(m) increase in predatory species populations	N/A	N/A	N/A	N/A	N/A	The Subject Property is already likely to support a population of predatory species. The proposed development is unlikely to increase the prevalence of predatory species population.
(n) increase in pest animal populations	N/A	N/A	N/A	N/A	N/A	The Subject Property is already likely to support a population of feral predatory pests such as foxes, rabbits and cats. The proposed development is unlikely to increase the prevalence of pest species population.
(o) increased risk of fire	N/A	N/A	N/A	N/A	N/A	The proposed development will remove vegetation from the Subject Land and reduce the risk of fire.
(p) disturbance to specialist breeding and foraging habitat, e.g. beach nesting for shorebirds.	N/A	N/A	N/A	N/A	N/A	No specialist breeding or foraging habitat occurs on the Subject Land.
(q) reduced viability of adjacent habitat due to shadowing	Duffys Forest EEC All Ecosystem Credit Species	Vegetation adjacent to the Subject Land	During Construction and Ongoing	Long-term	Construction, Operation	The proposed development is unlikely to significantly increase the shadowing on the vegetation to be retained beyond its current condition. The Subject Land is situated within an industrial complex surrounded by large buildings that already shade the area. Shadow Diagrams produced by Bureau SRH (2023) indicate that the proposed development will not cast additional shadow on the Duffys Forest EEC proposed to be retained such that its likelihood of survival is reduced (**Figure 13**).

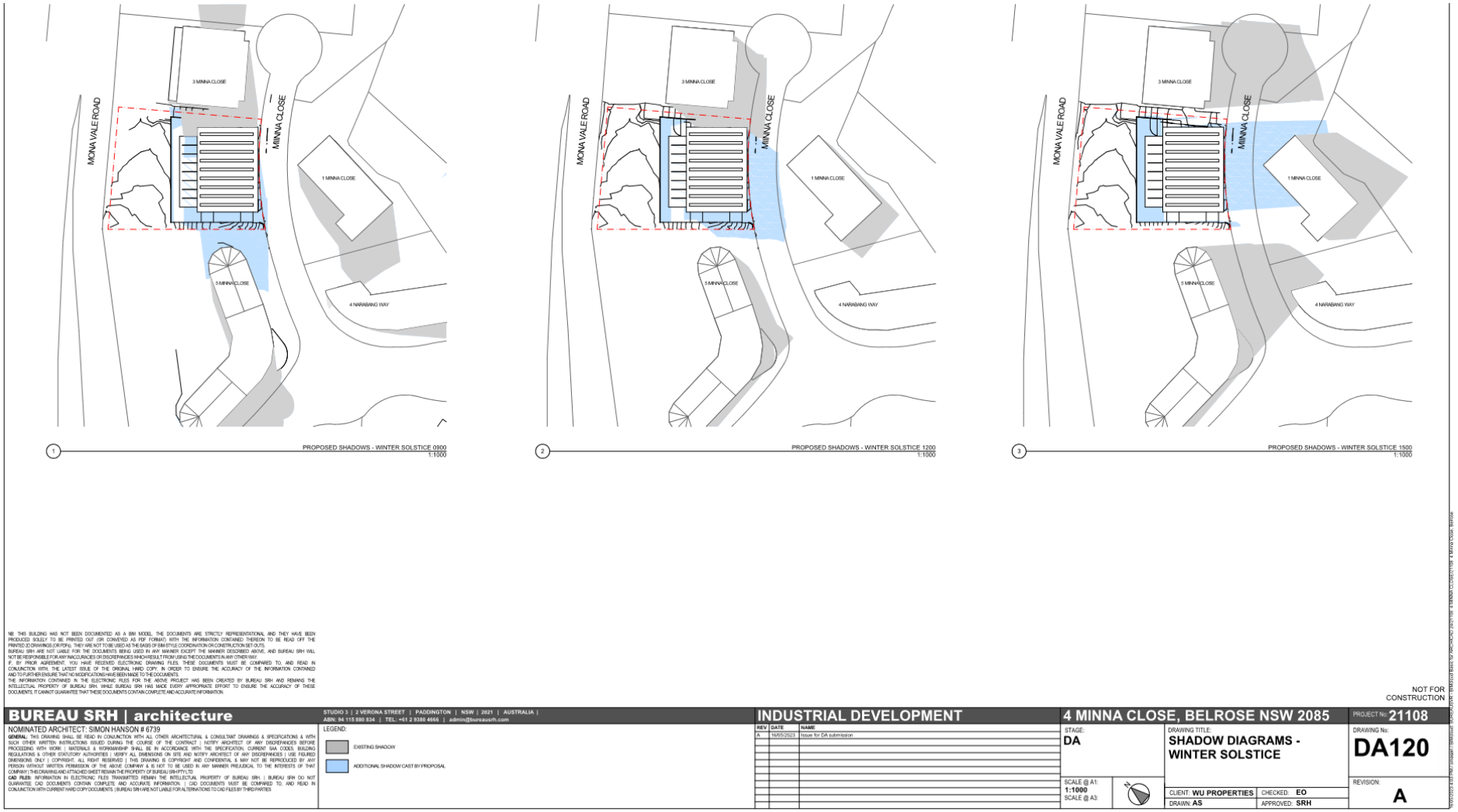

Figure 13. Shadow Diagrams for the proposed development (Bureau SRH 2023)

8.3 Prescribed Impacts

This section of the report addresses impact mitigation measures for prescribed impacts.

8.3.1 Karst, caves, crevices, cliffs, rocks or other geological features of significance

Not applicable.

8.3.2 Human-made structures

Not applicable.

8.3.3 Non-native vegetation

Table 30. Residual prescribed impacts – impacts to non-native vegetation

Nature	Threatened fauna or flora protected fauna that are at risk	SAII entities at risk	Likelihood	Extent	Duration	Consequences
The vegetation along the frontage of Minna Close is edge effected and contains patches of non-native vegetation such as weeds.	All Ecosystem Credit Species	Nil	High	The non-native vegetation along the frontage of Minna Close is proposed for removal from the Subject Land.	This impact will be permanent.	Negligible. Threatened species may forage within and around this non-native vegetation. This foraging habitat will be impacted by the proposed development. Other suitable foraging habitat will continue to occur in the locality. The vegetation must be managed and habitat must be replaced under a Biodiversity Management Plan (BMP).

8.3.4 Habitat connectivity

Table 31. Residual prescribed impacts – habitat connectivity

Nature	Threatened fauna or flora protected fauna that are at risk	SAII entities at risk	Likelihood	Extent	Duration	Consequences
The Subject Property contains a network of terrestrial habitat connections associated with the native remnant canopy of Eucalyptus spp., Corymbia gummifera and Angophora costata over dense understorey vegetation. This corridor contributes foraging habitat and a fly-way corridor, providing resource and genetic connectivity between bushland fragments across the landscape.	Duffys Forest EEC All Ecosystem Credit Species	Duffys Forest EEC	High	A total of 0.35 ha of native vegetation including 150 trees will be removed from the Subject Land.	This impact will be permanent.	The proposed development will alter habitat connectivity across the Subject Property. While some habitat will be removed, this will not prevent access to surrounding habitat. The vegetation adjoining Mona Vale Road is to be retained and will retain the connecting of Duffys Forest EEC along Mona Vale Road.

8.3.5 Waterbodies, water quality and hydrological processes

Not applicable.

8.3.6 Wind turbine strikes

Not applicable.

8.3.7 Vehicle strikes

Table 32. Residual prescribed impacts - vehicle strikes

Nature	Threatened fauna or protected fauna that are part of a TEC that are at risk of vehicle strike	SAII entity	Likelihood	Estimated vehicle strike rates	Consequences
Low-speed vehicle and heavy vehicle access points (driveways) are part of the proposed development. These are unlikely to adversely impact any threatened species as the Subject Land is in an industrial area surrounded by roads.	All Ecosystem Credit Species	No	Low	Nil	The Subject Property occurs in an urbanised locality surrounded by roads and is unlikely to impact any threatened or protected fauna beyond the status quo.

8.4 Mitigating residual impacts – management measures and implementation

Table 33. Summary of proposed mitigation and management measures for residual impacts (direct, indirect and prescribed)

Mitigation measure	Method/technique	Timing	Frequency	Responsibility	Likely efficacy (including risk of failure)
Project Location	The proposed development has been located towards the frontage of Minna Close where the non-threatened vegetation occurs. The Subject Property is in an urbanised area surrounded by roads.	Pre-construction phase	Once	Proponent	High
Project Design	The development footprint has been designed for the purposeful use of the Subject Land. The proposed development has been designed to reduce native vegetation clearing in the Duffys Forest EEC area by positioning the driveway at Minna Close. By retaining vegetation along the northern boundary of the Subject Property the biodiversity corridor values of the site are retained, enabling it to continue to connect to remaining patches of Duffys Forest EEC along Mona Vale Road. Further to this, the landscaping proposed contains areas of 'deep soil' and soft landscaping contains species that are representative of Duffys Forest EEC.	Pre-construction phase	Once	Proponent	High
Project Planning	The proponent will prepare a Construction Environmental Management Plan (CEMP) to manage construction activity. Following construction, the on-going landscaping and management of the retained vegetation should be undertaken in line with a Biodiversity Management Plan (BMP) which will detail on-going, habitat management, weed management, and maintenance.	Pre-construction phase	Once	Proponent Engineer Ecologist	High
Assigning a Project Ecologist	Prior to construction, the proponent will commission the services of a qualified and experienced Ecologist Consultant (>3 years of experience) with a minimum tertiary degree in Science, Conservation, Biology, Ecology, Natural Resource Management, Environmental Science or Environmental Management. The Ecologist must be licensed with a current Department of Primary Industries Animal Research Authority permit and New South Wales Scientific License issued under the BC Act. The Ecologist must be a member	Prior to vegetation clearance works	Once	Proponent	Moderate

Mitigation measure	Method/technique	Timing	Frequency	Responsibility	Likely efficacy (including risk of failure)
	of the NSW Ecological Consultants Association. The Ecologist will be commissioned to: • Assist the proponent in identifying and assigning an appropriate skilled bushland restoration professional to implement vegetation planting/restoration; • help the proponent undertake any Threatened species habitat augmentation or translocation. • provide staff training and site briefing to communicate environmental features to be protected and measures to be implemented.				
Implementation of a Biodiversity Management Plan (BMP)	The proposed development includes the removal of Duffys Forest EEC and known habitat for threatened species including the Large Bent-winged Bat. The Subject Property is also mapped as 'High Conservation Habitat', 'Wildlife Corridor' and 'Native Vegetation'. A Biodiversity Management Plan must be produced which outlines the management of the vegetation within the Subject Property.	Pre-construction phase	Once	Proponent Project Ecologist	High
Tree Protection	All trees to be retained must be protected in accordance with *Australian Standard – Protection of Trees on Development Sites (AS – 4970 – 2009)*, which outlines that a Tree Protection Zone (TPZ) is the principal means of protecting trees on development sites. It is an area isolated from construction disturbance so that the tree remains viable. Works will be avoided within the TPZ of any trees located outside of the development site that require retention. TPZs and tree protection measures are detailed in Urban Arbor (2023) *Arboricultural Impact Assessment Report* and must be enforced accordingly.	Prior to vegetation clearance works	During Construction	Project Arborist	Moderate
Hollow Replacement	As 15 hollow-bearing trees are to be removed for the proposed development, including two trees with substantial large-sized hollows. All of these hollows must be replaced. If possible, the hollows to be removed are to be carefully salvaged within the	Construction phase	During Construction	Proponent Project Arborist Project Ecologist	Moderate

Mitigation measure	Method/technique	Timing	Frequency	Responsibility	Likely efficacy (including risk of failure)
	bushland to be retained within the Subject Property. Hollow salvage has a greater success in usage by fauna post installation then artificial nest boxes. However, if hollow salvage is not possible, each hollow should be replaced with a nest box.				
Erosion and Sedimentation	Appropriate erosion and sediment control must always be erected and maintained during construction in order to avoid the potential of incurring impacts on biodiversity values in accordance with the recommendations of the Geotechnical Investigation (Martens Consulting Services 2022). As a minimum, such measures should comply with the relevant industry guidelines such as 'the Blue Book' (Landcom 2004).	Construction phase	Ongoing	Proponent Construction Contractor	Moderate
Stormwater	Stormwater will be managed according to the Stormwater Management Plans for the proposed development (AT&L 2023).	Construction phase	Ongoing	Proponent Construction Contractor Engineer	Moderate
Storage and Stockpiling (Soil and Materials)	Allocate all storage, stockpile and laydown sites away from any native vegetation that is planned to be retained. Avoid importing any soil from outside the site as this can introduce weeds and pathogens to the site in order to avoid the potential of incurring indirect impacts on biodiversity values.	Construction phase	During construction	Construction Contractors	Moderate
Mitigating effects of Light Spill	Lighting will be minimised to wherever it is required. Lighting will be turned off at designated times in the evening to reduce impacts of light spill on biodiversity and the environment. Diurnal timing of construction and operational activities will reduce impacts of light spill. Lighting will not be utilised at night.	Prior and Post construction.	Ongoing	Proponent Construction Engineer Architect Contractors	Moderate
Mitigating effects of Construction Noise	Prior to any demolition or construction, the proponent will install noise barriers to reduce noise from construction. All noise will be limited to standard daylight working hours 6am-6pm Monday to Friday, 7am-1pm Saturday. No work on Sunday.	Prior and During Construction	During construction	Proponent Construction Engineer Architect Contractors	Moderate

Table 34. Implementation of the mitigation and management measures

Measure/action	**Monitoring and evaluation strategy** (Data, frequency, timing and reporting)	**Performance criteria** (linked to monitoring and evaluation strategy)	**Adaptive management threshold** (trigger for adaptive management plan/actions)	**Adaptive management response** (when triggered)
Assigning a Project Ecologist	Project Ecologist to be engaged by proponent. Ecologist to conduct a pre-clearing survey for any sensitive fauna, breeding fauna, or threatened species in the Subject Property. No less than 48 hours prior to clearing commencing.	Assigned Project Ecologist to prepare an '*Ecologist Pre-clearing Report*' to detail findings of the pre-clearing survey.	If a tree hollow, or nesting, sensitive, or threatened fauna or flora is found, the Ecologist will prepare a strategy to maximise likelihood of safe relocation.	Relocate sensitive fauna, or threatened entity. If a tree hollow is found, instruct an Arborist to carefully remove the hollow sections of the tree and prepare excised hollows for re-install within the Subject Land or Property.
Tree Protection	Project Arborist (Urban Arbor) to be engaged by proponent. Tree protection fencing to be installed around any trees and other native vegetation to prevent such trees/vegetation being impacted by the proposed excavation or construction.	Project Arborist to supervise the installation of tree protection fencing. Arborist to provide letter with photographic evidence to confirm appropriate controls have been installed.	If any trees that have not been approved for clearing are accidentally cleared/harmed, or excavation works occur within the 'drip zones' or structural root zones of trees that are to be retained on the Subject Property or neighbours property.	Stop works immediately. Qualified Consulting Arborist must be present to supervise any excavation works and provide advice to ensure such works do not harm trees on adjacent properties. The Project Ecologist will work with the Arborist to restore the vegetation cleared.
Salvage and Relocation of Hollows and Woody Debris	To be documented and confirmed by Project Ecologist.	All hollows and at least 20 metres of course woody debris (felled tree trunks, not branches or root balls) to be salvaged and relocated to a suitable position within the Subject Property or public reserve as identified by Council, under the supervision of the Project Ecologist.	If Council cannot identify a suitable location to donate coarse woody debris too, contact Local Land Services or NSW Fisheries and see if they have a restoration project that may use the debris. If hollow salvage is not possible, each hollow should be replaced with a nest box.	Find a suitable recipient site for receipt of the hollows and 20 metres of coarse woody debris and felled tree trunks. Contact Council, NSW Fisheries or Local Land Services to determine a suitable recipient of the logs so they can continue to provide habitat for fauna.
Erosion and Sedimentation	Appropriate Erosion and Sedimentation Controls informed by the Blue Book (Landcom 2004) to be included in a Construction Environmental Management Plan (CEMP) commissioned by the proponent.	Minimum industry standards enforced prior to and during earthworks, clearing and construction.	If controls are not properly installed, or fail.	Engage Earthworks Contractor, Civil or Environmental Engineer to install appropriate controls within 24 hours of the breach.

Measure/action	**Monitoring and evaluation strategy** (Data, frequency, timing and reporting)	**Performance criteria** (linked to monitoring and evaluation strategy)	**Adaptive management threshold** (trigger for adaptive management plan/actions)	**Adaptive management response** (when triggered)
Storage and Stockpiling	All storage and stockpiling of construction resources must be in appropriate laydown areas away from the dripline of trees that will be retained. Ensure tree and vegetation protection fencing is installed around trees /vegetation that must be protected outside the development footprint.	No inadvertent impacts (harm) to trees, habitat or other vegetation.	Inadvertent impacts (e.g. accidental felling of trees or vegetation not approved for clearing) occur to adjacent vegetation as a result of improper management of construction materials.	Review controls and implement new measures. Restore the vegetation impacted under the guidance of the Project Ecologist.
Management of Light, Noise and Dust from Construction	Restrict construction to daylight hours. Manage dust, erosion and runoff in accordance with the provisions of 'The Blue Book' (Landcom 2004). Limit the unnecessary use of flood lighting.	Control measures implemented.	Control measures ineffective, resulting in disturbance to protected flora or fauna, or disturbance to nearby landholders.	Review controls and implement new measures under guidance of Construction Contractor to adequately mitigate impacts.

8.5 Adaptive management strategy for uncertain impacts

No uncertain impacts are anticipated as a result of the proposed development.

9. Serious and Irreversible Impacts

9.1 Assessment for serious and irreversible impacts on biodiversity values

There is one SAII entity that may be impacted by the proposed development (**Table 35**):

- Duffys Forest Ecological Community in the Sydney Basin Bioregion Endangered Ecological Community (EEC)

Due to the potential sensitivity of this EEC to any impact on habitat, a determination of whether or not the proposed impacts are serious and irreversible is to be undertaken in accordance with section 9.1 of the BAM (OEH 2020a).

The Duffys EEC within the Subject Land is species rich and structurally diverse though it occurs in an urbanised locality. Natural regeneration is present and will continue to occur within the vegetation to be retained within the Subject Property post-development. This vegetation must be managed in accordance with a Biodiversity Management Plan.

As this EEC is an SAII entity, there are no prescribed impact thresholds for the community. This means that any impact on the community could be considered 'serious and irreversible'. Due to the potential sensitivity of this community to any impact on habitat, a determination of whether or not the proposed impacts are serious and irreversible are to be undertaken in accordance with section 3.2 of the 'Guidance to assist a decision-maker to determine a serious and irreversible impact' (OEH 2017a) (**Table 36**).

It is considered unlikely that the proposed development will cause a serious and irreversible impact (SAII) to Duffys EEC, however the final determination of whether an impact is serious and irreversible lies with the consent authority, Northern Beaches Council.

Table 35. SAII Entities Impacted by the Development

Common name	Scientific name	Reason for inclusion in assessment
Duffys Forest Ecological Community in the Sydney Basin Bioregion	*Duffys Forest Ecological Community in the Sydney Basin Bioregion*	Included in current list of entities at risk of an SAII and is likely to be impacted by the proposal

Table 36. Serious and Irreversible Impact Assessment for Duffys Forest Ecological Community in the Sydney Basin Bioregion

Serious and Irreversible Impact (SAII) Impact assessment provisions for ecological communities: Duffys Forest Ecological Community in the Sydney Basin Bioregion	
BC Act Status: Endangered Ecological Community	
a) the action and measures taken to avoid the direct and indirect impact on the potential entity for a SAII	The proposed development does not avoid direct impact to Duffys Forest EEC, but it does minimise direct impacts through locating the majority of the development upon more disturbed and non-threatened vegetation. The placement of the development within the Subject Property has ensured a reduced development footprint within the Duffys Forest. Indirect impacts to adjacent vegetation will be effectively avoided and minimised through the measures detailed in this BDAR.
b) the area (ha) and condition of the threatened ecological community (TEC) to be impacted directly and indirectly by the proposed development. The condition of the TEC	A total area of 0.23 ha of Duffys Forest EEC will be directly impacted/ cleared from Subject Land. This vegetation is species rich and structurally diverse though it occurs in an urbanised locality. This vegetation occurs in two zones. 'Remnant' Duffys Forest EEC is the dominant zone covering 0.22 ha of total Duffys Forest EEC in the Subject Land, which has a current VI score of 94. The other zone, 'Canopy Overhang' only covers 0.01 ha of the Subject Land, which has a current VI score of 26.5.

Serious and Irreversible Impact (SAII) Impact assessment provisions for ecological communities: Duffys Forest Ecological Community in the Sydney Basin Bioregion		
is to be represented by the vegetation integrity score for each vegetation zone		
c) a description of the extent to which the impact exceeds the threshold for the potential entity that is specified in the Guideline for determining an SAII	Thresholds for ecological communities have not yet been determined by DPIE. A total area of 0.23 ha of Duffys Forest EEC occurs on the Subject Land. This vegetation occurs in two zones in the Subject Land, Remnant and Canopy Overhang. The 'Remnant' zone has a current VI score of 94 and the 'Canopy Overhang' has a current VI score of 26.5.	
d) the extent and overall condition of the potential TEC within an area of 1000ha, and then 10,000ha, surrounding the proposed development footprint	The NSW Office of Environment and Heritage (2016) '*The Native Vegetation of the Sydney Metropolitan Area*' was used to determine the extent of this EEC within the area surrounding the Subject Land. This resource identified 101.04 ha of Duffys Forest EEC within the 1000 ha area and 350.18 ha of Duffys Forest EEC within the 10000 ha area (**Figure 14**). The condition of these remnants is expected to be moderate, with the majority of it occurring in urban areas.	
e) an estimate of the extant area and overall condition of the potential TEC remaining in the IBRA subregion before and after the impact of the proposed development has been taken into consideration	The Final Determination for this EEC (TSSC 2011) identifies the area of occupancy to be approximately 240 ha, which is less than 16% of its original extent (1450ha). Few good quality connected remnant stands of this vegetation remain as the majority of this community is highly fragmented by urban developments. The proposed development will remove 0.21 ha of remnant vegetation belonging to this community (Urban Arbor 2023). However, associated landscaping will incorporate locally indigenous species belong to this EEC. The vegetation to be retained must be managed under a Biodiversity Management Plan that will improve the condition of this community post development.	
f) an estimate of the area of the candidate TEC that is in the reserve system within the IBRA region and the IBRA subregion	Approximately 30-50% of the remaining stands of the community are reserved, including approximately 1600ha in conservation areas.	
g) the development, clearing or biodiversity certification proposal's impact on:	**i. abiotic factors critical to the long-term survival of the potential TEC; for example, how much the impact will lead to a reduction of groundwater levels or the substantial alteration of surface water patterns**	The proposed development may result in an increase in sediment, nutrients and water runoff as a result of excavation and an increase in hard surfaces within the Subject Land. However, it is unlikely that the proposed development will significantly exacerbate abiotic factors given the location of the Subject Land in a disturbed urban matrix with existing edge effects. The Subject Land is already exposed to high levels of nutrients and runoff from surrounding landscaped areas.

Serious and Irreversible Impact (SAII) Impact assessment provisions for ecological communities: Duffys Forest Ecological Community in the Sydney Basin Bioregion		
	ii. **characteristic and functionally important species through impacts such as, but not limited to, inappropriate fire/flooding regimes, removal of understorey species or harvesting of plants**	The area of Duffys Forest EEC within the Subject Land is species rich and structurally diverse although it is surrounded by an industrial complex. The removal of 0.23 ha representative of this community will not disrupt habitat connectivity to other remaining Duffys Forest EEC along Mona Vale Road. 130 canopy trees will be retained that connects to other patches along Mona Vale Road, therefore maintaining functionally important vegetation for Duffys Forest EEC. Management of vegetation under a Biodiversity Management Plan will remediate the vegetation in the Subject Property post development. Fire and flood regimes will be negligibly impacted owing to its suburban situation. It is therefore unlikely that the proposed development will significantly exacerbate impacts on characteristic and functionally important species as the area is already surrounded by industrial developments.
	iii. **the quality and integrity of an occurrence of the potential 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 potential TEC**	The proposed development is unlikely to enhance weed infiltration into adjacent habitat by an increase in edge effects given the surrounding habitat occurs in an industrial setting impacted by garden escapees, nutrient and chemical runoff and garden maintenance activities.
h) **direct or indirect fragmentation and isolation of an important area of the potential TEC**	The removal of 0.23 ha representative of this community will not directly or indirectly fragment habitat connectivity across landscape. The proposed development has been designed to maintain a habitat corridor to the surrounding Duffys Forest EEC along Mona Vale Road that will allow natural regeneration, seed dispersal and genetic diversity to continue to occur across the landscape. The proposed development will not modify this community adversely beyond its current condition in the locality.	
i) **the measures proposed to contribute to the recovery of the potential TEC in the IBRA subregion.**	The proponent aims to contribute to the recovery of this TEC in the IBRA subregion through retiring of biodiversity offset credits, and by incorporating landscaping of species representative of Duffys Forest EEC. Further to this, management of this vegetation in accordance with a Biodiversity Management Plan will remediate the remaining Duffys Forest EEC post development.	

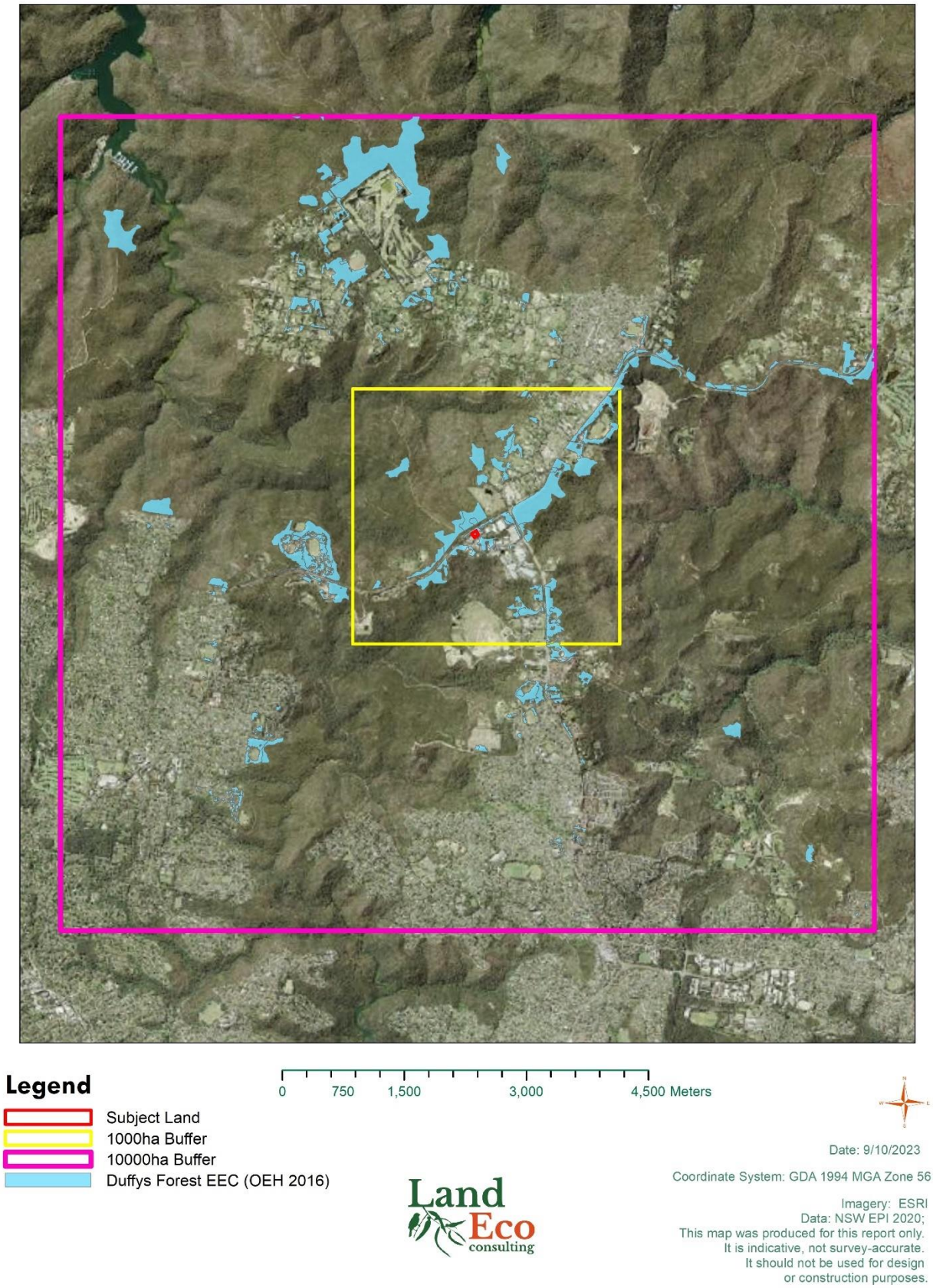

Figure 14. Extent of Duffys Forest EEC within 1000ha and 10000ha of the Subject Land

10. Impact Summary

10.1 Determine an offset requirement for impacts

10.1.1 Impacts on Native Vegetation and Threatened Ecological Communities

Table 37. Impacts that do not require offset - ecosystem credits

Vegetation zone	PCT name	TEC	Impact area (ha)	TEC association	Entity at risk of an SAII?	Current VI score
N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 38. Impacts that require an offset - ecosystem credits

Vegetation zone	PCT name	TEC	Impact area (ha)	Current VI score	Future VI score	Change in VI score	Biodiversity risk weighting	Number of ecosystem credits required
Remnant	PCT 3593 Sydney Sandstone Bloodwood Shrub Forest	Duffys Forest Ecological Community in the Sydney Basin Bioregion	0.34	94	0	-94	2	16
Canopy Overhang	PCT 3593 Sydney Sandstone Bloodwood Shrub Forest	Duffys Forest Ecological Community in the Sydney Basin Bioregion	0.01	26.5	0	-26.5	2	1
Total credits								17

10.1.2 Impacts on Threatened Species and their Habitat (Species Credits)

Table 39. Impacts that require an offset - species credits

Common name	Scientific name	BC Act status	EPBC Act status	Loss of habitat (ha) or individuals	Biodiversity risk weighting	Number of species credits required
N/A	N/A	N/A	N/A	N/A	N/A	N/A
					Total credits	0

10.1.3 Indirect and prescribed impacts

Table 40. Summary of proposed offsets for residual indirect and prescribed impacts

Residual indirect or prescribed impact (identified after mitigation)	Proposed offset (additional biodiversity credit requirement and/or other conservation measures)
N/A	N/A

10.2 Impacts that do not need further assessment

Table 41. Impacts that do not need further assessment for ecosystem credits

Impact	Location within subject land	Justification why no further assessment is required
N/A	N/A	N/A

11. Biodiversity Credit Report

11.1 Ecosystem credits

In accordance with section 9.2.1 of the BAM (DPIE 2020a) the assessor must determine an offset for all impacts of proposals on PCTs that are associated with a vegetation zone that has a vegetation integrity score of:

a. ≥15, where the PCT is representative of an EEC or a CEEC

b. ≥17, where the PCT is associated with threatened species habitat (as represented by ecosystem credits) or represents a vulnerable ecological community

c. ≥20, where the PCT does not represent a TEC and is not associated with threatened species habitat.

Seventeen (17) ecosystem credits require retirement for the proposed development (**Table 42**).

Table 42. Ecosystem credits class and matching credit profile

Credits to Retire	Attributes shared with matching credits						
	PCT name	PCT vegetation class	PCT vegetation formation	Associated TEC or EC	Offset trading group (BAM Section 10.2, Tables 4 & 5)	Hollow bearing trees present?	IBRA subregion (in which proposal is located)
17	N/A	N/A	N/A	N/A	Duffys Forest Ecological Community in the Sydney Basin Bioregion This includes PCTS's: 3259, 3593	Yes	Pittwater, Cumberland, Sydney Cataract, Wyong and Yengo. or Any IBRA subregion that is within 100 kilometres of the outer edge of the impacted site

11.2 Species credits

In accordance with section 9.2.2 of the BAM (DPIE 2020a):

1. The assessor must determine an offset for the impacts of proposals on the habitat of threatened species assessed for ecosystem credits and associated with a PCT in a vegetation zone with a vegetation integrity score of ≥17.

2. The assessor must determine an offset for the impacts of proposals on threatened species that require species credits, identified in accordance with Chapter 5 of the BAM (DPIE 2020a).

3. The method for determining offset requirements for impacts on threatened species and threatened species habitat is described in Chapter 10 of the BAM (DPIE 2020a).

4. An offset requirement can be proposed for a prescribed impact in accordance with Section 8.6 of the BAM (DPIE 2020a).

No threatened species credits require offsetting for the proposed development (**Table 43**).

Table 43. Species credit class and matching credit profile

Credits to Retire	Attributes shared with matching credits				
	Name of threatened species	Kingdom	BC Act status	EPBC Act status	IBRA region
N/A	N/A	N/A	N/A	N/A	N/A

12. Other Relevant Legislation, Plans & Policies Requiring Address

12.1 Warringah Local Environmental Plan 2011

The Subject Property is located in the Warringah Ward of the Northern Beaches Council and is therefore subject to the planning provisions of the Warringah LEP. This section details Environmental Controls relevant to the terrestrial biodiversity associated with the Subject Property and surrounds (**Table 44**).

Table 44. Environmental controls relevant to the terrestrial biodiversity associated with the Subject Property and surrounds.

Local Environmental Plan Reference	Application	Suitable Action
Part 2.1 Land Use Zones	The majority of the Subject Property is zoned 'SP4 – Enterprise'. A small section along the northern boundary is zoned 'C2 – Environmental Conservation'.	The proposed development is permitted with consent within the 'SP4 – Enterprise' zoned land. This report accompanies the DA that seeks consent. The Subject Land (development footprint) has been situated outside of the 'C2 – Environmental Conservation' zoned land as the development is prohibited there.
Part 5.23 Public Bushland	The proposed development has the potential to impact nearby public bushland.	Developments that have the potential to impact public bushland requires development consent from the consent authority, i.e. Northern Beaches Council. This report accompanies the DA that seeks consent. This development may cause indirect impacts to vegetation in nearby public bushland, however, these indirect impacts can be avoided and managed through implementation of the proposed mitigation and management measures for residual impacts (direct, indirect and prescribed) (**Table 33**).
Part 7.2 Earthworks	The proposed development will require earthworks that will impact native vegetation.	Vegetation clearing and earthworks have been minimised through the design process. All trees proposed to be retained can be protected without adverse effects through appropriate protective measures advised by a qualified Consulting Arborist (Urban Arbor 2023) and by following industry guidelines outlined in the 'Blue Blook' (Landcom 2004).

12.2 Warringah Development Control Plan 2011

The Subject Property is located in the Warringah Ward of the Northern Beaches Council and is therefore subject to the planning provisions of the Warringah DCP. This section details Development Controls relevant to the terrestrial biodiversity within the Subject Property and surrounds (**Table 45**). Seven controls listed in the Warringah DCP apply for the Subject Land.

Table 45. Development controls relevant to the terrestrial biodiversity within the Subject Property and surrounds

Control Number	Control Name	Does this control apply?	Reason	Suitable Action Proposed
E1	Preservation of Trees or Bushland Vegetation	Yes	The proposed development will result in the removal of 150 trees within the Subject Property, retaining 130 other trees within the Subject Property.	All tree removal will be conducted with permission from Northern Beach Council. Effort will be taken to avoid impacting retained vegetation within the Subject Property and the bushland adjoining the

Control Number	Control Name	Does this control apply?	Reason	Suitable Action Proposed
				Subject Property. Arborist controls will be installed to protect trees and vegetation to be retained.
E2	Prescribed Vegetation	Yes	The Subject Property is mapped 'Threatened and High Conservation Habitat', 'Wildlife Corridor' and 'Native Vegetation' on the Warringah DCP mapping. Further to this, the Subject Property is known/potential habitat for threatened species, populations or ecological communities as listed under the NSW Threatened Species Conservation Act 1995 and/or the Commonwealth Environment Protection and Biodiversity Conservation Act 1999.	The development proposes to remove 0.35 ha of native vegetation including the removal of 150 trees (Urban Arbor 2023). The Subject Land is located towards the frontage of Minna Close where the non-threatened vegetation occurs and where the vegetation is in the poorest condition which has been mapped purple on the BV Map (**Figure 4**). The portion of Duffys Forest EEC at the rear of the Subject Property is to be retained, maintaining a habitat connectivity corridor in this way. Further to this, the proposed landscaping plan (Ben Kaye Garden Design 2023) incorporates locally indigenous species belonging to Duffys Forest EEC.
E3	Threatened species, populations, ecological communities listed under State or Commonwealth legislation, or High Conservation Habitat	Yes	The Subject Property is mapped as 'Threatened and High Conservation Habitat' and is identified as known/potential habitat for threatened species.	The proponent must demonstrate that they are protecting and promoting the recovery of threatened species and vegetation communities. The proposed landscaping plan (Ben Kaye Garden Design 2023) incorporates locally indigenous species belonging to the Duffys Forest EEC. This planting will provide natural habitat for local wildlife to utilise. Further to this, as 15 hollow-bearing trees will be removed, including two trees with substantial large-sized hollows, hollow replacement is recommended to offset the loss of this habitat. The proponent must also demonstrate how the remaining vegetation will be managed and enhanced through a Biodiversity Management Plan.
E4	Wildlife Corridor	Yes	The Subject Property is mapped as a 'Wildlife Corridor' on the Warringah DCP Wildlife Corridors Map.	The proposed development will retain and enhance habitat for threatened species and endangered ecological communities in accordance with landscaping that incorporates locally indigenous species belonging to the Duffys Forest EEC. Further to this, 130 trees will be retained following the development to maintain the

Control Number	Control Name	Does this control apply?	Reason	Suitable Action Proposed
				connectivity of the wildlife corridor. The proponent must also demonstrate how the remaining vegetation will be managed and enhanced through a Biodiversity Management Plan.
E5	Native Vegetation	Yes	The majority of the Subject Property is mapped as 'Native Vegetation' on the Warringah DCP Native Vegetation Map.	The proponent has designed the development to retain native vegetation including 130 trees within the Subject Property in accordance with Arborist controls (Urban Arbor 2023). Currently there is approximately 604 hectares of native vegetation within the 1500m locality of the Subject Property. The proposed development will only remove 0.35 ha of native vegetation which represents approximately 0.05% of the total native vegetation within 1500m of the Subject Land. Therefore, the area to be removed does not represent a significant area of native vegetation loss in the locality. The proponent must also demonstrate how the remaining vegetation will be managed and enhanced through a Biodiversity Management Plan.
E6	Retaining Unique Environmental Features	Yes	The Subject Property is located within the Warringah sector of the Northern Beaches Council.	The development is designed to retain 130 trees in the remnant Duffys Forest EEC at the rear of the Subject Property. This bushland is connected to adjoining Duffys Forest EEC along Mona Vale Road. Further to this, proposed landscaping incorporates locally indigenous species belonging to Duffys Forest EEC.
E7	Development on land adjoining public open space	No	The Subject Property is not mapped on the 'Land Adjoining Public Open Space' Warringah DCP Map.	No action required.
E8	Waterways and Riparian Lands	No	The Subject Property is not mapped on the 'Waterways and Riparian Lands' Warringah DCP Map.	No action required.
E9	Coastal Hazard	No	The Subject Property is not mapped on the Warringah LEP Coastline Hazard Map.	No action required.
E10	Landslip Risk	Yes	The Subject Property is mapped on the Warringah LEP Landslip Risk Map. The majority is identified as 'Area A – Slope less than 5 degrees' with the southern edge identified as 'Area B – Flanking Slopes from 5 to 25 degrees'.	The proponent must consider this control when planning the proposed development.
E11	Flood Prone Land	No	The Subject Property is not mapped as 'Flood Prone Land'.	No action required.

12.3 Commonwealth Environment Protection and Biodiversity Conservation Act 1999

No Matters of National Environmental Significance were found to occur within the Subject Land.

Commonwealth listed threatened species that are MNES have potential to occur in the Subject Land on occasion. This includes, nomadic nectivorous flying-foxes and birds such as Grey-headed Flying-fox (*Pteropus poliocephalus*) and Swift Parrot (*Lathamus discolor*) that may forage within the Subject Land on occasion, though are unlikely to rely heavily upon the vegetation within the Subject Land owing to its small overall area in a disturbed industrialised locality.

No Matters of National Environmental Significance are likely to be significantly impacted by the proposed development. No referral to the Commonwealth is recommended for the proposed development.

12.4 State Environmental Planning Policy (Biodiversity and Conservation)

12.4.1 Chapter 2: Vegetation in Non-Rural Areas

All clearing of vegetation (native and non-native) including dying or dead vegetation that is required as habitat of native animals requires a permit granted by the local council (Northern Beaches Council).

12.4.2 Chapter 4: Koala Habitat Protection

The Subject Land is located within a Local Government Area listed in Schedule 1 of the Chapter 4: Koala Habitat Protection. Six species of 'Koala Use Tree Species' (OEH 2018c) listed in Schedule 2 were identified within the Subject Land with documented koala use in the Central Coast Koala Management Area (**Table 46**). A review of NSW Wildlife Atlas data (BioNet) (NSW DPE 2023b) revealed 20 koala records in the 10km locality, including a record from 2020 at Narabang Way Belrose, approximately 190m south-east of the Subject Land. The Subject Land is not considered 'core koala habitat'. While suitable koala use trees are present, the Subject Land is within an industrial area with no koalas recorded present in the last 18 years.

Table 46. Koala use tree species within the Subject Land

Species	Documented Koala Use in the Central Coast Koala Management Area
Eucalyptus sieberi	High use
Corymbia gummifera	Significant use
Eucalyptus capitellata	Irregular use
Banksia serrata	No sourced evidence of use
Angophora costata	Low use
Eucalyptus haemastoma	Low use
Allocasuarina littoralis	Low use

12.5 State Environmental Planning Policy (Resilience and Hazards) 2021

The R&H SEPP applies to land within the 'Coastal Environment Area' and aims to promote an integrated and co-ordinated approach to land use planning in the coastal zone in a manner consistent with the objectives of the *Coastal Management Act 2016*.

The Subject Land is not located within the mapped 'Coastal Environment Area' and within the mapped 'Coastal Use Area' therefore the DA does not need to address the provisions of this SEPP.

The Subject Land is not located within any mapped Littoral Rainforest, Coastal Wetlands or mapped areas in proximity to such.

12.6 Fisheries Management Act 1994

The Subject Land contains no mapped 'Key Fish Habitat' (KFH). A tributary of Ku-ring-gai Creek is mapped as KFH, occurring approximately 1.7km north-west of the Subject Land (DPI 2023). This watercourse will not be impacted by the proposed development.

13. References

AT&L (2023) 4 Minna Close Belrose NSW 2085 - Stormwater Plans

Australian Bureau of Meteorology (BOM) (2023) Terrey Hills Daily Weather Observations http://www.bom.gov.au/climate/dwo/IDCJDW2154.latest.shtml [accessed 13/9/2023]

Australian Standard 4970 (2009) Protection of Trees on Development Sites

Balance! Environmental (2022) Microbat Call Identification Report – 4 Minna Close, Belrose, NSW

Ben Kaye Garden Design (2023) Landscape Plan. Drawn by BK. Issue 02. Revision C. Date May 2023.

Bureau SRH (2023) Development Plans. Industrial Development. 4 Minna Close, Belrose NSW 2085. Project No. 21108. DA000. Revision 02. Date 10/05/2023.

Bushfire Consultancy Australia (2023) Bushfire Risk Assessment – 4 Minna Close, Belrose, NSW

Chruchill, S. (1998) Australian Bats, Reed New Holland, Sydney.

Commonwealth of Australia (2010a) Survey guidelines for Australia's threatened birds. Guidelines for detecting birds listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999

Commonwealth of Australia (2010b) Survey guidelines for Australia's threatened bats. Guidelines for detecting bats listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999

Commonwealth of Australia (2010c) Survey guidelines for Australia's threatened frogs. Guidelines for detecting frogs listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999

Commonwealth of Australia (2013) Survey guidelines for Australia's threatened orchids. Guidelines for detecting orchids listed as 'threatened' under the Environment Protection and Biodiversity Conservation Act 1999

Commonwealth of Australia (2011) Survey guidelines for Australia's threatened mammals. Guidelines for detecting mammals listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999

Google (2023) Google Earth Pro. Satellite Imagery [accessed 15/9/2023]

Landcom (2004) Managing Urban Stormwater: Soils and Construction 'The Blue Book', Volume 1, Fourth Edition, New South Wales Government, ISBN 0-9752030-3-7

Martens Consulting Services (2022) Geotechnical Assessment – 4 Minna Close, Belrose NSW

Mitchell, P.B. (2002) NSW Ecosystems Study: Background and Methodology

National Parks and Wildlife Service (NPWS) (2004) Duffys Forest Ecological Community ENDANGERED ECOLOGICAL COMMUNITY INFORMATION.

Northern Beaches Council (2023) Planning Maps https://eservices.northernbeaches.nsw.gov.au/ePlanning/live/Public/xc.plan/PlanningMapsEsri.aspx?cid=&a=&l=60Z [accessed 21/09/2023]

NSW Department of Environment and Conservation (DEC) (2004) Threatened Species Survey and Assessment: Guidelines for developments and activities (working draft), Department of Environmental Conservation, New South Wales Department of Environment and Conservation, Hurstville, NSW.

NSW Department of Environment & Conservation (DEC) (2007) Threatened Species Assessment Guidelines: The Assessment of Significance. Department of Environment and Climate Change NSW.

NSW Department of Primary Industries (DPI) (2023) Key Fish Habitat maps https://www.dpi.nsw.gov.au/fishing/habitat/publications/pubs/key-fish-habitat-maps [accessed 08/09/2023]

NSW Department of Planning Industry and Environment (DPIE) (2019) Guidance to assist a decisionmaker to determine a serious and irreversible impact

NSW Department of Planning Industry and Environment (DPIE) (2020a) Biodiversity Assessment Method. Published October 2020.

NSW Department of Planning Industry and Environment (DPIE) (2020b) Surveying threatened plants and their habitats – NSW survey guide for the Biodiversity Assessment Method

NSW Department of Customer Service (NSW DCS) (2020a) Planning Portal ePlanning Spatial Viewer https://www.planningportal.nsw.gov.au/ [accessed 15/9/2023]

NSW Department of Planning and Environment (2022a) NSW State Vegetation Type Map https://datasets.seed.nsw.gov.au/dataset/nsw-state-vegetation-type-map [accessed 13/9/2023]

NSW Department of Planning and Environment (2022b) BioNet Plant Community Type data https://www.environment.nsw.gov.au/research-and-publications/publications-search/bionet-plant-community-type-data [accessed 13/9/23]

NSW Department of Planning and Environment (DPE) (2023a) eSpade Web App https://www.environment.nsw.gov.au/eSpade2Webapp/# [accessed 13/9/2023]

NSW Department of Planning Environment (DPE) (2023b) NSW BioNet. The website of the Atlas of NSW Wildlife. Office of Environment and Heritage. http://www.bionet.nsw.gov.au/ [accessed 15/09/2023]

NSW Department of Planning Environment (DPE) (2023c) Transitional native vegetation regulatory map viewer https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=NVRMap [accessed 15/9/2023]

NSW Department of Planning Environment (DPE) (2023d) Biodiversity Values Map [accessed 28/9/23]

NSW Government Spatial Services (2023) Six Maps https://maps.six.nsw.gov.au/clipnship.html

NSW Government (2021) State Environmental Planning Policy (Biodiversity and Conservation) 2021 (https://legislation.nsw.gov.au/view/pdf/asmade/epi-2021-722#:~:text=This%20Policy%20is%20State%20Environmental,(Biodiversity%20and%20Conservation)%202021.&text=This%20Policy%20commences%20on%201,on%20the%20NSW%20legislation%20website.&text=In%20this%20Policy%E2%80%94%20the%20Act,Planning%20and%20Assessment%20Act%201979.) [accessed 11/05/2021]

NSW Office of Environment & Heritage (OEH) (2016a) NSW (Mitchell) Landscapes - version 3.1 Office of Environment and Heritage.

NSW Office of Environment & Heritage (OEH) (2016b). NSW Guide to Surveying Threatened Plants. Office of Environment and Heritage.

NSW Office of Environment & Heritage (OEH) (2017a) Guidance to assist a decision-maker to determine a serious and irreversible impact. Office of Environment and Heritage. http://www.environment.nsw.gov.au/resources/bcact/guidance-decision-makers-determine-serious-irreversible-impact-170204.pdf [accessed 09/05/2023]

NSW Office of Environment & Heritage (OEH) (2017b) Biodiversity Assessment Method (BAM) Calculator User guide

NSW Office of Environment & Heritage (OEH) (2017c) Interim Grasslands and other Groundcover Assessment Method Determining conservation value of grasslands and groundcover vegetation in NSW. Published Gazette No 93 of 25 August 2017, page 4559 (2018 No 35).

NSW Office of Environment & Heritage (OEH) (2018a) Biodiversity Assessment Method Operational Manual Stage 1. 30 May 2018

NSW Office of Environment & Heritage (OEH) (2018b) 'Species Credit' threatened bats and their habitats NSW survey guide for the Biodiversity Assessment Method.

NSW Office of Environment & Heritage (OEH) (2018c) A review of koala tree use across New South Wales

NSW Office of Environment & Heritage (OEH) (2023) Biodiversity Assessment Method (BAM) Calculator.

NSW Threatened Species Scientific Committee (TSSC) (2011) Duffys Forest Ecological Community in the Sydney Basin Bioregion - Determination to make a minor amendment to Part 3 of Schedule 1 of the Threatened Species Conservation Act

PlantNET (2020) The NSW Plant Information Network System. Royal Botanic Gardens and Domain Trust, Sydney. http://plantnet.rbgsyd.nsw.gov.au [accessed 08/09/2023]

Robinson, L. (2003) Field Guide to the Native Plants of Sydney, Third Edition, Kangaroo Press

SRH Architecture (2023) Principles of Avoid and Minimise – 4 Minna Close, Belrose

Urban Arbor (2023) Arboricultural Impact Assessment Report Site location: 4 Minna Close Belrose NSW Prepared for: Bureau SRH Prepared by: Bryce Claassens Urban Arbor Pty Ltd Date Prepared: 29 May 2023 Ref: 230529_4 Minna Cl_AIA Rev: 1

14. Appendices

Appendix A. Fauna recorded in Subject Property by Land Eco Consulting

Appendix B. Matters of National Environmental Significance

Appendix C. BAM VIS Field Survey Forms (copied from electronic data sheet)

Appendix D. Biodiversity Credit Reports from Biodiversity Assessment Method Calculator

Appendix E. Demonstration of Avoid and Minimise

Appendix A. Fauna recorded in Subject Property by Land Eco Consulting

Class	Scientific Name	Common Name	BC Act Status
Amphibia	*Litoria fallax*	Eastern Dwarf Tree Frog	Protected
Aves	*Acanthorhynchus tenuirostris*	Eastern Spinebill	Protected
Aves	*Alectura lathami*	Australian Brush-turkey	Protected
Aves	*Alisterus scapularis*	Australian King Parrot	Protected
Aves	*Anthochaera chrysoptera*	Little Wattlebird	Protected
Aves	*Cacatua galerita*	Sulphur-crested Cockatoo	Protected
Aves	*Corvus coronoides*	Australian Raven	Protected
Aves	*Dacelo novaeguineae*	Laughing Kookaburra	Protected
Aves	*Grallina cyanoleuca*	Magpie-lark	Protected
Aves	*Gymnorhina tibicen*	Australian Magpie	Protected
Aves	*Manorina melanocephala*	Noisy Miner	Protected
Aves	*Pardalotus punctatus*	Spotted Pardalote	Protected
Aves	*Phylidonyris niger*	White-cheeked Honeyeater	Protected
Aves	*Podargus strigoides*	Tawny Frogmouth	Protected
Aves	*Trichoglossus moluccanus*	Rainbow Lorikeet	Protected
Aves	*Vanellus miles*	Masked Lapwing	Protected
Mammalia	*Acrobates pygmaeus*	Feathertail Glider	Protected
Mammalia	*Chalinolobus gouldii*	Gould's Wattled Bat	Protected
Mammalia	*Chalinolobus morio*	Chocolate Wattled Bat	Protected
Mammalia	*Miniopterus orianae oceanensis*	Large Bent-winged Bat	Protected
Mammalia	*Nyctophilus sp.*	Long-eared Bat	Protected
Mammalia	*Ozimops ridei*	Ride's Free-tailed Bat	Protected
Mammalia	*Petaurus breviceps*	Sugar Glider	Protected
Mammalia	*Trichosurus vulpeca*	Brush-tailed Possum	Protected
Mammalia	*Wallabia bicolor*	Swamp Wallaby	Protected
Reptilia	*Eulamprus quoyii*	Eastern Water Skink	Protected
Reptilia	*Lampropholis delicata*	Rainbow Skink	Protected
Reptilia	*Lampropholis guichenoti*	Common Garden Skink	Protected

Appendix B. Matters of national environmental significance

No matters of national environmental significance were identified on the Subject Land.

Appendix C. BAM VIS Field Survey Forms (copied from electronic data sheet)

BAM Site - Field Survey Form

Date:	26.9.2023	**Plot ID:**	1	**Photo #:**		Counts apply when the **number of tree stems** within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a **multi-stemmed tree**, only the largest living stem is included in the count/estimate. **Tree stems must be living.**
Zone:	56H	**Plot Dimensions:**	Irregular	**Easting:**	33.703372	
Datum:	GDA94	**Middle Bearing (o) at 0m:**	158	**Northing:**	151.208056	
PCT:	Duffys Forest	**Condition Class**	Remnant	**Ecologists:**	Kurtis and Serene	
Belrose 4 Minna						

Growth Form	Scientific Name	Cover	Abundance	DBH	# Tree Stems Count	Number of Hollow-bearing Trees
Tree (TG)	Eucalyptus capitellata	12	N/A	**80+cm**	0	
Tree (TG)	Eucalyptus sieberi	6	N/A	**50-79cm**	5	3
Tree (TG)	Corymbia gummifera	25	N/A	**30-49cm**	29	2
Tree (TG)	Eucalyptus haemastoma	5	6	**20-29cm**	38	2
Tree (TG)	Angophora costata	1	1	**10-19cm**	42	1
Tree (TG)	Banksia serrata	8	N/A	**5-9cm**	22	
Shrub (SG)	Banksia ericifolia	5		**<5cm**	27	
Shrub (SG)	Banksia spinulosa	6	20			For **hollows**, count only the presence of a stem containing hollows. For a **multi-stemmed tree**, only the largest stem is included in the count/estimate. **Stems may be dead and may be shrubs.**
Shrub (SG)	Persoonia levis	5		**Length of Logs (m)**	13.5	
Shrub (SG)	Persoonia laurina	0.5	6	(≥10 cm diameter, >50 cm in length)		
Shrub (SG)	Hakea dactyloides	1	10			
Shrub (SG)	Hakea teretifolia	6	N/A	**BAM Attribute (1 x 1m plots)**	**Litter Cover (%)**	
Shrub (SG)	Persoonia lanceolata	2	1	**1**	70	
Shrub (SG)	Banksia oblongifolia	0.5	2	**2**	40	
Shrub (SG)	Lambertia formosa	6	N/A	**3**	70	
Tree (TG)	Ceratopetalum gummiferum	0.1	2	**4**	50	
Shrub (SG)	Leptospermum polygalifolium	1	3	**5**	80	
Shrub (SG)	Boronia pinnata	6	N/A	**Average (#no./5)**	**62**	
Shrub (SG)	Elaeocarpus reticulatus	1	5			
Shrub (SG)	Pultenaea rosmarinifolia	2	15	Litter cover is assessed as the average percentage ground cover of litter recorded from five 1m x 1m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.		
Shrub (SG)	Hibbertia empetrifolia subsp. empetrifolia	12	N/A			
Shrub (SG)	Hibbertia aspera	0.2	10			
Shrub (SG)	Hibbertia bracteata	2	20			
Shrub (SG)	Acacia ulicifolia	1	6			
Shrub (SG)	Micrantheum ericoides	3	200	**Growth Form**	**Composition Data**	**Structure Data**
Forb (FG)	Burchardia umbellata	0.1	20	**Tree**	**9**	**57.2**
Shrub (SG)	Grevillea linearifolia	1	15	**Shrub**	**35**	**61.6**
Fern (EG)	Pteridium esculentum	2	100	**Grass**	**11**	**29.2**
Shrub (SG)	Lomatia silaifolia	0.2	30	**Forb**	**10**	**3.7**
Shrub (SG)	Platysace linearifolia	0.2	10	**Fern**	**2**	**2.2**
Grass & grasslike (GG)	Lepyrodia scariosa	5		**Other**	**5**	**5.6**
Shrub (SG)	Telopea speciosissima	0.1	2	**H.T.E**	**0**	**0**
Grass & grasslike (GG)	Lepidosperma laterale	0.5	100	**Cover:** 0.1, 0.2, 0.3, ... 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m		
Grass & grasslike (GG)	Entolasia stricta	12	N/A			
Other (OG)	Cassytha pubescens	0.2	100			
Grass & grasslike (GG)	Entolasia marginata	1	50	**Abundance:** 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...		
Grass & grasslike (GG)	Austrostipa puberula	10				
Fern (EG)	Lindsaea linearis	0.2	100			
Shrub (SG)	Phyllanthus hirtellus	0.2	100			
Grass & grasslike (GG)	Lomandra obliqua	0.1	30			
Other (OG)	Xanthorrhoea media	5				
Forb (FG)	Dianella caerulea var. producta	0.5	30			
Forb (FG)	Patersonia glabrata	1.2	60			
Shrub (SG)	Comesperma ericinum	0.1	2			
Forb (FG)	Patersonia sericea	1	50			
Shrub (SG)	Leptospermum juniperinum	0.2	6			
Forb (FG)	Hybanthus monopetalus	0.2	10			
Grass & grasslike (GG)	Themeda avenacea	0.1	2			
Forb (FG)	Cryptostylis erecta	0.2	30			
Forb (FG)	Cryptostylis subulata	0.1	2			
Shrub (SG)	Lasiopetalum ferrugineum	0.2	5			
Shrub (SG)	Pittosporum undulatum	0.1	2			
Forb (FG)	Hovea linearis	0.1	1			
Other (OG)	Billardiera scandens	0.2	20			
Grass & grasslike (GG)	Lomandra cylindrica	0.1	1			
Shrub (SG)	Hakea sericea	0.2	3			
Forb (FG)	Gonocarpus teucrioides	0.2	20			
Shrub (SG)	Leucopogon amplexicaulis	0.1	5			
Forb (FG)	Dampiera stricta	0.1	10			
Shrub (SG)	Acacia myrtifolia	0.1	4			
Other (OG)	Smilax glyciphylla	0.1	3			
Shrub (SG)	Conospermum longifolium	0.1	1			
Grass & grasslike (GG)	Lomandra gracilis	0.1	1			
Grass & grasslike (GG)	Empodisma minus	0.2	30			
Shrub (SG)	Bossiaea heterophylla	0.1	1			
Shrub (SG)	Pimelea linifolia	0.1	1			
Shrub (SG)	Tetratheca thymifolia	0.1	2			
Shrub (SG)	Bossiaea obcordata	0.3	6			
Grass & grasslike (GG)	Lomandra brevis	0.1	3			
Tree (TG)	Allocasuarina littoralis	0.1	1			
Other (OG)	Livistona australis	0.1	1			

Appendix D. Biodiversity Credit Reports from Biodiversity Assessment Method Calculator

BAM Credit Summary Report

Proposal Details

Assessment Id 00031207/BAAS18059/22/00031208	Proposal Name 4 Minna Cl Belrose	BAM data last updated * 22/06/2023
Assessor Name Kurtis Lindsay	Report Created 17/11/2023	BAM Data version * 61
Assessor Number BAAS18059	BAM Case Status Finalised	Date Finalised 17/11/2023
Assessment Revision 0	Assessment Type Part 4 Developments (Small Area)	BOS entry trigger BOS Threshold: Biodiversity Values Map and area clearing threshold

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

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

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

Sydney Coastal Sandstone Bloodwood Shrub Forest												
1	3593_Remnant	Duffys Forest Ecological Community in the Sydney Basin Bioregion	94	94.0	0.34	Rate of decline	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00	True	16
2	3593_Canopy_Overhang	Duffys Forest Ecological Community in the Sydney Basin Bioregion	26.5	26.5	0.01	Rate of decline	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00	True	1
											Subtotal	**17**
											Total	**17**

Species credits for threatened species

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

BAM Candidate Species Report

Proposal Details

Assessment Id 00031207/BAAS18059/22/00031208	Proposal Name 4 Minna Cl Belrose	BAM data last updated * 22/06/2023
Assessor Name Kurtis Lindsay	Report Created 17/11/2023	BAM Data version * 61
Assessor Number BAAS18059	Assessment Type Part 4 Developments (Small Area)	BAM Case Status Finalised
Assessment Revision 0	Date Finalised 17/11/2023	BOS entry trigger BOS Threshold: Biodiversity Values Map and area clearing threshold

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List of Species Requiring Survey

Name	Presence	Survey Months
Astrotricha crassifolia Thick-leaf Star-hair	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☑ Aug ☑ Sep ☑ Oct ☑ Nov ☑ Dec ☐ Survey month outside the specified months?
Chalinolobus dwyeri Large-eared Pied Bat	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☑ Nov ☑ Dec ☐ Survey month outside the specified months?

Deyeuxia appressa Deyeuxia appressa	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Diuris bracteata Diuris bracteata	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Genoplesium baueri Bauer's Midge Orchid	No (surveyed)	☐ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Grevillea caleyi Caley's Grevillea	No (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☑ Nov ☑ Dec ☐ Survey month outside the specified months?
Melaleuca deanei Deane's Paperbark	No (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☑ Nov ☑ Dec ☐ Survey month outside the specified months?
Microtis angusii Angus's Onion Orchid	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Persoonia hirsuta Hairy Geebung	No (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☑ Nov ☑ Dec ☐ Survey month outside the specified months?
Prostanthera marifolia Seaforth Mintbush	No (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☑ Nov ☑ Dec ☐ Survey month outside the specified months?
Rhizanthella slateri Eastern Australian Underground Orchid	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Rhodamnia rubescens Scrub Turpentine	No (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☑ Nov ☑ Dec ☐ Survey month outside the specified months?
Rhodomyrtus psidioides Native Guava	No (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☑ Nov ☑ Dec ☐ Survey month outside the specified months?
Tyto tenebricosa Sooty Owl	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

BAM Candidate Species Report

Vespadelus troughtoni Eastern Cave Bat	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Threatened species Manually Added

Common Name	Scientific Name
Deyeuxia appressa	Deyeuxia appressa
Diuris bracteata	Diuris bracteata
Beach Stone-curlew	Esacus magnirostris
Regent Honeyeater	Anthochaera phrygia
Wallangarra White Gum	Eucalyptus scoparia

Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
Beach Stone-curlew	Esacus magnirostris	Refer to BAR
Broad-headed Snake	Hoplocephalus bungaroides	Habitat constraints
Darwinia peduncularis	Darwinia peduncularis	Habitat constraints
Haloragodendron lucasii	Haloragodendron lucasii	Habitat constraints Geographic limitations
Large Bent-winged Bat	Miniopterus orianae oceanensis	Habitat constraints
Little Bent-winged Bat	Miniopterus australis	Habitat constraints
Regent Honeyeater	Anthochaera phrygia	Habitat constraints
Swift Parrot	Lathamus discolor	Habitat constraints
Wallangarra White Gum	Eucalyptus scoparia	Species is vagrant Habitat constraints

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00031207/BAAS18059/22/00031208	4 Minna Cl Belrose	22/06/2023
Assessor Name	Report Created	BAM Data version *
Kurtis Lindsay	17/11/2023	61
Assessor Number	Assessment Type	BAM Case Status
BAAS18059	Part 4 Developments (Small Area)	Finalised
Assessment Revision	BOS entry trigger	Date Finalised
0	BOS Threshold: Biodiversity Values Map and area clearing threshold	17/11/2023

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

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

Common Name	Scientific Name	Vegetation Types(s)
Barking Owl	Ninox connivens	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest
Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest
Broad-headed Snake	Hoplocephalus bungaroides	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest
Dusky Woodswallow	Artamus cyanopterus cyanopterus	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest
Eastern Coastal Free-tailed Bat	Micronomus norfolkensis	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest
Eastern False Pipistrelle	Falsistrellus tasmaniensis	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest
Eastern Osprey	Pandion cristatus	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest
Flame Robin	Petroica phoenicea	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest
Gang-gang Cockatoo	Callocephalon fimbriatum	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest

Glossy Black-Cockatoo	Calyptorhynchus lathami	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest
Golden-tipped Bat	Phoniscus papuensis	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest
Greater Broad-nosed Bat	Scoteanax rueppellii	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest
Grey-headed Flying-fox	Pteropus poliocephalus	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest
Large Bent-winged Bat	Miniopterus orianae oceanensis	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest
Little Bent-winged Bat	Miniopterus australis	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest
Little Eagle	Hieraaetus morphnoides	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest
Little Lorikeet	Glossopsitta pusilla	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest
Masked Owl	Tyto novaehollandiae	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest
New Holland Mouse	Pseudomys novaehollandiae	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest
Powerful Owl	Ninox strenua	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest
Regent Honeyeater	Anthochaera phrygia	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest
Rose-crowned Fruit-Dove	Ptilinopus regina	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest
Rosenberg's Goanna	Varanus rosenbergi	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest
Scarlet Robin	Petroica boodang	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest
Sooty Owl	Tyto tenebricosa	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest
Spotted-tailed Quoll	Dasyurus maculatus	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest
Square-tailed Kite	Lophoictinia isura	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest
Superb Fruit-Dove	Ptilinopus superbus	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest
Swift Parrot	Lathamus discolor	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest
Turquoise Parrot	Neophema pulchella	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest
Varied Sittella	Daphoenositta chrysoptera	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest
White-bellied Sea-Eagle	Haliaeetus leucogaster	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest
White-throated Needletail	Hirundapus caudacutus	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest

BAM Predicted Species Report

Threatened species Manually Added

Common Name	Scientific Name
Rose-crowned Fruit-Dove	Ptilinopus regina
Regent Honeyeater	Anthochaera phrygia
Beach Stone-curlew	Esacus magnirostris

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

Common Name	Scientific Name	Plant Community Type(s)
Beach Stone-curlew	Esacus magnirostris	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest
Black Bittern	Ixobrychus flavicollis	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest

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

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C
Beach Stone-curlew	Esacus magnirostris	Refer to BAR
Black Bittern	Ixobrychus flavicollis	Habitat constraints

BAM Vegetation Zones Report

Proposal Details

Assessment Id	Assessment name	BAM data last updated *
00031207/BAAS18059/22/00031208	4 Minna Cl Belrose	22/06/2023
Assessor Name	**Report Created**	**BAM Data version ***
Kurtis Lindsay	17/11/2023	61
Assessor Number	**Assessment Type**	**BAM Case Status**
BAAS18059	Part 4 Developments (Small Area)	Finalised
Assessment Revision	**Date Finalised**	**BOS entry trigger**
0	17/11/2023	BOS Threshold: Biodiversity Values Map and area clearing threshold

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Vegetation Zones

#	Name	PCT	Condition	Area	Minimum number of plots	Management zones

1	3593_Remnant	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest	Remnant	0.34	1	
2	3593_Canopy_Overhang	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest	Canopy_Overhang	0.01	1	

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00031207/BAAS18059/22/00031208

Proposal Name
4 Minna Cl Belrose

BAM data last updated *
22/06/2023

Assessor Name
Kurtis Lindsay

Assessor Number
BAAS18059

BAM Data version *
61

Proponent Names
Jack Wu

Report Created
17/11/2023

BAM Case Status
Finalised

Assessment Revision
0

Assessment Type
Part 4 Developments (Small Area)

Date Finalised
17/11/2023

BOS entry trigger
BOS Threshold: Biodiversity Values Map and area clearing threshold

* 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
Duffys Forest Ecological Community in the Sydney Basin Bioregion	Endangered Ecological Community	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest

Species
Nil

BAM Biodiversity Credit Report (Like for like)

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
Ixobrychus flavicollis / Black Bittern
Esacus magnirostris / Beach Stone-curlew

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
3593-Sydney Coastal Sandstone Bloodwood Shrub Forest	Duffys Forest Ecological Community in the Sydney Basin Bioregion	0.4	17	0	17

BAM Biodiversity Credit Report (Like for like)

3593-Sydney Coastal Sandstone Bloodwood Shrub Forest

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
Duffys Forest Ecological Community in the Sydney Basin Bioregion This includes PCT's: 3259, 3593	-	3593_Remnant	Yes	16	Pittwater, Cumberland, Sydney Cataract, Wyong and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Duffys Forest Ecological Community in the Sydney Basin Bioregion This includes PCT's: 3259, 3593	-	3593_Canopy_ Overhang	Yes	1	Pittwater, Cumberland, Sydney Cataract, Wyong and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

No Species Credit Data

Credit Retirement Options

Like-for-like credit retirement options

BAM Biodiversity Credit Report (Like for like)

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id

00031207/BAAS18059/22/00031208

Proposal Name

4 Minna Cl Belrose

BAM data last updated *

22/06/2023

Assessor Name

Kurtis Lindsay

Assessor Number

BAAS18059

BAM Data version *

61

Proponent Name(s)

Jack Wu

Report Created

17/11/2023

BAM Case Status

Finalised

Assessment Revision

0

Assessment Type

Part 4 Developments (Small Area)

Date Finalised

17/11/2023

BOS entry trigger

BOS Threshold: Biodiversity Values Map and area clearing threshold

* 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
Duffys Forest Ecological Community in the Sydney Basin Bioregion	Endangered Ecological Community	3593-Sydney Coastal Sandstone Bloodwood Shrub Forest

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

None added

BAM Biodiversity Credit Report (Variations)

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
Ixobrychus flavicollis / Black Bittern
Esacus magnirostris / Beach Stone-curlew

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
3593-Sydney Coastal Sandstone Bloodwood Shrub Forest	Duffys Forest Ecological Community in the Sydney Basin Bioregion	0.4	17	0	17.00

3593-Sydney Coastal Sandstone Bloodwood Shrub Forest

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Duffys Forest Ecological Community in the Sydney Basin Bioregion This includes PCT's: 3259, 3593	-	3593_Remnant	Yes	16	Pittwater,Cumberland, Sydney Cataract, Wyong and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Duffys Forest Ecological Community in the Sydney Basin Bioregion This includes PCT's: 3259, 3593	-	3593_Canopy_Overhang	Yes	1	Pittwater,Cumberland, Sydney Cataract, Wyong and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 3 or higher threat status	3593_Remnant	Yes (including artificial)	16	IBRA Region: Sydney Basin, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 3 or higher threat status	3593_Canopy_Overhang	Yes (including artificial)	1	IBRA Region: Sydney Basin, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

No Species Credit Data

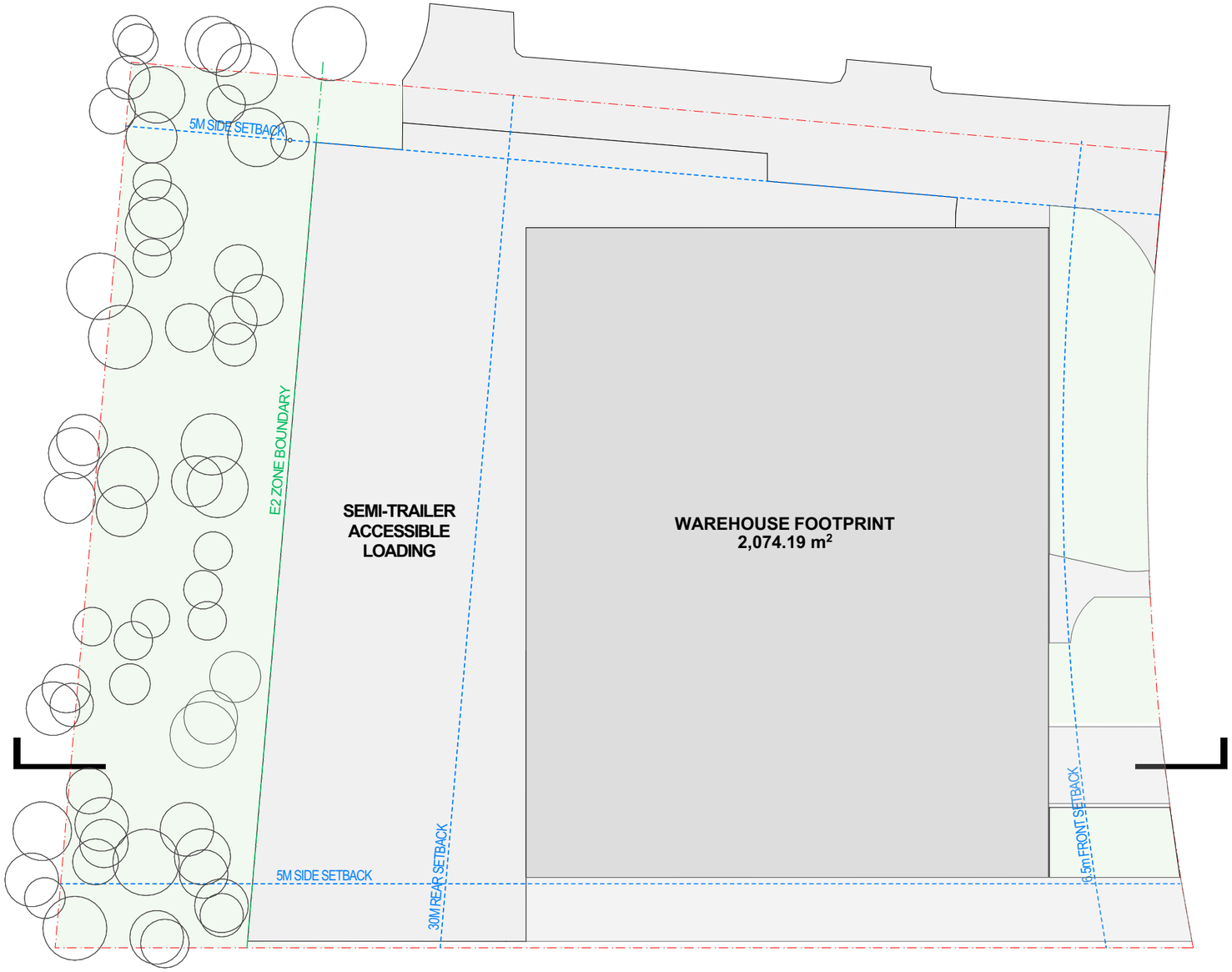
Credit Retirement Options

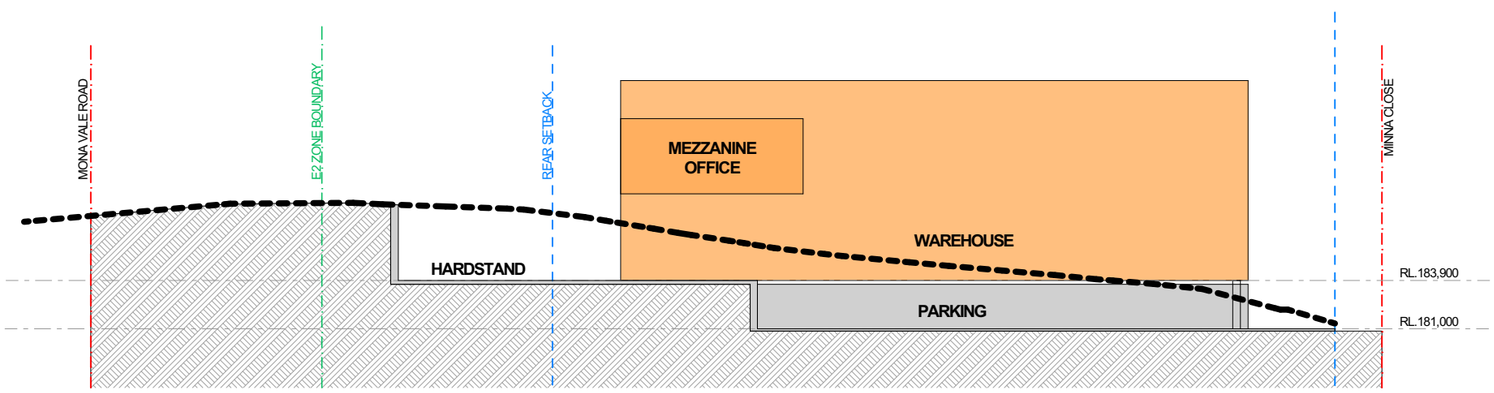
Like-for-like options

Appendix E. Demonstration of Avoid and Minimise

OPTION 1

SITE COVERAGE = 75%



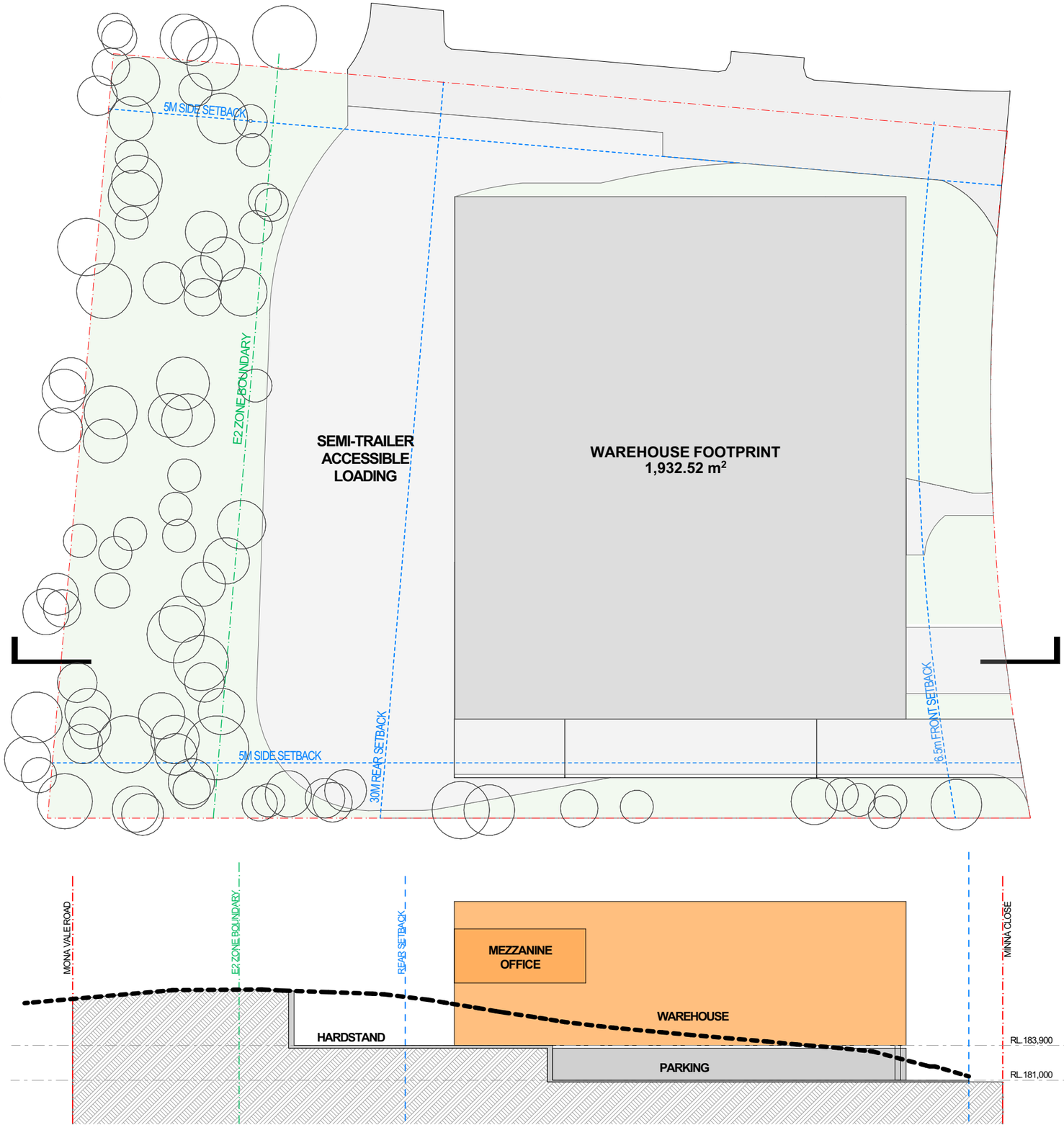


BDAR OPTION 1

WU PROPERTIES

OPTION 2

SITE COVERAGE = 66%

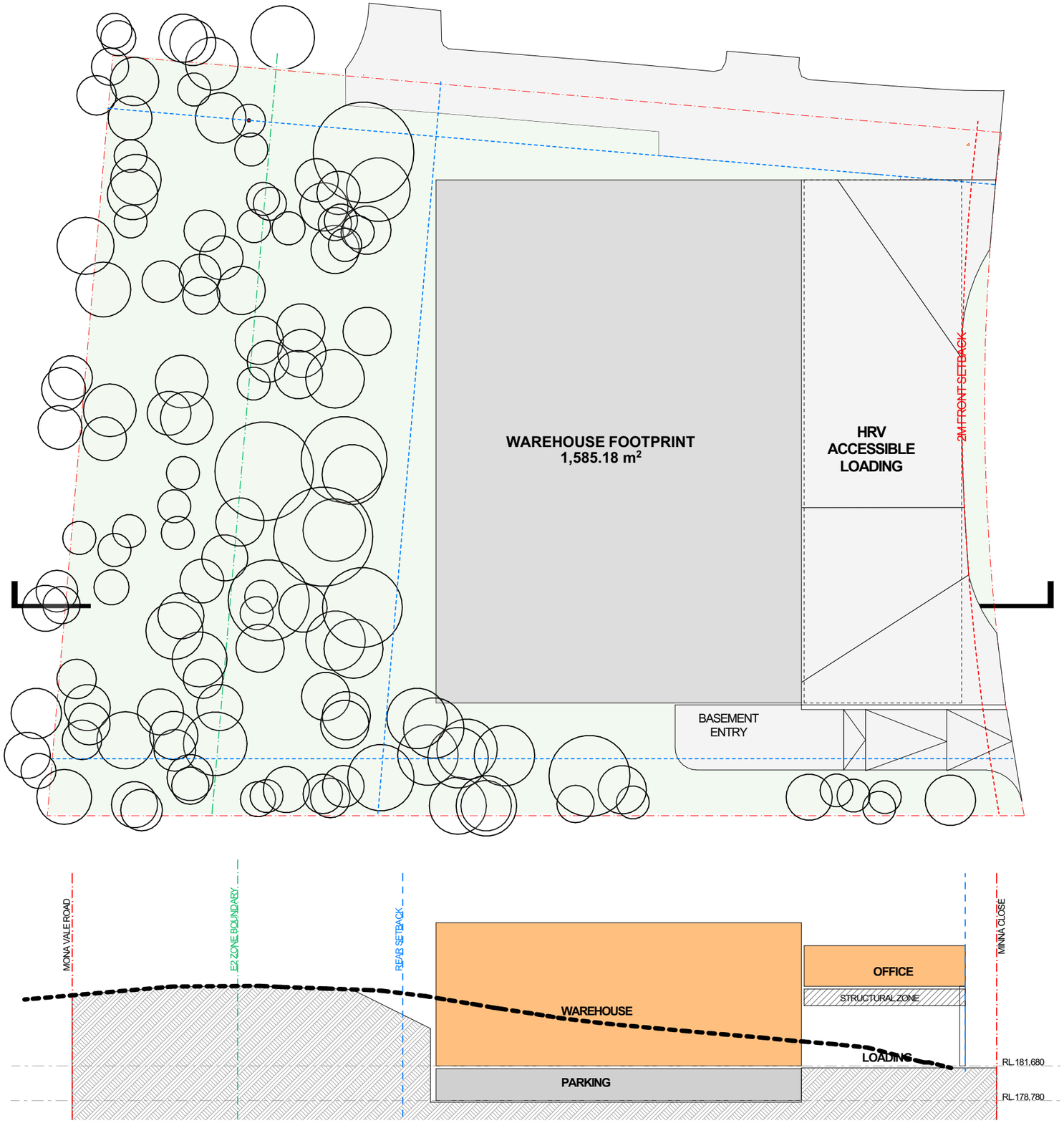


BDAR OPTION 2

WU PROPERTIES

OPTION 3

SITE COVERAGE = 50%



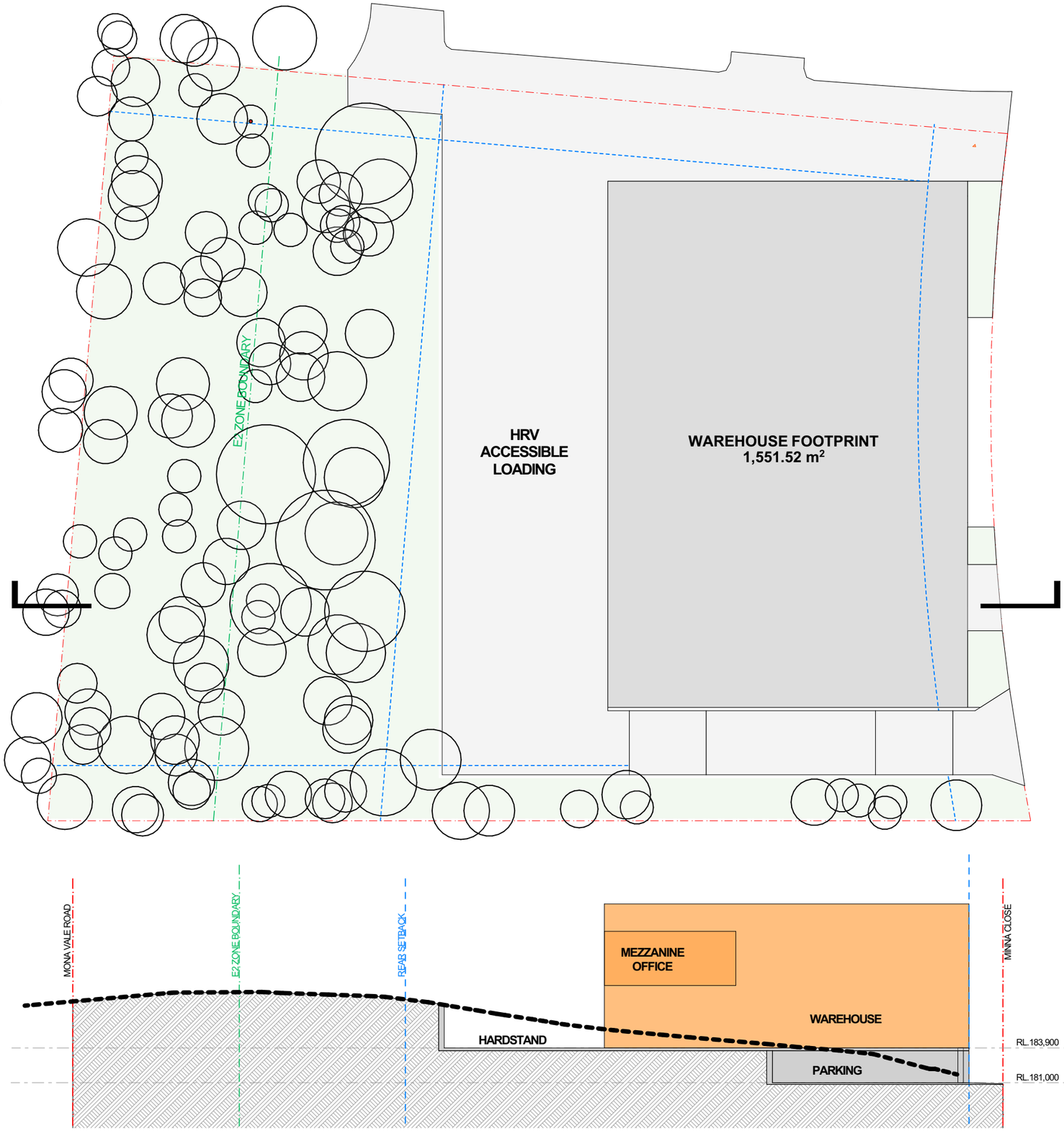
BDAR OPTION 3

WU PROPERTIES

25/09/2023 3:16 PM / omagari / BIMcloud: BUREAUSVR - BIMcloud Basic for ARCHICAD 24/21108_4 MINNA CLOSE/21108_4 Minna Close, Belrose

OPTION 4

SITE COVERAGE = 55%



BDAR OPTION 4 - SUBMISSION

WU PROPERTIES

25/09/2023 5:16 PM / omagari / BIMcloud BUREAUSVR - BIMcloud Basic for ARCHICAD 24/21108_4 MINNA CLOSE/21108_4 Minna Close, Bellrose

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