



**BIODIVERSITY DEVELOPMENT
ASSESSMENT REPORT (BDAR)
FOR
PROPOSED DEVELOPMENT
AT
189 RIVERVIEW ROAD,
AVALON BEACH, NSW, 2107**

PREPARED FOR:

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17th JULY 2021

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GLOSSARY AND ACRONYMS

BAM - Biodiversity Assessment Method (2017) - supports the BC Act (2016).

BC Act - *Biodiversity Conservation Act (2016)* - legislation enacted in August 2017

CEEC - Critically Endangered Ecological Community

DAWE - Commonwealth Department of Agriculture, Water and Environment

DPI - Department of Primary Industries

DPIE - Department of Planning, Industry and Environment

E (threatened species status) - Endangered species

EEC - Endangered Ecological Community as listed by the BC Act and EPBC Act

EPBC Act - Environmental Protection & Biodiversity Conservation Act (1999). Enacted to protect and manage nationally and internationally (migratory) flora, fauna and ecological communities, defined in the Act as matters of national environmental significance (NES)

Habitat - areas occupied, either territorially, periodically or occasionally, by a species, population or ecological community

KTP - Key threatening process, a process that threatens the survival, life cycle, abundance or potential evolutionary development of native species, populations or ecological communities (Dept of Environment and Conservation 2004). KTP's are listed under the BC Act and the EPBC Act.

Migratory species - listed under the EPBC Act and relating to international agreements to which Australia is a signatory. Includes the Japan-Australia Migratory Bird Agreement (JAMBA), China-Australia Migratory Bird Agreement (CAMBA) Republic of Korea Migratory Bird Agreement (ROKAMBA)

OEH - State Office of Environment and Heritage

PCT - Plant Community Type identified as such using the Bionet Vegetation Classification system (OEH 2018)

RoTAP - Rare or Threatened Australian Plants

Threatened species, populations or ecological communities - Entities listed by the BC Act and EPBC Act as 'Vulnerable to decreasing population growth in time', Endangered as population growth decreasing rapidly leading to eventual extinction' or 'Critically Endangered, a more extreme rate of population decrease than the former'.

TPZ - Tree Protection Zone

V (threatened species status) - Vulnerable

1 INTRODUCTION

1.1 Proposed development

In July 2021, ACS Environmental was commissioned by Mr Amandio Castenheira of Alchemy Architects Pty Ltd on behalf of Mr Jamie Durie to survey for flora and fauna and undertake a biodiversity development assessment for proposed development of land in Lot C DP381427 at 189 Riverview Road, Avalon Beach.

The total site area of the subject land is 929.5m² (Alchemy Architects 2021).

See Figures 1 & 2A - 2C for location and aerial maps showing property boundaries.

The proposal is to demolish the current dwelling and construct a new residence at the subject land (Figure 3A).

The proposal would effectively develop the land from the front setback some 4.23m from Riverview Road to the Foreshore Building Line (Figure 3A).

Figure 3B indicates the location of canopy trees at the subject site and neighbouring properties (Botanics Tree Wise People 2021)

The subject land appeared as follows:

1. The front yard which currently extends some 25m from the road to the dwelling retains native canopy trees including Spotted Gum and to less extent Broad-leaved White Mahogany, Grey Gum and Forest Oak (Figures 2C, 4 & 5). The low shrub cover includes some native small tree species, and some planted non-locally occurring native species and some ornamental species. The ground cover is present with few native species but with a high cover of High Threat Weeds (HTW) such as Balloon Vine, Ground Asparagus, Ribbon Plant, Asthma Weed, Jasmine and Wandering Jew (Figures 4 & 5) (DPIE 2021).

Similarly the rear yard below the dwelling and extending some 15m to the Foreshore Building Line, retains 3 native canopy trees including individuals of Spotted Gum, Grey Ironbark and Forest Oak (Figure 6). The land is steeply terraced to cliffed in this section of the property with ground cover including landscaped ornamental species and weeds (Figure 6).

This vegetation has been mapped by DPIE (2021) and confirmed as an area of Pittwater and Wagstaffe Spotted Gum Forest (PCT 1214), an Endangered Ecological Community listed on registers of the BC Act (2106) (DPIE 2021).

This community is described as a forest having a distinct association with Narrabeen sediments exposed on rises, escarpments and foreshore footslopes throughout the northern Pittwater LGA and Wagstaff peninsula in the Gosford LGA (OEH 2016). The forest includes tall trees of Spotted Gum (*Corymbia maculata*), Grey Ironbark (*Eucalyptus paniculata*) and Broad-leaved White Mahogany (*Eucalyptus umbra*). At the lower heights of the eucalypt stratum an open cover of Forest Oak (*Allocasuarina torulosa*) is common (OEH 2016). This community spans a number of aspects and topographic positions but is rarely found above 100 metres above sea level (A.S.L) (OEH 2016).

2. Below the Foreshore Building Line, the terraced sections of the land contain retained canopy trees including a semi-mature individual of Grey Ironbark and 6 individuals of Spotted Gum (Figure 6). The ground and shrub covers have been landscaped with mainly non-locally occurring native species and ornamentals (Figure 6).

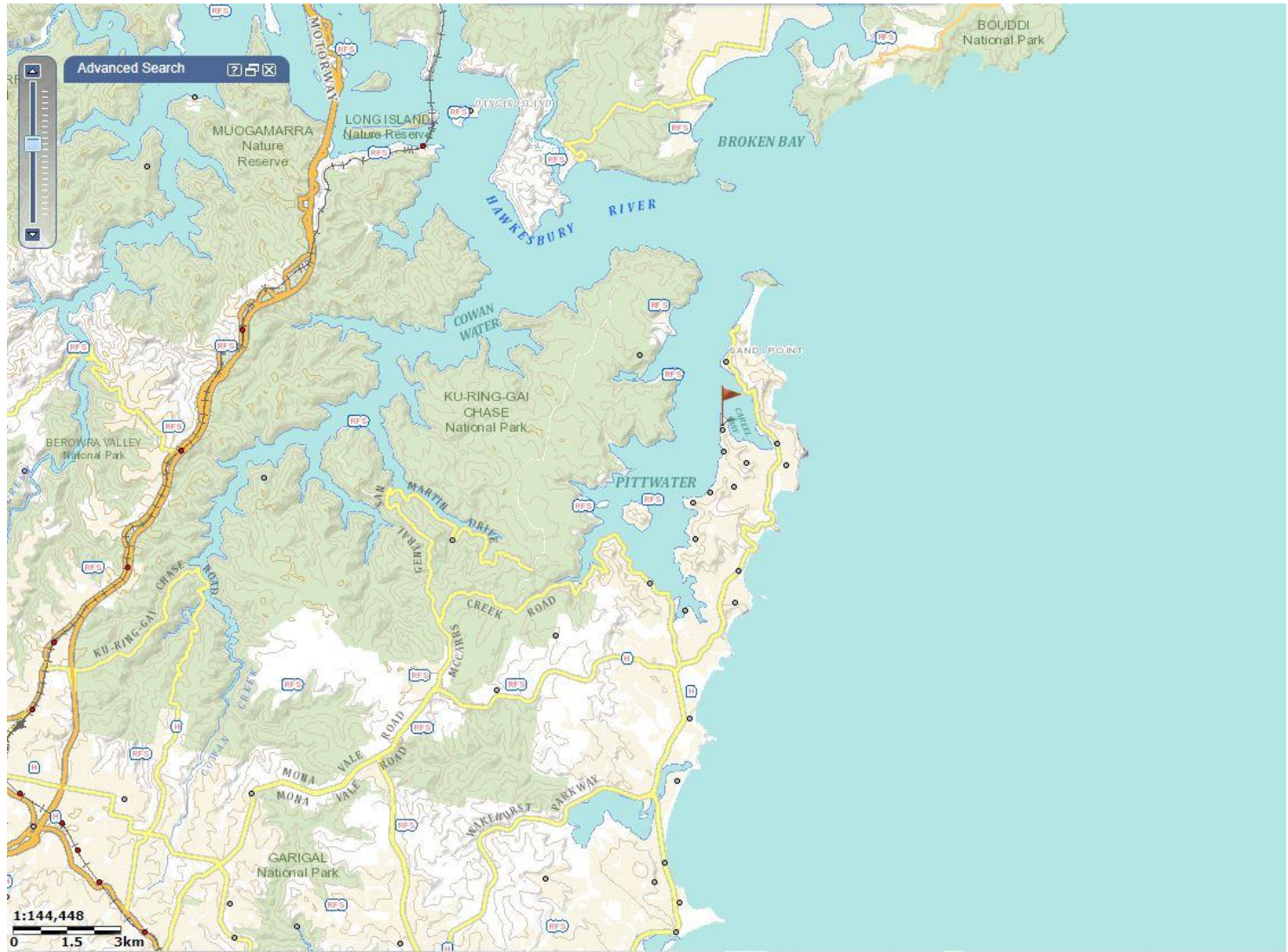


Figure 1 - Location of 189 Riverview Road, Avalon Beach within the greater Sydney region (red flag) (SixMaps 2021)

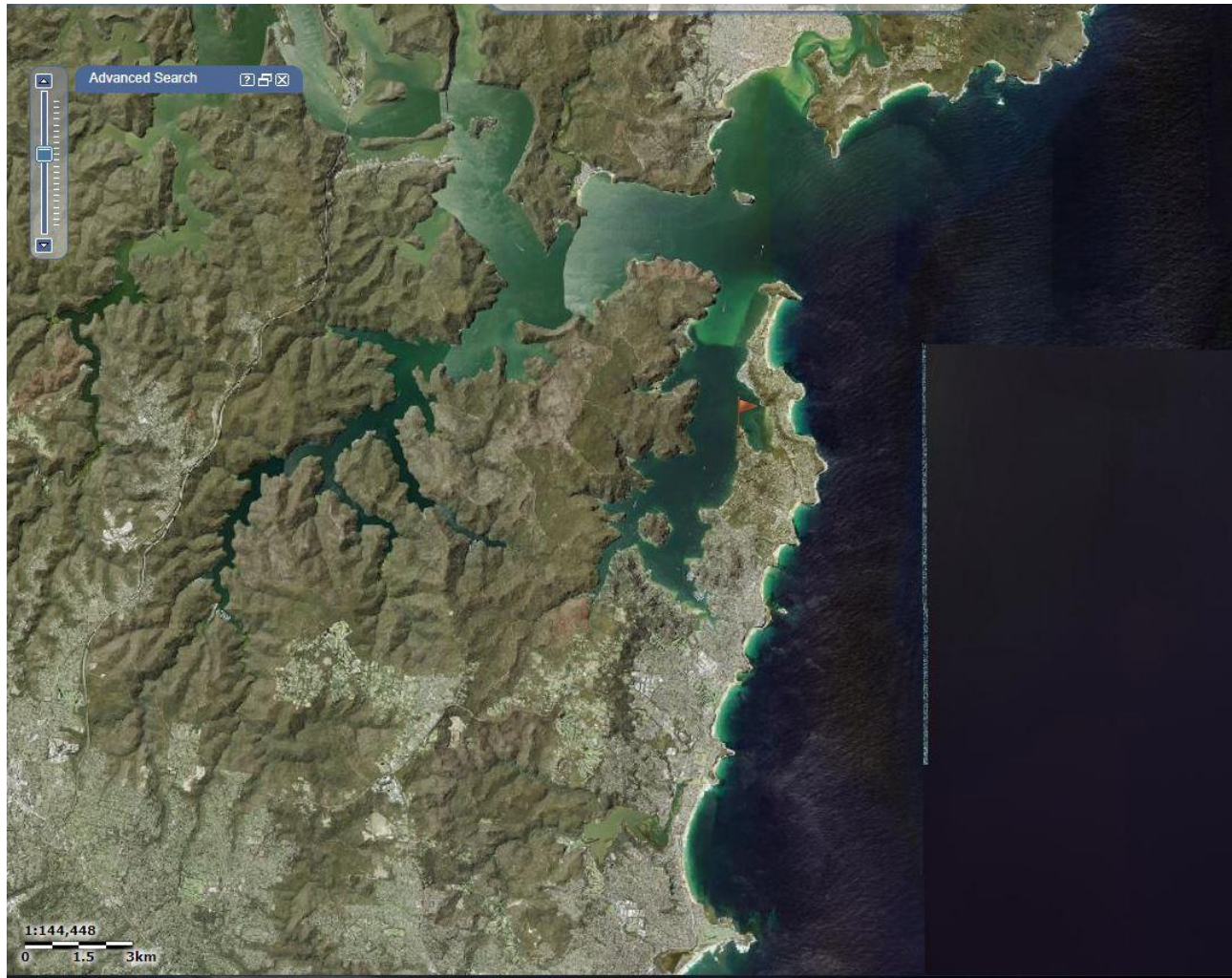


Figure 2A - Locality aerial image of 189 Riverview Road, Avalon Beach (red flag), and surrounds in relation to landscapes and current urbanisation (SIXmaps 2021)

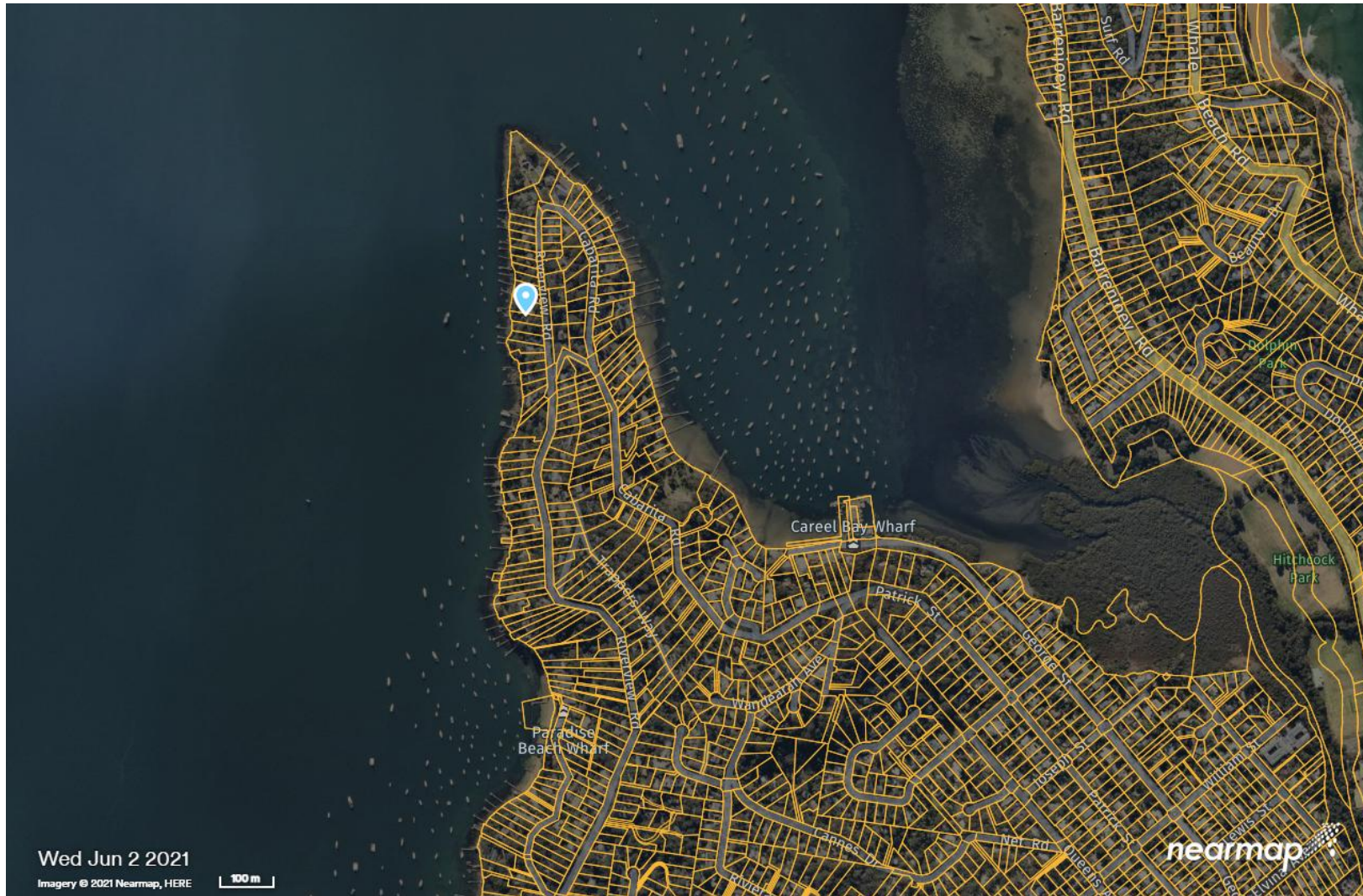


Figure 2B - Locality aerial image of part of Avalon Beach/Careel Bay showing property boundaries in relation to 189 Riverview Road, Avalon Beach (blue marker) (Nearmap 2021)

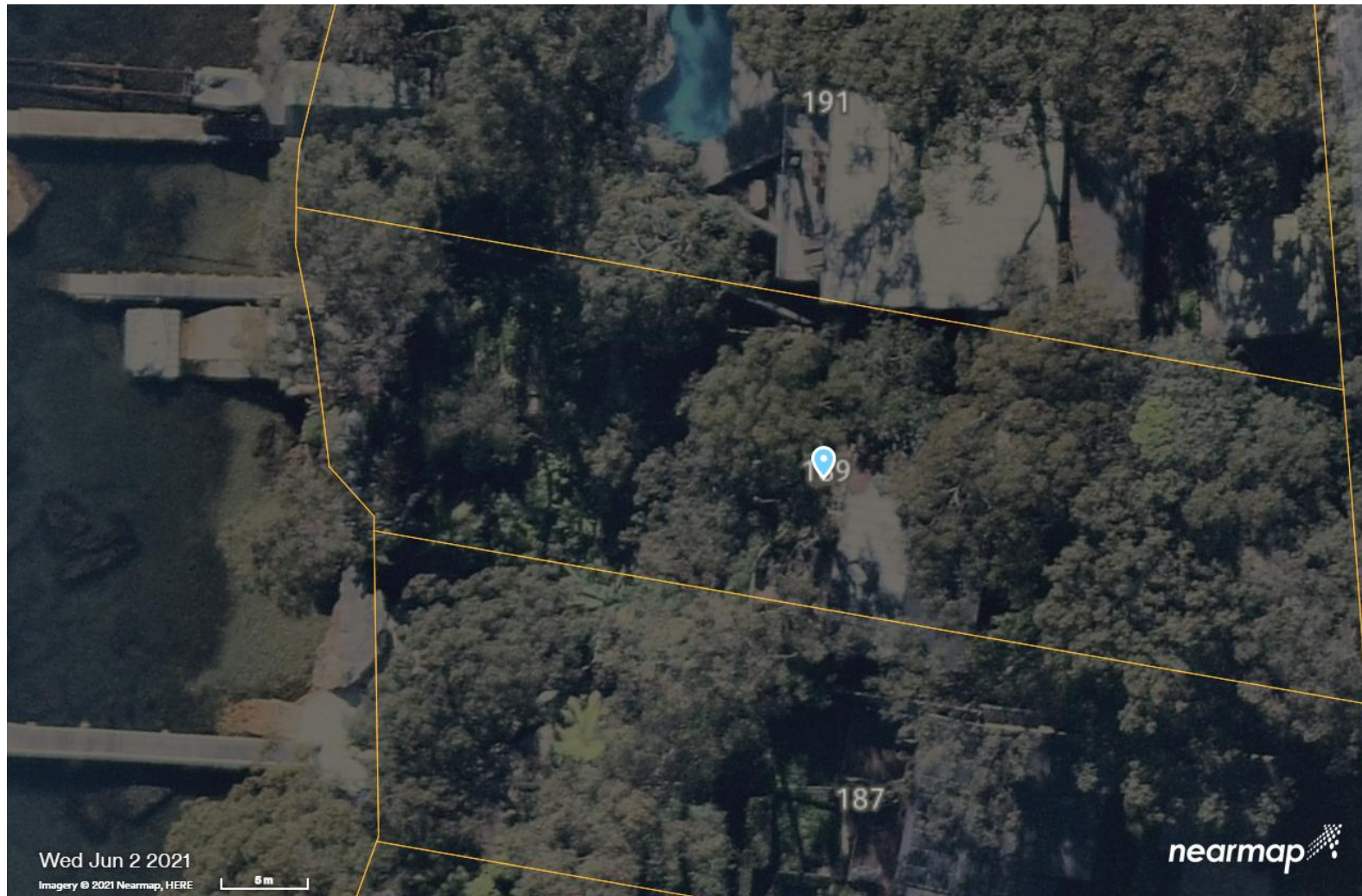


Figure 2C - Aerial image of canopy distribution and existing dwelling at subject site at 189 Riverview Road, Avalon Beach (yellow outline) (Nearmap 2021)

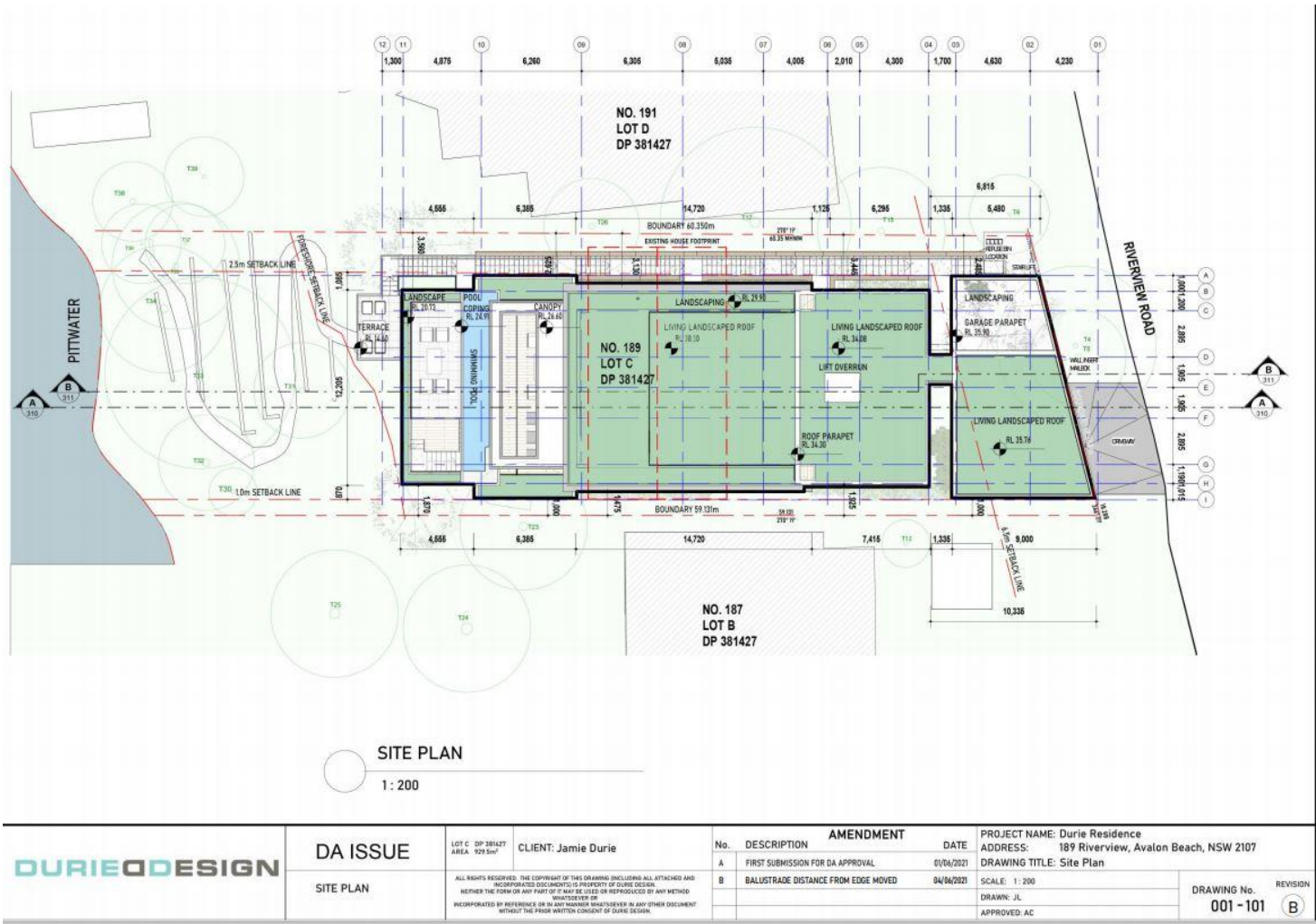


Figure 3A - Detail of proposed construction of subject land at 189 Riverview Road, Avalon Beach (For detail see Alchemy Architects Rev B 2021).

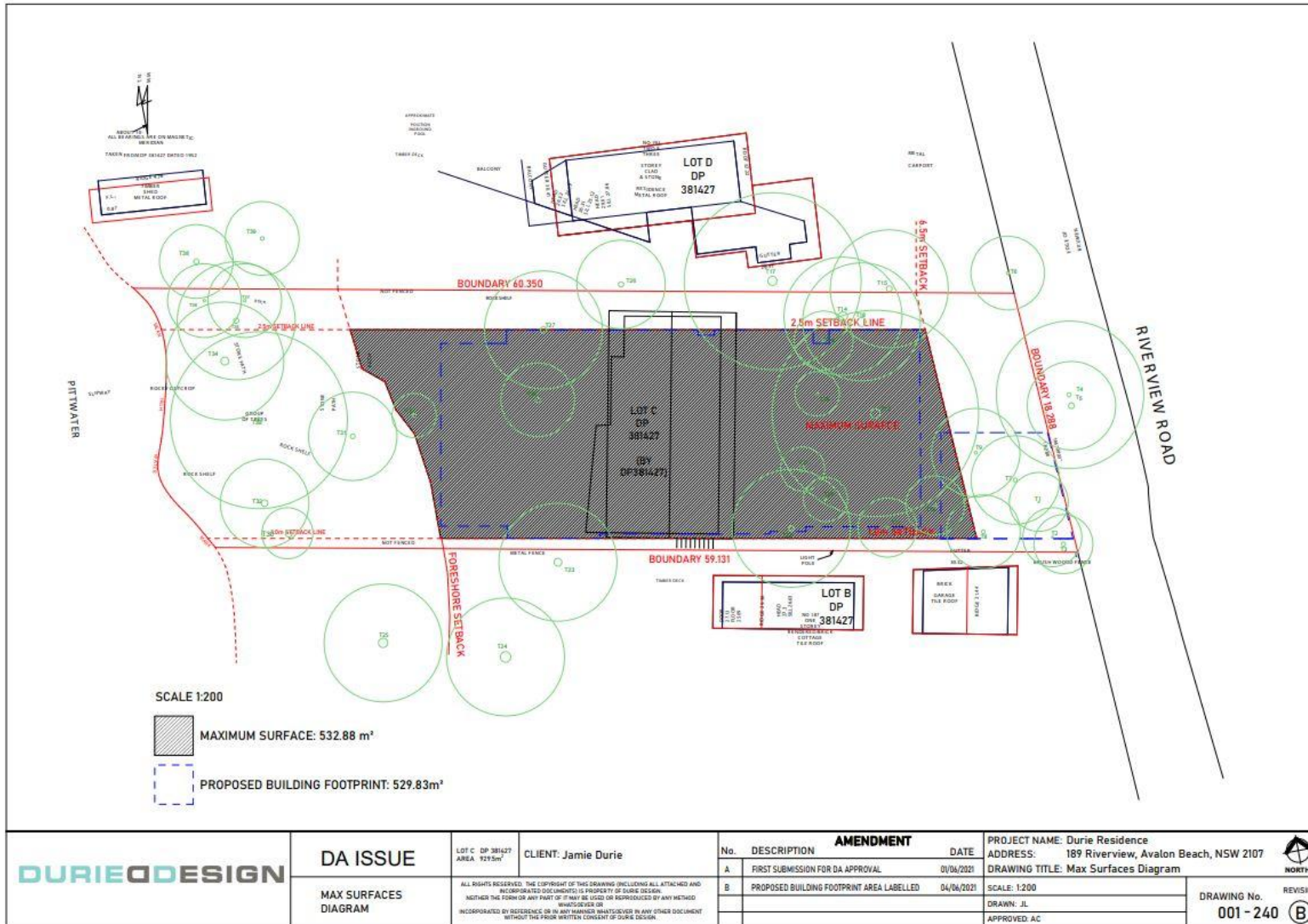


Figure 3B - Detail of tree locations on site plan of subject land at 189 Riverview Road, Avalon Beach (For detail see Botanics Tree Wise People 2021).



Figure 4 - Section of the sloping front yard at subject property indicating large, mature individual of Spotted Gum, small tree of Christmas Bush and weed-infested ground cover



Figure 5 - Lower section of front yard showing individuals of Forest Oak and Spotted Gum, individual of Burrawang (*Macrozamia communis*) and with weed-infested ground cover



Figure 6 - Section of terraced land showing individuals of Grey Ironbark and Spotted Gum located below the Foreshore Building Line and including landscaped gardens. Above the Foreshore Building Line associated with the cliffline occur individuals of Grey Ironbark and Forest Oak with a weed-infested ground cover

1.2 Sampling vegetation attributes

The forested vegetation at the front yard was sampled for vegetation composition attributes in an approximate 18m (width of property) x 22.3m quadrat to derive a Vegetation Integrity Score (VIS). This area and an area extending for another 30m at the rear of the dwelling was sampled for structural and functional attributes.

BAM attributes were sampled on 6th July 2021.

Figure 7 indicates the location of the sampling areas (approx 18 X 22m plot with extended 18 x 33m plot) sampled below the dwelling house.

These discontinuous plots provided the attributes that were used to derive the potential offsets. The plots were orientated towards the WNW.

Table 1 summarises environmental and biotic attributes recorded in the plot (PLOT 1) (Figure 7).

DESCRIPTION	TALL to MEDIUM TALL FOREST
PLOT COORDINATES	-33.617390 151.316809
BEARING	279.5 WNW
APPROX TREE CANOPY COVER (%)	~50%
TOTAL NUMBER LOCALLY-OCCURRING NATIVE SPP	9
TOTAL NUMBER NON LOCALLY-OCCURRING NATIVE SPP	3
COMMON LOCALLY- OCCURRING NATIVE CANOPY SPP OCCURRING AT >5% COVER IN 22 x 18m PLOT	<i>Corymbia maculata</i> ; <i>Allocasuarina torulosa</i> ; <i>Eucalyptus punctata</i> ; <i>Eucalyptus umbra</i> ;
COMMON LOCALLY-OCCURRING NATIVE SPP OCCURRING AT <5% COVER IN 22 x 18m PLOT	<i>Macrozamia communis</i> ; <i>Ceratopetalum gummiferum</i> ; <i>Dichondra repens</i> ; <i>Pittosporum undulatum</i> ; <i>Cupaniopsis anacardioides</i>

Table 1 - Summarises abiotic environmental and biotic attributes recorded at sampled plot at the subject land

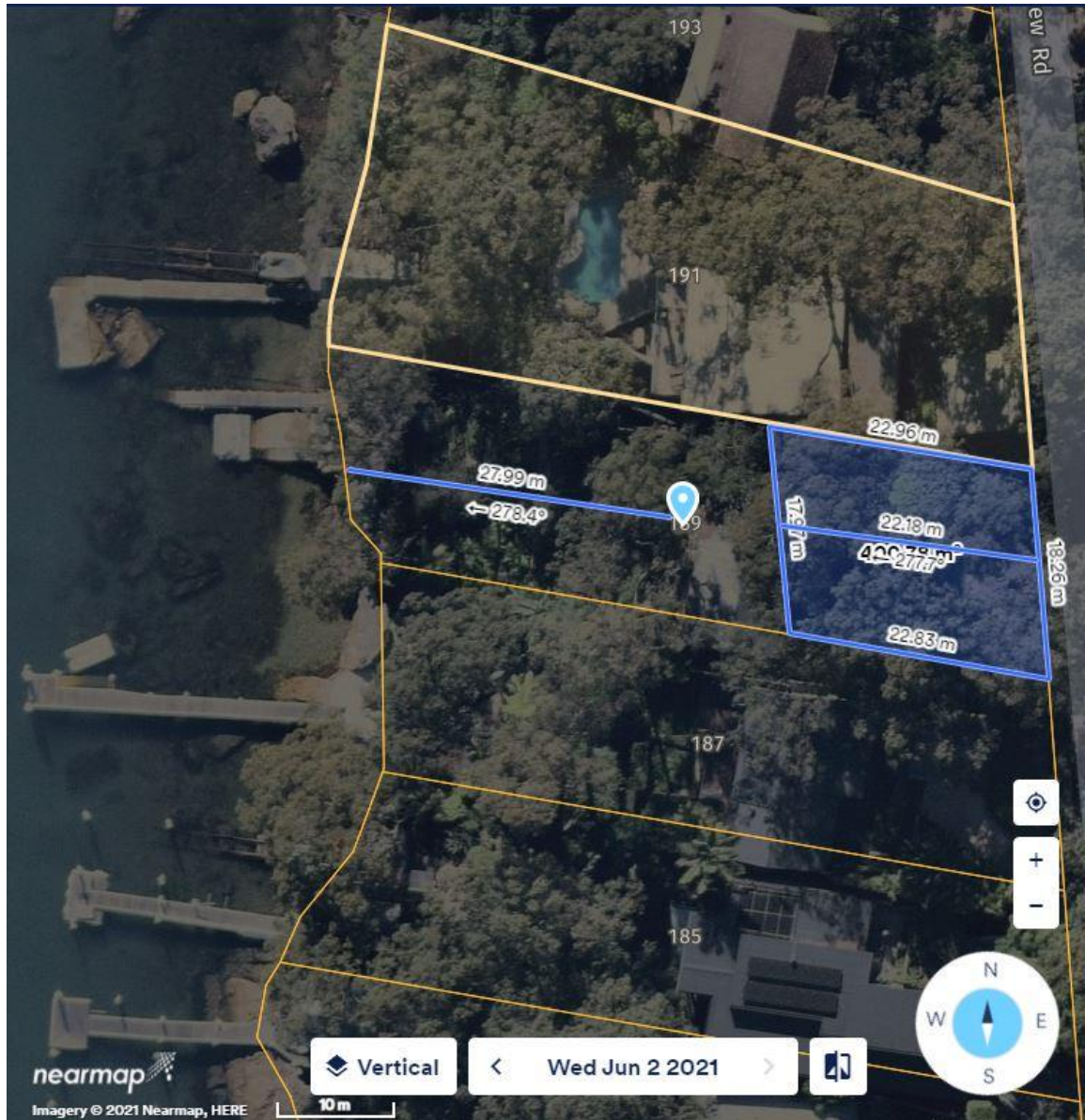


Figure 7 - Sampled plot location at 189 Riverview Road, Avalon Beach showing sampled floristic quadrat located at front, roadside of property and extended structural and functional plot located at rear of dwelling (Nearmap 2021)

1.3 Extent of land proposed to be impacted by development

Figure 3A indicates that the entire area of the subject land between the 4.25m setback at the front of the property to the vicinity of the Foreshore Building Line at the rear of the subject land is proposed for development, with the required setbacks allowed for along the sides. Greater detail is available in the architectural plans provided by Alchemy Architects Pty Ltd in a series of site plan diagrams (Alchemy Architects 2021).

Figure 8 indicates the extent of potential habitat that would be lost as a result of the proposal.

As such, a total extent of 0.042ha is used for land that is impacted and included in offset evaluation by the BAM Calculator.

The mapping of Biodiversity Value indicates that Biodiversity Value is associated with the subject property, resulting from mapping of Pittwater and Wagstaffe Spotted Gum Forest by DPIE (2021) (Figure 9).

This report will determine the number of Biodiversity Credits that may be required to offset the loss of potential Pittwater and Wagstaffe Spotted Gum Forest, the offset to be paid under the NSW Biodiversity Offsets Agreement Management Scheme (BOAMS).

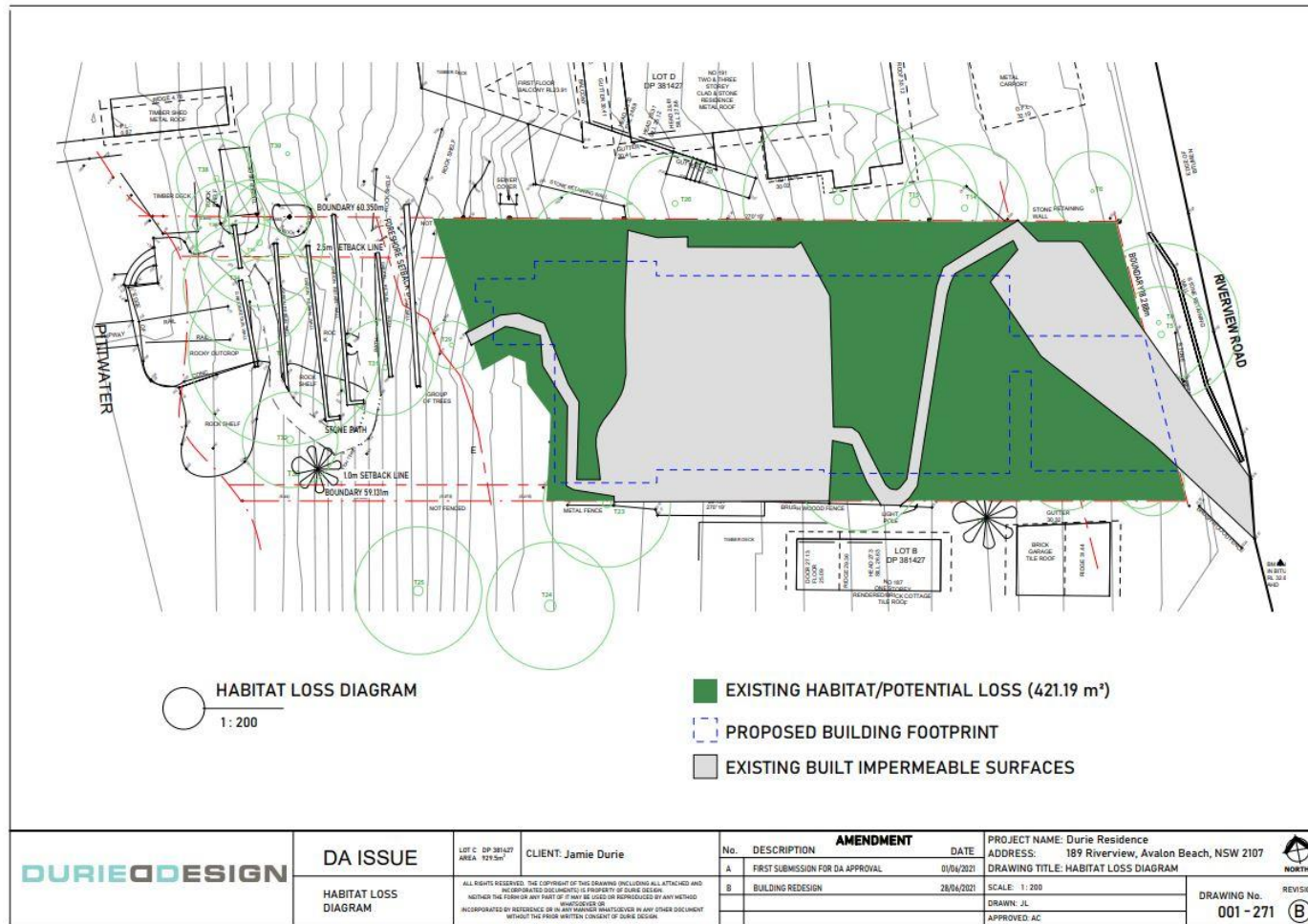


Figure 8 - Potential impacts to elements of Pittwater and Wagstaffe Spotted Gum Forest at 189 Riverview Road, Avalon Beach (green shading) (from Alchemy Architects 2021)

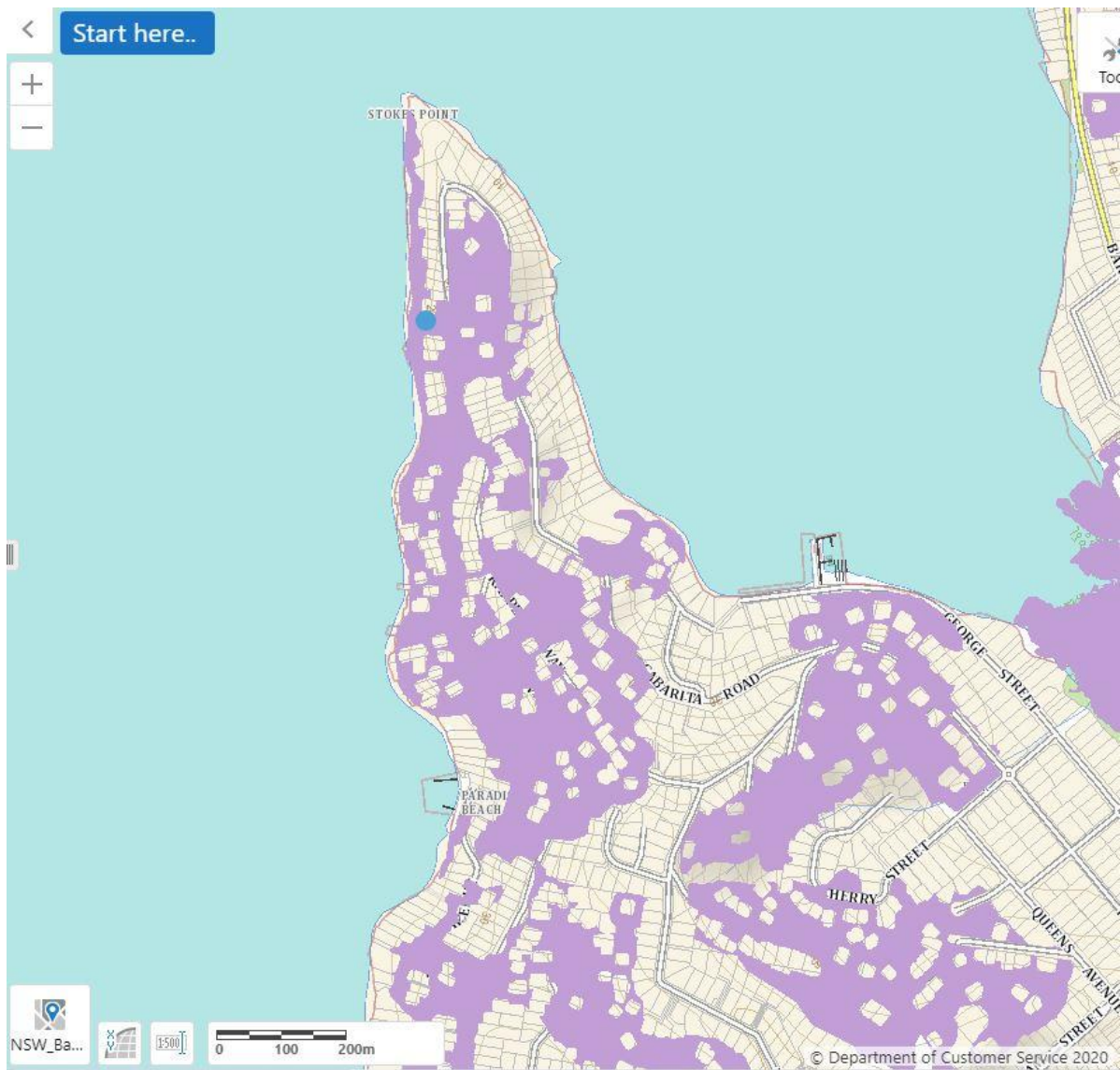


Figure 9 - Biodiversity Values Mapping of subject site at 189 Riverview Road, Avalon Beach, (blue solid circle), showing biodiversity values mapped for the subject land and surrounds (biodiversity values are indicated in purple shading) (Dept Customer Service 2020)

1.4 Topography, geology and soils

The site slopes steadily and steeply to the west (Figure 2C & 7).

The local substrate geology of the subject area at 189 Riverview Road, Avalon Beach, occurs within sediments of the Newport Formation of the Narrabeen Group of sandstones (Herbert 1983). The Newport Formation is comprised of interbedded laminite, shale and quartz, to lithic-quartz sandstone (Herbert 1983).

The predominant soil landscape series of the landscape occurs within the colluvial Watagan Soil Landscape Series (Chapman & Murphy 1989).

The Watagan Soil Landscape Series is characterised by rolling to very steep hills (slopes $>25^{\circ}$) on fine-grained Narrabeen Group sediments (Chapman & Murphy 1989). Soils derived from this Soil Landscape type include shallow to deep lithosols/siliceous sands and yellow podzolics on sandstones, with moderately deep brown, red and gleyed podzolics on shales (Chapman & Murphy 1989).

1.5 Current database and mapping searches

Existing information on 'Threatened Flora of the Locality', defined as an area of 5km radius around the site, was accessed from the DPIE Bionet Atlas of NSW Wildlife (online BioNet 2021), Review of Commonwealth DAWE Environmental Protected Matters Search Tool for MNES records within an area of 5km radius around the site (July 2021) and RoTAP (Briggs and Leigh 1996) databases.

Other literature detailing regionally and locally threatened and significant flora and fauna, as well as plant communities of the study area, included NSW Scientific Committee Final Determinations (1996-2021), Benson and Howell (1994) and DPIE Mapping (2021).

1.6 Literature review

Information sources reviewed included the following:

Aerial Photograph Interpretation (API)

Relevant guidelines, including:

- DPIE Biodiversity Assessment Method (BAM) (2020);
- NSW Guide to Surveying Threatened Plants (OEH 2016);
- 'Species credit' threatened bats and their habitats: NSW survey guide for the Biodiversity Assessment Method (OEH 2018);
- Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities (Department of Environment and Conservation 2004);
- DPIE Threatened Species, Populations and Ecological Communities website (2021);
- Commonwealth DAWE Species, Profile and Threats Database (2021);
- Threatened species survey and assessment guidelines: field survey methods for fauna: Amphibians (DEC 2009);

- NSW Guideline to Surveying Threatened Plants (OEH 2016b);
- 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 2010a);
- 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 2010c);
- Survey guidelines for Australia’s threatened mammals. Guidelines for detecting mammals listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth of Australia 2011);
- Survey guidelines for Australia’s threatened orchids (2017);
- Guidelines for detecting bats listed as ‘threatened’ under the Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth of Australia 2013).

2 LANDSCAPE FEATURES

2.1 IBRA Regions and Subregions

The subject site occurs within the Sydney Basin IBRA region and the Pittwater IBRA Subregion (Figure 10).

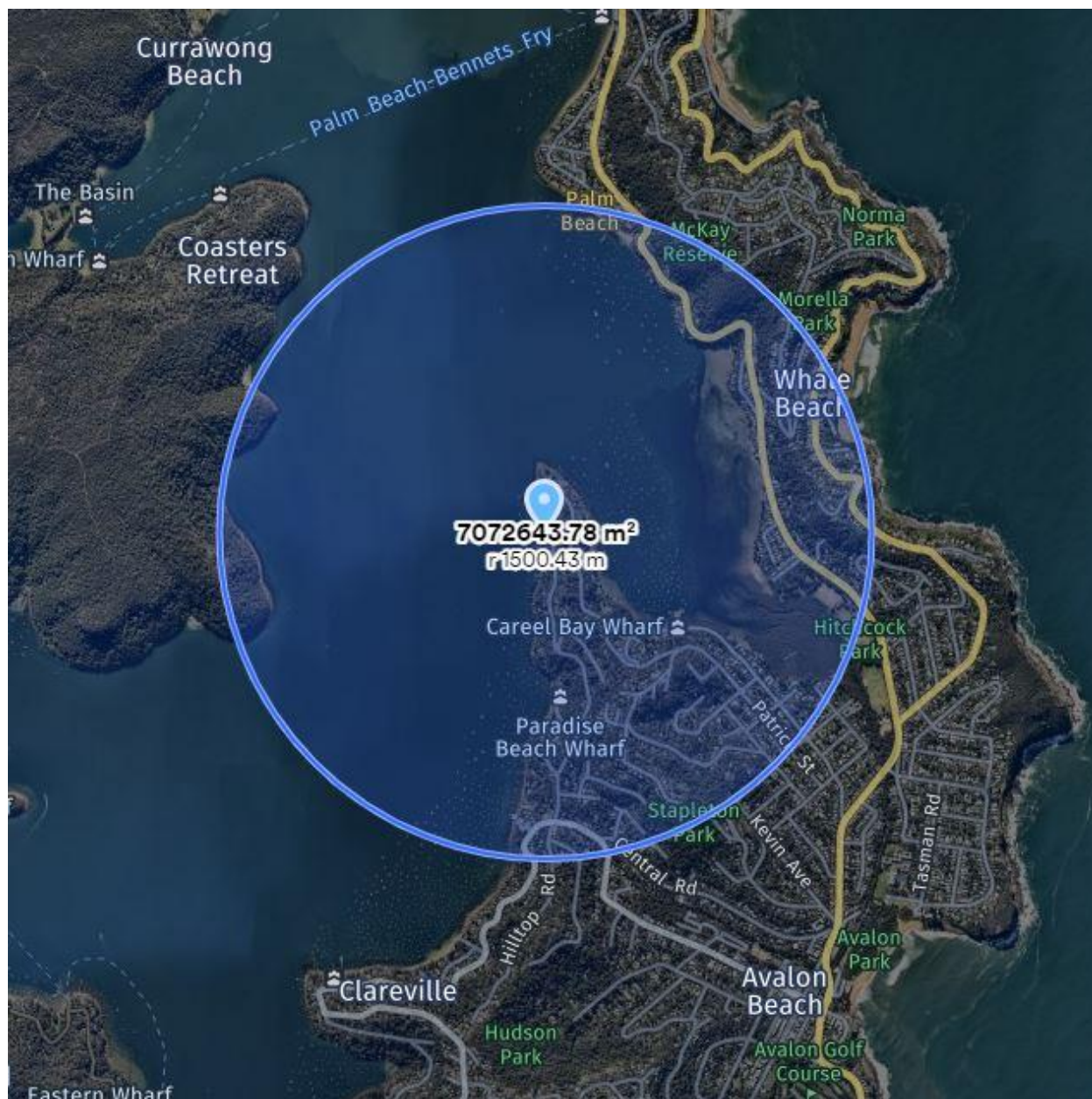


Figure 10 - Subject site central to 1500m buffer area (from Nearmap 2021)

2.2 Mitchell Landscapes (NSW Landscape regions)

The subject site occurs within the Belrose Coastal Slopes Mitchell NSW Landscape (Figure 11).

In general the Belrose Coastal Slopes landscape region comprises benched hill slopes and deep valleys of the coastal fall on horizontal Triassic quartz sandstone, lithic sandstone and shales. There is high proportion of rock outcrop with discontinuous cliffs to 5m high. General elevation is from 0 to 180m, with local relief to 80m. Shallow uniform or gradational sands and earthy sands on ridges, deeper sands, loamy sands and organic sands on wet benches and in hanging swamps, grey or yellow texture-contrast soils on shale benches.

Coastal forest such as occurs at the subject site occurs in sheltered areas on better quality shale soil containing canopy species such as Sydney blue gum (*Eucalyptus saligna*), Blackbutt (*Eucalyptus pilularis*), Turpentine (*Syncarpia glomulifera*), Grey Ironbark (*Eucalyptus paniculata*), Spotted gum (*Corymbia maculata*), Coast Mahogany (*Eucalyptus botryoides*), Cabbage-tree Palm (*Livistona australis*) and Burrawang (*Macrozamia communis*) (Mitchell 2002).



Figure 11 - Subject site mostly occurs within mapped portion of Belrose Slopes Mitchell Landscape Group (Bsl) (DPIE 2021)

2.3 Extent of native vegetation

Areas of native vegetation cover, both within the site and within a 1,500 m buffer area surrounding the site are shown in Figure 10. It is estimated that the native vegetation cover within the 1500m buffer area to the subject site is 21.5% and this was used in the BAM Offsets calculations.

2.4 Wetlands, Rivers, Streams and Estuaries

No significant wetlands, rivers, streams and estuaries are present within the developmental sections of the subject land or that would affect the assessment. The site abuts the bay at Pittwater but if appropriate sediment and run-off controls are undertaken, it is considered that there will be no significant impact to this waterway

2.5 Connectivity

Landscapes that retain connections between patches of otherwise isolated areas of vegetation are more likely to maintain more numerous and more diverse populations of plant and animal species (Lindenmayer and Fischer 2006).

The proposed development will only slightly reduce the cover of canopy trees in the subject locality and it is considered that any potential connectivity to the biodiversity corridor that currently exists in the area would not be significantly impacted (Figures 4, 6 & 9).

2.6 Areas of Geological significance and soil hazard features

These features are not present on the subject land. The steep slopes at the rear of the subject property have been stabilised by terraced rock gabion structures which act to prevent soil creep down the slope (Figure 6).

There are well defined sandstone cliffed features occurring in the rear yard but these will be retained and not excavated (Figure 6).

A significant cave feature also occurs below the level of the Foreshore Building Line and this feature will be retained and not impacted by the proposed development (Figure 12).

2.7 Areas of Outstanding Biodiversity Value (AOBV)

AOBV are special areas that contain irreplaceable biodiversity values that are considered important to NSW, Australia or globally. No listed AOBV occur within the site or within a 1,500m area buffer around the subject site.



Figure 12 - Large cave structure occurs downslope of the Foreshore Building Line in the rear yard, suitable potential roosting and sheltering habitat for cave-roosting microbats and reptiles.

2.8 Site Context

2.8.1 Native vegetation cover

Native vegetation cover is calculated as a percentage cover occurring on the subject land and within the surrounding 1,500m buffer area.

Cover estimates are based on the cover of native woody and non-woody vegetation relative to the approximate benchmarks for the PCT considering the extent and condition of the vegetation.

The native vegetation cover is estimated at 21.5% (Figures 2C, 7 & 10).

2.8.2 Patch size

Patch size is used to describe areas that include native vegetation with a gap of less than 100m from adjacent or surrounding areas of native vegetation that occur in moderate to good condition.

The patch size for the vegetation onsite is assessed as 37.4ha (Figures 9 & 10).

3 NATIVE VEGETATION

3.1 Native vegetation extent within the site

The total area of native vegetation cover within the site was estimated at about 0.024ha or about 57% of the total vegetated cover within the subject site (Figures 2C, 4, 5, 6 & 7).

The extent of native vegetation intended for removal equates to the total amount of potential native vegetation habitat within the proposed development area (Figures 3A, 3B, 4, 5 & 8).

As such, a total of 0.042ha was included in the impacted area on the BAM calculator.

3.2 Plant Community Types (PCT's)

3.2.1 Plant Community Type mapped and PCT assessed as occurring at the site

Mapping by DPIE (2021) has mapped the general vegetation occurring across the local section of the bay, including the subject site, as Pittwater and Wagstaffe Spotted Gum Forest (PCT 1214) (Figure 13).

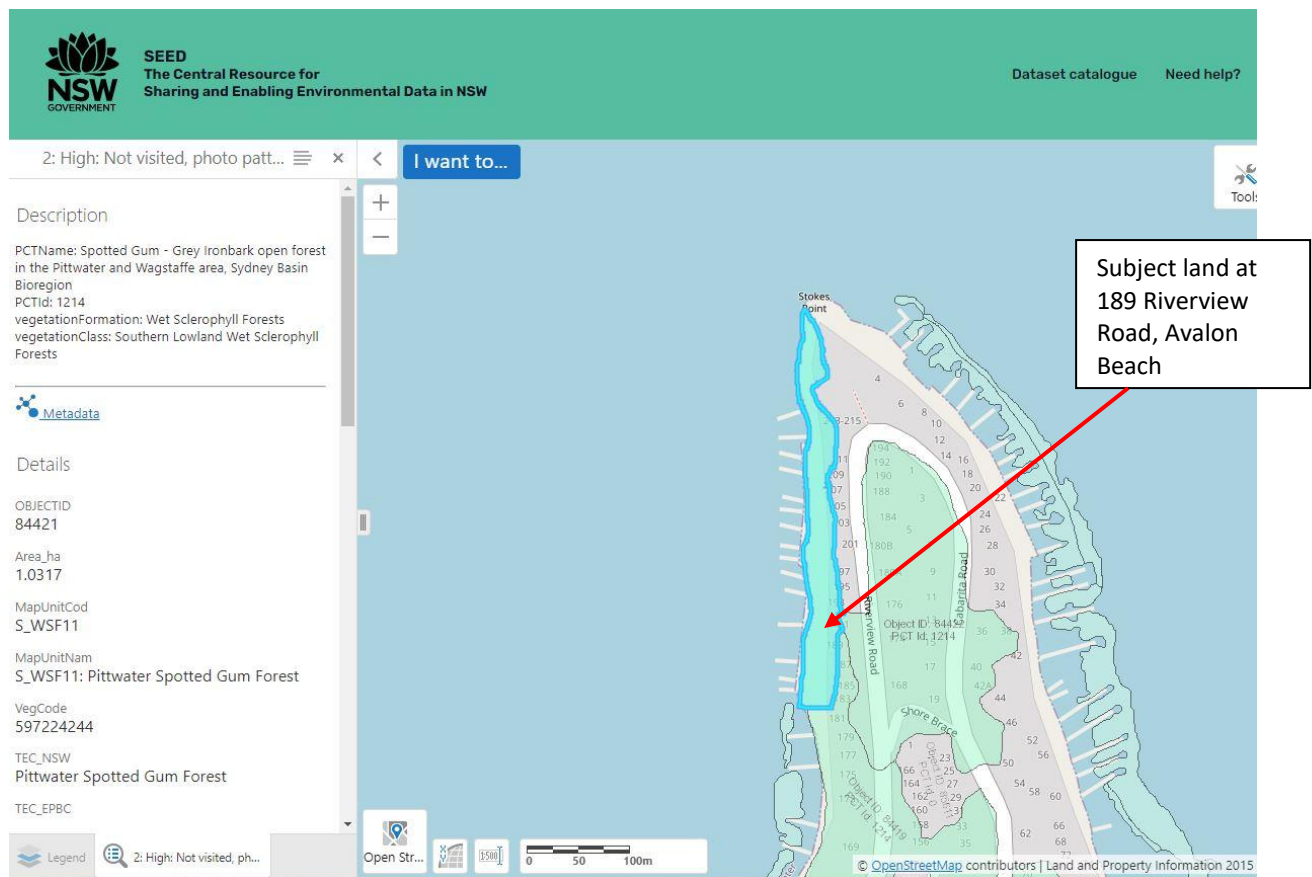


Figure 13 – Mapping of ecological communities over the locality including the Study Area (DPIE (2021) indicating the distribution of Pittwater and Wagstaffe Spotted Gum Forest along the local stretch of the bay coastline (aqua green shading)

As such, PCT 1214, Pittwater and Wagstaffe Spotted Gum Forest, was assessed as the PCT to enter into the BAM calculator

(PCT descriptions from listed Bionet Plant Community Profiles Report DPIE 2021).

Profile description of PCT 1214:

Plant Community Type ID (PCT ID): 1214 **PCT Scientific Name:** Spotted Gum - Grey Ironbark open forest in the Pittwater and Wagstaffe area, Sydney Basin Bioregion

Bioregion Classification Confidence Level: 2-High

Vegetation Description: Stands of Spotted Gum (*Corymbia maculata*) mark this distinctive forest on the foreshores and escarpments of the Pittwater peninsula. These trees form a tall open forest that may also include Grey Ironbark (*Eucalyptus paniculata*) and Broad-leaved White Mahogany (*Eucalyptus umbra*).

At the lower heights of the eucalypt stratum an open cover of Forest Oak (*Allocasuarina torulosa*) often occurs. The midstorey usually comprises a mixed layer of mesic and dry shrub species and occasional palms. Shrub species include Blueberry Ash (*Elaeocarpus reticulatus*), Scentless Rosewood (*Synoum glandulosum* subsp. *glandulosum*), Narrow-leaved Geebung (*Persoonia linearis*) and Mountain Holly (*Podolobium ilicifolium*). Like many Spotted Gum forests along coastal New South Wales Burrawang (*Macrozamia communis*) can assume a prominent component of the ground layer above a scatter of grasses, ferns and small vines. An abundance of Blady Grass (*Imperata cylindrica* var. *major*) is notable where there is a history of frequent fire.

Pittwater Spotted Gum Forest has recently been subject to review by Bell and Stables (2012). These authors concluded that this forest has a close association with Narrabeen sediments exposed on rises, escarpments and footslopes throughout northern Pittwater LGA and the Wagstaff peninsula in the Gosford LGA. The forest spans a number of aspects and topographic positions but is rarely found above 100 metres above sea level. It receives between 1150 and 1300 millimetres of mean annual rainfall. It is estimated that 75 per cent of its pre-European distribution has been cleared in the Pittwater and Gosford urban areas (Bell and Stables 2012) with some remaining stands impacted by the encroachment of urban weeds.

Vegetation Formation:; Wet Sclerophyll Forests (Grassy sub-formation);

Vegetation Class: Southern Lowland Wet Sclerophyll Forests;

IBRA Bioregion: Sydney Basin; **IBRA Sub-region:** Pittwater

LGA: PITTWATER; CENTRAL COAST;

Upper Stratum Species: *Corymbia maculata*; *Eucalyptus paniculata*; *Eucalyptus umbra*; *Allocasuarina torulosa*; *Elaeocarpus reticulatus*; *Glochidion ferdinandii*; *Corymbia gummifera*; *Eucalyptus botryoides*;

Mid Stratum Species: *Podolobium ilicifolium*; *Macrozamia communis*; *Notelaea longifolia*; *Synoum glandulosum* subsp. *glandulosum*;

Ground Stratum Species: *Billardiera scandens*; *Dianella caerulea*; *Entolasia stricta*; *Lomandra longifolia*; *Xanthorrhoea macronema*; *Microlaena stipoides* var. *stipoides*; *Schelhammera undulata*; *Themeda australis*;

TEC Assessed: : Listed BC Act, E: Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion (Equivalent);

PCT Percent Cleared: 71.00

3.2.2 Plot data used in BAM Calculator

The area containing Plot 1 (Figure 7) was subject to BAM analysis for Vegetation Integrity Scores that may require biodiversity offsets.

The data for Plot 1 is presented in Appendix 1.

The native species occurring in the plots is indicated in Table 1.

3.2.3 Flora species occurring in plot (front yard)

The flora species complement and respective cover values are listed in Appendix 2.

3.2.4 Fauna species and potential fauna habitat

Since the subject area subject to offsets (Figure 7) has been largely cleared of natural understorey and small tree strata with a high incidence of noxious weed cover in the ground stratum, there is currently little potential habitat for fauna, either structural habitat for sheltering or plant species available for foraging (Figures 4, 5 & 6). The owner has stated that Possums including Brushtail and Ringtail species have been observed at the subject site.

3.3 Vegetation Integrity Assessment

3.3.1 Vegetation Zone

A vegetation zone is defined as an area of vegetation having the same PCT and occurring in a similar condition state. According to the owner, the vegetation has long been left unmanaged except for the area below the Foreshore Building Line which has been landscaped and continually managed (Figures 4, 5 & 6).

A total of 9 naturally-occurring native species were recorded in Plot 1, with many native shrub and ground cover species occurring at low cover. The extensive weed component included particularly Balloon Vine (*Cardiospermum grandiflorum*), Ribbon Plant (*Chlorophytum comosum*), Wandering Jew (*Tradescantia fluminensis*) and Ground Asparagus (*Asparagus aethiopicus*), as well as Large-leaved Privet (*Ligustrum lucidum*) (Figures 4 & 5).

The condition of the highly degraded vegetation in regard to BAM analysis was regarded as 'poor'.

3.3.2 Patch size

The patch size for relatively continuous patches of native vegetation within the buffer area and aligned with the vegetation of the subject land is 37.4ha. This area was used for patch size in the BAM calculation.

3.3.3 Vegetation Integrity Score

Plot 1 included tree species comprised mainly of Spotted Gum (*Corymbia maculata*) and Forest Oak (*Allocasuarina torulosa*), and with Broad-leaved White Mahogany, Grey Gum, Tuckeroo and Christmas Bush also present in the assemblage in lower frequency and cover. The shrub species Sweet Pittosporum (*Pittosporum undulatum*) also occurred at a low percentage cover. The plot was located as shown in Figure 7.

Quantitative measures for species composition, structure and function attributes were derived from the intact vegetation within the plot as listed in Table 2 of BAM (2020) as indicated in Table 2.

The 50m x 20m plot was located in the intact vegetation (Figure 7) and scores derived from the 20m x 50m plot were used.

Condition attributes use to assess composition of vegetation	Condition attributes use to assess structure within vegetation	Condition attributes use to assess functionality within vegetation
Tree richness	Tree cover	Number large trees
Shrub richness	Shrub cover	Tree regeneration potential
Grass and grass-like richness	Grass and grass-like cover	Tree stem size classes
Forb richness	Forb cover	Total length of fallen logs
Fern richness	Fern cover	Litter cover
Other richness (Twiners, Burrawang etc)	Other cover (Twiners, Burrawang etc)	High Threat Weed cover

Table 2 - Condition attributes for composition, structure and function at plots (Table 1; Figure 7) which were sampled for BAM analysis (from Table 2 in BAM 2020).

Table 3 tabulates the plot scores for the attributes listed in Table 2 for the plot.

Table 4 lists the condition, structure and function scores for the plot, as well as Vegetation Integrity Score which is used to calculate the offset credits required and the costs incurred for clearing native vegetation a the subject land.

PLOT 1 (Figure 7)

Life-form	Tree	Shrub	Grass & Grass-like	Forb	Fern	Other
Counts for composition	6	1	0	1	0	1
Counts for cover (%)	53	2	0	1	0	1

Number large trees (>80cm DBH)	Tree regeneration.	Tree stem size classes (cm)				Length fallen logs	litter cover (%)	HTW (%)
		10-19	20-29	30-49	50-79			
1	present	yes	yes	yes	yes	4m	7	70

Table 3 - Condition attributes for composition, structure and function in Plot 1 (Figure 7)

Table 4 summarises the condition attributes for composition, structure and functionality of the biota in the plot which were sampled for BAM analysis, with resultant the Vegetation Integrity Score (VIS) based on the area of 0.042ha impacted (from Table 2 in BAM 2020).

PLOT 1 (Figure 7)

ATTRIBUTE	COMPOSITION SCORE	STRUCTURE SCORE	FUNCTION SCORE	VEGETATION INTEGRITY SCORE (VIS)
PCT 1214	13.7	45.1	50.2	31.4

Table 4 - Condition attribute scores for composition, structure, function and VIS at Plot 1 for PCT 1214

4 THREATENED SPECIES

4.1 Ecosystem Credit Species

These species are those where the likelihood of occurrence of the species potential elements of the species habitat can reasonably be predicted by vegetation surrogates and features of the landscape, or for which targeted species surveys have a low probability of detection.

The Threatened Biodiversity Data Collection (TBDC) has identified several potential ecosystem credit species as requiring assessment. These are listed and addressed in the following Table 5.

4.2 Species Credit Species (Candidate Species)

These species are those where the likelihood of occurrence of the species, or potential suitable elements of the species habitat, cannot be reliably predicted by vegetation surrogates and landscape features and can more reliably be detected by species surveys. The TBDC has identified several candidate species requiring assessment and these are listed and addressed in the following Table 5.

In accordance with Section 5.3 of BAM (2020) a targeted species survey must be undertaken for a threatened candidate species that is likely to occur at the site based on the application of Steps 1 - 3 in Sub-sections 5.2.1 - 5.2.3 (BAM 2020).

Since the subject land that is proposed to be impacted has been largely cleared of much lower strata structural and functional aspects of the habitat, as well as much of the natural species complement, and is heavily infested with High Threat Weeds (HTW) it is considered that targeted surveys in this case would not achieve any purpose.

However, Table 5 lists all Ecosystem Credit and Species Credit Species (Candidate Species) listed in the TBDC and addresses their suitability to the habitat and likelihood of occurrence.

Table 5 - Candidate species assessment table for PCT 1214 occurring at 189 Riverview Road, Avalon Beach

SPECIES & COMMON NAME	HABITAT REQUIREMENTS AND PREFERENCES (CONSTRAINTS) (from species profiles DPIE 2021)	HABITAT SUITABILITY FROM TDBC AND CALCULATOR TICK BOXES	HISTORICAL RECORDS (TO 20 YEARS PREVIOUS)	CANDIDATE SPECIES ASSESSMENT
PLANTS				
<i>Diuris bracteata</i>	Terrestrial herb. Dry sclerophyll woodland and forest with a predominantly grassy understorey. In recent years, however, extant populations from north-west of Gosford have been recorded and this area is now the only known area of occurrence of the species. All known plants fall within the Central Coast Local Government Areas.	Potential degraded habitat onsite is unsuitable	None	Not a candidate species credit species. Species requirements do not occur onsite and site is heavily degraded
<i>Genoplesium baueri</i> Bauer's Midge Orchid	Terrestrial orchid to 15cm tall, occurs in sparse sandy dry sclerophyll forest habitat and moss outcrops over sandstone.	Potential degraded habitat onsite is unsuitable	None	Not a candidate species credit species. Species requirements do not occur onsite and site is heavily degraded.
<i>Hygrocybe aurantipes</i>	A small brightly coloured gilled fungus that occurs in warm temperate gallery forests dominated by Lilly Pilly (<i>Acmena smithii</i>), Grey Myrtle (<i>Backhousia myrtifolia</i>), Cheese Tree (<i>Glochidion ferdinandi</i>) and Sweet Pittosporum (<i>Pittosporum undulatum</i>)	Potential degraded habitat onsite is unsuitable	None	Not a candidate species credit species. Species requirements do not occur onsite and site heavily is degraded.

SPECIES & COMMON NAME	HABITAT REQUIREMENTS AND PREFERENCES (CONSTRAINTS) (from species profiles DPIE 2021)	HABITAT SUITABILITY FROM TDBC AND CALCULATOR TICK BOXES	HISTORICAL RECORDS (TO 20 YEARS PREVIOUS)	CANDIDATE SPECIES ASSESSMENT
<i>Rhodamnia rubescens</i> Scrub Turpentine	Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils.	Potential habitat onsite is highly modified and degraded	Nearest record is about 2.85km to the south of Bilgola Plateau towards Newport	Not a candidate species credit species. Site heavily is degraded.
ANIMALS				
<i>Varanus rosenbergi</i> Rosenbergs Goanna	Found in heath, open forest and woodland. Associated with termites, the mounds of which this species nests in; termite mounds are a critical habitat component. Individuals require large areas of habitat. Feeds on carrion, birds, eggs, reptiles and small mammals. Shelters in hollow logs, rock crevices and in burrows, which they may dig for themselves, or they may use other species' burrows, such as rabbit warrens.	Habitat unsuitable and highly degraded	Most records to the west in Kuring-gai National Park. Also records about 5.2km to the south-west at Bayview	Not a candidate species credit species. Shrub and ground cover components of site are highly degraded but most trees retained
<i>Hirundapus caudacutus</i> White-throated Needletail	Summer migrant to coastal and sub-coastal eastern Australia	Occurs over a range of habitats where it forages in the airspace over forests, woodlands, urban areas, grasslands and water	Single record within 10km	Not a candidate species credit species. Site is degraded but most trees retained, considered to have no significant impact.

SPECIES & COMMON NAME	HABITAT REQUIREMENTS AND PREFERENCES (CONSTRAINTS) (from species profiles DPIE 2021)	HABITAT SUITABILITY FROM TDBC AND CALCULATOR TICK BOXES	HISTORICAL RECORDS (TO 20 YEARS PREVIOUS)	CANDIDATE SPECIES ASSESSMENT
<p><i>Hieraaetus morphnoides</i></p> <p>Little Eagle</p>	<p>The Little Eagle is seen over woodland and forested lands and open country, extending into the arid zone. It tends to avoid rainforest and heavy forest. The Little Eagle searches for prey on the wing or from a high exposed perch, taking prey from the ground, the shrub layer or the canopy. Prey includes rabbits, other live mammals and insects.</p>	<p>Habitat unsuitable and otherwise heavily degraded</p>	<p>Records at Palm Beach and Church Point</p>	<p>Not a candidate species credit species.</p> <p>Site is heavily degraded but most trees retained, considered to have no significant impact.</p>
<p><i>Callocephalon fimbriatum</i></p> <p>Gang Gang Cockatoo</p>	<p>Has a preference for wetter forests and woodlands from sea level to > 2,000m on the Great Dividing Range, timbered foothills and valleys, timbered watercourses, coastal scrubs, farmlands and suburban gardens. Favours old growth forest and woodland attributes for nesting and roosting. Nests are located in hollows that are 10 cm in diameter or larger and at least 9m above the ground in eucalypts.</p>	<p>Habitat unsuitable for foraging, and otherwise heavily degraded</p>	<p>No records in vicinity</p>	<p>Not a candidate species credit species.</p> <p>Habitat degraded and unsuitable</p>
<p><i>Calyptorhynchus lathamii</i></p> <p>Glossy Black Cockatoo</p>	<p>Inhabits open forest and woodlands of the coast and the Great Dividing Range up to 1000 m in which stands of she-oak species, particularly Black She-oak (<i>Allocasuarina littoralis</i>), Forest She-oak (<i>A. torulosa</i>) or Drooping She-oak (<i>A. verticillata</i>) occur. Forest She-oak is the preferred foraging resource. Roosts in the canopy of tall trees, occasionally in tree hollows. Nests in deep hollows in eucalypts.</p>	<p>Habitat suitable for foraging with 5 individuals of Forest Oak occurring within area to be impacted. However, this is considered a small loss compared to the abundance of this species in the locality. No chewed cones observed</p>	<p>Records occur some 2.6km to the north-west at Coasters Retreat</p>	<p>Not a candidate species credit species.</p> <p>No chewed cones on site and nearest records some 2.6km to north-west. Only a small number (5) of individuals of Forest Oak to be removed</p>

SPECIES & COMMON NAME	HABITAT REQUIREMENTS AND PREFERENCES (CONSTRAINTS) (from species profiles DPIE 2021)	HABITAT SUITABILITY FROM TDBC AND CALCULATOR TICK BOXES	HISTORICAL RECORDS (TO 20 YEARS PREVIOUS)	CANDIDATE SPECIES ASSESSMENT
<p><i>Glossopsitta pusilla</i></p> <p>Little Lorikeet</p>	<p>Little Lorikeets mostly occur in dry, open eucalypt forests and woodlands. They have been recorded from both old-growth and logged forests in the eastern part of their range, and in remnant woodland patches and roadside vegetation on the western slopes.</p> <p>Little lorikeets are considered to be nomadic, likely in a response to food availability. These lorikeets usually forage in small flocks, feeding mainly on nectar and pollen, but also fruit of eucalypts, melaleucas and mistletoes. The little lorikeet breeds from May to September, nesting in tree hollows, with small diameter entrance holes. Most breeding records are located on the western slopes.</p>	<p>Habitat unsuitable for foraging and breeding</p>	<p>Single record at Coasters Retreat some 2.6km to the west</p>	<p>Not a candidate species credit species.</p> <p>Single record at Coasters Retreat some 2.6km to the west. Habitat unsuitable.</p>
<p><i>Lathamus discolor</i></p> <p>Swift Parrot</p>	<p>On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Winter migrant to coastal NSW where they feed in the following trees; Swamp Mahogany (<i>E. robusta</i>), Forest Redgum (<i>E. tereticornus</i>), Spotted Gum (<i>Corymbia maculata</i>), Red Bloodwood (<i>Corymbia gummifera</i>).</p>	<p>Habitat suitable for foraging in winter. Total of 7 individuals of Spotted Gum proposed for removal, however, total of 10 retained either in adjacent properties or below Foreshore Building Line</p>	<p>All records in natural undisturbed bushland to the west in Ku-ring-gai National Park</p>	<p>Not a candidate species credit species.</p> <p>Site is degraded but many trees retained.</p> <p>All records in natural undisturbed bushland to the west in Ku-ring-gai National Park</p>

SPECIES & COMMON NAME	HABITAT REQUIREMENTS, PREFERENCES (CONSTRAINTS) (species profiles DPIE 2021)	HABITAT SUITABILITY FROM TDBC AND CALCULATOR TICK BOXES	HISTORICAL RECORDS (TO 20 YEARS PREVIOUS)	CANDIDATE SPECIES ASSESSMENT
<p><i>Ninox strenua</i></p> <p>Powerful Owl</p>	<p>Inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. The Powerful Owl requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. It roosts by day in dense vegetation comprising species such as Turpentine <i>Syncarpia glomulifera</i>, Black She-oak <i>Allocasuarina littoralis</i>, Blackwood <i>Acacia melanoxylon</i>, Rough-barked Apple <i>Angophora floribunda</i>, Cherry Ballart <i>Exocarpus cupressiformis</i> and a number of other eucalypt species.</p>	<p>May occasionally forage in the area, however, site is heavily degraded. No evidence (presence of pellets or droppings at base of trees occurring nearby or on tree trunks) of this species using the subject site for roosting or foraging. The subject site is not regarded as core habitat for Powerful Owl.</p>	<p>The Powerful Owl is more likely to occur within tracts of forest where there are large areas of undisturbed bushland, though sightings have been made in the vicinity.</p> <p>Records occur over the locality and occur in a 1km grid pattern, calls heard over a wide area</p>	<p>Not a candidate species credit species.</p> <p>Site has been degraded and prey animals would appear scarce in this habitat</p>
<p><i>Tyto novahollandiae</i></p> <p>Masked Owl</p>	<p>Extends from the coast where it is most abundant to the western plains. Overall records for this species fall within approximately 90% of NSW, excluding the most arid north-western corner. There is no seasonal variation in its distribution. Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but often hunts along the edges of forests, including roadsides. The typical diet consists of tree-dwelling and ground mammals, especially rats. Pairs have a large home-range of 500 to 1000 hectares. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting.</p>	<p>Habitat has been highly degraded. May occasionally forage in locality.</p>	<p>Four records in locality, from Barrenjoey Headland and Elvina Bay</p>	<p>Not a candidate species credit species.</p> <p>Habitat widespread and the proposed small extent of degraded habitat clearing is not significant for this owl.</p>

SPECIES & COMMON NAME	HABITAT REQUIREMENTS, PREFERENCES (CONSTRAINTS) (species profiles DPIE 2021)	HABITAT SUITABILITY FROM TDBC AND CALCULATOR TICK BOXES	HISTORICAL RECORDS (TO 20 YEARS PREVIOUS)	CANDIDATE SPECIES ASSESSMENT
<p><i>Anthochaera phrygia</i></p> <p>Regent Honeyeater</p>	<p>The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes.</p> <p>Every few years non-breeding flocks are seen foraging in flowering coastal Swamp Mahogany and Spotted Gum forests, particularly on the central coast and occasionally on the upper north coast. Birds are occasionally seen on the south coast.</p> <p>The Regent Honeyeater is a generalist forager, although it feeds mainly on the nectar from a relatively small number of eucalypts that produce high volumes of nectar. Key eucalypt species include Mugga Ironbark, Yellow Box, White Box and Swamp Mahogany. Flowering of associated species such as Thin-leaved Stringybark <i>Eucalyptus eugenioides</i> and other Stringybark species, and Broad-leaved Ironbark <i>E. fibrosa</i> can also contribute important nectar flows at times. Nectar and fruit from the mistletoes <i>Amyema miquelii</i>, <i>A. pendula</i> and <i>A. cambagei</i> are also utilised.</p>	<p>Habitat at subject site degraded and most foraging sites occur particularly on the central and north coasts</p>	<p>No records within 5km radius of subject land</p>	<p>Not a candidate species credit species.</p> <p>Habitat degraded and unsuitable for breeding or foraging. & individuals of Spotted Gum will be removed and 10 retained in the adjacent property and below the Foreshore Building Line</p>

	When nectar is scarce lerp and honeydew can comprise a large proportion of the diet. Insects make up about 15% of the total diet and are important components of the diet of nestlings.			
SPECIES & COMMON NAME	HABITAT REQUIREMENTS, PREFERENCES (CONSTRAINTS) (species profiles DPIE 2021)	HABITAT SUITABILITY FROM TDBC AND CALCULATOR TICK BOXES	HISTORICAL RECORDS (TO 20 YEARS PREVIOUS)	CANDIDATE SPECIES ASSESSMENT
<i>Daphoenositta chrysoptera</i> Varied Sittella	Inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and <i>Acacia</i> woodland. The Varied Sittella feeds on arthropods gleaned from crevices in rough or decortivating bark, dead branches, standing dead trees, and from small branches and twigs in the tree canopy.	Potential habitat highly degraded and urbanised	No records within 10km centred around site	Not a candidate species credit species. Habitat unsuitable and highly degraded
<i>Artamus cyanopterus cyanopterus</i> Dusky Woodswallow	Inhabits dry, open eucalypt forests and woodlands, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. Primarily eats invertebrates, mainly insects, which are captured whilst hovering or sallying above or under the canopy, primarily over leaf litter and dead timber. Also occasionally take nectar, fruit and seed. Depending on location and local climatic conditions (primarily temperature and rainfall), the dusky woodswallow can be resident year round or migratory. Nest sites vary greatly, but generally occur in shrubs or low trees, living or dead, horizontal or upright forks in branches, spouts, hollow stumps or logs	Habitat unsuitable and highly degraded	No records within 10km centred around site	Not a candidate species credit species. Habitat unsuitable

SPECIES & COMMON NAME	HABITAT REQUIREMENTS, PREFERENCES (CONSTRAINTS) (species profiles DPIE 2021)	HABITAT SUITABILITY FROM TDBC AND CALCULATOR TICK BOXES	HISTORICAL RECORDS (TO 20 YEARS PREVIOUS)	CANDIDATE SPECIES ASSESSMENT
<i>Petroica boodang</i> Scarlet Robin	The species inhabits dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. Prefers abundant logs and fallen timber which do not occur at the subject site. For breeding, prefers ridges in dry eucalypt forest and woodland.	Habitat unsuitable	No records in locality	Not a candidate species credit species. Habitat highly degraded and unsuitable.
<i>Phascolarctus cinereus</i> Koala	Occurs in natural eucalypt forests and woodlands. Koala feed trees listed under Schedule 2 of SEPP 44 legislation include: Forest red gum <i>Eucalyptus tereticornis</i> ; Tallowwood, <i>Eucalyptus microcorys</i> ; Grey Gum, <i>Eucalyptus punctata</i> ; Manna Gum, <i>Eucalyptus viminalis</i> ; River Red Gum, <i>Eucalyptus camaldulensis</i> ; Broad leaved scribbly gum, <i>Eucalyptus haemastoma</i> ; Scribbly gum and Swamp mahogany, <i>Eucalyptus robusta</i> .	Habitat highly degraded and urbanised. Very few Koala food trees onsite	Single record observed some 15 years ago, 1.5km to the spout at Clareville	Not a candidate species credit species. Habitat unsuitable
<i>Dasyurus maculata</i> Spotted-tail Quoll	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock crevices, boulder fields and rocky-cliff faces as den sites (Edgar & Belcher 1995).	Habitat is urbanised and highly degraded. Unsuitable	No records in locality	Not a candidate species credit species. Habitat unsuitable and no records in locality

SPECIES & COMMON NAME	HABITAT REQUIREMENTS, PREFERENCES (CONSTRAINTS) (species profiles DPIE 2021)	HABITAT SUITABILITY FROM TDBC AND CALCULATOR TICK BOXES	HISTORICAL RECORDS (TO 20 YEARS PREVIOUS)	CANDIDATE SPECIES ASSESSMENT
<p><i>Pteropus poliocephalus</i></p> <p>Grey-headed Flying-fox</p>	<p>Grey-headed Flying Fox (<i>Pteropus poliocephalus</i>). This species congregates in large camps and is found in a variety of habitats including rainforest, mangroves, Melaleuca swamps, wet and dry sclerophyll forests and also cultivated areas. The species feeds on the blossoms of more than 80 plant species, especially eucalyptus blossom and the fruits of a number of palm species. Flowering species of eucalypts such as Swamp Mahogany (<i>Eucalyptus robusta</i>) and Forest Red Gum (<i>Eucalyptus tereticornis</i>) and Paperbarks (<i>Melaleuca quinquenervia</i>), are particularly important. Distances of up to 30km from the camp are often travelled, with 60-70km sometimes covered per night to reach a particular food source.</p> <p>The Grey-headed Flying Fox (<i>Pteropus poliocephalus</i>) was not sighted during the survey, which occurred during mid-morning when the bats would be roosting in camps, but may be attracted to flowering Eucalyptus trees on occasion.</p>	<p>Habitat highly degraded.</p>	<p>Many records occur across the locality, this species foraging on flowering eucalypts at various seasonal times</p>	<p>Not a candidate species credit species.</p> <p>May forage in the area as part of a wider foraging range. Habitat degraded.</p>

SPECIES & COMMON NAME	HABITAT REQUIREMENTS, PREFERENCES (CONSTRAINTS) (species profiles DPIE 2021)	HABITAT SUITABILITY FROM TDBC AND CALCULATOR TICK BOXES	HISTORICAL RECORDS (TO 20 YEARS PREVIOUS)	CANDIDATE SPECIES ASSESSMENT
<p><i>Saccolaimus flaviventris</i> Yellow-bellied Sheathtail-Bat</p>	<p>The Yellow-bellied Sheathtail-bat is a wide-ranging species found across northern and eastern Australia. There are scattered records of this species across the New England Tablelands and North West Slopes. Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. When foraging for insects, flies high and fast over the forest canopy, but lower in more open country. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory.</p>	<p>May occasionally forage in area as part of a wider range, though habitat is degraded.</p>	<p>No records within a 5km radius of the site, single record north of the Hawkesbury River</p>	<p>Not a candidate species credit species.</p> <p>No impact on potential foraging behaviours expected at the subject site as site is part of a wider foraging range in the locality</p>
<p><i>Micronomus norfolkensis</i> Eastern Coastal Freetail Bat</p>	<p>Occurs in dry sclerophyll forest and woodland east of the Great Dividing Range. Roost mainly in tree hollows but will also roost under bark or in man-made structures. Insectivorous.</p>	<p>No roosting habitat, habitat highly degraded</p>	<p>Nearest record about 1.3km to the east at Careel Bay</p>	<p>Not a candidate species credit species.</p> <p>No roosting habitat, habitat highly degraded.</p>
<p><i>Chalinobus dwyeri</i> Large-eared Pied Bat</p>	<p>These bats roost in shallow caves in escarpments, particularly in sandstone and forage in remnant native dry and wet open forests, woodlands and rainforests.</p>	<p>Small cave occurs beneath Foreshore Building Line (Figure 12). This feature will not be impacted. Foraging habitat highly degraded</p>	<p>Has been recorded from Bilgola Beach to Palm Beach, nearest record some 1.3km to the east at Careel Bay</p>	<p>Not a candidate species credit species.</p> <p>Nearest record some 1.3km to the east. Small cave occurs below Foreshore Building line and will not be impacted</p>

SPECIES & COMMON NAME	HABITAT REQUIREMENTS, PREFERENCES (CONSTRAINTS) (species profiles DPIE 2021)	HABITAT SUITABILITY FROM TDBC AND CALCULATOR TICK BOXES	HISTORICAL RECORDS (TO 20 YEARS PREVIOUS)	CANDIDATE SPECIES ASSESSMENT
<p><i>Miniopterus australis</i> Little Bentwing Bat</p>	<p>Habitat in moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas. Little Bentwing-bats roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and at night forage for small insects beneath the canopy of densely vegetated habitats. No breeding habitat onsite</p>	<p>Habitat degraded and unsuitable for this species. Small roosting cave occurs below Foreshore Building Line (Figure 12), will not be impacted.</p>	<p>Has been recorded from Littel Lovett Bay to Palm Beach, nearest record some 1.3km to the east at Careel Bay</p>	<p>Not a candidate species credit species. Nearest record some 1.3km to the east. Small cave occurs below Foreshore Building line and will not be impacted</p>
<p><i>Miniopterus orianae oceanensis</i> Large Bentwing Bat</p>	<p>This sub species of Bentwing Bat occurs from Cape York to central Vic. Occurs in wet and dry sclerophyll forests and rainforests. Roost within man-made structures. Known roost sites include caves, disused mines, storm-water drains, culverts and buildings. However maternity roosts occur in sandstone or limestone cave systems. Will form scattered smaller colonies, mostly within 300km of the larger maternity cave (Churchill 1998). Active all year round, foraging mostly on moths above the tree canopy. Feeds over large areas of land and has been reported to travel up to 70 km in one night (Dwyer 1995). No breeding habitat onsite.</p>	<p>Foraging habitat remains. Small roosting cave occurs below Foreshore Building Line (Figure 12), will not be impacted.</p>	<p>Has been recorded from Church Point to Palm Beach, nearest record some 1.3km to the east at Careel Bay</p>	<p>Not a candidate species credit species. Nearest record some 1.3km to the east. Small cave occurs below Foreshore Building line and will not be impacted</p>
<p><i>Pseudomys novaehollandiae</i> New Holland Mouse</p>	<p>Known to inhabit open heathlands, woodlands and forests with a heathland understorey and vegetated sand dunes</p>	<p>Habitat unsuitable and highly degraded</p>	<p>No records within 5km radius of site</p>	<p>Not a candidate species credit species. Habitat unsuitable</p>

4.3 Description of impacts

4.3.1 Direct impacts to subject site

- **Trees proposed for removal**

A total of 17 native canopy trees would be removed as a result of the proposal, all occurring within the footprint of the subject site above the Foreshore Building Line (Figure 3B)

These trees include 7 individuals of Spotted Gum; 2 individuals of Broad-leaved White Mahogany; 5 individuals of Forest Oak; 1 individual of Grey Gum; 1 individual of Christmas Bush; and 1 individual of Grey Ironbark (Figure 3B).

- **Trees proposed for retention**

A total of 9 native canopy trees would be retained, all occurring within the footprint of the subject site below the Foreshore Building Line (Figure 3B)

These trees include 8 individuals of Spotted Gum; and 1 individual of Grey Ironbark (Figure 3B).

4.3.2 Biodiversity Credits for PCT 1214

The vegetation community assessed occurring as component of the highly degraded vegetation is Pittwater and Wagstaffe Spotted Gum Forest, PCT 1214, an Endangered Ecological Community listed on registers of the BC Act, occurring in a structurally, functionally and floristically modified, degraded condition (Figures 4, 5 & 6).

This assessment (prepared using the BAM Offsets Calculator) has determined that for the clearing of 0.0421ha of a highly modified and degraded form of Pittwater and Wagstaffe Spotted Gum Forest, one (1) ecosystem credit should be required to offset impacts to the removal of the canopy area of this community.

4.3.3 Serious and Irreversible Impacts (SAII)

Species and ecological communities with a 'very high' biodiversity risk weighting are considered to be a potential serious and irreversible impact (SAII). These 'potential SAII entities' are identified by the BAM calculator (BAM 2020).

The determination of serious and irreversible impacts on biodiversity values is to be made by the consent authority in accordance with the principles set out in the BC Regulation. To assist the consent authority, the guidance document 'Guidance to Assist a Decision Maker to determine a serious and irreversible impact' includes criteria that enable the application of the four principles set out in clause 6.7 of the BC Regulation. These criteria provide a guide to

identify the species and ecological communities that are likely to be the subject of serious and irreversible impacts.

These four principles include the following (BC Regulation 2018):

An impact is to be regarded as serious and irreversible if it is likely to contribute significantly to the risk of a threatened species or ecological community becoming extinct because:

- (a) it will cause a further decline of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline, or
- (b) it will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very small population size, or
- (c) it is an impact on the habitat of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very limited geographic distribution, or
- (d) the impacted species or ecological community is unlikely to respond to measures to improve its habitat and vegetation integrity and therefore its members are not replaceable. (3

For the purpose of this clause, a decline of a species or ecological community is a continuing or projected decline in:

- (a) an index of abundance appropriate to the taxon, or
- (b) the geographic distribution and habitat quality of the species or ecological community.

PCT 1214 in the Sydney Basin Bioregion is listed as a threatened entity. However, this small area of a highly degraded patch of the ecological community represents a decrease of just 0.015% of the 275ha of the community that is retained throughout the Sydney Basin IBRA region, and it is considered that the biodiversity offset would compensate for this very small decrease in extent of the community in the locality and in the wider regional area.

4.3.4 Potential direct impacts

4.3.4.1 Removal of vegetation and potential habitat

The impacts would include the removal of most of the existing vegetation, including 17 individuals of native canopy trees (Figure 3B; Botanics Tree Wise People 2021), from between the 4.25m setback from Riverview Road to the Foreshore Building Line to accommodate the new house design (Figures 3A & 3B).

4.3.4.2 Potential for runoff, sedimentation and erosion during construction

Due to the very steep sloping ground surface of the subject land, construction activities could potentially lead to soil erosion and an increase in sediment loads downslope. The potential for accidental leaks/spills of oil, fuel, cement or other substances entering the embayment could pollute also surface waters. Gabion rock wall structures have been installed in terraced areas below the Foreshore Building Line and these would act to reduce potential erosion of land surfaces and decrease the sediment wash downslope.

An approved Construction Environment Management Plan (CEMP) must be prepared for the proposal and be provided with the approved application prior to issue of the Construction Certificate to address these potential issues.

4.3.4.3 Potential temporary noise, dust, excessive lighting and vibration disturbance during construction

The effects of temporary but excessive noise, dust, bright lighting and vibration disturbance upon fauna are difficult to predict.

Potential impacts may include negative effects on predator-prey interactions and changes to roosting and breeding behaviours.

An approved Construction Environment Management Plan (CEMP) must be prepared for the proposal and be provided with the approved application prior to issue of the Construction Certificate to address these potential issues.

4.3.5 Indirect impacts

Indirect impacts occur when the proposal or activities relating to the construction or operation of the proposal may affect adjacent or proximal areas of native vegetation, threatened ecological communities or threatened species habitat beyond the subject site.

Potential indirect impacts to flora and fauna would include hydrological changes to the surface water-runoff flow. Additional hard surface areas created as a result of the proposed construction would be expected to potentially result in some changes to the current hydrological regime, however, it is proposed that all water run-off would be directed to the urban stormwater management system.

4.3.6 Prescribed and uncertain impacts

Prescribed impacts on biodiversity values includes any potential impacts that are not a result of direct vegetation clearing or construction development that have been prescribed by the Biodiversity Construction Regulation (2017), these listed in Table 6 as follows:

Attributes or features of the habitat	Potential impacts	Actions to alleviate or ameliorate potential impacts
Species using caves, cliffs, karsts or crevices. Includes potential roosting sites for cave-dwelling microchiropterans (Figure 12)	None, as these features occur below the Foreshore Building Line and will be retained	Not required
Habitat of threatened species associated with rocks	Not applicable	Not applicable
Habitat of threatened species associated with man-made structures	Microchiropteran species may roost in eaves of old buildings and potentially harmed during demolition.	Demolition should be staged such that any roof structures are carefully dismantled allowing bat species to escape
Habitat of threatened species associated with non-native vegetation	Not applicable	Not applicable
Connectivity of habitats within and between allotments facilitating movement of species across their range	Connectivity reduced as canopy trees will be removed	Connectivity still maintained as canopy trees occurring below Foreshore Building Line will be retained and where possible, along the boundaries of the property where TPZ's of canopy trees may be protected (Botanics Tree Wise People 2021)
Movement of threatened species required to maintain life cycles	Some extent of connectivity reduced as canopy trees will be removed but considered insufficient to cause decline in maintenance of life cycles, particularly with regard to avian fauna	Some extent of connectivity reduced as canopy trees will be removed but unlikely to cause decline in maintenance of life cycles, particularly with regard to avian fauna
Hydrological regimes required to sustain threatened species	Not applicable	Not applicable

Table 6 - List of potential prescribed impacts which may occur as a result of proposed development

4.3.7 Avoidance/minimisation of impacts

Avoidance of impacts have been achieved by avoiding any impact on cave or cliff structures that occur below the Foreshore Building Line.

The Tree Protection Zone Management Plan prepared by Botanics Tree Wise People Pty Ltd (2021) indicates that the TPZ of several canopy trees (up to 4) occurring in neighbouring properties would be encroached by between 12 and 22% as a result of the proposed construction. Where possible, tree protection strategies will be undertaken to protect these individuals during construction.

The rooftop gardens proposed for the development would be landscaped to an area of 340m² (Alchemy Architects 2021) with recommended small shrub and ground cover species representative of Pittwater and Wagstaffe Spotted Gum Forest (PCT 1214), the representative species list for the community derived from OEH (2016).

A Vegetation Management Plan should be prepared detailing management actions to protect any retained trees occurring within or adjacent to the construction footprint, as well as a weeding program to remove any HTW weeds from the property following construction.

5 IMPACT SUMMARY

5.1 Serious and irreversible impacts (SAII)

OEH (2017) 'Guidance to Assist a Decision-maker to Determine a Serious and Irreversible Impact' lists the ecological communities and species that are 'potential serious and irreversible impact (SAII) entities'.

Pittwater and Wagstaffe Spotted Gum Forest (PCT 1214) in the Sydney Basin Bioregion is listed as a threatened entity, an endangered ecological community listed on registers of the BC Act (2016).

It is estimated that about 66ha occurs in the reserved area. A total of 275ha occurs within the Sydney Basin Bioregion (OEH 2016). It is estimated that about 76% of its natural distribution has been removed (OEH 2016). The community is not regarded as 'Critically Endangered', a qualification critical to its endangered status and to its assessment as to whether the removal of a small area would constitute a SAII. This small area of a highly degraded patch of the ecological community represents a decrease of just 0.015% of the 275ha of the community that is retained throughout the Sydney Basin IBRA region, and it is considered that the biodiversity offset would compensate for this very small decrease in extent of the community in the locality and in the wider regional area.

5.2 Impacts that require an Offset

Table 7 summarises the impact to areas of PCT 1214 that require an offset.

Vegetation Zone (Description)	PCT	Extent of area impacted	Current Vegetation Integrity Score (VIS)	Future Vegetation Integrity Score	Number of Ecosystem credits required
Patch of highly degraded Pittwater and Wagstaffe Spotted Gum Forest	1214	0.0421ha	31.4	0	1

(Figures 4, 5, 6 & 13)

6 BIODIVERSITY CREDIT REPORT

For this proposed development at 189 Riverview Road, Avalon Beach, one (1) credit is assessed as having been generated with the loss of 0.0421ha of a highly degraded form of the Pittwater and Wagstaffe Spotted Gum Forest ecological community

The vegetation is assessed as being highly degraded in the shrub and ground strata. Individuals of canopy trees have been retained but the lower strata have been highly modified and degraded (Figures 4, 5 & 6).

The Biodiversity Credit Report for the proposal is as follows:



BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00026680/BAAS18125/21/00026681	AVALON BEACH	10/06/2021
Assessor Name	Assessor Number	BAM Data version *
PETER STRICKER	BAAS18125	45
Proponent Names	Report Created	BAM Case Status
JAMIE DURIE	17/07/2021	Finalised
Assessment Revision	Assessment Type	Date Finalised
0	Part 4 Developments (Small Area)	17/07/2021
BOS entry trigger	* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.	
BOS Threshold: Biodiversity Values Map		

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		
Species		
Nil		

Additional Information for Approval

Assessment Id	Proposal Name
00026680/BAAS18125/21/00026681	AVALON BEACH



BAM Biodiversity Credit Report (Like for like)

PCTs With Customized Benchmarks

PCT

No Changes

Predicted Threatened Species Not On Site

Assessment Id

00026680/BAAS18125/21/00026681

Proposal Name

AVALON BEACH

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BAM Biodiversity Credit Report (Like for like)

Name
Dasyurus maculatus / Spotted-tailed Quoll
Lathamus discolor / Swift Parrot
Miniopterus australis / Little Bent-winged Bat
Miniopterus orianae oceanensis / Large Bent-winged Bat
Micronomus norfolkensis / Eastern Coastal Free-tailed Bat
Ninox connivens / Barking Owl
Pandion cristatus / Eastern Osprey
Phascolarctos cinereus / Koala
Saccolaimus flaviventris / Yellow-bellied Sheath-tail-bat
Tyto novaehollandiae / Masked Owl
Varanus rosenbergi / Rosenberg's Goanna
Anthochaera phrygia / Regent Honeyeater
Callocephalon fimbriatum / Gang-gang Cockatoo
Glossopsitta pusilla / Little Lorikeet
Hieraaetus morphnoides / Little Eagle
Petroica boodang / Scarlet Robin
Daphoenositta chrysoptera / Varied Sittella
Artamus cyanopterus cyanopterus / Dusky Woodswallow
Pseudomys novaehollandiae / New Holland Mouse
Hirundapus caudacutus / White-throated Needle-tail

Assessment Id

00026680/BAAS18125/21/00026681

Proposal Name

AVALON BEACH

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BAM Biodiversity Credit Report (Like for like)

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
1214-Pittwater Spotted Gum forest	Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion	0.0	0	1	1

1214-Pittwater Spotted Gum forest	Like-for-like credit retirement options					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
	Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion This includes PCT's: 1214, 1589	-	1214_Poor	No	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

Assessment Id
00026680/BAAS18125/21/00026681

Proposal Name
AVALON BEACH

7 REFERENCES AND LITERATURE REVIEWED

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Appendix 1 - Field Data for Plot 1 at 189 Riverview Road, Avalon Beach

AVALON BEACH Q1			Covers	Native	Trees	Shrubs	Forb	Grass	Fern	Other	Exotic	High Threat	Zone	Easting (1)	Northing (1)
			# spp	Count	Count	Count	Count	Count	Count	Count	Count	Count	56	-33.617317	151.316869
					6	1	1	0	0	1	13	9	UTM	Orientation	282°W
			Sum Cover	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Attributes 20X50m plot Stem classes		
Species	Cover	Abundance			53	2	1	0	0	1	80	70			
<i>Allocasuarina torulosa</i>	10	4											80+	1	
<i>Ceratopetalum gummiferum</i>	2	1											50-79	5	
<i>Corymbia maculata</i>	25	4											30-49	8	
<i>Cupaniopsis anacardioides</i>	2	2											20-29	8	
<i>Dichondra repens</i>	1	100											10-19	2	
<i>Eucalyptus punctata</i>	7	1											5-9		
<i>Eucalyptus umbra</i>	7	2											<5	1	
<i>Macrozamia communis</i>	1	1													
<i>Pittosporum undulatum</i>	2	1											Hollows	0	
													Length of logs (m)	4	
													Litter cover	7	
													Hard surfaces	15	
													Rock	0	

Appendix 2: Floristic species assemblage recorded in Plot 1 (quadrat 18 x 22m) in front yard of 189 Riverview Road, Avalon Beach

<p>KEY</p> <p>Status * - exotic HTW - High Threat Weed BIOSECURITY WEED - Priority weeds listed for Greater Sydney (DPI 2021) pl - landscaped planting</p> <p>Vegetation Degraded form of Pittwater and Wagstaffe Spotted Gum Forest</p> <p>Relative cover value (% cover in 22 x 18m quadrat)</p>

STATUS	SCIENTIFIC NAME	COMMON NAME	SUBJECT AREA
	GYMNOSPERMAE: CONIFERALES		
	Zamiaceae <i>Macrozamia communis</i>	Burrawang	1
	MAGNOLIOPSIDA: MAGNOLIDAE		
	Anacardiaceae <i>Cupaniopsis anacardioides</i>	Tuckeroo	2
BIOSECURITY WEED	Bignoniaceae <i>Dolichandra unguis-cati</i>	Cat's Claw Creeper	2
	Casuarinaceae <i>Allocasuarina torulosa</i>	Forest Oak	10
	Convolvulaceae <i>Dichondra repens</i>	Kidney Weed	1
	Cunoniaceae <i>Ceratopetalum gummiferum</i>	Christmas Bush	2

STATUS	SCIENTIFIC NAME	COMMON NAME	SUBJECT AREA
	Myrtaceae		
	<i>Corymbia maculata</i>	Spotted Gum	25
	<i>Eucalyptus punctata</i>	Grey Gum	7
	<i>Eucalyptus umbra</i>	Broad-leaved White Mahogany	7
pl	<i>Syzgium australe</i>	Brush Cherry	5
pl	<i>Syzgium oleosum</i>	Blue Lilly Pilly	1
	Ochnaceae		
*	<i>Ochna serrulata</i>	Mickey Mouse Plant	0.5
	Oleaceae		
*	<i>Jasmine polyanthemum</i>	White Jasmine	5
C4	<i>Ligustrum lucidum</i>	Large-leaved Privet	10
	Pittosporaceae		
	<i>Pittosporum undulatum</i>	Sweet Pittosporum	2
	Proteaceae		
pl	<i>Stenocarpus sinuatus</i>	Firewheel Tree	2
	Sapindaceae		
HTW	<i>Cardiospermum grandiflorum</i>	Balloon Vine	25
	Solanaceae		
*	<i>Solanum nigrum</i>	Black Nightshade	1
	Urticaceae		
HTW	<i>Parietaria judaica</i>	Asthma Weed	5
	MAGNOLOPSIDA: LILIDAE		
	Anthericaceae		
HTW	<i>Chlorophytum comosum</i>	Ribbon Plant	5
	Asparagaceae		
BIOSECURITY WEED	<i>Asparagus aethiopicus</i>	Asparagus Fern	5
	Commelinaceae		
HTW	<i>Tradescantia fluminensis</i>	Wandering Jew	25
	Poaceae		
*	<i>Ehrhata erecta</i>	African Veldt Grass	2

STATUS	SCIENTIFIC NAME	COMMON NAME	SUBJECT AREA
*pl	Strelitzaceae <i>Strelitzia nicolai</i>	Bird-of-paradise Tree	1
*	Zingiberaceae <i>Hedychium gardneranum</i>	Wild Ginger	1

**LEGEND TO APPENDIX 1 - BIOSECURITY WEEDS IN NORTHERN BEACHES COUNCIL LGA
(Department of Primary Industries 2021)**

SPECIES	BIOSECURITY STATUS
<u>Cat's Claw Creeper</u> <i>Dolichandra unguis-cati</i>	Prohibition on dealings <i>Must not be imported into the State or sold</i>
<u>Ground Asparagus</u> <i>Asparagus aethiopicus</i>	Prohibition on dealings <i>Must not be imported into the State or sold</i>

Appendix 3 - BAAS Profile for P Stricker



Profile PETER STRICKER

Phone (2) ▼
0403081902

Email
acs@actinotus.com.au

BAM Assessor Accreditation Number
BAAS18125

Title

Work Phone
0403081902

Name
PETER STRICKER

Mobile
0403081902

Email
acs@actinotus.com.au

Account Record Type
Person Account

Customer Number
C-005058

Assessor Accreditation

BAM Assessor Accreditation Number ⓘ
BAAS18125

Accreditation Valid From
18/07/2018

Accreditation Valid To
17/07/2021

Accreditation Renewal Start Date
17/04/2021

Accreditation Renew End Date
17/10/2021

Public Register Details (hover info icon below for details)

I Agree to public register terms ⓘ

OEH Assessor Public register Url
[Click Here](#)

Public Register Email Address
acs@actinotus.com.au

Public Register Phone Number
0403081902

Preferred Work Location
Greater Sydney

Description
SF18/18450

Appendix 3 - BAM Summary Reports

Proposal Details

Assessment Id 00026680/BAAS18125/21/00026681	Proposal Name AVALON BEACH	BAM data last updated * 10/06/2021
Assessor Name PETER STRICKER	Report Created 17/07/2021	BAM Data version * 45
Assessor Number BAAS18125	BAM Case Status Finalised	Date Finalised 17/07/2021
Assessment Revision 0	Assessment Type Part 4 Developments (Small Area)	BOS entry trigger BOS Threshold: Biodiversity Values Map

* 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)	BC Act Listing status	EPBC Act listing status	Species sensitivity to gain class (for BRW)	Biodiversity risk weighting	Potential SAIL	Ecosystem credits
Pittwater Spotted Gum forest											
1	1214_Poor	Not a TEC	31.4	31.4	0.04			High Sensitivity to Potential Gain	2.00		1
										Subtotal	1
										Total	1

BAM Credit Summary Report

Pittwater Spotted Gum forest											
1	1214_Poor	Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion	31.4	31.4	0.04	Endangered Ecological Community	Not Listed	High Sensitivity to Potential Gain	2.00	TRUE	1
										Subtotal	1
										Total	1

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAll	Species credits



BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00026680/BAAS18125/21/00026681	AVALON BEACH	10/06/2021
Assessor Name	Assessor Number	BAM Data version *
PETER STRICKER	BAAS18125	45
Proponent Name(s)	Report Created	BAM Case Status
JAMIE DURIE	17/07/2021	Finalised
Assessment Revision	Assessment Type	Date Finalised
0	Part 4 Developments (Small Area)	17/07/2021
BOS entry trigger	* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.	
BOS Threshold: Biodiversity Values Map		

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		
Species		
Nil		

Additional Information for Approval

PCTs With Customized Benchmarks

PCT

No Changes

Predicted Threatened Species Not On Site

Assessment Id

00026680/BAAS18125/21/00026681

Proposal Name

AVALON BEACH

Page 1 of 3

Predicted Threatened Species Not On Site

Name
Dasyurus maculatus / Spotted-tailed Quoll
Lathamus discolor / Swift Parrot
Miniopterus australis / Little Bent-winged Bat
Miniopterus orianae oceanensis / Large Bent-winged Bat
Micronomus norfolkensis / Eastern Coastal Free-tailed Bat
Ninox connivens / Barking Owl
Pandion cristatus / Eastern Osprey
Phascolarctos cinereus / Koala
Saccolaimus flaviventris / Yellow-bellied Sheath-tail-bat
Tyto novaehollandiae / Masked Owl
Varanus rosenbergi / Rosenberg's Goanna
Anthochaera phrygia / Regent Honeyeater
Callocephalon fimbriatum / Gang-gang Cockatoo
Glossopsitta pusilla / Little Lorikeet
Hieraaetus morphnoides / Little Eagle
Petroica boodang / Scarlet Robin
Daphoenositta chrysoptera / Varied Sittella
Artamus cyanopterus cyanopterus / Dusky Woodswallow
Pseudomys novaehollandiae / New Holland Mouse
Hirundapus caudacutus / White-throated Needletail

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

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AVALON BEACH

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BAM Biodiversity Credit Report (Variations)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired	
1214-Pittwater Spotted Gum forest	Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion	0.0	0	1	1.00	
1214-Pittwater Spotted Gum forest	Like-for-like credit retirement options					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion This includes PCT's: 1214, 1589	-	1214_Poor	No	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	
Wet Sclerophyll Forests (Grassy sub-formation)	Tier 3 or higher threat status	1214_Poor	No	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**

Assessment Id

00026680/BAAS18125/21/00026681

Proposal Name

AVALON BEACH

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Proposal Details

Assessment Id 00026680/BAAS18125/21/00026681	Proposal Name AVALON BEACH	BAM data last updated * 10/06/2021
Assessor Name PETER STRICKER	Report Created 17/07/2021	BAM Data version * 45
Assessor Number BAAS18125	Assessment Type Part 4 Developments (Small Area)	BAM Case Status Finalised
Assessment Revision 0	Date Finalised 17/07/2021	BOS entry trigger BOS Threshold: Biodiversity Values Map

* 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.

List of Species Requiring Survey

Name	Presence	Survey Months
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Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
Bauer's Midge Orchid	Genoplesium baueri	Habitat degraded
Diuris bracteata	Diuris bracteata	Habitat degraded
Hygrocybe aurantipes	Hygrocybe aurantipes	Habitat degraded
Large Bent-winged Bat	Miniopterus orianae oceanensis	Habitat degraded
Large-eared Pied Bat	Chalinolobus dwyeri	Habitat degraded
Little Bent-winged Bat	Miniopterus australis	Habitat degraded
Regent Honeyeater	Anthochaera phrygia	Habitat degraded
Scrub Turpentine	Rhodamnia rubescens	Habitat degraded
Swift Parrot	Lathamus discolor	Habitat degraded

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00026680/BAAS18125/21/00026681	AVALON BEACH	10/06/2021
Assessor Name	Report Created	BAM Data version *
PETER STRICKER	17/07/2021	45
Assessor Number	Assessment Type	BAM Case Status
BAAS18125	Part 4 Developments (Small Area)	Finalised
Assessment Revision	BOS entry trigger	Date Finalised
0	BOS Threshold: Biodiversity Values Map	17/07/2021

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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)
Glossy Black-Cockatoo	<i>Calyptorhynchus lathami</i>	1214-Pittwater Spotted Gum forest
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	1214-Pittwater Spotted Gum forest
Large Bent-winged Bat	<i>Miniopterus orianae oceanensis</i>	1214-Pittwater Spotted Gum forest
Powerful Owl	<i>Ninox strenua</i>	1214-Pittwater Spotted Gum forest

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

Common Name	Scientific Name	Plant Community Type(s)
Barking Owl	<i>Ninox connivens</i>	1214-Pittwater Spotted Gum forest
Dusky Woodswallow	<i>Artamus cyanopterus cyanopterus</i>	1214-Pittwater Spotted Gum forest
Eastern Coastal Free-tailed Bat	<i>Micronomus norfolkensis</i>	1214-Pittwater Spotted Gum forest
Eastern Osprey	<i>Pandion cristatus</i>	1214-Pittwater Spotted Gum forest
Gang-gang Cockatoo	<i>Callocephalon fimbriatum</i>	1214-Pittwater Spotted Gum forest

Koala	<i>Phascolarctos cinereus</i>	1214-Pittwater Spotted Gum forest
Little Bent-winged Bat	<i>Miniopterus australis</i>	1214-Pittwater Spotted Gum forest
Little Eagle	<i>Hieraaetus morphnoides</i>	1214-Pittwater Spotted Gum forest
Little Lorikeet	<i>Glossopsitta pusilla</i>	1214-Pittwater Spotted Gum forest
Masked Owl	<i>Tyto novaehollandiae</i>	1214-Pittwater Spotted Gum forest
New Holland Mouse	<i>Pseudomys novaehollandiae</i>	1214-Pittwater Spotted Gum forest
Regent Honeyeater	<i>Anthochaera phrygia</i>	1214-Pittwater Spotted Gum forest
Rosenberg's Goanna	<i>Varanus rosenbergi</i>	1214-Pittwater Spotted Gum forest
Scarlet Robin	<i>Petroica boodang</i>	1214-Pittwater Spotted Gum forest
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	1214-Pittwater Spotted Gum forest
Swift Parrot	<i>Lathamus discolor</i>	1214-Pittwater Spotted Gum forest
Varied Sittella	<i>Daphoenositta chrysoptera</i>	1214-Pittwater Spotted Gum forest
White-throated Needle-tail	<i>Hirundapus caudacutus</i>	1214-Pittwater Spotted Gum forest
Yellow-bellied Shearwater	<i>Saccolaimus flaviventris</i>	1214-Pittwater Spotted Gum 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
Barking Owl	<i>Ninox connivens</i>	Refer to BAR
Dusky Woodswallow	<i>Artamus cyanopterus cyanopterus</i>	Refer to BAR
Eastern Coastal Free-tailed Bat	<i>Micronomus norfolkensis</i>	Refer to BAR
Eastern Osprey	<i>Pandion cristatus</i>	Refer to BAR
Gang-gang Cockatoo	<i>Callocephalon fimbriatum</i>	Refer to BAR
Koala	<i>Phascolarctos cinereus</i>	Refer to BAR
Little Bent-winged Bat	<i>Miniopterus australis</i>	Refer to BAR
Little Eagle	<i>Hieraaetus morphnoides</i>	Refer to BAR
Little Lorikeet	<i>Glossopsitta pusilla</i>	Refer to BAR
Masked Owl	<i>Tyto novaehollandiae</i>	Refer to BAR

BAM Predicted Species Report

New Holland Mouse	<i>Pseudomys novaehollandiae</i>	Refer to BAR
Regent Honeyeater	<i>Anthochaera phrygia</i>	Refer to BAR
Rosenberg's Goanna	<i>Varanus rosenbergi</i>	Refer to BAR
Scarlet Robin	<i>Petroica boodang</i>	Refer to BAR
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	Refer to BAR
Swift Parrot	<i>Lathamus discolor</i>	Refer to BAR
Varied Sittella	<i>Daphoenositta chrysoptera</i>	Refer to BAR
White-throated Needletail	<i>Hirundapus caudacutus</i>	Refer to BAR
Yellow-bellied Sheath-tail-bat	<i>Saccolaimus flaviventris</i>	Refer to BAR

Proposal Details

Assessment Id	Assessment name	BAM data last updated *
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Assessor Name	Report Created	BAM Data version *
PETER STRICKER	17/07/2021	45
Assessor Number	Assessment Type	BAM Case Status
BAAS18125	Part 4 Developments (Small Area)	Finalised
Assessment Revision	Date Finalised	BOS entry trigger
0	17/07/2021	BOS Threshold: Biodiversity Values Map

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Vegetation Zones

#	Name	PCT	Condition	Area	Minimum number of plots	Management zones
1	1214_Poor	1214-Pittwater Spotted Gum forest	Poor	0.04	1	

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Proposal Name
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Biodiversity payment summary report

Assessment Id	Payment data version	Assessment Revision	Report created
00026680/BAAS18125/21/00026681		0	17/07/2021
Assessor Name	Assessor Number	Proposal Name	BAM Case Status
PETER STRICKER	BAAS18125	AVALON BEACH	Finalised
Assessment Type	Date Finalised	BOS entry trigger	
Part 4 Developments (Small Area)	17/07/2021	BOS Threshold: Biodiversity Values Map	

PCT list

Price calculated	PCT common name	Credits
Yes	1214 - Pittwater Spotted Gum forest	1

Species list

Price calculated	Species	Credits
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Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Assessment Id	Proposal Name
00026680/BAAS18125/21/00026681	AVALON BEACH



Biodiversity payment summary report

IBRA sub region	PCT common name	Threat status	Offset trading group	Risk premium	Administrative cost	Methodology adjustment factor	Price per credit	No. of ecosystem credits	Final credits price
Pittwater	1214 - Pittwater Spotted Gum forest	No	Southern Lowland Wet Sclerophyll forests >=70% and <90%	19.12%	\$119.90	0.5081	\$3,690.39	1	\$3,690.39
Subtotal (excl. GST)									\$3,690.39
GST									\$369.04
Total ecosystem credits (incl. GST)									\$4,059.43

Species credits for threatened species

Species profile ID	Species	Threat status	Price per credit	Risk premium	Administrative cost	No. of species credits	Final credits price
No species available							

No species available

Grand total							\$4,059.43
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Assessment Id

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Proposal Name

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