

Biodiversity Development Assessment Report

Construction of a dwelling house

100 Hilltop Road, Avalon Beach

*Prepared by Ecological Consultants Australia PTY LTD TA
Kingfisher Urban Ecology and Wetlands*

22 April 2025



About this document



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Summary

Ecological Consultants Australia Pty Ltd, trading as Kingfisher Urban Ecology and Wetlands, has been engaged to prepare a Biodiversity Development Assessment Report (BDAR) for a proposed development at 100 Hilltop Road, Avalon Beach (the subject land).

The proposed development is for the construction of a dwelling house and associated works.

The legislative pathway for the proposed development or activity to be considered is development that requires consent under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), with Northern Beaches Council as the consent authority.

The proposal requires the clearing of native vegetation identified on the Biodiversity Values (BV) Map, triggering the requirement for an accredited assessor to assess the impacts of the proposal on biodiversity values through the application of the Biodiversity Assessment Method (BAM).

The site contains 0.1 hectares (ha) of Plant Community Type (PCT) 3234 – Hunter Coast Lowland Spotted Gum Moist Forest.

PCT 3234 is associated with the Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion Endangered Ecological Community (EEC), listed under the *Biodiversity Conservation Act 2016* (BC Act). This EEC is a Serious and Irreversible Impacts (SII) entity.

PCT 3234 occurs in one condition state within the subject land – moderate, with a Vegetation Integrity (VI) score of 42.4.

The Large-eared Pied Bat (*Chalinolobus dwyeri*) and the Eastern Cave Bat (*Vespadelus troughtoni*) were recorded during acoustic surveys conducted on the subject land from 24 November to 12 December 2024, using a Ranger recorder (Titely Scientific). Both species are listed as SII entities.

The proposal would result in the clearing and modification of 0.1 ha of Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion EEC.

The proposal would involve clearing vegetation and habitat across half of the subject land for the construction of the new house, carport, and driveway. Vegetation and habitat within the backyard would be retained and managed as a bushland regeneration area, preserving connectivity between neighbouring properties.

Indirect impacts associated with the proposal include edge effects, noise generated from machinery during works, light spill, transport of weeds and pathogens from the site to adjacent vegetation, trampling of vegetation, and erosion and sedimentation impacts during construction works.

Direct, indirect, and prescribed impacts associated with the proposed development will be mitigated through the implementation of mitigation measures, including (but not limited to):

- A minimum of two nest boxes installed within the retained Pittwater Spotted Gum Forest at the rear of the property.
- A pre-clearance survey to be undertaken no more than seven days prior to the commencement of clearing by the Project Ecologist. Any vegetation clearance must be supervised by the Project Ecologist.
- Temporary exclusion fencing must be erected to mark the approved clearing limit and the vegetation to be retained. Signage must be attached to the fencing to inform contractors of the exclusion zone and the importance of the Pittwater and Wagstaffe Spotted Gum Forest EEC.
- Appropriate erosion and sediment control must be erected and maintained during construction to avoid indirect impacts on the retained Pittwater and Wagstaffe Spotted Gum Forest EEC.
- A Vegetation Management Plan (VMP) must be prepared to guide the rehabilitation, planning, implementation, monitoring and maintenance of Pittwater Spotted Gum Forest EEC at the rear of the property. Any revegetation works proposed in the VMP must ensure that 100% of the

planting list incorporates native vegetation listed in the Final Determination for Pittwater Spotted Gum Forest EEC¹.

- Weed and pathogen control measures will be detailed in the VMP and implemented during construction and for the life of the development.
- Any hollows removed during vegetation clearing will be salvaged and relocated within the rear of the property to provide supplementary habitat for native fauna.
- All storage, stockpiles, and laydown sites must be located away from any native vegetation that is proposed for retention.
- Any landscaping works undertaken around the new house, carport, or driveway ensure that at least 80% of the planting list incorporates native vegetation listed in the Final Determination for Pittwater Spotted Gum Forest EEC.

Table E1 identifies impacts that require an offset – ecosystem credits. Table E2 identifies impacts that require an offset – species credits.

Table E1 Impacts that require an offset – ecosystem credits

Vegetation zone	PCT	TEC/EC	Impact area (ha)	Number of ecosystem credits required
1	3234-Hunter Coast Lowland Spotted Gum Moist Forest	Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion	0.1	2

Table E2 Impacts that require an offset – species credits

Common name	Scientific name	Loss of habitat (ha) or individuals	Number of species credits required
Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>	0.1	3
Eastern Cave Bat	<i>Vespadelus troughtoni</i>	0.1	3

¹ NSW Scientific Committee, 2005. Final Determination: Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion Endangered Ecological Community. Available at: <https://www2.environment.nsw.gov.au/sites/default/files/pittwater-wagstaffe-spotted-gum-forest-nsw-scientific-committee-final-determination.pdf>

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Shortened forms

AHD	Australian Height Datum
APZ	asset protection zone
AOBV	area of outstanding biodiversity value
BAM	biodiversity Assessment Method
BAM-C	biodiversity Assessment Method Calculator
BC Act	<i>Biodiversity Conservation Act 2016 (NSW)</i>
BC Regulation	Biodiversity Conservation Regulation 2017 (NSW)
BCT	Biodiversity Conservation Trust
BDAR	Biodiversity Development Assessment Report
BOS	Biodiversity Offsets Scheme
CEEC	critically endangered ecological community
DBH	diameter at breast height over bark
EC	ecological community listed under the EPBC Act
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)</i>
EP&A Act	<i>Environmental Planning and Assessment Act 1979 (NSW)</i>
EEC	endangered ecological community
HTW	high threat weed
IBRA	Interim Biogeographic Regionalisation for Australia
LGA	local government area
LLS Act	<i>Local Land Services Act 2013 (NSW)</i>
NPW Act	<i>National Parks and Wildlife Act 1974 (NSW)</i>
NSW	New South Wales
PCT	plant community type
SAII	serious and irreversible impact
TBDC	threatened Biodiversity Data Collection
TEC	threatened ecological community
VEC	Vulnerable ecological community

Declarations

i. Certification under clause 6.15 *Biodiversity Conservation Act 2016*

I, Brooke Thompson, 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: 22 April 2025

BAM Assessor Accreditation no: BAAS24037

This BDAR has been prepared to meet the requirements of BAM 2020. Appendix I assesses compliance with the minimum information requirements outlined in BAM Appendix K.

ii. Details and experience of author/s and contributors

Name	BAM Assessor Accreditation no.	Position	Tasks performed	Relevant qualifications
Brooke Thompson	BAAS24037	Senior Ecologist Ecological Consultants Australia Pty Ltd	Report preparation BAM-C data entry and analysis Figure preparation BAM plot surveys Targeted threatened species surveys	BSc. Conservation Biology

iii. Conflict of interest

I, Brooke Thompson, declare that I have considered the circumstances and there is no actual, perceived or potential conflict of interest.

This declaration has been made in the interests of full disclosure to the decision-maker. Full disclosure has also been provided to the client.

Signature:



Date: 22 April 2025

BAM Assessor Accreditation no: BAAS24037

Stage 1: Biodiversity assessment

1 Introduction

1.1 Proposed development

1.1.1 Development overview

The proposed development is for the construction of a dwelling house and associated works.

The legislative pathway for the proposed development or activity to be considered is a development that requires consent under Part 4 of the EP&A Act and Northern Beaches Council is the consent authority.

1.1.2 Subject land

The subject land is legally described as Lot 2 of DP 260241, located at 100 Hilltop Road, Avalon Beach NSW 2107. It is a 0.1-hectare vacant block containing remnant native bushland (see details in Table 1.1). The location of the subject land is shown in Figure 1.1.

Table 1.1. Subject land details.

Legal description	Lot 2 DP 260241
Address	100 Hilltop Road, Avalon Beach NSW 2107
LGA	Northern Beaches Council
Area	0.1 ha
Land zoning	C4 – Environmental Living
LEP	Pittwater Local Environmental Plan 2014
DCP	Pittwater 21 Development Control Plan

1.1.3 Proposed development and the subject land

The proposed development involves the construction of a new house, carport, and driveway (Figure 1.2).

The proposal requires the clearing of twenty-two trees for the house, carport, driveway, and the establishment of an Asset Protection Zone (APZ), as outlined in the Arboricultural Impact Assessment and Bushfire Hazard Assessment.

The entire property would be managed as an Inner Protection Area (IPA) in accordance with the Bushfire Hazard Assessment. Appendix 4 of Planning for Bushfire Protection 2019 (NSW RFS) specifies the standards that must be met within an APZ.

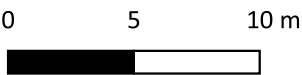
The proposal includes planting fifty Wattle Mat-rush (*Lomandra filiformis*) at the front of the property and one Sydney Red Gum (*Angophora costata*) at the rear, as detailed in the Landscape Plan (Appendix V). The rear of the property would be designated as a bushland regeneration area, with a minimum two-year commitment to plant replacement and ongoing weed management.

Construction access will be via Hilltop Road. Temporary sediment fencing will be installed around the construction site, as specified in the Stormwater Plan (Appendix VI). Stockpiles will be located to the north of the proposed dwelling footprint and enclosed with sediment fencing.

1.1.4 Other documentation

The following documentation relates to the proposed development and has been referenced in this assessment:

- Arboricultural Impact Assessment (Arbor Logix, 16 July 2024)
- Bushfire Hazard Assessment (Bushfire Planning and Design, 25 June 2024)
- Geotechnical Investigation (White Geotechnical Group, 30 July 2024)
- Landscape Plan (Andrew Davies, 14 February 2025)
- Master Set (Oliver Keaveney, 14 June 2024)
- Stormwater (NITMA Consulting Pty Ltd, 1 July 2024)



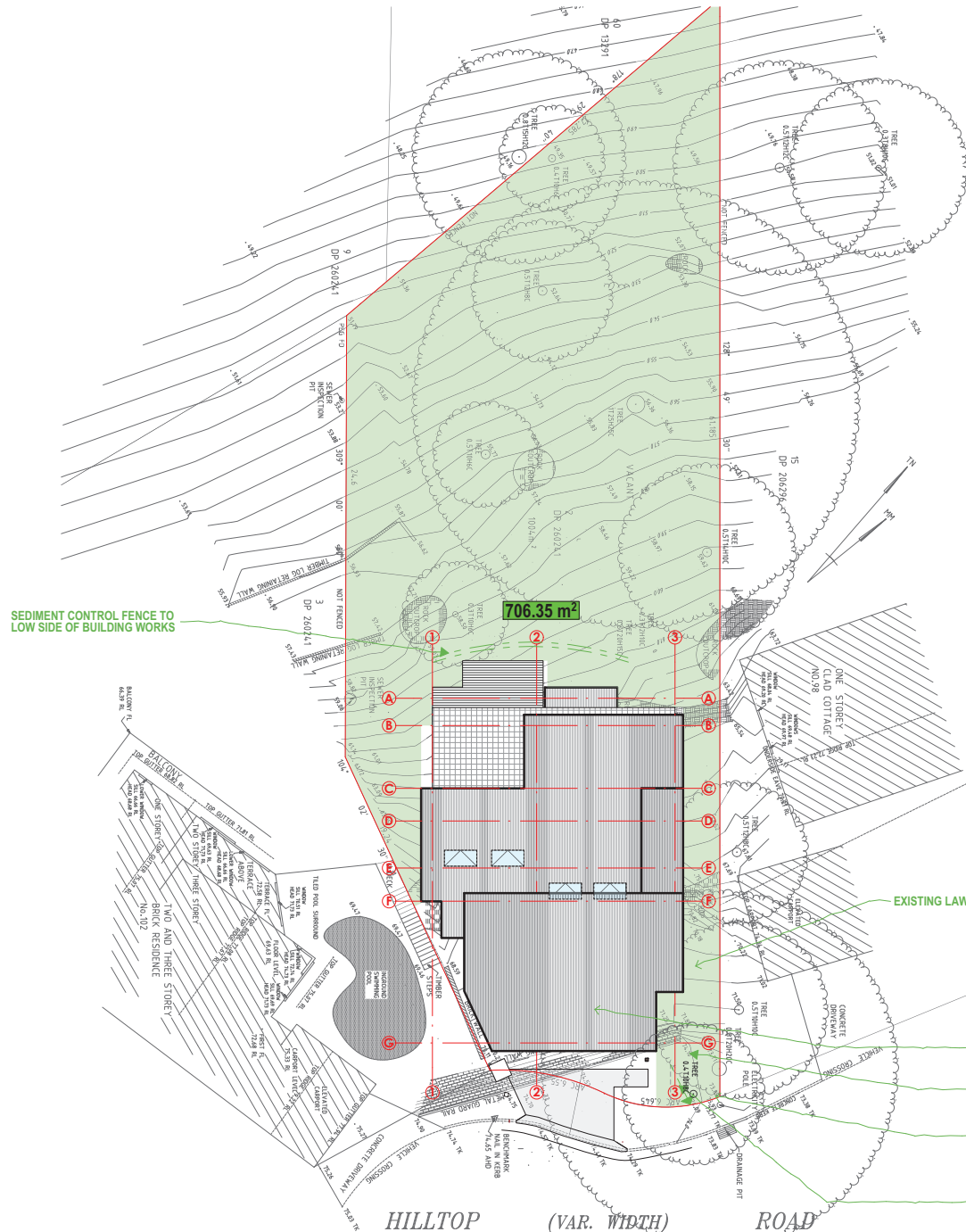
100 Hilltop Road, Avalon Beach

Figure 1.1. Subject land.

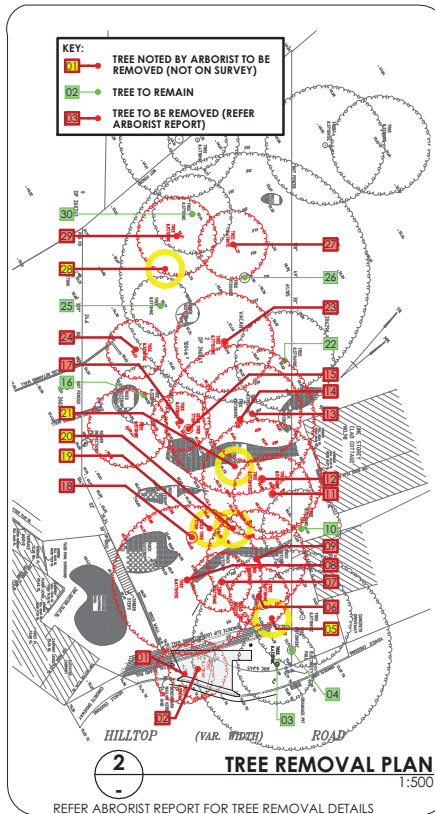
Coordinate system: GDA 94 / NSW Lambert
Imagery: Nearmap 23 November 2024

Legend

- | | | |
|-------------------------|----------------|----------------------------|
| Subject land | Stockpile | Bushland regeneration area |
| Lot | Absorption pit | |
| Proposed dwelling house | Silt fence | |



- NOTES:
- RIDGE & GUTTER LEVELS HAVE BEEN DETERMINED BY REMOTE METHODS & ARE APPROXIMATE ONLY.
 - DENOTES SPOT HEIGHT POSITION
 - TREE DIMENSIONS ARE APPROXIMATE ONLY.
 - NO SERVICES SEARCH HAS BEEN UNDERTAKEN. ONLY THOSE SERVICES STRUCTURES EVIDENT & VISIBLE AT THE TIME OF SURVEY HAVE BEEN LOCATED. DIAL 100 BEFORE YOU DIG FOR SERVICES CONFIRMATION.
 - BOUNDARIES SHOULD BE MARKED PRIOR TO ANY CONSTRUCTION
 - THE PROPERTY IS SUBJECT TO COVENANT C243319
 - THE PROPERTY IS SUBJECT TO RESTRICTIONS ON THE USE OF LAND DP260241



- CONNECT ALL DOWNPIPES TO RAINWATER TANKS VIA 100 DIA. PIPE
RAINWATER TANK OVERFLOW TO DETENTION BASIN VIA 100 DIA. PIPE
- PROPOSED ON-SITE SORTING & STORAGE AREA TO BE USED FOR WASTE MATERIAL & MATERIAL STORAGE IN GARAGE
- STORMWATER BASIN STORAGE AREA TO BE CONFIRMED AS PART OF CONSTRUCTION CERTIFICATE
- SECURITY FENCING TO SITE FRONT BOUNDARY
REFER DRAWING A3.6 FOR ADDITIONAL DRIVEWAY DETAILS
- LAY 200x100x6 RHS (GALV) TO KERB AT 1% MIN. GRADE, WHERE CONCENTRATED FLOWS ARE LESS THAN 20l/s. ALTERNATIVELY, ALLOW FLOWS TO OVERFLOW FROM A CONVERTOR AT THE BOUNDARY AS UNCONCENTRATED FLOWS WHERE THEY EXCEED 20l/s

NOTES
This drawing shall be read in conjunction with all other drawings and specifications for the project.
Any discrepancies shall be referred to the architect for clarification before proceeding with work.
All dimensions shall be verified on site prior to commencement of construction or fabrication on and off site.
Figured dimensions to be used rather than scaling.
All building work must be carried out in accordance with the Building Code of Australia and all relevant Australian Standards.
CAD Ref: 18546Keaveney-V27.pln DRAWN BY: SH

LEGEND

OLIVER KEAVENEY
UNIT 4/101 DARLEY ST
MONA VALE NSW 2103
oliver@oak.net.au

PROJECT
KEAVENEY HOUSE
100 HILLTOP ROAD
AVALON BEACH NSW
LOT:2 DP:260241
NEW DWELLING
DEVELOPMENT APPLICATION
CLIENT
OLIVER KEAVENEY
UNIT 4/101 DARLEY ST
MONA VALE NSW 2103
DRAWING TITLE

**LANDSCAPE /
STORMWATER**

REVISION
DEVELOPMENT APPLICATION
PLOT DATE
14/06/24
SCALES
A3 1:250
PROJECT NO.
18456
DRAWING NO.
A1.4
DATE
14 JUN 2024

1.2 Biodiversity Offsets Scheme entry

A Biodiversity Development Assessment Report (BDAR) is required to accompany a development application if the proposed development is likely to 'significantly affected threatened species' and the Biodiversity Offsets Scheme (BOS) will apply.

Section 7.2 of the *Biodiversity Conservation Act 2016* (BC Act) states that a development will 'significantly affect threatened species' if:

- it is likely to significantly affect threatened species or ecological communities, or their habitats, according to the test in section 7.3, or
- the development exceeds the biodiversity offsets scheme threshold if the BOS applies to the impacts of the development on biodiversity values, or
- it is carried out in a declared area of outstanding biodiversity value.

The BOS threshold is established by section 7.2(1)(b) of the BC Act and clause 7.1(1) of the Biodiversity Conservation Regulation 2017 (BC Regulation).

The threshold has two components:

- whether the amount of native vegetation being cleared exceeds a threshold area
- whether the development involves clearing of native vegetation or prescribed impacts on an area mapped on the biodiversity values map published by the Minister for the Environment.

1.2.1 Area clearing threshold

The area clearing threshold is one of the thresholds used to determine if a BDAR must accompany a development application.

The area clearing thresholds are set out in clause 7.2(1) of the BC Regulation as per Table 1.2.

The minimum lot size associated with the subject property is 700 m². The proposed development would clear 0.1 hectares of native vegetation and thus does not trigger the area clearing threshold.

Table 1.2. Area clearing thresholds.

Minimum lot size associated with the property	Threshold for clearing above which a BDAR is required
Less than 1 hectare	0.25 hectares or more
1 hectare to less than 40 hectares	0.5 hectares or more
40 hectares to less than 1000 hectares	1 hectare or more
1000 hectares or more	2 hectares or more

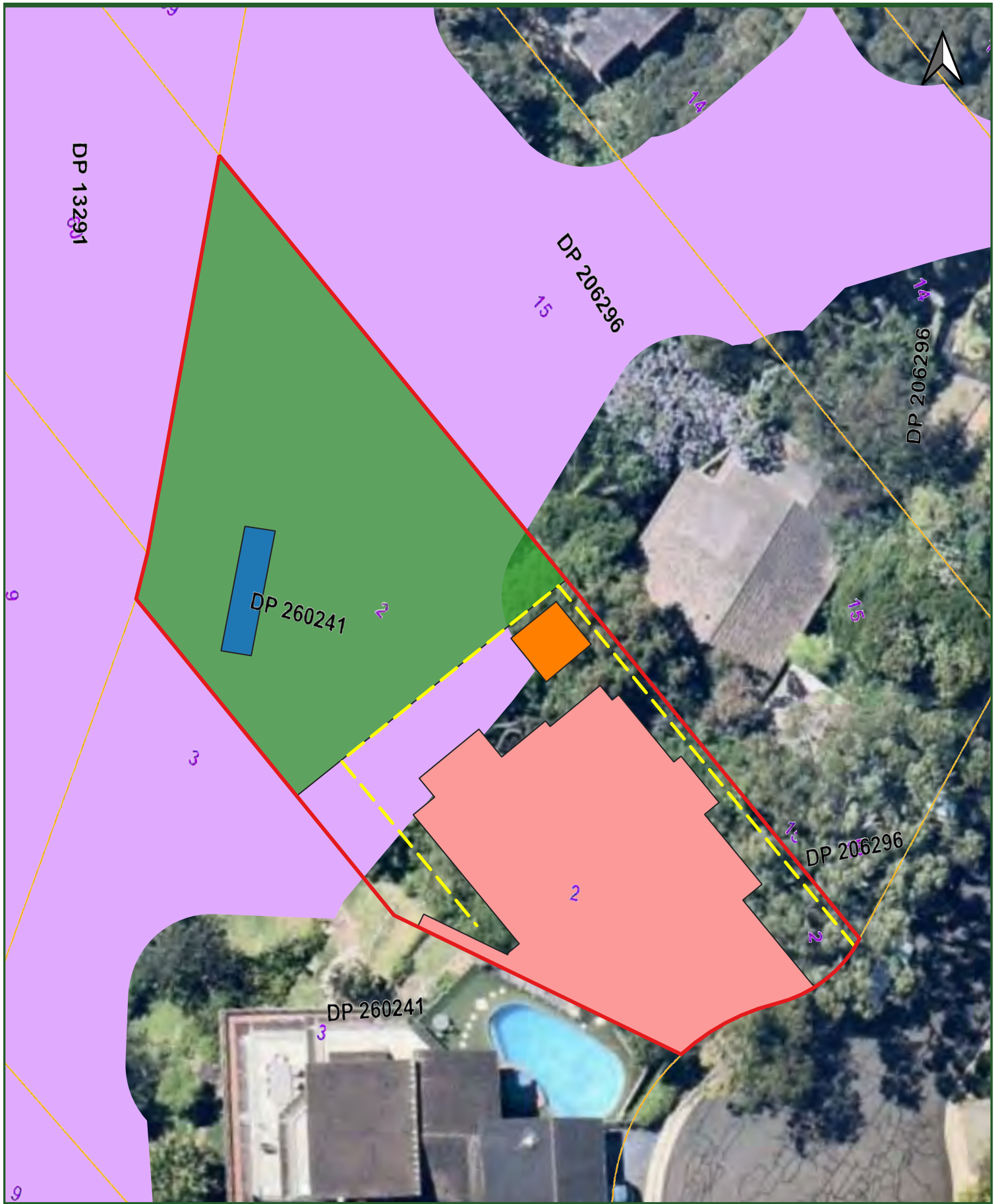
1.2.2 Biodiversity Values Map

Clearing of any native vegetation on an area mapped on the Biodiversity Values Map will trigger the requirement to prepare a BDAR for a development application under Part 4 of the EP&A Act (local development).

The subject land contains areas mapped on the Biodiversity Values Map. The proposal would require clearing of native vegetation within the biodiversity values mapped area as shown in Figure 1.3.

1.2.3 Assessment method

The proposal has been assessed under the BAM Streamlined assessment module – Small area, which may be used in accordance with the area clearing threshold shown in Table 12 of the BAM (which in this case is a minimum lot size of less than 1 ha and clearing of <1 ha).



0 5 10 m











100 Hilltop Road, Avalon Beach

Figure 1.3. Biodiversity Values Map.

Coordinate system: GDA 94 / NSW Lambert
Imagery: Nearmap 23 November 2024

Legend

- | | | |
|--|--|--|
|  Subject land |  Stockpile |  Bushland regeneration area |
|  Lot |  Absorption pit |  Biodiversity Values Map |
|  Proposed dwelling house |  Silt fence | |

1.3 Matters of national environmental significance

The EPBC Act is Australia's main national environmental legislation, which provides for the protection and management of nationally and internationally important plants, animals, habitats and places. The EPBC Act refers to the living things (including plants and animals), habitats and places that need protecting as 'matters of national environmental significance' (MNES). MNES include:

- World Heritage areas
- Commonwealth Heritage places
- wetlands of international importance (listed under the Ramsar Convention)
- listed threatened species and listed ecological communities
- listed migratory species (protected under international agreements)
- Commonwealth marine areas
- Great Barrier Reef Marine Park
- nuclear actions (including uranium mines)

Under the EPBC Act an action will require approval from the minister if the action has, will have, or is likely to have, a significant impact on any of the above listed MNES. The general test for significance is whether an impact is 'important, notable or of consequence, having regard to its context or intensity'.

Appendix II provides an assessment of the *Matters of National Environmental Significance Significant Impact Guidelines 1.1* (DoE 2013) with respect to threatened species and migratory species that could utilise the subject land.

On the basis of the assessment, it is not likely that the proposed development will have a significant impact on any matters of national environmental significance listed under the EPBC Act. Referral of the development application to the Commonwealth Department of Climate Change, Energy, the Environment and Water is not warranted.

1.4 Information sources

Information sources used to inform this BDAR have been provided in the following sections.

1.4.1 Spatial data

GIS layer	Reference
NSW Interim Biogeographic Regions of Australia (IBRA region and subregion)	IBRA Version 7 https://datasets.seed.nsw.gov.au/dataset/interim-biogeographic-regionalisation-for-australia-ibra-version-7-subregions
Rivers, streams, estuaries and wetlands	NSW Hydrography https://datasets.seed.nsw.gov.au/dataset/nsw-hydrography Directory of Important Wetlands in Australia https://www.dcceew.gov.au/water/wetlands/australian-wetlands-database/directory-important-wetlands
NSW (Mitchell) Landscapes	NSW (Mitchell) Landscapes Version 3.1 https://datasets.seed.nsw.gov.au/dataset/nsw-mitchell-landscapes-version-3-1
Biodiversity Values Map	Biodiversity Values Map Edition 16.2 https://datasets.seed.nsw.gov.au/dataset/biodiversity-values-map
NSW Cadastre	NSW Cadastre Web Service https://datasets.seed.nsw.gov.au/dataset/nsw-cadastre-web-service

GIS layer	Reference
Native vegetation extent	NSW State Vegetation Type Map Edition C2.0M2.0 https://datasets.seed.nsw.gov.au/dataset/nsw-state-vegetation-type-map NSW Six Map
Soil landscapes	Soil Landscapes of Central and Eastern NSW https://datasets.seed.nsw.gov.au/dataset/published-soil-landscapes-of-central-and-eastern-nsw37d37 eSPADE https://www.environment.nsw.gov.au/eSpade2Webapp/
Aerial imagery	NSW Six Map, Nearmap and Historical Imagery Viewer

1.4.2 Web sites and documents

Title	Web link
BAM 2020	https://www.environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-method-2020
Biodiversity Assessment Method 2020 Operational Manual – Stage 1	https://www.environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-manual-2020-operational-manual-stage-1
Biodiversity Assessment Method Operational Manual Stage 2	https://www.environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-method-operational-manual-stage-2
BioNet Threatened Biodiversity Data Collection (TBDC)	https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/nsw-bionet
NSW BioNet Atlas	https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/nsw-bionet
Biodiversity Values Map and Threshold tool	https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BOSETMap
Native Vegetation Regulatory Map	https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=DraftNVRmap
Protected Matters Search Tool	https://www.dccew.gov.au/environment/epbc/protected-matters-search-tool
SEED Data Portal	https://www.seed.nsw.gov.au/
PlantNET	https://plantnet.rbgsyd.nsw.gov.au/search/simple.htm
Descriptions for NSW (Mitchell) Landscapes Version 2 (2002)	https://www.environment.nsw.gov.au/resources/conservation/landscapesdescriptions.pdf
Surveying threatened plants and their habitats NSW survey guide for the Biodiversity Assessment Method	https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/surveying-threatened-plants-and-habitats-nsw-survey-guide-biodiversity-assessment-method-200146.pdf
'Species credit' threatened bats and their habitats NSW survey guide for the Biodiversity Assessment Method	https://www.environment.nsw.gov.au/research-and-publications/publications-search/species-credit-threatened-bats-nsw-survey-guide-for-biodiversity-assessment-method

2 Methods

2.1 Landscape features

2.1.1 Landscape features

An investigation of the subject land and assessment area was undertaken as per Section 3.1 of the BAM (DPE 2020) to provide context for the landscape features detailed in Section 3.2.

The assessment area was established using GIS software to include the subject land and a 1500 m buffer surrounding the boundary of the subject land.

2.1.2 Native vegetation cover

Native vegetation cover and habitat connectivity have been assessed in relation to native vegetation cover across a broader area as per Sections 3.1.3 and 3.2 of the BAM (DPE 2020).

The native vegetation cover was used to assess the habitat suitability of the subject land for threatened species. Areas of connectivity determine the extent of habitat that may facilitate the movement of threatened species across their range.

Areas of native vegetation were confirmed using information collected during the site assessment, as well as the latest Nearmap aerial imagery with reference to the NSW State Vegetation Type Map (DCCEEW 2024).

2.2 Native vegetation, threatened ecological communities and vegetation integrity

2.2.1 Existing information

A review of the NSW State Vegetation Type Map (DCCEEW 2024) was used to assist in the identification of Plant Community Types (PCTs) within and surrounding the subject land.

The best-fit PCT was determined based on the floristic attributes and descriptions within the BioNet Vegetation Classification database and the vegetation plot data collected during field surveys. The BioNet Vegetation Classification PCT Filter Tool with reference to previous vegetation mapping was also used to assist in the identification of PCTs.

2.2.2 Mapping native vegetation extent

The extent of native vegetation within the subject land was confirmed using information collected during the field assessment, as well as the latest Nearmap aerial imagery.

2.2.3 Plot-based vegetation survey

A systematic plot-based floristic vegetation survey was undertaken as per BAM Subsection 4.2.1. The sampling plot location was chosen as representative of the type and condition of vegetation that is proposed to be impacted for the proposed development.

2.2.4 Vegetation integrity survey

The vegetation integrity survey was conducted in accordance with BAM Subsection 4.3.4. A standard plot (20 m x 50 m) did not fit within the subject land. When a standard plot cannot fit into a vegetation zone, a longer and narrower or wider and shorter plot may be used, as outlined in Section 3.4.1 of the BAM Operational Manual – Stage 1 (DPIE 2020).

For this survey, a 400 m² plot (approximately 12 m x 33 m) was used to assess composition and structure attributes (cover and abundance), and a 1,000 m² plot (approximately 12 m x 83 m) was used to assess function attributes (number of large trees, stem size classes, tree regeneration and lengths of logs).

2.3 Threatened flora survey methods

2.3.1 Review of existing information

A list of threatened flora and associated habitat constraints and geographic limitations, predicted to occur in the subject land, was automatically generated using the BAM-C based on site context including IBRA region and subregion, predicted PCTs and NSW (Mitchell) Landscape.

Aerial imagery, soil landscapes, contour maps and vegetation maps were also reviewed to identify habitat constraints for threatened species.

Habitat constraints and microhabitat were further identified and considered during the field assessment.

2.3.2 Habitat constraints assessment

Using the existing information (Section 2.3.1), field assessments were undertaken to confirm the presence of associated habitat and microhabitat constraints.

Hollow bearing trees (HBTs) were recorded, and any other potential habitat such as stick nests, rocks and large woody debris, were noted and used to inform targeted threatened fauna surveys required. Transects were walked across the subject land to ensure any habitat constraints were identified.

2.3.3 Field surveys

The field surveys were conducted over four days (refer to details in Table 2.1). This survey effort included collection of BAM plot data, habitat assessment and targeted threatened species searches as applicable at the time of the assessment.

Flora surveys were conducted following the Department of Planning Industry and Environment's *Surveying threatened plants and their habitats – NSW survey guide for the Biodiversity Assessment Method 2020*. Search effort was reduced in areas very strongly dominated by exotic weed species which would preclude the presence of the target species.

Ecologists conducted walking transects across the subject land to search for the species or suitable habitat for the species.

2.4 Threatened fauna survey methods

2.4.1 Review of existing information

A list of threatened fauna and associated habitat constraints and geographic limitations, predicted to occur in the subject land, was automatically generated using the BAM-C based on site context including IBRA region and subregion, NSW (Mitchell) Landscape and PCTs.

Soil mapping and topography were also used to provide further context on habitat constraints for threatened fauna.

Habitat constraints and microhabitat were further identified and considered during the field assessment.

2.4.2 Habitat constraints assessment

The likelihood of threatened species occurrence within the subject land was informed by field surveys and the presence of suitable habitat. Field surveys focused on searches for habitat constraints (e.g. water bodies, rocky areas, tree hollows), including microhabitats, present within the subject land and immediate surrounds. Potential habitat constraints within the broader area (1,500m buffer) were assessed using soil, topography and recent vegetation mapping.

Field survey and flora search transects enabled further identification of habitat constraints and microhabitats.

2.4.3 Field surveys

Field surveys included walked transects to search for listed species or assess habitat values or constraints associated with each species, as applicable at the time of the assessment (refer to Figure 2.1 Field survey locations).

Threatened species searches were undertaken in accordance with BAM guidance materials listed in Section 1.4.2. The surveys focused on targeted assessment, conducted within the BAM-required survey period for each species.

2.5 Weather conditions

Table 2.1 documents weather conditions on the days of the surveys, as provided for the Terry Hills AWS and Mona Vale Golf Club weather station.

Table 2.1. Environmental conditions during threatened species surveys.

Survey undertaken (e.g., method / targeted species)	Date	Time	Temperature ¹ (min. & max.)	Wind (light, mod...)	Rainfall ² (mm)	Other conditions relevant to the species
BAM plots, species/habitat transects	24 April 2024	All day	16.1 – 25.1	Light	0	N/A
Species/habitat transects	11 October 2024	All day	14.2 – 16.5	Light	0	N/A
Species/habitat transects, set up ultrasonic bat detector	24 November 2024	Afternoon	17.6 – 28.1	Light	0.2	N/A
Species/habitat transects, pick up ultrasonic bat detector	12 December 2024	Afternoon	15.7 – 28.5	Light	0	N/A

2.6 Limitations

Limitations of the study may arise where certain cryptic species of plants may occur as soil-stored seed or as subterranean vegetation structures. Some species are identifiable above ground only after environmental circumstances related to factors such as periodic fire frequency, intensity or seasonality, soil moisture regime, biological life-cycle patterns as in the case of small plants such as species of orchids, etc.

Surveys, even throughout one year, cannot be expected to detect the presence of all species occurring, or likely to occur, in the study area. This is because some species may (a) occur seasonally, (b) utilise different areas periodically (as a component of a more extensive home range), or (c) become dormant during specific periods of the year.



100 Hilltop Road, Avalon Beach

Figure 2.1. Field survey locations.

Coordinate system: GDA 94 / NSW Lambert
Imagery: Nearmap 23 November 2024

Legend

- ▭ Subject land
- ▭ Plot 400sqm
- Plot midline
- Survey tracks
- Ranger

3 Site context

3.1 Assessment area

The assessment area includes the subject land and the area of land within a 1500 m buffer around the edge of the subject land.

3.2 Landscape features

Landscape features identified within assessment area are shown in Figure 3.1. A discussion of relevant landscape features is provided below in Table 3.1.

Landscape features identified within the subject land are shown in Figure 1.1.

Table 3.1. Landscape features.

IBRA Bioregion	Sydney Basin
IBRA Sub-region	Pittwater
NSW (Mitchell) landscape	Belrose Coastal Slopes
Topography	<p>The subject land has a steep slope descending toward the northwest and features sandstone rock outcrops, as shown in the Boundary Identification Survey (Appendix VII).</p> <p>At the Hilltop roadside, the land sits at 74 m Australian Height Datum (AHD), gradually falling to 46 m AHD in the northwest.</p>
Geology	<p>The subject land is underlain by the Newport Formation of the Narrabeen Group, which consists of interbedded laminite, shale, and quartz to lithic quartz sandstone.</p> <p>A band of medium-strength sandstone lies beneath the proposed house site, extending through the otherwise shale-dominated profile.</p>
Soils	<p>The subject land is situated on the Watagan soil landscape, characterised by rolling to very steep hills on fine-grained Narrabeen Group sediments.</p> <p>This landscape has a local relief of 50-220m and slopes exceeding 25%. It features narrow convex crests and ridges, steep colluvial sideslopes, and occasional sandstone boulders and benches.</p> <p>The Narrabeen Group comprises a variety of rock types including quartz-lithic sandstone, siltstone, claystone, conglomerate, and shale.</p>
Groundwater	<p>Normal groundwater seepage is expected to flow over the buried rock surface and through natural cracks.</p> <p>Given the elevation of the block, the water table is expected to be several metres below the base of the proposed works.</p>
Surface water	<p>No evidence of surface flow was observed on the property during the inspection.</p> <p>Normal sheet wash from the slope above is expected to be intercepted by the street drainage system on Hilltop Road.</p>
Rivers, streams, estuaries and wetlands	<p>The subject land is located immediately south of a mapped first-order Strahler hydroline which flows northwest to Pittwater.</p> <p>The assessment area contains eleven first-order Strahler hydrolines.</p>

Habitat connectivity	The entire subject land is vegetated and maintains canopy connectivity with habitat on adjacent properties. The continuity of midstorey and ground layer vegetation is disrupted by local roads and residential development.
Karst, caves, crevices, cliffs, rocks and other geological features of significance	The subject land features sandstone rock outcrops but does not contain any karst formations, caves, crevices, or cliffs. To the southeast, within the assessment area, Angophora Reserve includes rocky areas that may contain caves, overhangs, escarpments, outcrops, and crevices.
Areas of outstanding biodiversity value	There are no areas of outstanding biodiversity value within the subject land or assessment area.
Soil hazard features	No geotechnical hazards were observed beside the property. The steep slope that falls across the property and continues above and below is a potential hazard.

3.3 Native vegetation cover

Table 3.2 summarises the extent of native vegetation cover within the assessment area. Native vegetation cover within the assessment area is shown in Figure 3.2.

Table 3.2. Native vegetation cover in the assessment area.

Assessment area (ha)	730.05 ha
Total area of native vegetation cover (ha)	178.23 ha
Percentage of native vegetation cover (%)	24.41% (rounded to 24% in the BAM-C)
Class (0-10, 10-30, 30-70 or >70%)	10-30













0 250 500 m



100 Hilltop Road, Avalon Beach

Figure 3.1. Landscape assessment.

Legend

- | | | |
|--|--|--|
|  Subject land |  IBRA subregion |  NSW Mitchell landscape |
|  Assessment area |  Pittwater |  Belrose Coastal Slopes |
|  Watercourse |  Sydney - Newcastle |  Barriers and Beaches |
|  Waterbody | | |

Coordinate system: GDA 94 / NSW Lambert
Imagery: Nearmap 23 November 2024








0 250 500 m



Legend

-  Subject land
-  Assessment area
-  Native vegetation cover

100 Hilltop Road, Avalon Beach

Figure 3.2. Native vegetation cover.

Coordinate system: GDA 94 / NSW Lambert
Imagery: Nearmap 23 November 2024



4 Native vegetation, threatened ecological communities and vegetation integrity

4.1 Native vegetation extent

4.1.1 Changes to the mapped native vegetation extent

The site comprises remnant native bushland, characterised by a native canopy and an understorey predominantly composed of weed species.

There are no differences between the actual native vegetation extent and that shown on the aerial imagery used in the figures. The native vegetation cover within the subject land has been measured at approximately 0.1 hectares in extent, as shown in Figure 4.1.

4.1.2 Areas that are not native vegetation

The midstorey and groundlayer is dominated by weeds. These include local priority weeds: Asparagus Fern (*Asparagus aethiopicus*), Cassia (*Senna pendula* var. *glabrata*), Chinese Celtis (*Celtis sinensis*), Crofton Weed (*Ageratina adenophora*), Lantana (*Lantana camara*), Morning Glory (*Ipomoea indica*), Ochna (*Ochna serrulata*), Broad-leaf Privet (*Ligustrum lucidum*), Small-leaf Privet (*Ligustrum sinense*), and Trad (*Tradescantia fluminensis*).

Other exotic plants include *Jacaranda mimosifolia* (Jacaranda), *Nephrolepis cordifolia* (Fishbone Fern), and *Plumeria* sp. (Frangipani).

4.2 Plant community types

4.2.1 Overview

Vegetation within the subject land has been assessed as aligning with the BioNet Vegetation Classification PCTS identified in Table 4.1 and their extent is shown in Figure 4.2.



PCT ID	PCT name	Subject land area (ha)
3234	Hunter Coast Lowland Spotted Gum Moist Forest	0.1 (entire site)
Total area		0.1 (entire site)



0 5 10 m



Legend

-  Subject land
-  Native vegetation extent

100 Hilltop Road, Avalon Beach

Figure 4.1. Native vegetation extent.

Coordinate system: GDA 94 / NSW Lambert
Imagery: Nearmap 23 November 2024



0 10 20 m



Legend

- Subject land
- Plot 400sqm
- Plot midline
- PCT 3234 - Hunter Coast Lowland Spotted Gum Moist Forest

100 Hilltop Road, Avalon Beach

Figure 4.2. Plant community types.

Coordinate system: GDA 94 / NSW Lambert
Imagery: Nearmap 23 November 2024

4.2.2 PCT 3234 – Hunter Coast Lowland Spotted Gum Moist Forest

4.2.2.1 PCT overview

Table 4.2 presents data contained within the BioNet Vegetation Classification for PCT 3234, and data obtained for the subject land.

Table 4.2. PCT 3234 – Hunter Coast Lowland Spotted Gum Moist Forest

PCT ID	3234
PCT name	Hunter Coast Lowland Spotted Gum Moist Forest
Vegetation formation	Wet Sclerophyll Forests (Grassy sub-formation)
Vegetation class	Northern Hinterland Wet Sclerophyll Forests
Per cent cleared value (%)	28
Extent within subject land (ha)	0.1



Photo 1. Looking into the subject land from Hilltop Road.



Photo 2. Looking into the subject land from the southwest corner.



Photo 3. View of the subject land from Hilltop Road cul-de-sac.



Photo 4. Looking upslope toward 98 Hilltop Road.



Photo 5. Looking downslope from the central portion of the subject land.



Photo 6. Looking upslope into the subject land from the rear boundary.



Photo 7. Sandstone rock outcrop surrounded by Pittwater Spotted Gum Forest.



Photo 8. Midstorey layer dominated by *Lantana camara* (Lantana) and *Ochna serrulata* (Ochna) with *Ipomoea indica* (Morning Glory) smothering much of the midstorey vegetation and extending into the canopy.



Photo 9. Rock outcrop within proposed operational footprint.



Photo 10. Midstorey and ground layer dominated by exotic species such as *Hypoestes aristata*, *Asparagus aethiopicus* (Asparagus Fern), and *Nephrolepis cordifolia* (Fishbone Fern).



Photo 11. Vegetation to the northeast of the subject land included in the vegetation integrity survey plot to assess function attributes.



Photo 12. Clearing on neighbouring property encroached into the subject land.

4.2.2.2 Condition states

This PCT occurs in one condition state – Moderate, with a VI score of 36.1.

4.2.2.3 Justification of PCT selection

Table 4.3 presents the selected search criteria entered into the NSW BioNet Vegetation Classification PCT Filter Tool to identify PCTs within the subject land.

Table 4.3. PCT 3234 – Hunter Coast Lowland Spotted Gum Moist Forest.

PCT 3234 – Hunter Coast Lowland Spotted Gum Moist Forest		
Justification of PCT selection	Search Term	Selection
	IBRA Bioregion	Sydney Basin
	IBRA Sub-region	Pittwater
	Vegetation Formation	Wet Sclerophyll Forests (Grassy sub-formation) Wet Sclerophyll Forests (Shrubby sub-formation)
	Upper Stratum Species	<i>Allocasuarina torulosa</i> , <i>Angophora costata</i> , <i>Ceratopetalum gummiferum</i> , <i>Corymbia gummifera</i> , <i>Corymbia maculata</i> (not present but abundant within landscape), <i>Eucalyptus eugenioides</i> , <i>Glochidion ferdinandi</i>
	Long list	Returned a long list of 14 PCTs: 3239, 3262, 3259, 3136, 3230, 3234, 3242, 3176, 3263, 3237, 3087, 3155, 3216 and 3141.
	Mid Stratum Species	<i>Breynia oblongifolia</i> , <i>Pittosporum undulatum</i> , <i>Myrsine variabilis</i> , <i>Wilkiea hugeliana</i>
	Short list	Returned a short list of 6 PCTs: 3239, 3230, 3234, 3242 and 3262.

	Selection	<p>PCT 3239 discarded as this PCT very frequently <i>Syncarpia glomulifera</i> with <i>Angophora euryphylla</i>, <i>Eucalyptus crebra</i> and <i>Eucalyptus sparsifolia</i> which were not recorded.</p> <p>PCT 3230 discarded as this PCT very frequently includes <i>Angophora floribunda</i> and <i>Syncarpia glomulifera</i> which were not recorded.</p> <p>PCT 3242 discarded as this PCT very frequently includes <i>Syncarpia glomulifera</i> with <i>Eucalyptus acmenoides</i>, <i>Eucalyptus saligna</i> and <i>Eucalyptus paniculata</i> which were not recorded.</p> <p>PCT 3262 discarded as this PCT is dominated by <i>Syncarpia glomulifera</i> which was not recorded.</p> <p>PCT 3234 was selected as the most likely PCT. PCT 3234 is mapped within the site as per the NSW State Vegetation Type Map.</p>
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4.2.2.4 Alignment with TECs

This PCT is associated with the Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion Endangered Ecologist Community (EEC) listed under the BC Act.

4.2.2.5 Alignment with EPBC Act listed ECs

This PCT is not associated with an EC listed under the EPBC Act.

4.3 Threatened ecological communities

Table 4.4 documents the threatened ecological communities (TECs) identified within the subject land.

Table 4.4. TECs within the subject land.

TEC name	BC Act status	EPBC Act status	Associated vegetation zones within the subject land	Area within subject land (ha)
Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion	Endangered	Not listed	Zone 1	0.1

4.4 Vegetation zones

Table 4.5 identifies the vegetation zones and patch sizes within the subject land.

Table 4.5. Vegetation zones and patch sizes

Vegetation zone ID	PCT ID number and name	Condition / other defining features	Area (ha)	Patch size class	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
1	3234-Hunter Coast Lowland Spotted Gum Moist Forest	Moderate	0.1	<input type="checkbox"/> <5 ha <input type="checkbox"/> 5-24 ha <input type="checkbox"/> 25-100 ha <input checked="" type="checkbox"/> >100 ha	1	1	1	1

4.5 Vegetation integrity (vegetation condition)

4.5.1 Vegetation integrity survey plots

The minimum number of plots required were completed as part of this assessment.

4.5.2 Scores

Table 4.6 provides scores for each vegetation zone. Appendix III provides full vegetation survey data.

Table 4.6. Vegetation integrity scores.

Vegetation zone ID	Condition / other defining features	Composition condition score	Structure condition score	Function condition score	Vegetation integrity score	Hollow bearing trees present?
1	Moderate	37.7	40.5	49.9	42.4	Yes

4.5.3 Use of benchmark data

Community Condition Benchmarks as per the BAM calculator (in line with the BioNet Vegetation Classification) was used to assess vegetation integrity attributes in each zone.

5 Habitat suitability for threatened species

5.1 Identification of threatened species for assessment

5.1.1 Ecosystem credit species

Table 5.1 lists ecosystem credit species likely to occur on or use the subject land and the source of information (e.g., automatically populated in BAM-C, recently listed under the BC Act and not yet added to the TBDC, previous ecological reports [environmental impact statements, scientific literature, Council reports, site survey, etc.]).

Table 5.1. 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	Sensitivity to gain class
		BC Act	EPBC Act						
Black Bittern	<i>Ixobrychus flavicollis</i>	Vulnerable	Not Listed	No	BAM-C	Yes	N/A	All zones	Moderate
Black-chinned Honeyeater (eastern subspecies)	<i>Melithreptus gularis gularis</i>	Vulnerable	Not Listed	No	BAM-C	Yes	N/A	All zones	Moderate
Brown Treecreeper (eastern subspecies)	<i>Climacteris picumnus victorae</i>	Vulnerable	Vulnerable	No	BAM-C	Yes	N/A	All zones	High
Dusky Woodswallow	<i>Artamus cyanopterus cyanopterus</i>	Vulnerable	Not Listed	No	BAM-C	Yes	N/A	All zones	Moderate
Eastern Coastal Free-tailed Bat	<i>Micronomus norfolkensis</i>	Vulnerable	Not Listed	No	BAM-C	Yes	N/A	All zones	High
Eastern Osprey	<i>Pandion cristatus</i>	Vulnerable	Not Listed	Yes	BAM-C	Yes	N/A	All zones	Moderate

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	Sensitivity to gain class
		BC Act	EPBC Act						
Flame Robin	<i>Petroica phoenicea</i>	Vulnerable	Not Listed	No	BAM-C	Yes	N/A	All zones	Moderate
Gang-gang Cockatoo	<i>Callocephalon fimbriatum</i>	Endangered	Endangered	Yes	BAM-C	Yes	N/A	All zones	Moderate
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	Vulnerable	Vulnerable	Yes	BAM-C	Yes	N/A	All zones	High
Large Bent-winged Bat	<i>Miniopterus orianae oceanensis</i>	Vulnerable	Not Listed	Yes	BAM-C	Yes	N/A	All zones	High
Little Bent-winged Bat	<i>Miniopterus australis</i>	Vulnerable	Not Listed	Yes	BAM-C	Yes	N/A	All zones	High
Little Eagle	<i>Hieraaetus morphnoides</i>	Vulnerable	Not Listed	Yes	BAM-C	Yes	N/A	All zones	Moderate
Little Lorikeet	<i>Glossopsitta pusilla</i>	Vulnerable	Not Listed	No	BAM-C	Yes	N/A	All zones	High
New Holland Mouse	<i>Pseudomys novaehollandiae</i>	Not Listed	Vulnerable	No	BAM-C	Yes	N/A	All zones	High
Regent Honeyeater	<i>Anthochaera phrygia</i>	Critically Endangered	Critically Endangered	Yes	BAM-C	Yes	N/A	All zones	High
Rosenberg's Goanna	<i>Varanus rosenbergi</i>	Vulnerable	Not Listed	No	BAM-C	Yes	N/A	All zones	High
Scarlet Robin	<i>Petroica boodang</i>	Vulnerable	Not Listed	No	BAM-C	Yes	N/A	All zones	Moderate

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	Sensitivity to gain class
		BC Act	EPBC Act						
South-eastern Glossy Black-Cockatoo	<i>Calyptorhynchus lathami lathami</i>	Vulnerable	Vulnerable	Yes	BAM-C	Yes	N/A	All zones	High
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	Vulnerable	Endangered	No	BAM-C	Yes	N/A	All zones	High
Square-tailed Kite	<i>Lophoictinia isura</i>	Vulnerable	Not Listed	Yes	BAM-C	Yes	N/A	All zones	Moderate
Superb Fruit-Dove	<i>Ptilinopus superbus</i>	Vulnerable	Not Listed	No	BAM-C	Yes	N/A	All zones	Moderate
Swift Parrot	<i>Lathamus discolor</i>	Endangered	Critically Endangered	Yes	BAM-C	Yes	N/A	All zones	Moderate
Varied Sittella	<i>Daphoenositta chrysoptera</i>	Vulnerable	Not Listed	No	BAM-C	Yes	N/A	All zones	Moderate
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	Vulnerable	Not Listed	Yes	BAM-C	Yes	N/A	All zones	High
White-throated Needle-tail	<i>Hirundapus caudacutus</i>	Vulnerable	Vulnerable	No	BAM-C	Yes	N/A	All zones	High
Yellow-bellied Sheath-tail-bat	<i>Saccolaimus flaviventris</i>	Vulnerable	Not Listed	No	BAM-C	Yes	N/A	All zones	High

5.1.2 Species credit species

Tables 5.2 (flora) and 5.3 (fauna) list all predicted species credit species (e.g. automatically populated in BAM-C, recently listed under the BC Act and not yet added to the TBDC) and the relevant source of information (e.g. previous ecological reports, environmental impact statements, scientific literature, Council reports, site survey etc.).

Table 5.2. 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				
Eastern Australian Underground Orchid	<i>Rhizanthella slateri</i>	Vulnerable	Endangered	BAM-C	Yes	N/A	All zones
Scrub Turpentine	<i>Rhodamnia rubescens</i>	Critically Endangered	Critically Endangered	BAM-C	Yes	N/A	All zones
Native Guava	<i>Rhodomyrtus psidioides</i>	Critically Endangered	Critically Endangered	BAM-C	Yes	N/A	All zones

Table 5.3. Predicted fauna 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				
Regent Honeyeater	<i>Anthochaera Phrygia</i>	Critically Endangered	Critically Endangered	BAM-C	No	Species is excluded based on habitat constraints. The subject land is not located within mapped areas of important habitat.	N/A
Swift Parrot	<i>Lathamus discolor</i>	Endangered	Critically Endangered	BAM-C	No	Species is excluded based on habitat constraints.	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				
						The subject land is not located within mapped areas of important habitat.	
Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>	Vulnerable	Endangered	BAM-C	Yes	N/A	All zones
Eastern Cave Bat	<i>Vespadelus troughtoni</i>	Vulnerable	Not Listed	BAM-C	Yes	N/A	All zones
Little Bent-winged Bat	<i>Miniopterus australis</i>	Vulnerable	Not Listed	BAM-C	No	Species is excluded based on habitat constraints. The subject land does not contain caves, tunnels, mines, culverts or other structures known or suspected to be used for breeding including species records in BioNet with microhabitat code 'IC – in cave' observation type code 'E nest-roost' with numbers of individuals >500 or from the scientific literature.	N/A
Large Bent-winged Bat	<i>Miniopterus orianae oceanensis</i>	Vulnerable	Not Listed	BAM-C	No	Species is excluded based on habitat constraints. The subject land does not contain caves, tunnels, mines, culverts or other structures known or suspected to be used for breeding including species records in BioNet with microhabitat code 'IC – in cave' observation type code 'E nest-roost' with numbers of individuals >500 or from the scientific literature.	N/A

5.2 Presence of candidate species credit species

Tables 5.4 (flora) and 5.5 (fauna) list the remaining candidate species credit species and identify those confirmed to be present within the subject land based on:

- Assumed presence within the subject land,
- An important habitat map (for dual credit species),
- Targeted threatened species surveys, or
- An expert report,

in accordance with BAM Subsection 5.2.4.

Table 5.4. Determining 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?
		BC Act	EPBC Act			
Eastern Australian Underground Orchid	<i>Rhizanthella slateri</i>	Vulnerable	Endangered	Targeted threatened species survey	No	No
Scrub Turpentine	<i>Rhodamnia rubescens</i>	Critically Endangered	Critically Endangered	Targeted threatened species survey	No	No
Native Guava	<i>Rhodomyrtus psidioides</i>	Critically Endangered	Critically Endangered	Targeted threatened species survey	No	No

Table 5.5. Determining 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?
		BC Act	EPBC Act			
Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>	Vulnerable	Endangered	Targeted threatened species survey	Yes	Yes
Eastern Cave Bat	<i>Vespadelus troungtoni</i>	Vulnerable	Not Listed	Targeted threatened species survey	Yes	Yes

5.3 Threatened species surveys

Tables 5.6 (flora) and 5.7 (fauna) present the survey effort where targeted threatened species surveys were used to determine presence of the species.

Table 5.6. 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)
Eastern Australian Underground Orchid	<i>Rhizanthella slateri</i>	Transects	<input checked="" type="checkbox"/> Yes Daytime 11 October 2024 24 November 2024	<input type="checkbox"/> No <Dates & times>	2 days, 2 people	No	No
Scrub Turpentine	<i>Rhodamnia rubescens</i>	Transects	<input checked="" type="checkbox"/> Yes Daytime 24 April 2024 11 October 2024 24 November 2024 12 December 2024	<input type="checkbox"/> No <Dates & times>	4 days, 2 people	No	No
Native Guava	<i>Rhodomyrtus psidioides</i>	Transects	<input checked="" type="checkbox"/> Yes Daytime 24 April 2024 11 October 2024 24 November 2024 12 December 2024	<input type="checkbox"/> No <Dates & times>	4 days, 2 people	No	No

Table 5.7. Threatened species surveys for candidate fauna 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 (e.g., harp trap, Elliot trap, bioacoustics, etc.)	Timing of survey – within recommended period? (BAM-C / TBDC)		Effort (hours & no. people)		
Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>	Passive acoustic detection	<input checked="" type="checkbox"/> Yes 24 November to 12 December 2024	<input type="checkbox"/> No <Dates & times>	16 nights	Yes	Yes
Eastern Cave Bat	<i>Vespadelus troughtoni</i>	Passive acoustic detection	<input checked="" type="checkbox"/> Yes 24 November to 12 December 2024	<input type="checkbox"/> No <Dates & times>	16 nights	Yes	Yes

5.4 Expert reports

No expert reports were used for this assessment.

5.5 More appropriate local data (where relevant)

No local data was used for this assessment.

5.6 Area or count, and location of suitable habitat for a species credit species (a species polygon)

Table 5.8 provides a description of habitat condition for each species polygon.

Table 5.8. Results for present species (recorded within the subject land)

Common name	Scientific name	Biodiversity risk weighting (BAM-C & TBDC)	SAIL 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)
Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>	Very High (3)	Yes	The subject land does not contain breeding habitat.	N/A	0.1	The species polygon boundary should align with all PCTs on the subject land that are within 2 kilometres of identified potential roost habitat features, and with which the species is associated (as listed in the TBDC).	Zone 1: VI – 42.4
Eastern Cave Bat	<i>Vespadelus troughtoni</i>	Very High (3)	Yes	The subject land does not contain breeding habitat.	N/A	0.1	The species polygon boundary should align with all PCTs on the subject land that are within 2 kilometres of identified potential roost habitat features, and with which the species is associated (as listed in the TBDC).	Zone 1: VI – 42.4

Table 5.9. 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)
Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>	N/A	0.1





100 Hilltop Road, Avalon Beach

Figure 5.1. Candidate species credit species records and species polygons.

Coordinate system: GDA 94 / NSW Lambert
Imagery: Nearmap 23 November 2024

Legend

-  Subject land
-  Large-eared Pied Bat
Eastern Cave Bat

6 Identifying prescribed impacts

Table 6.1 identifies prescribed impacts and whether each is relevant to the proposed development.

Table 6.1. 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. Where relevant, threatened species or fauna that are part of a TEC or EC, that are at risk of vehicle strike.
Karst, caves, crevices, cliffs, rocks or other geological features of significance	<input checked="" type="checkbox"/> Yes / <input type="checkbox"/> No	Sandstone outcrops	Sandstone outcrops on the subject land are unlikely to provide habitat for threatened species. The field assessment indicated that there were no caves, crevices, or overhangs that would be used by the species assessed (e.g., Large-eared Pied Bat and Eastern Cave Bat).
Human-made structures	<input type="checkbox"/> Yes / <input checked="" type="checkbox"/> No	N/A	N/A
Non-native vegetation	<input checked="" type="checkbox"/> Yes / <input type="checkbox"/> No	Non-native vegetation is scattered throughout the property (i.e., <i>Lantana camara</i> , <i>Asparagus aethiopicus</i> , <i>Ochna serrulata</i> , <i>Cestrum parqui</i> , <i>Ipomoea indica</i> , <i>Ehrharta erecta</i> , <i>Ligustrum lucidum</i> , <i>Ligustrum sinense</i> , <i>Tradescantia zebrina</i> , <i>Lilium formosanum</i> , <i>Hypoestes aristata</i> , <i>Nephrolepis cordifolia</i> , etc.)	Non-native vegetation within the subject land does not provide habitat for threatened entities.
Habitat connectivity	<input checked="" type="checkbox"/> Yes / <input type="checkbox"/> No	The entire subject land is vegetated and maintains canopy connectivity with habitat on adjacent properties. The continuity of midstorey and ground layer vegetation is disrupted by local roads and residential development but maintained with vegetation at the rear of the property.	Large-eared Pied Bat (<i>Chalinolobus dwyeri</i>) Eastern Cave Bat (<i>Vespadelus troughtoni</i>)
Waterbodies, water quality and hydrological processes	<input type="checkbox"/> Yes / <input checked="" type="checkbox"/> No	N/A	N/A
Wind turbine strikes (wind farm development only)	<input type="checkbox"/> Yes / <input checked="" type="checkbox"/> No	N/A. The proposal is not a wind farm development.	N/A

Vehicle strikes	<input type="checkbox"/> Yes / <input checked="" type="checkbox"/> No	N/A. The proposal would not result in an increased vehicle strike risk.	N/A
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6.1 Habitat connectivity

The Large-eared Pied Bat and Eastern Cave Bat are microchiropteran species that rely on well-connected forested landscapes for foraging, roosting, and movement. Both are vulnerable to prescribed impacts, particularly the loss of canopy connectivity, which can disrupt essential ecological functions.

Canopy connectivity facilitates movement between roosting and foraging areas, reduces exposure to predators and environmental stressors, and supports access to insect prey. Its loss or fragmentation can alter movement patterns and reduce foraging efficiency.

The Large-eared Pied Bat roosts in caves, rock overhangs, and mine shafts, typically near forested habitats. It forages in forested and woodland areas, using the canopy and midstorey for navigation and hunting. The loss of canopy connectivity can increase energy expenditure due to the need to traverse open areas, heighten exposure to predators, particularly raptors, and disrupt movement pathways between roosting and foraging sites, potentially leading to local population declines.

The Eastern Cave Bat roosts in caves, rock crevices, and tree hollows, foraging in structurally complex forested habitats. It primarily flies beneath or along the edges of the canopy, where insect prey is most abundant. The loss of canopy connectivity can reduce access to foraging areas, decrease prey availability, increase mortality risk from exposure when crossing open spaces, and contribute to population isolation, limiting genetic exchange and long-term viability.

Canopy connectivity is a critical ecological feature for both species, supporting essential behaviours such as foraging and commuting. Habitat fragmentation and connectivity loss can increase energy demands, predation risk, and habitat isolation. Avoidance and mitigation measures should prioritise the retention and restoration of continuous canopy corridors to minimise impacts in accordance with BAM 2020.

Stage 2: Impact assessment

7 Avoid and minimise impacts

The BC Act establishes a legal framework for avoiding and minimising before offsetting residual biodiversity impacts. The Act provides that measures to offset or compensate for impacts on biodiversity values may only be undertaken after steps are taken to avoid and minimise those impacts.

In practice, this means proponents must first seek to avoid direct, indirect and prescribed impacts from the proposed development on biodiversity values including native vegetation, threatened species and TECs, and habitat for threatened species and TECs.

Proponents must then minimise any remaining impacts before offsetting them.

The BAM requires that the demonstrable exploration of reasonable avoid and minimise measures on developable land is necessary to meet the avoid and minimise provisions of the BAM and BC Act.

7.1 Avoid and minimise direct and indirect impacts

7.1.1 Avoiding biodiversity impacts

Table 7.1. Summary of measures to avoid impacts on biodiversity values.

Measures considered to avoid impacts on biodiversity values	Measures taken
Alternatives for the location and design of the proposal	<p>There are no alternative locations that would further reduce impacts, as the site is a small 1,000 m² residential block. The proposed house, carport, and driveway footprint are already confined to the front half of the property, with the rear providing habitat connectivity to adjoining properties.</p> <p>The house design incorporates four levels, accommodating four bedrooms, three bathrooms, a family room, kitchen, dining, living, and utility spaces, all within the restricted footprint at the front of the property. This design allows for the retention of a 500 m² bushland regeneration area at the rear of the property.</p>
Consideration of alternative technologies to achieve the same outcome with reduced impacts (e.g. horizontal directional drilling instead of trenching to avoid surface disturbance)	No known alternative technologies were considered.
Details of constraints that have influenced the selection of the proposal's location (e.g. areas of biodiversity, wind modelling for a wind farm development, location of resource deposits for a mine development)	The site is currently a vacant block vegetated with Pittwater Spotted Gum Forest EEC. The proposed location has been carefully selected as the most suitable option to retain and protect the Pittwater Spotted Gum Forest within the site, while accommodating the residential development of the block. The proposal retains a 500 m ² bushland regeneration area at the rear of the property.
Constraints for matters other than biodiversity that might restrict the availability of alternative sites or footprints (e.g. areas of flooding,	<p>There are no alternative sites available, as the property is a small 1,000 m² residential block.</p> <p>There are no alternative footprints that would further reduce impacts. The proposed house, carport, and driveway footprint are already</p>

Measures considered to avoid impacts on biodiversity values	Measures taken
proximity to neighbours with odour or noise concerns, zonings)	confined to the front half of the property, with the rear providing habitat connectivity to adjoining properties.
Consideration of whether the areas of impacts are focused away from threatened species habitat (e.g., karst systems, waterbodies, vegetation corridors) or vegetation with a high VI score	The subject land provides limited habitat for threatened species, primarily serving as foraging habitat for highly mobile species, such as birds and bats. To preserve this habitat, the proposal includes the retention of a 500 m ² bushland regeneration area at the rear of the property, ensuring that critical foraging resources for threatened species are maintained on-site.
Whether the proposed development makes the best use of space (e.g., overlapping infrastructure to minimise impact area)	The proposed house, carport, and driveway footprint have been confined to the front half of the property, thereby retaining a 500 m ² bushland regeneration area at the rear. The design of the house incorporates four levels, accommodating four bedrooms, three bathrooms, family room, kitchen, dining, living, and utility spaces within the restricted footprint.
Mechanisms to assure biodiversity values in avoided areas are not degraded or lost (e.g., a biodiversity management plan (BMP) or vegetation management plan (VMP) required by consent conditions or a conservation agreement).	The bushland regeneration area will be actively managed to ensure biodiversity values are not degraded or lost, with all works guided by a comprehensive VMP.

7.1.2 Minimising biodiversity impacts

Measures proposed to minimise impacts are set out in Section 8.4. These include (but are not limited to):

- A minimum of two nest boxes installed within the retained Pittwater Spotted Gum Forest at the rear of the property.
- A pre-clearance survey to be undertaken no more than seven days prior to the commencement of clearing by the Project Ecologist. Any vegetation clearance must be supervised by the Project Ecologist.
- Temporary exclusion fencing must be erected to mark the approved clearing limit and the vegetation to be retained. Signage must be attached to the fencing to inform contractors of the exclusion zone and the importance of the Pittwater and Wagstaffe Spotted Gum Forest EEC.
- Appropriate erosion and sediment control must be erected and maintained during construction to avoid indirect impacts on the retained Pittwater and Wagstaffe Spotted Gum Forest EEC.
- A Vegetation Management Plan (VMP) will be prepared to guide the rehabilitation, planning, implementation, monitoring and maintenance of Pittwater Spotted Gum Forest EEC at the rear of the property. Any revegetation works proposed in the VMP must ensure that 100% of the planting list incorporates native vegetation listed in the Final Determination for Pittwater Spotted Gum Forest EEC.
- Weed and pathogen control measures will be detailed in the VMP and implemented during construction and for the life of the development.
- Any hollows removed during vegetation clearing will be salvaged and relocated within the rear of the property to provide supplementary habitat for native fauna.

- All storage, stockpiles, and laydown sites must be located away from any native vegetation that is proposed for retention.
- Any landscaping works undertaken around the new house, carport, or driveway ensure that at least 80% of the planting list incorporates native vegetation listed in the Final Determination for Pittwater Spotted Gum Forest EEC.

7.2 Avoid and minimise prescribed impacts

The entire subject land is vegetated and maintains canopy connectivity with habitat on adjacent properties. The continuity of midstorey and ground layer vegetation is disrupted by local roads and residential development but maintained with vegetation at the rear of the property. Vegetation and habitat at the rear of the property would be retained and managed as a bushland regeneration area, preserving connectivity between neighbouring properties and habitat for native fauna.

The proposal would retain five trees within the rear of the property. These include: T16 (*Jacaranda mimosifolia*), T22 (*Glochidion ferdinandi*), T25 and T30 (*Allocasuarina torulosa*), and T26 (*Angophora costata*). The proposal would also include the planting of one Sydney Red Gum (*Angophora costata*) within the northeast corner of the block, as per the Landscape Plan (Appendix V).

8 Impact assessment

8.1 Direct impacts

8.1.1 Residual direct impacts

Table 8.1 documents the impacts likely to occur on the subject land after steps taken to avoid and minimise impacts.

Table 8.1. Summary of residual direct impacts.

Direct impact	BC Act status	EPBC Act status	SAIL entity	Project phase/timing of impact	Extent (ha)
Vegetation clearance will impact PCT 3234-Hunter Coast Lowland Spotted Gum Moist Forest within the subject land. PCT 3234 is associated with the Pittwater and Wagstaffe Spotted Gum Forest EEC listed under the BC Act.	Endangered	Not listed	Yes	Construction	0.1
Vegetation clearance will impact foraging habitat of the Large-eared Pied Bat.	Vulnerable	Endangered	Yes	Construction	0.1
Vegetation clearance will impact foraging habitat of the Eastern Cave Bat.	Vulnerable	Not listed	Yes	Construction	0.1

8.1.2 Change in vegetation integrity score

Table 8.2 documents the change in vegetation integrity for residual direct impacts on native vegetation, TECs, threatened species and their habitat that were identified on the subject land.

Table 8.2. Impacts to vegetation integrity.

Vegetation zone	PCT code	Management zone	Area (ha)	Before development				After development				Change in VI score
				Composition	Structure	Function	VI score	Composition	Structure	Function	VI score	
1	3234	N/A	0.1	37.7	40.5	49.9	42.4	0	0	0	0	-42.4

8.1.3 Impacts on threatened species and their habitat

Table 8.3 documents the impacts likely to occur on threatened species and their habitat after steps taken to avoid and minimise impacts.

Table 8.3. Impacts on threatened species and their habitat.

Common name	Scientific name	BC Act status	EPBC Act status	Loss of habitat (ha)	Biodiversity risk weighting
Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>	Endangered	Endangered	0.1	Very High (3)
Eastern Cave Bat	<i>Vespadelus troughtoni</i>	Vulnerable	Not listed	0.1	Very High (3)



0 5 10 m



Legend

- | | |
|--|--|
|  Subject land |  Absorption pit |
|  Proposed dwelling house |  Silt fence |
|  Stockpile |  Bushland regeneration area |

100 Hilltop Road, Avalon Beach

Figure 8.1. Final impacts likely to occur on the subject land.

Coordinate system: GDA 94 / NSW Lambert
Imagery: Nearmap 23 November 2024

8.1.4 Impacts to trees within the subject land

The proposal would result in the clearing of twenty-two trees for the construction of the new house, carport, and driveway, and provision of an APZ.

Table 8.4 summarises the proposed impacts to trees within the subject land, as outlined in the Arboricultural Impact Assessment.

Refer to Tree Removal and Location Plan in Appendix VIII.

Table 8.4. Tree impact summary.

Tree no.	Scientific name	Arborist recommendations
1	<i>Melaleuca bracteata</i>	Remove
2	<i>Agonis flexuosa</i>	Remove
3	<i>Callistemon sp.</i>	Retain
4	<i>Eucalyptus scias</i>	Retain
5	<i>Ligustrum lucidum</i>	Remove
6	<i>Schefflera actionophylla</i>	Remove
7	<i>Corymbia gummifera</i>	Remove
8	<i>Eucalyptus eugenioides</i>	Remove
9, 13, 14, 19	<i>Glochidion ferdinandi</i>	Remove
10	<i>Ceratopetalum gummiferum</i>	Retain
11, 12, 21, 23, 27-29	<i>Allocasuarina torulosa</i>	Remove
15, 18	Dead	Remove
16	<i>Jacaranda mimosifolia</i>	Retain
17, 20, 24	<i>Pittosporum undulatum</i>	Remove
22	<i>Glochidion ferdinandi</i>	Retain
25, 30	<i>Allocasuarina torulosa</i>	Retain
26	<i>Angophora costata</i>	Retain

8.2 Indirect impacts

Table 8.5 documents the residual indirect impacts (likely to occur on native vegetation, threatened entities and their habitat beyond the development footprint).

Table 8.5. Summary of residual indirect impacts.

Indirect impact	Impacted entities	Extent	Frequency	Duration	Project phase/timing of impacts	Likelihood and consequences
Edge effects	PCT 3234-Hunter Coast Lowland Spotted Gum Forest and associated fauna	Vegetation and habitat beyond the development footprint	Daily	Short and long-term	Construction and operation	<p>Adjoining vegetation and habitat are already heavily impacted by edge effects, such as weed invasion.</p> <p>The proposed backyard will be managed as a bushland regeneration area, with a minimum of two years of active plant replacement and ongoing weed management. This approach is expected to reverse much of the current edge effects impacting the site and neighbouring vegetation and habitat.</p>
Noise generated from machinery during works	Fauna utilising adjacent vegetation and habitat	Vegetation and habitat beyond the development footprint	During works	Short-term	Construction	<p>The proposed works are located within an urbanised landscape where local fauna are likely already accustomed to higher noise levels.</p> <p>The works will be carried out during standard construction hours and are not expected to affect nocturnal fauna, such as microbats, which forage at night.</p> <p>Construction works will be temporary, and the risk of increased noise impacts is considered low.</p>
Light spill	Fauna utilising adjacent vegetation and habitat	Light spill from dwelling	Daily during operation	Long-term	Operation	<p>The proposal is expected to increase light levels within the subject land above that which already exist. However, resident fauna in the area are likely already accustomed to residential lighting.</p> <p>'DarkSky' lighting should be used to shield light and direct it downward, preventing illumination from spilling upwards or horizontally into the sky.</p>

Indirect impact	Impacted entities	Extent	Frequency	Duration	Project phase/timing of impacts	Likelihood and consequences
						<p>'DarkSky' approved lighting must minimise upward-directed light, reduce glare, avoid over-lighting, use dimming and other suitable lighting controls, and limit short-wavelength (bluish) light in the nighttime environment.</p> <p>With appropriate outdoor lighting installed, the risk of increased light impacts is expected to be low.</p>
Transport of weeds and pathogens from the site to adjacent vegetation	PCT 3234-Hunter Coast Lowland Spotted Gum Forest and associated fauna	Spread of weeds and pathogens to and from the subject land via seed dispersal from machinery and vehicles	Daily during works	Short-term	Construction	<p>Construction activities have the potential to introduce and spread weeds and pathogens via machinery, equipment, and clothing, such as boots.</p> <p>The proposed backyard will be managed as a bushland regeneration area, with at least two years of active plant replacement and ongoing weed management.</p> <p>With proper weed and pathogen management in place, the risk of spread is expected to be low.</p>
Trampling of vegetation during construction works	PCT 3234-Hunter Coast Lowland Spotted Gum Forest and associated fauna	Trampling of plants during construction works	During works	Short-term	Construction	<p>With appropriate exclusion zone fencing installed before the commencement of construction works, the likelihood of trampling vegetation intended for retention is expected to be low.</p>
Erosion and sedimentation	PCT 3234-Hunter Coast Lowland Spotted Gum Forest and associated fauna	Vegetation clearing and earthworks can expose soils and subsoils which following rainfall may erode and mobilise soils in	During works	Short-term	Construction	<p>Runoff can smother ground layer vegetation, impacting its health by reducing photosynthesis.</p> <p>Runoff can also affect water quality in nearby waterways, harming aquatic organisms.</p> <p>With appropriate erosion and sediment control measures in place, the likelihood of increased erosion and sedimentation is expected to be low.</p>

Indirect impact	Impacted entities	Extent	Frequency	Duration	Project phase/timing of impacts	Likelihood and consequences
		runoff, impacting vegetation and waterways beyond the subject land.				

8.3 Prescribed impacts

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

Sandstone outcrops on the subject land are unlikely to provide habitat for threatened species. The field assessment indicated that there were no caves, crevices, or overhangs that would be used by the species assessed (e.g., Large-eared Pied Bat and Eastern Cave Bat).

8.3.2 Human-made structures

No human-made structures of relevant value were recorded within the subject land.

8.3.3 Non-native vegetation

No non-native vegetation of relevant value was recorded within the subject land.

8.3.4 Habitat connectivity

The entire subject land is vegetated and maintains canopy connectivity with habitat on adjacent properties. However, the continuity of midstorey and ground layer vegetation is interrupted by local roads and residential development.

The proposal would involve clearing vegetation and habitat across half of the subject land for the construction of the new house, carport, and driveway. Vegetation and habitat within the backyard would be retained and managed as a bushland regeneration area, preserving connectivity between neighbouring properties.

8.3.5 Waterbodies, water quality and hydrological processes

No waterbodies, water quality, or hydrological processes will be impacted by this proposal, provided that standard hardstand water management practices are in place as required. Sediment control fencing will be installed on the lower side of the construction works to prevent runoff from affecting adjacent vegetation and habitat.

The proposal does not involve deep excavation of the subject land, except for footings and possible minor levelling. The proposed new house, carport, and driveway will be supported on piers.

8.4 Mitigating residual impacts – management measures and implementation

Table 8.6 provides detail of proposed mitigation and management measures.

Table 8.6. Summary of proposed mitigation and management measures for residual impacts (direct, indirect and prescribed).

Mitigation measure	Method/technique	Timing	Frequency	Responsibility	Likely efficacy	MNES (when relevant)
Nest boxes (a minimum of two nest boxes to be installed)	Install nest boxes in line with the following: <ul style="list-style-type: none"> Height: At least three metres above ground-level. Aspect: North-east to avoid hot afternoon sun. Location: On a native tree. Density: Evenly spaced, with no more than a single box per tree or as advised by the Project Ecologist. 	Prior to any vegetation clearing works OR following removal of temporary fencing	Once	Installation by experienced and qualified persons is highly recommended (i.e., Working at Heights accredited).	Likely to be effective.	N/A
Pre-clearing surveys	Habitat features are to be marked using high visibility flagging tape or equivalent (spray paint). Habitat is to be inspected for occupying fauna. Disused nests are to be carefully dismantled or relocated prior to clearing. A concise letter report is to be prepared and provided to Council that includes: <ul style="list-style-type: none"> A list of habitat features identified A list of threatened flora and fauna identified A list of priority weeds identified 	No more than seven days prior to clearing commencement	Once	Ecologist with at least 3 years' experience; or a registered and licenced wildlife carer with at least 3 years' experience.	Likely to be effective.	N/A

Mitigation measure	Method/technique	Timing	Frequency	Responsibility	Likely efficacy	MNES (when relevant)
	<ul style="list-style-type: none"> A map detailing the locations of habitat, threatened species and weeds Recommendations to manage any of the above features identified, and Photographs of significant findings 					
Vegetation clearing supervision	<p>A two-staged clearing process is to be undertaken:</p> <ul style="list-style-type: none"> Stage 1: Removal of non-habitat. Habitat trees are to be left standing for at least 24 hours, to allow nocturnal fauna an opportunity to self-relocate prior to Stage 2 clearing. Stage 2: Removal of habitat trees. Habitat is to be inspected by climbing Arborist or an Ecologist prior to removal, and fauna unable to self-relocate are to be captured and relocated. <p>Following capture:</p> <ul style="list-style-type: none"> Healthy fauna are to be relocated to an appropriate nearby area by the attending Ecologist or licensed Wildlife Carer. Injured or juvenile fauna are to be taken to a nearby vet or transferred into the care of a registered Wildlife Carer. Any captured pest species are to be euthanised humanely by the attending Ecologist and must not be released. 	<p>During vegetation clearance</p> <p>Where timing allows, clearing should be avoid during fauna breeding seasons (typically spring-early summer).</p>	During vegetation clearance	Ecologist with at least 3 years' experience; or a registered and licenced wildlife carer with at least 3 years' experience.	Likely to be effective.	N/A

Mitigation measure	Method/technique	Timing	Frequency	Responsibility	Likely efficacy	MNES (when relevant)
Exclusion zones	<p>The building site will be fenced to prevent the community from entering the site and to establish a buffer between the works and the bushland regeneration area.</p> <p>The boundary between the building site and the bushland regeneration area requires delineation using high-visibility bunting.</p> <p>Where a biodiversity feature within the approved clearing limits is required to be retained, red and white hazard tape is to be used.</p> <p>Exclusion zone fencing requiring star pickets must be established outside tree protection zones (in accordance with Australian Standard AS 4970-2009 Protection of trees on development sites) and following any recommendations by the project arborist.</p>	<p>Prior to commencement</p> <p>Temporary exclusion fencing is to be removed following completion of works</p>	Ongoing	Licensed and registered surveyor, and/or ecologist with at least 3 years' experience.	Effective.	N/A
Tree protection zones	<p>Tree protection exclusion fencing and signage is to be installed in accordance with the Arboricultural Impact Assessment.</p> <p>Tree protection zone signage is recommended to inform contractors working within the construction footprint and is recommended to be at 5 metre intervals outwards and visible and clearly obvious to contractors.</p>	Prior to commencement	Ongoing	Arborist	Effective.	N/A
Erosion and sedimentation	Appropriate erosion and sediment control must always be erected and maintained during construction to avoid the potential of incurring indirect impacts on biodiversity values. As a minimum, such measures should comply with	Prior to construction	Ongoing	Proponent Construction Contractor	Effective.	N/A

Mitigation measure	Method/technique	Timing	Frequency	Responsibility	Likely efficacy	MNES (when relevant)
	relevant industry guidelines such as 'the Blue Book' (Landcom 2004).					
Weeds and pathogens	<p>Priority weeds would be managed in accordance with the <i>Biosecurity Act 2015</i>. Weeds of national significance would be managed in accordance with the Weeds of National Significance: weed management guides.</p> <p>Any herbicides would be applied such that impacts on surrounding agricultural properties and native vegetation are avoided.</p>	During construction	Ongoing	Proponent Bush Regeneration Contractor	Effective.	N/A
Vegetation Management Plan (VMP)	A VMP would be prepared to guide the rehabilitation, planning, implementation, monitoring and maintenance of Pittwater Spotted Gum Forest.	Prior to commencement	Ongoing	Proponent Project Ecologist Bush Regeneration Contractor	Likely to be effective.	N/A
Salvage and relocation of woody debris	Where possible, woody debris (fallen trees and logs) within the subject land are to be retained. Logs from the felling of mature canopy trees should be relocated within the site, as directed by the Project Ecologist.	During vegetation clearance	Once	Proponent Project Ecologist Bush Regeneration Contractor	Likely to be effective.	N/A
Storage and stockpiling (soil and materials)	Allocate all storage, stockpile and laydown sites away from any native vegetation that is planned to be retained. Avoiding importing any soil from outside the site as this can introduce weeds and pathogens to the site.	During construction	Ongoing	Construction Contractor	Effective.	N/A

9 Serious and irreversible impacts

9.1 Assessment for serious and irreversible impacts on biodiversity values

Table 9.1 identifies the entities at risk of serious and irreversible impacts (SAIL) relevant to the proposed development.

The information in the following sections is provided to assist the consent authority to evaluate the nature of an impact on a potential entity at risk of an SAIL (in accordance with BAM Sections 9.1.1 and 9.1.2).

Table 9.1. Entities at risk of an SAIL.

Common name	Scientific name	Reason for inclusion in assessment
Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion	Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion	Included in current list of entities at risk of an SAIL and is likely to be impacted by the proposal
Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>	Included in current list of entities at risk of an SAIL and is likely to be impacted by the proposal
Eastern Cave Bat	<i>Vespadelus troughtoni</i>	Included in current list of entities at risk of an SAIL and is likely to be impacted by the proposal

9.2 TEC at risk of an SAIL (Pittwater and Wagstaffe Spotted Gum Forest)

Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion is assessed in this section as it is an SAIL ecological community. In accordance with BAM Section 9.1.1 the following information is provided to assist the consent authority in determining whether the proposal represents a serious and irreversible impact on this TEC.

9.2.1 Actions and measures taken to avoid the direct and indirect impacts on the TEC at risk of SAIL

Refer to Section 7 of this BDAR.

9.2.2 Current status (excluding impacts of the proposal)

Table 9.2. Current status – Pittwater and Wagstaffe Spotted Gum Forest.

Criteria	Data/ information	Data sources	Details of data deficiency, assumptions, reasons for low confidence in information
Current total geographic extent (ha) of the TEC in NSW	The NSW Scientific Committee estimate the total extant area of the community is 227 ha. A search of the NSW BioNet Vegetation Classification database for PCTs associated with the Pittwater and Wagstaffe Spotted Gum Forest returned PCT 3234, Hunter Coast Lowland Spotted Gum Moist Forest and PCT	NSW Scientific Committee – final determination (2013) NSW BioNet Vegetation Classification database (accessed 19 April 2024)	The NSW Scientific Committee's estimate of the total extant area is considerably lower than that identified in the BioNet Vegetation Classification database; however, given DPE's ecological systematic revision of PCTs in 2022, PCT 3234 and 3437 are not limited to the Pittwater region. Lineage PCT 1214, Pittwater Spotted Gum Forest

Criteria	Data/ information	Data sources	Details of data deficiency, assumptions, reasons for low confidence in information
	<p>3437, Hunter Coast Lowland Spotted Gum Dry Forest as forming 'part' of the ecological community.</p> <p>The current extent of PCT 3234 listed in the database is 7925 ha.</p> <p>The current extent of PCT 3437 listed in the database is 994 ha.</p>		identifies the current extent of the community is 275 ha.
Estimated reduction in geographic extent of the TEC since 1970	<p>The NSW Scientific Committee estimate the reduction in geographic distribution of the community since European settlement is 75%.</p> <p>The pre-European extent of PCT 3234 listed in the database is 10,952 ha, and PCT percent cleared is 27.64%.</p> <p>The pre-European extent of PCT 3437 listed in the database is 2,473 ha, and PCT percent cleared is 59.81%.</p>	<p>NSW Scientific Committee – final determination (2013)</p> <p>NSW BioNet Vegetation Classification database (accessed 19 April 2024)</p>	<p>Information on the estimated reduction in geographic extent of the TEC since 1970 is unavailable.</p> <p>The database identifies the pre-European extent of PCT 1214 is 954 ha, and PCT percent cleared is 71%.</p>
<p>Extent of reduction in ecological function, describing the degree of environmental degradation or disruption to biotic processes (Principle 2) indicated by factors listed in BAM Subsection 9.1.1(2.b.)</p> <p>This ecological community is threatened by clearing for urban development, urban runoff, dumping of rubbish and garden refuse, weed invasion, inappropriate fire regimes, fragmentation, and demographic and environmental stochasticity due to the small size of most remaining remnants. Collectively, these threats have led to changes in community structure and species composition, habitat degradation and fragmentation, and invasion and establishment of exotic species, and are indicative of a large reduction in ecological function of the community.</p>			
<p>Evidence of restricted geographic distribution (Principle 3) based on the TEC's geographic range in NSW</p>			
Extent of occurrence (ha)	approx. 227ha	NSW Scientific Committee – final determination (2013)	
Area of occupancy (ha)	approx. 88km ²	NSW Scientific Committee – final determination (2013)	

Criteria	Data/ information	Data sources	Details of data deficiency, assumptions, reasons for low confidence in information
Number of threat-defined locations	Pittwater and Wagstaffe Spotted Gum Forest is restricted to the Sydney Basin Bioregion and is currently known to occur within the local government areas of Pittwater and Gosford but may occur elsewhere within the bioregion.	NSW Scientific Committee – final determination (2013)	No threat defined locations are listed in the TBDC.

9.2.3 Impact assessment

Table 9.3. Impact assessment – Pittwater and Wagstaffe Spotted Gum Forest.

Criteria	Data/ information	Data sources	Details of data deficiency, assumptions, reasons for low confidence in information (e.g. TBDC indicates data is unknown or deficient)
Impact on the geographic extent of the TEC (Principles 1 and 3)			
Area of TEC to be impacted by the proposal (ha)	0.1	N/A	N/A
Area of TEC to be impacted by the proposal as a % of the current geographic extent in NSW (%)	0.04%	N/A	N/A
Direct/indirect impacts likely as a result of the proposal to contribute to loss of flora/fauna species characteristic of the TEC (BAM Subsection 9.1.1(4.a.ii.))	Refer to Section 8 of this BDAR.	N/A	N/A
Impacts likely to contribute to further environmental degradation or disruption of biotic processes (Principle 2)			
Remaining extent of isolated areas of TEC (ha)	The proposal does not isolate areas of the TEC.	N/A	N/A
Average distance between remaining remnants – remnant is retained (m)	TEC connectivity to be maintained with the retention and management of Pittwater	N/A	N/A

Criteria	Data/ information	Data sources	Details of data deficiency, assumptions, reasons for low confidence in information (e.g. TBDC indicates data is unknown or deficient)
	Spotted Gum Forest within the backyard.		
Average distance between remaining remnants – remnant is removed (m)	N/A	N/A	N/A
Estimated maximum dispersal distance of species associated with the TEC (km)	N/A	N/A	N/A
Area to perimeter ratio of remaining remnants (ratio)	N/A	N/A	N/A
Vegetation integrity analysis			
Vegetation Zone 1 (Composition score)	37.7	N/A	N/A
Vegetation Zone 1 (Structure score)	40.5	N/A	N/A
Vegetation Zone 1 (Function score)	49.9	N/A	N/A

9.3 Species at risk of SAI (Large-eared Pied Bat and Eastern Cave Bat)

Chalinolobus dwyeri (Large-eared Pied Bat) and *Vespadelus troughtoni* (Eastern Cave Bat) are assessed in this section as they are SAI threatened species. In accordance with BAM Section 9.1.2 the following information is provided to assist the consent authority in determining whether or not the proposal represents a serious and irreversible impact on this species.

The species are species credit species because they cannot be reliably predicted to occur on a site based on vegetation and other landscape features (either foraging or breeding).

Any impacts on breeding habitat used by the species could be considered potentially serious and irreversible. Potential breeding habitat associated with the species includes rocky areas containing caves, overhangs, escarpments, outcrops, or crevices.

9.3.1 Measures taken to avoid the direct and indirect impacts on the species at risk of an SAI

Rocky areas containing caves, overhangs, escarpments, outcrops, or crevices are not present on the subject land and thus, the proposal would not impact on breeding habitat for this species.

This species forages for small, flying insects below the forest canopy. Hence, timbered areas within the subject land that are subject to clearing have been conservatively entered into the BAM-C and an offset obligation incurred.

9.3.2 Current status – Large-eared Pied Bat

Table 9.4. Current status – Large-eared Pied Bat.

Criteria	Data/ information	Data sources	Details of data deficiency, assumptions, reasons for low confidence in information (e.g. TBDC indicates data is unknown or deficient)
Species that is unlikely to respond to management and is therefore irreplaceable (Principle 4)			
Life history traits and/or ecology which is known, but the ability to control key threats at the site scale is negligible	The species is known to be reliant of caves for breeding.	Conservation Advice for <i>Chalinolobus dwyeri</i> (Large-eared Pied Bat) Department of Agriculture, Water and the Environment (2021)	The lack of detailed information regarding the distribution, abundance and ecological requirements of the species makes an assessment of key threats difficult.
Known reproductive characteristics that severely limit their ability to increase the existing population on, or occupy new habitat	The species is known to be reliant of caves for breeding.	Conservation Advice for <i>Chalinolobus dwyeri</i> (Large-eared Pied Bat) Department of Agriculture, Water and the Environment (2021)	
Habitat critical to the survival of the species	The species is dependent on the presence of diurnal roosts for shelter. Roosts are utilised during the day and also at night when not feeding, as well as for the raising of young. This bat has been	National recovery plan for the Large-eared Pied Bat <i>Chalinolobus dwyeri</i> Department of Environment and Resource Management (2011).	The value of mine shafts and disused fairy martin nests as roost sites has not been evaluated to date. The number of known breeding sites is limited.

Criteria	Data/ information	Data sources	Details of data deficiency, assumptions, reasons for low confidence in information (e.g. TBDC indicates data is unknown or deficient)
	known to roost in disused mine shafts, caves, overhangs and abandoned fairy martin <i>Hirundo ariel</i> nests (Schulz 1998).		
Number of threat-defined locations	The main known cause of decline in the species is the destruction of, and interference with maternity and other roosts. Information presented in the recovery plan and in Schulz et al. (1999) identifies other probable threats as: mining of roosts; mine induced subsidence of clifflines; disturbance from human recreational activities; habitat disturbance by introduced animals, including livestock; predation by introduced pests; vegetation clearing in the proximity of roosts; and fire in the proximity of roosts.	Department of Environment and Resource Management (2011).	No threat-defined locations are listed in the TBDC. The lack of detailed information regarding the distribution, abundance and ecological requirements of the species makes an assessment of threats difficult.
Whether the species' population is likely to undergo extreme fluctuations	It has been suggested that the species is unlikely to undergo extreme natural fluctuations in population numbers, extent of occurrence or area of occupancy (Hoye 2006 pers. comm.), although the justification for this is unknown.	DCCEE SPRAT	There is insufficient data to estimate abundance or population trends of the Large-eared Pied Bat. Also, no site monitoring of known roosts has occurred. Some data were collected in the early 1960s, but this site was subsequently flooded by Copeton Dam (Hoye & Dwyer 1995).

9.3.3 Current status – Eastern Cave Bat

Table 9.5. Current status – Eastern Cave Bat.

Criteria	Data/ information	Data sources	Details of data deficiency, assumptions, reasons for low confidence in information (e.g. TBDC indicates data is unknown or deficient)
Species that is unlikely to respond to management and is therefore irreplaceable (Principle 4)			
Life history traits and/or ecology which is known, but the ability to control key threats at the site scale is negligible	The species is known to be reliant of caves for breeding.	NSW OEH Eastern cave bat – profile (Last updated 01 Dec 2017)	Very little is known about the ecology, behaviour and habitat requirements.
Known reproductive characteristics that severely limit their ability to increase the existing population on, or occupy new habitat	The species is known to be reliant of caves for breeding.	NSW OEH Eastern cave bat – profile (Last updated 01 Dec 2017)	Very little is known about the ecology, behaviour and habitat requirements.
Habitat critical to the survival of the species	Caves	NSW OEH Eastern cave bat – profile (Last updated 01 Dec 2017)	
Number of threat-defined locations	<p>The main known threats to the species include:</p> <ul style="list-style-type: none"> • Clearing and isolation of dry eucalypt forest and woodland, particularly about cliffs and other areas containing suitable roosting and maternity sites, mainly as a result of agricultural and residential development. • Loss of roosting habitat including rocky areas, caves, overhangs crevices, cliffs and escarpments, or old mines or tunnels, old buildings and sheds. • Loss of suitable feeding habitat near roosting and maternity sites as a 	NSW OEH Eastern cave bat – profile (Last updated 01 Dec 2017)	No threat-defined locations are listed in the TBDC.

Criteria	Data/ information	Data sources	Details of data deficiency, assumptions, reasons for low confidence in information (e.g. TBDC indicates data is unknown or deficient)
	<p>result of modifications from timber harvesting and inappropriate fire regimes usually associated with grazing.</p> <ul style="list-style-type: none"> • Pesticides and herbicides may reduce the availability of invertebrates, or result in the accumulation of toxic residues in individuals' fat stores. • Damage to roosting and maternity sites from mining operations, and recreational activities such as caving. • There is a strong likelihood that unrecorded populations could be unintentionally affected by land management actions. • Probable predation by cats and foxes. 		
Whether the species' population is likely to undergo extreme fluctuations	Unknown		Very little is known about the ecology, behaviour and habitat requirements.

9.3.4 Impact assessment – Large-eared Pied Bat and Eastern Cave Bat.

Table 9.6. Impact assessment – Large-eared Pied Bat and Eastern Cave Bat.

Criteria	Data/ information	Data sources	Details of data deficiency, assumptions, reasons for low confidence in information (e.g. TBDC indicates data is unknown or deficient)
Number of individuals (mature and immature) present in the subpopulation on the subject land	The subject land does not contain a subpopulation of either species. The vegetation within the subject land forms part of the species' foraging habitat.	N/A	N/A
Number of individuals (mature and immature) to be impacted by the proposal	No individuals would be directly impacted.	N/A	N/A
Individuals (mature and immature) to be impacted by the proposal as a percentage of total NSW population (%)	No individuals would be directly impacted.	N/A	N/A
Area of habitat to be impacted (ha) (for species measured by area only)	0.1 hectares of foraging habitat will be impacted.	N/A	N/A
Individuals impacted	No individuals will be directly impacted, some habitat will be impacted.	N/A	N/A

10 Impact summary

10.1 Determine an offset requirement for impacts

10.1.1 Impacts on native vegetation and TECs or ECs (ecosystem credits)

Table 10.1 identifies the impacts that require an offset (as per BAM Subsection 9.2.1(1.)). Refer to Figure 10.1 Thresholds for assessment and offsetting impacts.

Table 10.1. 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
1	Hunter Coast Lowland Spotted Gum Moist Forest	Pittwater and Wagstaffe Spotted Gum Forest	0.1	42.4	0	-42.4	2	2

10.1.2 Impacts on threatened species and their habitat (species credits)

Table 10.2 identifies the impact on threatened species and their habitat (species credits) that require offset.

Table 10.2. 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
Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>	Vulnerable	Endangered	0.1 ha	3	3
Eastern Cave Bat	<i>Vespadelus trougtoni</i>	Vulnerable	Not Listed	0.1 ha	3	3

10.1.3 Indirect and prescribed impacts

No additional offsets are proposed to account for residual indirect and prescribed impacts.

Other scenarios

No alternative offsetting scenarios are currently proposed for this proposal.





100 Hilltop Road, Avalon Beach

Figure 10.1. Thresholds for assessing and offsetting impacts.

Coordinate system: GDA 94 / NSW Lambert
Imagery: Nearmap 23 November 2024

Legend

-  Subject land
-  Impacts requiring offset

11 Appendices

11.1 Appendix I – BDAR requirements compliance

Minimum information requirements for the Biodiversity Development Assessment Report: Streamlined assessment module – Small area

Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	BDAR ref.
Introduction	Chapters 2 and 3	INFORMATION Introduction to the biodiversity assessment including: <ul style="list-style-type: none"> <input type="checkbox"/> brief description of proposed development <input type="checkbox"/> identification of subject land boundary, including: <ul style="list-style-type: none"> <input type="checkbox"/> operational footprint <input type="checkbox"/> construction footprint indicating clearing associated with temporary/ancillary construction facilities and infrastructure <input type="checkbox"/> general description of the subject land <input type="checkbox"/> Sources of information used in the assessment, including reports and spatial data <input type="checkbox"/> Identification of assessment method applied (i.e. linear or site-based) 			Section 1
		MAPS and TABLES (in document) <input type="checkbox"/> Map of the subject land boundary showing the final proposal footprint, including the construction footprint for any clearing associated with temporary/ancillary construction facilities and infrastructure (if BDAR)			Figure 1.1
		DATA (to be supplied) – N/A			
Landscape	Section 3.1 and 3.2, Appendix E	INFORMATION Identification of site context components and landscape features at the proposed site, including: <ul style="list-style-type: none"> <input type="checkbox"/> general description of subject land topographic and hydrological setting, geology and soils <input type="checkbox"/> percent native vegetation cover in the assessment area (as described in BAM Subsection 3.2 (4 .)) <input type="checkbox"/> IBRA bioregions and subregions (as described in BAM Subsection 3.1.3 (2 .)) Other relevant landscape features which may include:			Section 3

Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	BDAR ref.
		<input type="checkbox"/> rivers and streams classified according to stream order (as described in BAM Subsection 3.1.3 (3 –4.) and Appendix E) <input type="checkbox"/> wetlands within, adjacent to and downstream of the site (as described in BAM Subsection 3.1.3 (4 .)) <input type="checkbox"/> connectivity of different areas of habitat (as described in BAM Subsection 3.1.3 (5 –6 .)) <input type="checkbox"/> areas of geological significance and soil hazard features (as described in BAM Subsections 3.1.3 (7.) and 3.1.3 (10 .)) <input type="checkbox"/> areas of outstanding biodiversity value occurring on the subject land and assessment area (as described in BAM Subsection 3.1.3 (8 –9 .))			
		MAPS and TABLES (in document) <input type="checkbox"/> Site Map <ul style="list-style-type: none"> <input type="checkbox"/> boundary of subject land <input type="checkbox"/> cadastre of subject land <input type="checkbox"/> landscape features identified in BAM Subsection 3.1.3 <input type="checkbox"/> areas of outstanding biodiversity value within the subject land <input type="checkbox"/> Location Map <ul style="list-style-type: none"> <input type="checkbox"/> digital aerial photography at 1:1,000 scale or finer <input type="checkbox"/> boundary of subject land <input type="checkbox"/> 1500 m buffer area <i>or</i> 500 m buffer for linear development <input type="checkbox"/> landscape features identified in BAM Subsection 3.1.3 <input type="checkbox"/> additional detail (e.g. local government area boundaries) relevant at this scale <input type="checkbox"/> areas of outstanding biodiversity value within the assessment area Landscape features identified in BAM Subsection 3.1.3 and to be shown on the Site Map and/or Location map include: <ul style="list-style-type: none"> <input type="checkbox"/> IBRA bioregions and subregions <input type="checkbox"/> rivers, streams and estuaries <input type="checkbox"/> wetlands and important wetlands 			Figures 3.1 and 3.2

Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	BDAR ref.
		<input type="checkbox"/> connectivity of different areas of habitat <input type="checkbox"/> areas of geological significance and soil hazard features			
		DATA (to be supplied) <input type="checkbox"/> All report maps as separate jpeg files Individual digital shape files of: <ul style="list-style-type: none"> <input type="checkbox"/> subject land boundary <input type="checkbox"/> assessment area (i.e. buffer area) boundary <input type="checkbox"/> cadastral boundary of subject land <input type="checkbox"/> areas of native vegetation cover <input type="checkbox"/> areas of habitat connectivity 			Uploaded to BOAMS
Native vegetation, TECs and vegetation integrity	Chapter 4	INFORMATION <ul style="list-style-type: none"> <input type="checkbox"/> Patch size (in accordance with BAM Subsection 4.3.2) <input type="checkbox"/> Identification of the dominant PCT on the subject land and extent (ha) with justification of method used (existing information or plot-based survey data) <input type="checkbox"/> Identification of any TEC associated with the PCT (BAM Subsection 4.2.2) <input type="checkbox"/> Estimate of percent cleared value of dominant PCT (BAM Subsection 4.2.1 (5 .)) <input type="checkbox"/> Identification of any TEC on site that is not associated with the dominant PCT (Note: This TEC is required to be assessed and offset.) <input type="checkbox"/> Equivalence with mapping units of previous vegetation maps reviewed as part of the assessment (i.e. equivalent mapping units) <input type="checkbox"/> Vegetation integrity of the PCT(s) on the subject land as individual vegetation zones <input type="checkbox"/> Justification for how this was determined (i.e. qualitatively by observing values for the condition attributes set out in Table 2 of the BAM or quantitatively by collecting field data for the condition attributes at a plot in accordance with BAM Subsection 4.3.4) <input type="checkbox"/> Use of relevant benchmark data from BioNet Vegetation Classification (as described in BAM Subsections 4.3.3 (5 .)) 			Section 4

Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	BDAR ref.
		<p>Where use of more appropriate local benchmark data is proposed (as described in BAM Subsection 1.4.2, BAM Subsection 4.3.3(5.) and BAM Appendix A):</p> <ul style="list-style-type: none"> <input type="checkbox"/> identify the PCT or vegetation class for which local benchmark data will be applied <input type="checkbox"/> identify published sources of local benchmark data (if benchmarks obtained from published sources) <input type="checkbox"/> describe methods of local benchmark data collection (if reference plots used to determine local benchmark data) <input type="checkbox"/> provide justification for use of local data rather than BioNet Vegetation Classification benchmark values 			
		<p>MAPS and TABLES (in document)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Map of native vegetation extent for the subject land (as described in BAM Section 3.1) <input type="checkbox"/> Map of PCT/vegetation zones within the subject land (as described in BAM Section 4.2 (1 .) <input type="checkbox"/> Map the location of floristic vegetation survey plots and vegetation integrity survey plots relative to PCT boundaries <input type="checkbox"/> Map of TEC distribution on the subject land <input type="checkbox"/> Patch size of native vegetation (as described in BAM Subsection 4.3.2) <p>Table of current vegetation integrity scores for vegetation zone within the site including:</p> <ul style="list-style-type: none"> <input type="checkbox"/> composition condition score <input type="checkbox"/> structure condition score <input type="checkbox"/> function condition score <p><input type="checkbox"/> Report from BAM-C (Small area module) including vegetation integrity scores (BAM Section 4.4)</p>			Section 4 Figures 4.1 and 4.2
		<p>DATA (to be supplied)</p> <ul style="list-style-type: none"> <input type="checkbox"/> All report maps as separate jpeg files <input type="checkbox"/> Plot field data (MS Excel format) <input type="checkbox"/> Digital shape files for all maps and spatial data <input type="checkbox"/> Field data sheets (if relevant) for determining vegetation integrity (BAM Subsection 4.3.4) 			Uploaded to BOAMS Appendix III
		INFORMATION			Section 5

Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	BDAR ref.
Habitat suitability for threatened species	Chapter 5 and Section 9.1	<p><input type="checkbox"/> Describe the review of existing information and any field survey undertaken to assess habitat constraints and microhabitats for threatened species within the subject land</p> <p><input type="checkbox"/> Determination of the suite of threatened species likely to occur on or use the proposed site according to Steps 1 and 2 in BAM Section 5.2 including species to be assessed for ecosystem credits and the list of species to be assessed for species credits</p> <p><input type="checkbox"/> List of ecosystem credit species derived from the TBDC (as described in BAM Subsections 5.2.1 and 5.2.2) with justification for the exclusion of any ecosystem credit species based on habitat constraints (as described in BAM Subsection 5.2.2)</p> <p><input type="checkbox"/> Identification of candidate species credit species that are at risk of an SAI and therefore, must be further assessed (BAM Section 9.1)</p> <p>Note: Candidate species credit species that are not at risk of an SAI and not incidentally recorded on the subject land do not require further assessment.</p> <p>For candidate species credit species that are at risk of an SAI, a description of the species, any habitat constraints or microhabitats associated with the species on the subject land and information used to create the species polygon/s in accordance with Steps 3 to 5 of BAM Section 5.2 including:</p> <p><input type="checkbox"/> justification for determining that a candidate species credit species at risk of an SAI is unlikely to have suitable habitat on the subject land or specific vegetation zone (based on a field assessment of the subject land and published literature or an expert report prepared in accordance with Box 3 of the BAM)</p> <p><input type="checkbox"/> determination of the presence of remaining candidate species credit species at risk of an SAI (by assuming presence, conducting a threatened species survey or an expert report).</p> <p>Note: If the subject land is mapped on an important habitat map for a species, or for a component of its habitat, the subject land is considered to have suitable habitat for the species to be present.</p> <p><input type="checkbox"/> species polygons identifying the location and area of suitable habitat for each candidate threatened species at risk of an SAI that is recorded on the subject land and is measured by area, OR</p> <p><input type="checkbox"/> species polygons identifying the area of suitable habitat and targeted surveys identifying the count and location of individuals on the subject land for each candidate threatened flora species at risk of an SAI that is recorded on the subject land and is measured by count</p> <p><input type="checkbox"/> species polygons for each threatened species identified on the subject land that is not at risk of an SAI (i.e. incidentally observed during site visit)</p>			

Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	BDAR ref.
		<input type="checkbox"/> Determination of habitat condition within species polygon/s for each threatened species (measured by area) at risk of an SAI or incidentally observed during the site visit (Step 6 of BAM Section 5.2) <input type="checkbox"/> For flora species credit species at risk of an SAI or incidentally observed during site visit, provide a count, or an estimation, of the number of individual plants present on the subject land (as described in BAM Subsection 5.2.5 (4 .))			
		MAPS and TABLES (in document) <input type="checkbox"/> Table showing ecosystem credit species in accordance with BAM Subsection 5.1.1 , and: <input type="checkbox"/> identifying any ecosystem credit species removed from the list of species on the basis of further assessment in accordance with BAM Subsections 5.2.2 and 5.2.3 <input type="checkbox"/> identifying the sensitivity to gain class of each species (BAM Section 5.4) <input type="checkbox"/> Table detailing species credit species within the subject land at risk of an SAI (BAM Section 9.1) or incidentally observed during the site visit including any associated habitat feature/components and its abundance (flora)/extent of habitat (flora and fauna) and biodiversity risk weighting (BAM Sections 5.2 –5.4) <input type="checkbox"/> Map of species credit species records within the subject land and species polygons for flora and fauna species at risk of an SAI or incidentally observed during the site visit (as described in BAM Subsection 5.2.5 (1 –7 .))			Section 5
		DATA (to be supplied) <input type="checkbox"/> Digital shape files of species polygons <input type="checkbox"/> Species polygon map in jpeg format <input type="checkbox"/> Expert reports and any supporting data used to support conclusions of the expert report <input type="checkbox"/> Field data sheets (if relevant) for threatened species surveys			Uploaded to BOAMS
Prescribed impacts	Chapter 6	INFORMATION <input type="checkbox"/> Any prescribed impacts from the small area proposal must be set out in the BDAR consistent with Appendix K			Section 6
		MAPS AND TABLES (in document) <input type="checkbox"/> If relevant, maps showing location of any prescribed impact features (i.e. karst, caves, crevices, cliffs, rocks, human-made structures, etc.)			N/A

Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	BDAR ref.
		DATA (to be supplied) <input type="checkbox"/> If relevant, digital shape files of prescribed impact feature locations <input type="checkbox"/> Prescribed impact features map in jpeg format			Uploaded to BOAMS
Avoid and minimise impacts	Chapter 7	INFORMATION Demonstration of efforts to avoid and minimise impacts on biodiversity values (including prescribed impacts) associated with the proposal location in accordance with Chapter 7, including an analysis of alternative: <ul style="list-style-type: none"> <input type="checkbox"/> modes or technologies that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed mode or technology <input type="checkbox"/> alternative locations that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed location <input type="checkbox"/> alternative sites within a property on which the proposal is located that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed site <input type="checkbox"/> Describe efforts to avoid and minimise impacts (including prescribed impacts) to biodiversity values through proposal design (as described in BAM Subsections 7.1.2 and 7.2.2) <input type="checkbox"/> Identification of any other site constraints that the proponent has considered in determining the location and design of the proposal (as described in BAM Subsection 7.2.1 (3 .))			Section 7
		MAPS and TABLES (in document)			
		<input type="checkbox"/> Table of measures to be implemented before, during and after construction to avoid and minimise the impacts of the proposal, including action, outcome, timing and responsibility			Table 8.6
		<input type="checkbox"/> Map of final proposal footprint, including construction and operation			Figure 1.1
		<input type="checkbox"/> Maps demonstrating indirect impact zones where applicable			N/A
		DATA (to be supplied) Digital shape files of: <ul style="list-style-type: none"> <input type="checkbox"/> final proposal footprint <input type="checkbox"/> direct and indirect impact zones 			Uploaded to BOAMS

Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	BDAR ref.
		<input type="checkbox"/> Maps in jpeg format			
Assessment of impacts	Chapter 8, Section 8.1 and 8.2	INFORMATION Determine the impacts on native vegetation and threatened species habitat, including: <ul style="list-style-type: none"> <input type="checkbox"/> description of direct impacts of clearing of native vegetation, threatened ecological communities and threatened species habitat (as described in BAM Sections 8.1) <input type="checkbox"/> description of the nature, extent, frequency, duration and timing of indirect impacts of the proposal (as described in BAM Subsection 8.2 <input type="checkbox"/> Any prescribed impacts from the small area proposal must be set out in the BDAR consistent with Appendix K 			Section 8
		MAPS and TABLES (in document) <input type="checkbox"/> Table showing change in vegetation integrity score for each vegetation zone as a result of identified impacts			Table 8.2
		DATA (to be supplied) – N/A			
Mitigation and management of impacts	Chapter 8, Section 8.4 and 8.5	INFORMATION Identification of measures to mitigate or manage impacts in accordance with the recommendations in BAM Subsections 8.4.1 and 8.4.2, including (as described in BAM Subsection 8.4.1(2.): <ul style="list-style-type: none"> <input type="checkbox"/> techniques, timing, frequency and responsibility <input type="checkbox"/> identify measures for which there is risk of failure <input type="checkbox"/> evaluate the risk and consequence of any residual impacts <input type="checkbox"/> document any adaptive management strategy proposed Identification of measures for mitigating impacts related to: <ul style="list-style-type: none"> <input type="checkbox"/> displacement of resident fauna (as described in BAM Subsection 8.4.1) <input type="checkbox"/> indirect impacts on native vegetation and habitat (as described in BAM Subsection 8.4.1 (3 .)) <input type="checkbox"/> mitigating prescribed biodiversity impacts (as described in BAM Subsection 8.4.2) <input type="checkbox"/> Details of the adaptive management strategy proposed to monitor and respond to impacts on biodiversity values that are uncertain (BAM Section 8.5)			Section 8.4
		MAPS and TABLES (in document)			Table 8.6

Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	BDAR ref.
		<input type="checkbox"/> Table of measures to be implemented before, during and after construction to mitigate and manage impacts of the proposal, including action, outcome, timing and responsibility			
		DATA (to be supplied) – N/A			
Thresholds for assessing and offsetting impacts of the proposal	Chapter 9	INFORMATION <input type="checkbox"/> Information from the TBDC and/or other sources to report on the current status of threatened species, threatened populations at risk of an SAIL and TEC/s for the proposal, and <input type="checkbox"/> Report on impacts of the proposal on TEC/s in accordance with BAM Subsection 9.2.1 <input type="checkbox"/> Report on impacts of the proposal on threatened species and/or threatened populations at risk of an SAIL in accordance with BAM Section 9.1 <input type="checkbox"/> Identification of impacts requiring offset in accordance with BAM Section 9.2 <input type="checkbox"/> Identification of impacts not requiring offset in accordance with BAM Subsection 9.2.1 (3 .) <input type="checkbox"/> Identification of areas not requiring assessment in accordance with BAM Section 9.3			Section 9
		MAPS and TABLES (in document)			
		<input type="checkbox"/> Map showing the extent of TECs at risk of an SAIL within the subject land			Figure 4.2
		<input type="checkbox"/> Map showing the location of threatened species at risk of an SAIL within the subject land			N/A
		Map showing location of:			
		<input type="checkbox"/> impacts requiring offset			Figure 10.1
		<input type="checkbox"/> impacts not requiring offset			N/A
		<input type="checkbox"/> areas not requiring assessment			N/A
		DATA (to be supplied) Digital shape files of: <input type="checkbox"/> extent of TECs at risk of an SAIL within the subject land			Uploaded to BOAMS

Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	BDAR ref.
		<input type="checkbox"/> threatened species at risk of an SAIL within the subject land <input type="checkbox"/> boundary of impacts requiring offset <input type="checkbox"/> boundary of impacts not requiring offset <input type="checkbox"/> boundary of areas not requiring assessment <input type="checkbox"/> Maps in jpeg format			
Applying the no net less standard	Chapter 10	INFORMATION <input type="checkbox"/> Description of the impact on PCTs/TECs <input type="checkbox"/> Description of the impact on threatened species at risk of an SAIL or incidentally observed via site visit <input type="checkbox"/> Number of ecosystem credits required for impacts on biodiversity values according to BAM Subsection 9 <input type="checkbox"/> Number of species credits required for impacts on biodiversity values according to BAM Subsection 10.1.3, including any species credit species that has been incidentally observed on the subject land Note: Species credits for any species at risk of an SAIL are calculated in the event that the decision-maker forms the opinion that the proposed impact is unlikely to be serious and irreversible and therefore can be offset. <input type="checkbox"/> Identification of credit class for ecosystem credits and species credits according to BAM Section 10.2 (this can be generated from BAM-C)			Section 10
		MAPS and TABLES (in document)			
		<input type="checkbox"/> Table showing biodiversity risk weightings			Table 10.1
		<input type="checkbox"/> Table of BC Act listing status for PCTs and threatened species requiring offset			Tables 10.1 and 10.2
		<input type="checkbox"/> Table of PCTs requiring offset and number of ecosystem credits required (Subsection 10.2.1)			Table 10.1
		<input type="checkbox"/> Table of species at risk of an SAIL or incidentally observed on site assessed for species credits and the number of credits required			Table 10.2
		<input type="checkbox"/> BAM-C credit report			Appendix IX
		DATA (to be supplied) – N/A			

11.2 Appendix II – Matters of national environmental significance

11.2.1 Relevant Matters

A search for matters of national environmental significance within a 5-kilometre radius of the subject land was conducted using the Protected Matters Search Tool². Table 11.1 summarises the results of the search, listing the matters of national environmental significance that may occur in, or may relate to, the subject land.

Table 11.1. Matters of national environmental significance.

World Heritage Properties	None
National Heritage Places	1
Wetlands of International Importance (Ramsar)	None
Great Barrier Reef Marine Park	None
Commonwealth Marine Area	1
Listed Threatened Ecological Communities	8
Listed Threatened Species	113
Listed Migratory Species	60

Matters of national environmental significance relevant to the proposed development include threatened and migratory species.

The Large-eared Pied Bat (*Chalinolobus dwyeri*) was detected during acoustic surveys on the subject land. The site does not contain rocky areas with caves, overhangs, escarpments, outcrops, or crevices, and thus, the proposal would not impact on breeding habitat for this species. The Large-eared Pied Bat forages for small flying insects below the forest canopy. Consequently, timbered areas within the subject land that are subject to clearing have been conservatively entered into the BAM-C and an offset obligation incurred.

Other threatened species that may opportunistically forage on the subject land include the Brown Treecreeper, Gang-gang Cockatoo, Regent Honeyeater, South-eastern Glossy Black-Cockatoo, Swift Parrot, and the Grey-headed Flying-fox.

Terrestrial migratory species such as the White-throated Needletail, Yellow Wagtail, and Oriental Cuckoo may also use the site's vegetation for foraging.

11.2.2 Significant Impact Assessment

Threatened Species

The threatened species identified in Section 11.2.1 have been assessed in accordance with the significant impact criteria for vulnerable, endangered, and critically endangered species outlined in the *Matters of National Environmental Significance Significant Impact Guidelines 1.1* (DoE 2013).

Considering all stages and components of the proposal, as well as associated activities and infrastructure, there is potential for impacts, including indirect impacts, on matters of national environmental significance. These impacts mainly involve the loss of potential foraging habitat for mobile threatened fauna species, including birds, bats, and mammals. However, it is highly unlikely that any of these species will be adversely affected by the proposal because:

² [Protected Matters Search Tool - DCCEEW](#)

- Suitable breeding habitat for most species is absent from the subject land. For species that may use the habitats present, local populations are unlikely to rely solely on the subject land for survival. Any local populations will not be rendered extinct by the proposed development, given the species' large ranges and the small area, nature, and condition of the habitats on the site.
- The subject land is not considered to contain habitat critical to the survival of any species.
- The subject land is unlikely to support an 'important population' (as defined by DoE 2013) of any threatened species.
- Proposed mitigation measures will minimise or reduce impacts on threatened species.

According to the criteria for vulnerable, endangered, and critically endangered species, the proposal is unlikely to:

- Lead to a long-term decrease in the size of an important population of a species
- Reduce the area of occupancy of an important population
- Fragment an existing important population into two or more populations
- Adversely affect habitat critical to the survival of a species
- Disrupt the breeding cycle of an important population
- Modify, destroy, remove, isolate, or decrease the availability or quality of habitat to an extent that could cause a species to decline
- Enable the establishment of invasive species harmful to a vulnerable species within its habitat
- Introduce diseases that may cause a species to decline
- Interfere substantially with the recovery of any of these species

Migratory Species

The subject land contains potential foraging habitat for terrestrial migratory species. The forested areas may be used temporarily by highly mobile migratory species during foraging, dispersal, or migration. However, the subject land represents only a small proportion of these species' large ranges and does not contain breeding habitat.

According to the criteria for migratory species in the *Matters of National Environmental Significance Significant Impact Guidelines 1.1*, the subject land does not contain 'important habitat' for any migratory species. Furthermore, the proposal is highly unlikely to disrupt the lifecycle (breeding, feeding, migration, or resting behaviour) of an ecologically significant proportion of any migratory species' population.

Therefore, the proposal is not likely to significantly impact any listed migratory species under the EPBC Act.

Conclusion

Based on this assessment, it is unlikely that the proposed development will have a significant impact on any matters of national environmental significance listed under the EPBC Act. Consequently, referral of the development application to the Commonwealth Department of Climate Change, Energy, the Environment and Water is not required.

11.3 Appendix III – Vegetation survey data

Sheet #	1 of 2	Date	24 / 04 / 2024	Survey name	100 Hilltop Road, Avalon Beach			Plot identifier	1
Recorders	Brooke Thompson			IBRA region	Pittwater			Veg zone ID	1
Datum	GDA94	Coordinate system	Geographic	MGA zone	56	Easting	343524	Northing	6276797
Location description		400m² plot situated adjacent Hilltop Road within the operational footprint							
Plot dimensions		For composition & structure (400m²): 20 m x 20 m For function (1000m²): 20 m x 50 m			Orientation of midline from 0 m point			316	

Datum: AGD66, WGS84, GDA94, GDA2020 or other (specify).

MGA Zone (for projected coordinate system only): 56 (Coastal NSW), 55 (Central NSW) or 54 (Western NSW).

X/Y coordinate: Long/Lat (for projected coordinate system), Easting/Northing (for geographic coordinate system).

Coordinate: Longitude (for projected coordinate system), Easting/Northing (for geographic coordinate system).

Vegetation integrity

Composition and structure sum values may be completed after entering data into available tools. It is not required while in the field.

Composition (400 m ² plot)			Structure (400 m ² plot)			Function (1000 m ² plot)		
		Sum values			Sum values (%) (may sum to >100%)	³ Tree stem size class (DBH)	If data are to be used as more appropriate local data i.e., to generate local benchmarks, stems must be counted	
Total count of native plant species (richness) in each growth form group (not individual plants within each growth form)	Trees (TG)	7	² foliage cover of native plant species by growth form group	Trees (TG)	27	80 + cm	0	
	Shrubs (SG)	4		Shrubs (SG)	13	50 – 79 cm	3	
	Grasses etc. (GG)	1		Grasses etc. (GG)	2	30 – 49 cm	✓	
	Forbs (FG)	3		Forbs (FG)	4.1	20 – 29 cm	✓	
	Ferns (EG)	1		Ferns (EG)	2	10 – 19 cm	✓	
	Other (OG)	6		Other (OG)	13	5 – 9 cm	0	
						⁴ Tree regeneration <5 cm	✓	
			Total high threat weed cover	89.2%	⁵ Length of fallen logs	27 m		
						⁶ Hollow bearing trees	3	
Vegetation integrity – function cont. (five 1 m² plots)				⁷ Litter cover (%)				
Subplot score (% in each)				75	80	80	90	100
Average of the 5 subplots				85				

These attributes require consideration of site observations and may be completed after field work:

Vegetation class	Northern Hinterland Wet Sclerophyll Forests	⁸ Large tree benchmark size	80 DBH	Confidence	High
Plant community type (PCT)	Hunter Coast Lowland Spotted Gum Moist Forest	EEC	✓	Confidence	High

400 m ² floristics plot:		Survey name	Plot identifier	Recorders	
Date	24 / 04 / 2024	100 Hilltop Road, Avalon Beach	1	Brooke Thompson	
GF code	Species name Full species name, or a unique means of identifying separate taxa within a survey is mandatory. Data from here will be used to assign growth form richness and cover.		N, HTW or non-HTW		² Foliage cover
TG	1	<i>Angophora costata</i>	N		10
TG	2	<i>Allocasuarina torulosa</i>	N		5
TG	3	<i>Corymbia gummifera</i>	N		3
TG	4	<i>Eucalyptus eugenioides</i>	N		3
TG	5	<i>Glochidion ferdinandi</i>	N		4
TG	6	<i>Ceratopetalum gummiferum</i>	N		1
TG	7	<i>Ficus rubiginosa</i>	N		1
	8	Dead tree	N		0
SG	9	<i>Pittosporum undulatum</i>	N		10
SG	10	<i>Breynia oblongifolia</i>	N		1
SG	11	<i>Wilkiea hugeliana</i>	N		1
SG	12	<i>Myrsine variabilis</i>	N		1
GG	13	<i>Microlaena stipoides</i>	N		2
FG	14	<i>Viola hederacea</i>	N		0.1
FG	15	<i>Commelina cyanea</i>	N		3
FG	16	<i>Dianella caerulea</i>	N		1
EG	17	<i>Pteridium esculentum</i>	N		2
OG	18	<i>Stephania japonica</i>	N		1
OG	19	<i>Cissus hypoglauca</i>	N		3
OG	20	<i>Geitonoplesium cymosum</i>	N		1
OG	21	<i>Pandorea pandorana</i>	N		2
OG	22	<i>Livistona australis</i>	N		5
OG	23	<i>Smilax glycyphylla</i>	N		1
	24	<i>Lantana camara</i>	HTW		10
	25	<i>Asparagus aethiopicus</i>	HTW		50
	26	<i>Ochna serrulata</i>	HTW		1
	27	<i>Cestrum parqui</i>	HTW		0.1
	28	<i>Ipomoea indica</i>	HTW		25
	29	<i>Ehrharta erecta</i>	HTW		5
	30	<i>Ligustrum lucidum</i>	HTW		5
	31	<i>Ligustrum sinense</i>	HTW		0.5
	32	<i>Tradescantia fluminensis</i>	HTW		1
	33	<i>Tradescantia zebrina</i>	E		25
	34	<i>Hibiscus sp</i>	E		2
	35	<i>Plumeria sp</i>	E		0.1
	36	<i>Jacaranda mimosifolia</i>	E		1

	37	<i>Lilium formosanum</i>	E	1
	38	<i>Strelitzia sp</i>	E	15
	39	<i>Hypoestes aristata</i>	E	25
	40	<i>Nephrolepis cordifolia</i>	E	10
	41	<i>Schefflera actionophylla</i>	E	2
	42	<i>Senecio angulatus</i>	E	20
	43			

GF Code: see growth form definitions in BAM 2020 Appendix F. **N:** native, **HTW:** high threat weed.

² **Foliage cover:** 0.1, 0.2, 0.3, ..., 1, 2, 3, 4, 5, 10, 15, 20, 25, ...100%; 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. Note the top 3 dominant native species within each GF group.

11.4 Appendix IV – Pittwater Local Environmental Plan 2014 and Pittwater 21 Development Control Plan

11.4.1 Land zoning

The site is zoned C4 – Environmental Living under the *Pittwater Local Environmental Plan 2014* (Pittwater LEP).

Table 11.2. Compliance with land zoning objectives.

Objectives	Compliance
To provide for low-impact residential development in areas with special ecological, scientific or aesthetic values.	<p>The site is currently a vacant block containing Pittwater Spotted Gum Forest. The proposed residential development is consistent with adjoining properties while ensuring the retention of the site's ecological and aesthetic values.</p> <p>The proposal preserves the Pittwater Spotted Gum Forest at the rear of the property, maintain its ecological significance and visual appeal. This area will be managed as a bushland regeneration area, with all works guided by a VMP to support long-term conservation and enhancement of habitat.</p>
To ensure that residential development does not have an adverse effect on those values.	<p>All practical measures have been taken to avoid and minimise impacts on the ecological values of the site. However, it is acknowledged that any development on the block would result in some impacts on the Pittwater Spotted Gum Forest.</p> <p>The proposed development has been carefully designed to minimise these impacts as much as possible. Comprehensive mitigation measures are included to address any adverse effects on vegetation within the site, ensuring that the ecological integrity of the Pittwater Spotted Gum Forest is preserved.</p>
To provide for residential development of a low density and scale integrated with the landform and landscape.	The proposal is for a residential development consistent with adjoining properties of low density and scale integrated with the landform and landscape.
To encourage development that retains and enhances riparian and foreshore vegetation and wildlife corridors.	The subject land does not contain any riparian or foreshore vegetation. Vegetation and habitat within the backyard would be retained and managed as a bushland regeneration area, preserving connectivity between adjoining properties.

11.4.2 Clause 7.6 Biodiversity

The subject land has been identified as Biodiversity on the Pittwater Biodiversity Map.

Table 11.3. Compliance with cl. 7.6 Biodiversity.

Objectives	Compliance
<p>The objective of this clause is to maintain terrestrial, riparian and aquatic biodiversity by—</p> <ul style="list-style-type: none"> (a) protecting native fauna and flora, and (b) protecting the ecological processes necessary for their continued existence, and (c) encouraging the conservation and recovery of native fauna and flora and their habitats. 	<p>The proposed development includes the establishment of a 500 m² bushland regeneration area at the rear of the property. This area will be actively managed to support the long-term protection and conservation of native fauna and flora, with all works guided by a comprehensive VMP.</p> <p>By enhancing and restoring native habitat, the proposal protects ecological processes essential for the continued existence of native species and encourages the recovery and conservation of local biodiversity.</p>

11.4.3 B4.7 Pittwater Spotted Gum Forest – Endangered Ecological Community

Pittwater Spotted Gum Forest has been identified within the subject land. As such, the relevant B4.7 Pittwater Spotted Gum Forest – Endangered Ecological Community controls under the Pittwater 21 Development Control Plan (DCP) apply to the proposal.

Table 11.4. Compliance with Control B4.7 PSGF – EEC.

DCP Control	Compliance
Development shall not have an adverse impact on Pittwater Spotted Gum Endangered Ecological Community.	<p>The site is currently a vacant block containing remnant Pittwater Spotted Gum Forest. To facilitate the construction of a new house, carport, driveway, and APZ, the proposal requires the removal and/or modification of 0.1 hectares of Pittwater Spotted Gum Forest.</p> <p>Efforts have been made to retain as many trees as possible, with tree removal limited to those within the footprints of the new house, carport, driveway, or those necessary to meet APZ requirements. A total of eight trees have been prioritised for retention.</p> <p>As part of the proposal, one Sydney Red Gum (<i>Angophora costata</i>) will be replanted on the site. However, due to APZ requirements, no additional tree planting can be undertaken.</p> <p>The existing vegetation and habitat within the proposed backyard area will be managed as a bushland regeneration area, ensuring that the retained Pittwater Spotted Gum Forest is protected and that there will be no adverse impact on this EEC.</p>
Development shall restore and/or regenerate Pittwater Spotted Gum Endangered Ecological Community and provide links between remnants.	<p>The development will restore and regenerate the Pittwater Spotted Gum Forest within the bushland regeneration area.</p>
Development shall be in accordance with any Pittwater Spotted Gum Forest Recovery Plan.	<p>There is currently no NSW State Government Recovery Plan for Pittwater Spotted Gum Forest. The NSW OEH profile³ for Pittwater Spotted Gum Forest lists activities to assist the EEC. These include:</p> <ul style="list-style-type: none"> • Remove rubbish. • Control stormwater and soil erosion. • Introduce measures to control unrestricted access and/or inappropriate use. • Manage weed infestations. • Protect areas of habitat from clearing and further fragmentation. • Restore degraded habitat using bush regeneration techniques. <p>The VMP will outline activities such as rubbish removal, weed management, and bush regeneration techniques.</p> <p>Stormwater and soil erosion will be managed in accordance with the Stormwater Plan (Appendix VI).</p> <p>Temporary exclusion fencing will be installed during construction to restrict access to the bushland regeneration area.</p>

³ [Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion - profile | NSW Environment, Energy and Science](#)

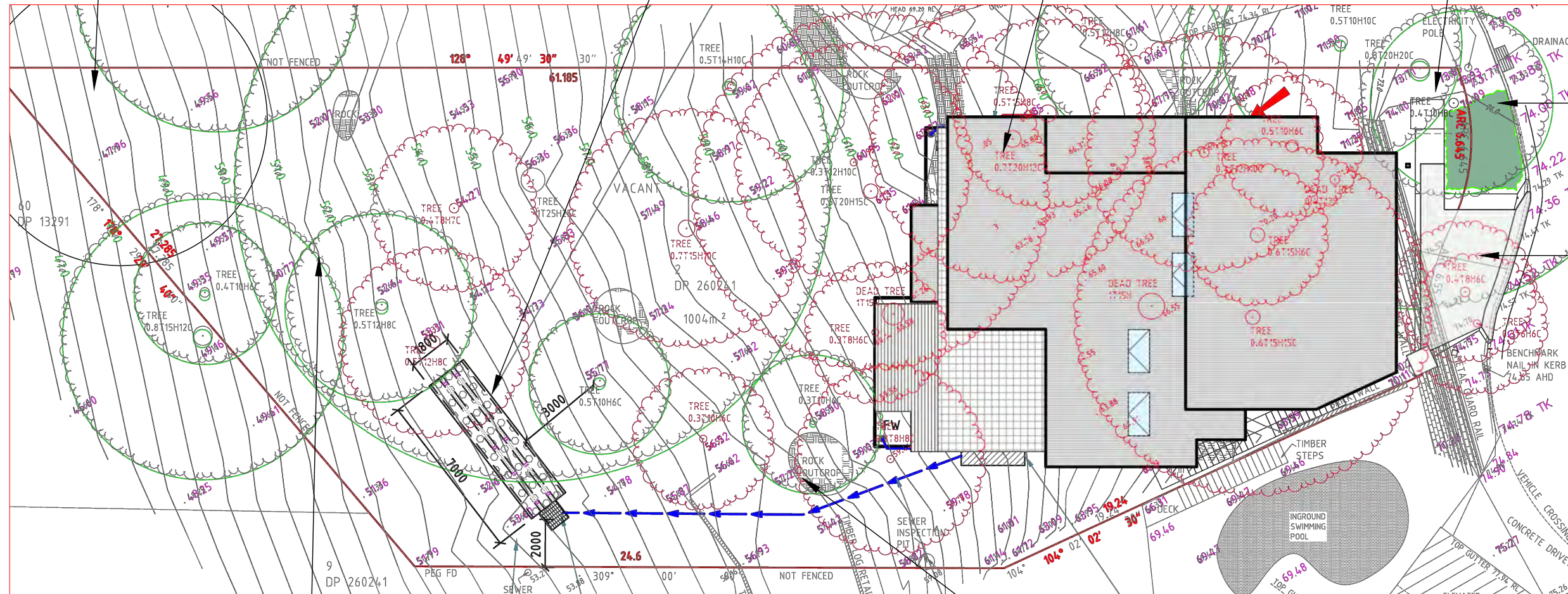
Development shall result in no significant onsite loss of canopy cover or a net loss in native canopy trees.	<p>The site is currently a vacant block containing Pittwater Spotted Gum Forest. It is acknowledged that the proposed residential development would result in the loss of canopy cover, including that required for the establishment of an APZ.</p> <p>The development involves the remove of 22 of the 30 canopy trees located on the site. Due to the constraints imposed by the APZ, replanting canopy trees beyond those already proposed would not be feasible. The proposal includes the planting of one Sydney Red Gum (<i>Angophora costata</i>) at the rear of the property.</p> <p>The development has been carefully designed to minimise these impacts as much as possible. Comprehensive mitigation measures have been included to address potential adverse effects on vegetation, ensuring the continued ecological integrity of the Pittwater Spotted Gum Forest.</p>
Development shall retain and enhance habitat and wildlife corridors for locally native species, threatened species and endangered populations.	The development will retain a 500 m ² bushland regeneration area at the rear of the property. This area will be actively managed to support the long-term protection and enhancement of native fauna and flora habitats, with all works guided by a comprehensive VMP.
Caretakers of domestic animals shall prevent them from entering wildlife habitat.	Noted.
Fencing shall allow the safe passage of native wildlife.	Noted.
Development shall ensure that at least 80% of any new planting incorporates native vegetation (as per species found on the site or listed in Pittwater Spotted Gum Endangered Ecological Community).	Compliant. Refer to Landscape Plan (Appendix V).
Development shall ensure any landscaping works are outside areas of existing Pittwater Spotted Gum Endangered Ecological Community and do not include Environmental Weeds.	Compliant. Refer to Landscape Plan (Appendix V).

11.5 Appendix V – Landscape Plan

- Stormwater dispersion spreader
see Nitma Consulting hydraulic plan
1.7.24 Issue B

- Ex Eucalyptus scias Red Mahogany to be counted as canopy tree to front /DCP

- See Architects plans
14.6.24



- 50x
Lomandra
filiformis
x140mm pot

- New driveway and crossover to NBC specification

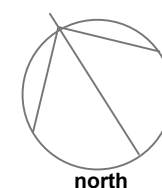
Lower garden area to be treated as a bushland regeneration area: Minimum two year activity for plant replacement and on going weed management. Ideally a local bushcare group is to be contracted to perform : on going weed removal along with site management for removal of plants/privet etc as identified by NBC council web site www.pittwater.nsw.gov.au/environment/noxious_weeds/a-z_list_of_weeds.

- See Arborlogix Arboricultural Impact Assessment 6.6.24 for trees to be retained and trees to be removed.

To be read in conjunction with
Bushfire Planning and Design
consulting report.

Landscape plan
100 Hill Top road Avalon

Issue: A client DRAFT
Issue: B Council issue
Issue: C REV plan and Eco Rev
Issue: D REV plant Sch Lomandra filiformis



Andrew Davies
landscape designer

27 Turimetta Street, Mona Vale NSW 2103
design.bdg@gmail.com
abn : 17 986 316 620
www.banksiadesigngroup.com.au 0414 2900 57

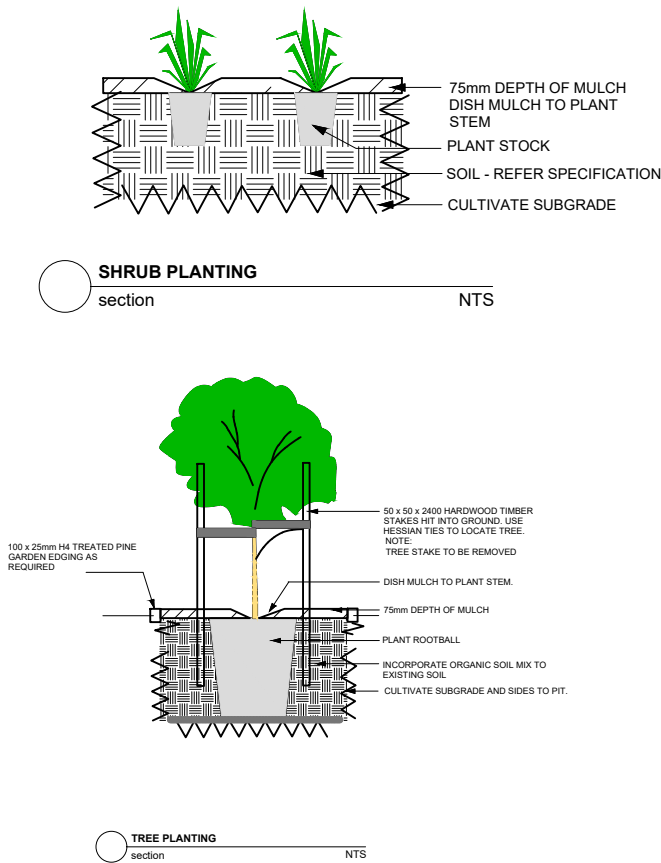
Drawing: AD/TT	Checked by: AD
Andrew Davies	Job:R09 220527
Date 14.2.25	Issue : D
Scale:1to 200 A3 Approx	

2

3

Plant Schedule

Botanical Name	Common Name	Pot size mm	Dimensions WxH in metres	Qty.
Angophora costata	Argle apple tree	75ltr	20x20plus	1
Lomandra filiformis	Lomandra	140	.4x.7	50



Plant Schedule and notes

Landscape plan
100 Hill Top road Avalon

Issue: A client DRAFT
Issue: B Council issue
Issue: C REV plan and Eco Rev
Issue: D REV plant Sch Lomandra filiformis

LANDSCAPE GENERAL
SPECIFICATION AND NOTES

All landscape works and material supply, to be in accordance with AS 4000, LCA guidelines and Occupational Health & Safety standards.

All landscape works to comply with relevant Australian Standards and relevant Building Codes of Australia

All dimensions and locations to be checked on site and confirmed by landscape site supervisor before commencement of works

Do not scale from drawings. Dimensions take preference

Plant schedule and quantities to be used as guide only and to be confirmed by contractor before final purchase of plants

Final plant positions to be determined on site (by Landscape Supervisor).

DESIGN LIABILITY NOTE: No liability is accepted by these plans. Contractors are required to check ALL construction facts, figures and relevant information pertaining to the soft and hard scape works to be performed. Should anomalies occur, the designer or a representative of Banksia Design Group must be contacted and given due notice and sufficient documentation and, if required, due compensation to allow for adjustment/s to plans, documentation etc

REMOVAL OF NOXIOUS WEEDS: As a duty of care exists for all contractors: if a noxious weed exists onsite it should be removed after discussion with the owner or site supervisor.

ENVIRONMENTAL MANAGEMENT AND SEDIMENT CONTROL: All Landscape works to adhere with Environmental Legislation outlined in the *Protection of the environment operations act 1997*, by the EPA NSW.

It is highly recommended to use Dial Before You Dig services – contact for information at www.dialbeforeyoudig.com.au or call 1100.

TREES: All trees to be staked: use 2 x hardwood 50x50mm stakes and hessian webbing. See detail

TURF: 1. Install turf rolls diagonal to the fall of the land. Roll turf following installation, and water as required . Use soft leaf Buffalo sp

2. 50 - 70mm topsoil underlay to be used in ground preparation .Note check ph after construction and before laying turf, adjust as required for optimum plant growth

SOIL:

1. Contractor is to check soil pH levels, two weeks prior to planting, and allow for reasonable adjustments, using lime or similar to ensure plant viability

2. Break up existing ground surface using mattock, rotary hoe or tractor tine as required

3. Topsoil sandy loam 50mm depth to turf areas.

4. Where necessary mound soil to assist in soil drainage to avoid root rot and poor plant growth

5. Incorporate ¼ tonne organic soil mix into holes where trees are planted, using recycled leaf litter as mulch

6. Soil Quality to be Australian Native Landscape Standard

7. Supply and Install 'Garden Mix' to all garden beds incorporated into the top 300mm of existing site profile. Note use rotary hoe as required do not just place on top of ground

MULCH: Mulch to be installed to all planter beds to a depth of 75mm. Mulch type to be Recycled Leaf Litter ideally from local tree company based on more native plants than general exotics.

EDGING: See plan for locations. Top edge higher than lawn to allow garden beds to be aerated & mounded

DRAINAGE: fall paving to lawn area

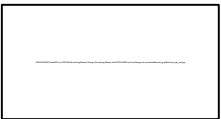
LIGHTING: to future plans TBA

MAINTENANCE: New plants to receive regular deep irrigation for a minimum 12 weeks establishment period. Seasonal pruning, fertilising and pest and disease checks to be carried out. Advice by qualified horticulturalist recommended

IRRIGATION: Drip irrigation TBA

Andrew Davies
landscape designer

27 Turimetta Street, Mona Vale NSW 2103
design.bdg@gmail.com
alm : 17 986 316 620
www.banksiadesigngroup.com.au 0414 2900 57



Landscape DA Plan

Drawing: AD/TT	Checked by: AD
Andrew Davies	Job: R09 220527
Date 14.2.25	Issue : D
Scale: 1to 200 A3	
Approx	

3

3

11.6 Appendix VI – Stormwater Plan

GENERAL NOTES

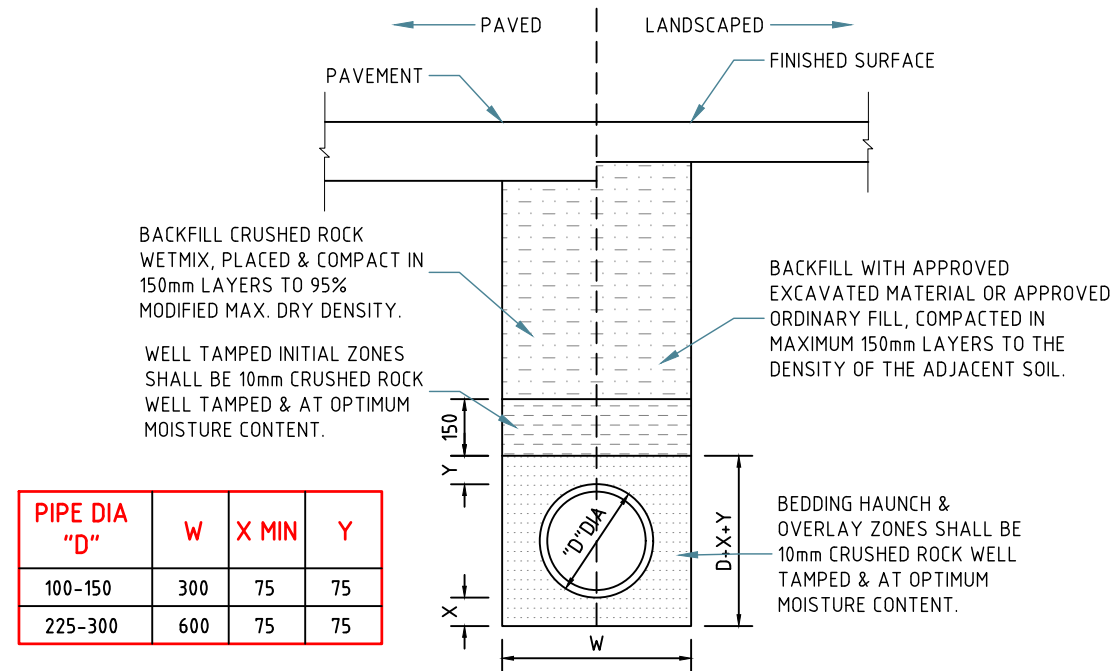
1. THE PLUMBER/ DRAINER SHALL INSPECT THE SITE AND CONFIRM THE EXISTING SITE STRUCTURES, SERVICES AND CONDITIONS PRIOR TO PROCEEDING. IF ANY DISCREPANCIES FOUND, CONTACT THE ENGINEER FOR DISCUSSION.
2. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH RELEVANT AUSTRALIAN STANDARDS, BUILDING CODE OF AUSTRALIA AND LOCAL GOVERNMENT'S REQUIREMENTS. IT IS THE RESPONSIBILITY OF THE PLUMBER/ DRAINER TO OBTAIN ANY APPROVALS/ PERMITS/ LICENSES ISSUED BY THE AUTHORITIES PRIOR TO PROCEEDING WITH STORMWATER WORKS.
3. UNLESS NOTED AS OTHERWISE, ALL DOWNPIPES TO BE Ø100 ROUND (OR 100x75 RECTANGULAR) AND FULLY SEALED. ALL EAVE GUTTERS TO BE 115 QUAD HI-FRONT OR EQUIVALENT, ALL BOX GUTTERS TO BE 200Wx150H. ALL STORMWATER PIPES TO BE Ø100 SEWER GRADE AND LAID AT 1% MIN. FALL. ALL MATERIALS USED IN THE WORK SHALL BE NEW AND CONFORM WITH RELEVANT AUSTRALIAN STANDARDS AND BEAR THE REQUIRED STANDARDS MARK.
4. LOCATION OF STORMWATER SYSTEMS, INCLUDING DOWNPIPES, PIPES, PITS AND RAINWATER TANK ARE INDICATIVE ONLY. EXACT LOCATION SHALL BE DETERMINED ON SITE TO SUIT SITE CONDITIONS.
5. SUB-SOIL DRAINS FOR RETAINING WALL SHALL BE INSTALLED BY THE BUILDER AND CONNECTED TO STORMWATER LINES. ALL AGG. LINES SHALL BE 100mm DIA., UNLESS NOTED OTHERWISE.
6. NATURAL GROUND LEVELS ALONG ALL BOUNDARIES MUST BE MAINTAINED UNALTERED. ALL RETAINING WALLS TO BE SETBACK FROM BOUNDARIES TO AVOID CONCENTRATION OF STORMWATER FLOWS.
7. LEVELS ARE APPROXIMATE ONLY. THE PLUMBER/ DRAINER SHALL CONFIRM THE LEVELS PRIOR TO PROCEEDING. IF ANY DISCREPANCIES FOUND, CONTACT THE ENGINEER FOR DISCUSSION.
8. INSPECTION AND CERTIFICATION, IF REQUIRED, SHALL BE DONE PRIOR TO BACKFILLING. ALLOW 24 HOUR NOTICE FOR THE ENGINEER TO CARRY OUT INSPECTION.
9. ANY DAMAGE TO SERVICES DURING CONSTRUCTION SHALL BE REPAIRED IMMEDIATELY AT THE PLUMBER/ DRAINER'S OWN EXPENSE.
10. THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH:
- ARCHITECTURAL PLAN BY OLIVER KEAVENEY, JOB No. 18456, DATED 07/10/22

BASIX REQUIREMENTS

THIS DEVELOPMENT REQUIRES A 3500L RWT. A 3500L ABOVE GROUND RWT IS PROVIDED TO MEET THE REQUIREMENT

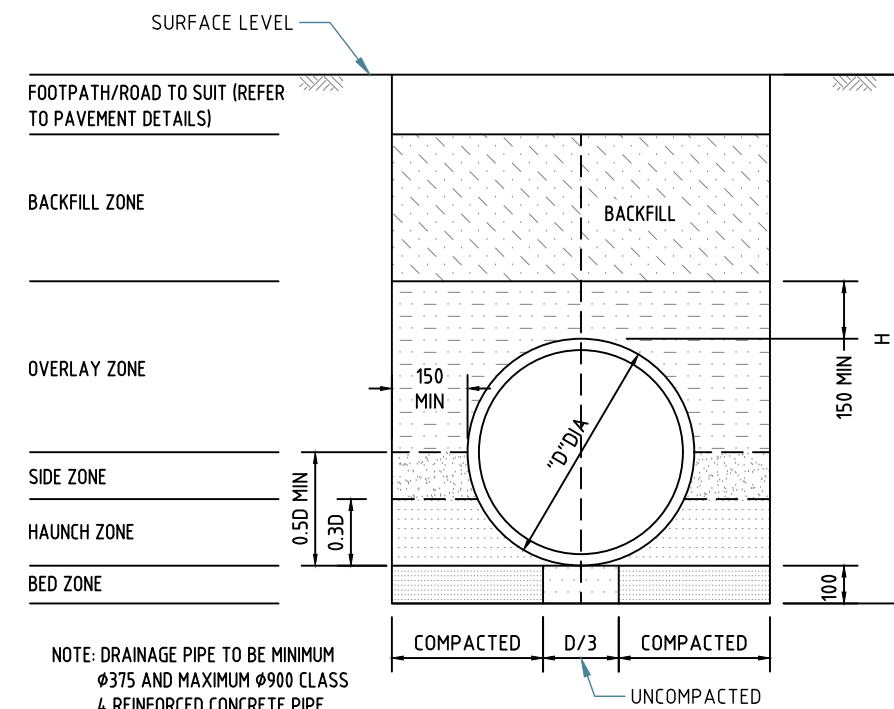
OSD REQUIREMENTS

SITE AREA = 1004 m2
TOTAL IMPERVIOUS AREA = 290m2
IMPERVIOUS RATIO = 28% < 35%
THEREFOR, OSD IS NOT REQUIRED



UPVC PIPE TRENCH BACKFILL TYP. DETAILS

SCALE 1:20

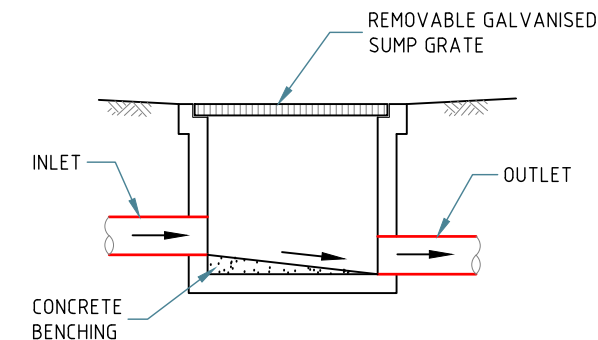


CONCRETE PIPE TRENCH BACKFILL TYP. DETAILS

SCALE 1:20

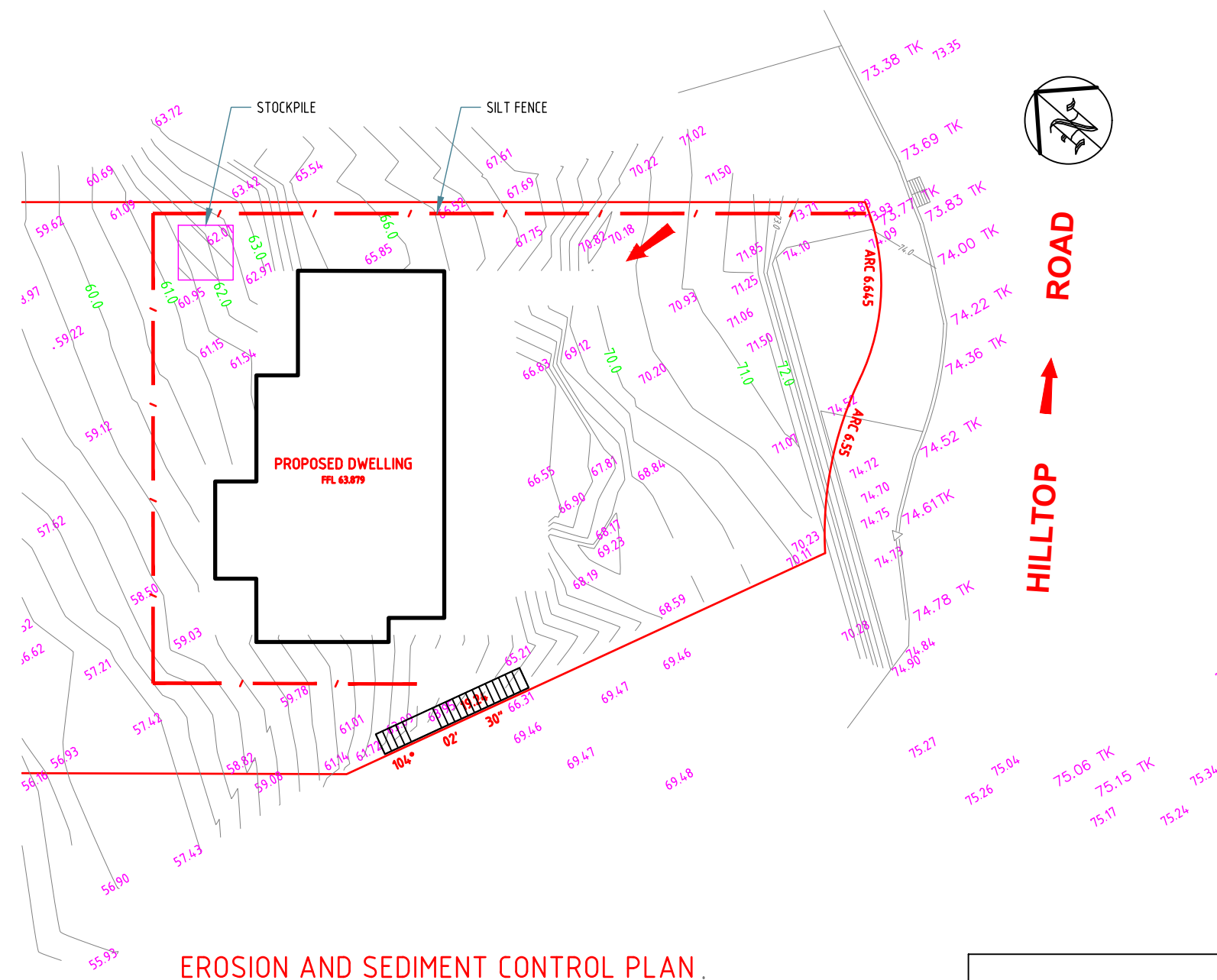
MINIMUM PIPE COVER (FROM FINISHED SURFACE TO TOP OF PIPE)		
LOCATION	MINIMUM COVER (mm)	
	CAST/DUCTILE IRON GAL STEEL	OTHER AUTHORISED PRODUCTS (-)
1. NOT SUBJECT TO VEHICULAR LOADING: A. WITHOUT PAVEMENT i. FOR SINGLE DWELLING ii. OTHER THAN SINGLE DWELLING B. WITH PAVEMENT OF BRICK/UNREINFORCED CONCRETE	0 0 0(~~)	100 300 50(~~)
2. SUBJECT TO VEHICULAR LOADING: A. OTHER THAN ROAD: i. WITHOUT PAVEMENT ii. WITH PAVEMENT OF: - REINFORCED CONC. FOR HEAVY VEHICLE - BRICK/UNREINF. CONC. LIGHT VEHICLE B. ROAD i. SEALED ii. UNSEALED	300 0(~~#) 0(~~#) 300 300	450 100(~~#) 75(~~#) 500(#) 500(#)
3. SUBJECT TO CONSTRUCTION VEHICLE OR IN ENBANKMENT CONDITION	300	500(#)

(-) INCLUDES OVERLAY ABOVE THE TOP OF THE PIPE OF NOT LESS THAN 50mm THICK
(~~) BELOW THE UNDERSIDE OF THE PAVEMENT
(#) SUBJECT TO COMPLIANCE WITH AS1762, AS2033, AS/NZS2566.1, AS3725 OR AS4060



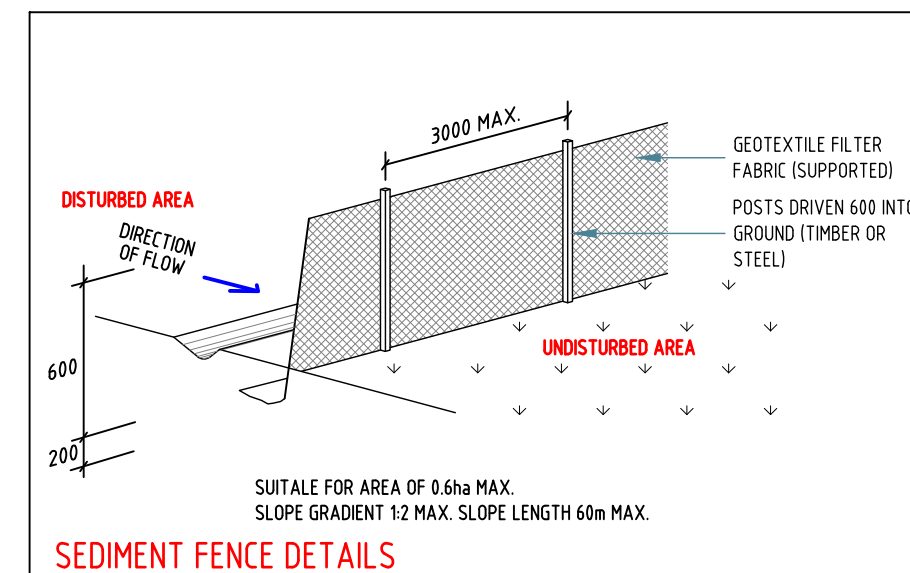
TYP. GRATED PIT DETAILS

SCALE 1:20



NOTES:

1. ALL EROSION AND SEDIMENT CONTROL MEASURES TO BE INSPECTED AND MAINTAINED DAILY BY SITE MANAGER
2. MINIMISE DISTURBED AREA
3. ALL STOCKPILES TO BE CLEAR FROM DRAINS, GUTTERS AND FOOTPATH
4. DRAINAGE IS TO BE CONNECTED TO STORMWATER SYSTEM AS SOON AS POSSIBLE
5. ROADS AND FOOTPATH TO BE SWEEPED DAILY
6. KERB SIDE INLET TO BE PROTECTED WITH FABRIC FILLED WITH GRAVEL



A3

Paper size:

All dimensions are in millimetres. Do not scale the drawing. Use written dimensions. Dimensions must be confirmed prior to commencement. Location of services are approximate only. Dial 1100 before any excavation or demolition.

Revisions

Absorption System Relocated

Designed: CH

Checked: HN

Approved:

Quoc Huy Nguyen

PhD (Eng), MIEAust, CPEng,

NER Reg. No. 208 2513

NfTmA

CONSULTING

NITMA CONSULTING PTY LTD

PO Box 43, West Ryde NSW 1685

P: 1300 905 269

E: admin@nitma.com.au

W: nitma.com.au

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ADDRESS: 100 HILLTOP RD, AVALON

LGA: NORTHERN BEACHES COUNCIL

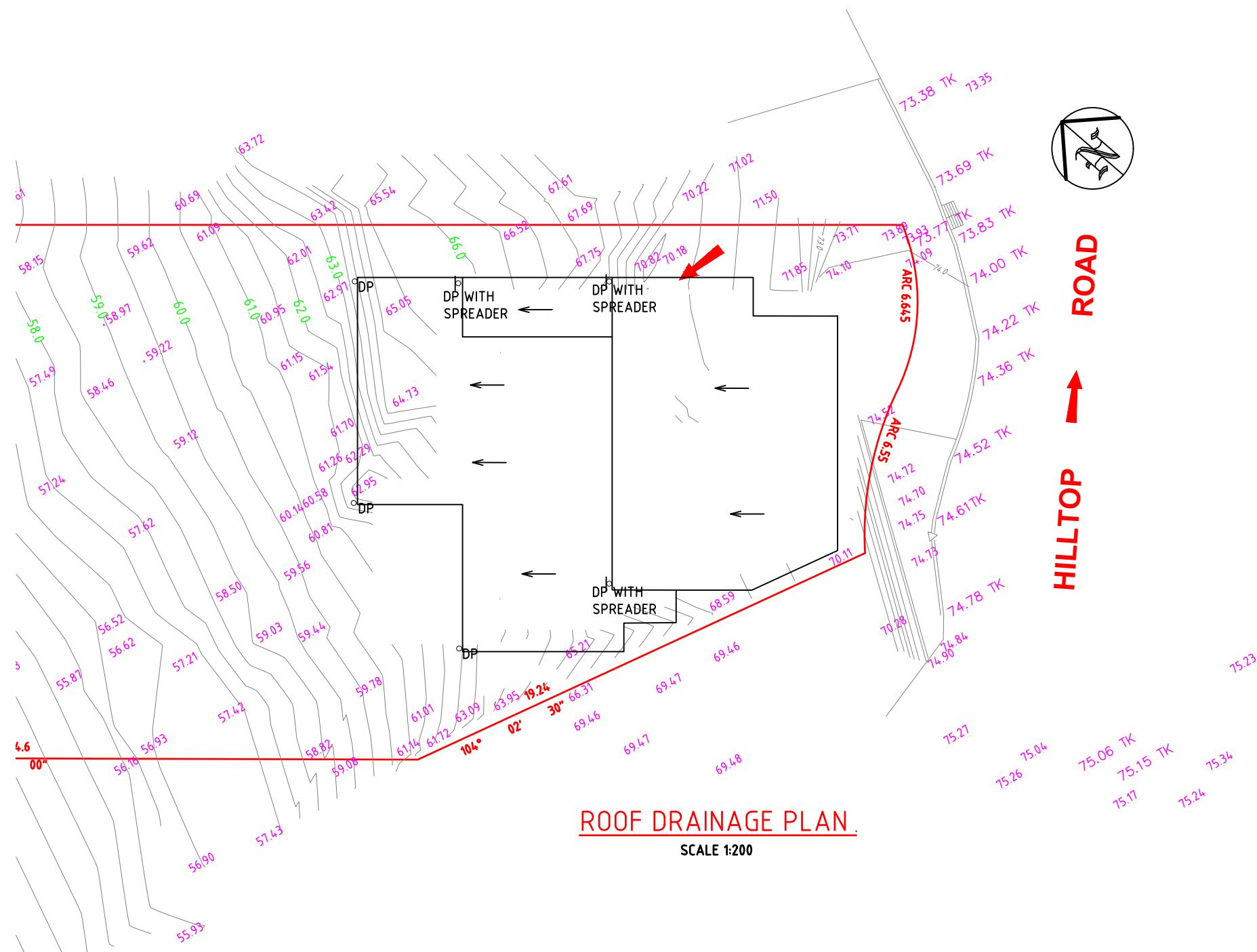
EROSION & SEDIMENT CONTROL PLAN








Project No: 5652H

Issue: B

Date: 01.07.2024

Sheet No: 2 of 7

**LEGEND**

DP	DOWNPIPE
GP	GRATED PIT
SP	SILT ARRESTOR PIT
CP	CLEAN-OUT PIT
SL	SURFACE LEVEL
IL	INVERT LEVEL
	GRATED BOX DRAIN
	ROOF- WATER PIPELINE
	SURFACE- WATER PIPELINE
	EXISTING PIPELINE
	SURFACE RUNOFF DIRECTION
	EXISTING GROUND CONTOUR
	PROPOSED GROUND LEVEL

Paper size: **A3**

All dimensions are in millimetres. Do not scale the drawing. Use written dimensions. Dimensions must be confirmed prior to commencement. Location of services are approximate only. Dial 1100 before any excavation or demolition.

Revisions	
Absorption System Relocated	
Designed: CH	Checked: HN

Approved:

Quoc Huy Nguyen
PhD (Eng), MIEAust, CPEng,
NER Reg. No. 208 2513

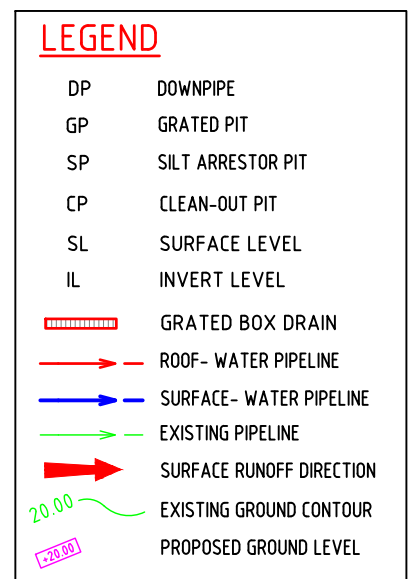
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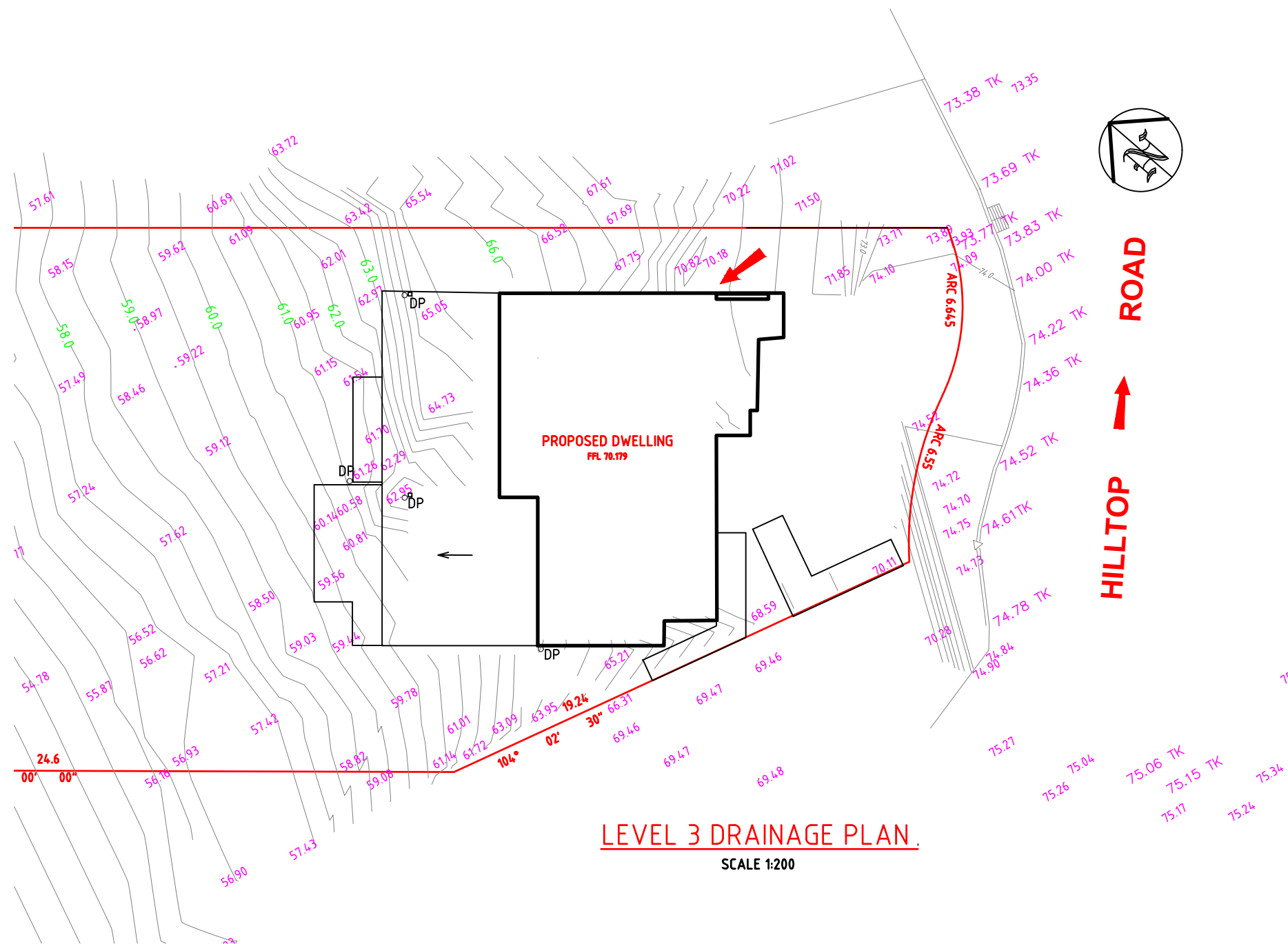
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LEVEL 3 DRAINAGE PLAN

Project No: 5652H Issue: B Date: 01.07.2024 Sheet No: **3** of 7












LEVEL 3 DRAINAGE PLAN

SCALE 1:200

LEGEND

DP	DOWNPIPE
GP	GRADED PIT
SP	SILT ARRESTOR PIT
CP	CLEAN-OUT PIT
SL	SURFACE LEVEL
IL	INVERT LEVEL
	GRADED BOX DRAIN
	ROOF- WATER PIPELINE
	SURFACE- WATER PIPELINE
	EXISTING PIPELINE
	SURFACE RUNOFF DIRECTION
	EXISTING GROUND CONTOUR
	PROPOSED GROUND LEVEL

Paper size: **A3**

All dimensions are in millimetres. Do not scale the drawing. Use written dimensions. Dimensions must be confirmed prior to commencement. Location of services are approximate only. Dial 1100 before any excavation or demolition.

Revisions	
Absorption System Relocated	
Designed: CH	Checked: HN

Approved:

Quoc Huy Nguyen
PhD (Eng), MIEAust, CPEng,
NER Reg. No. 208 2513

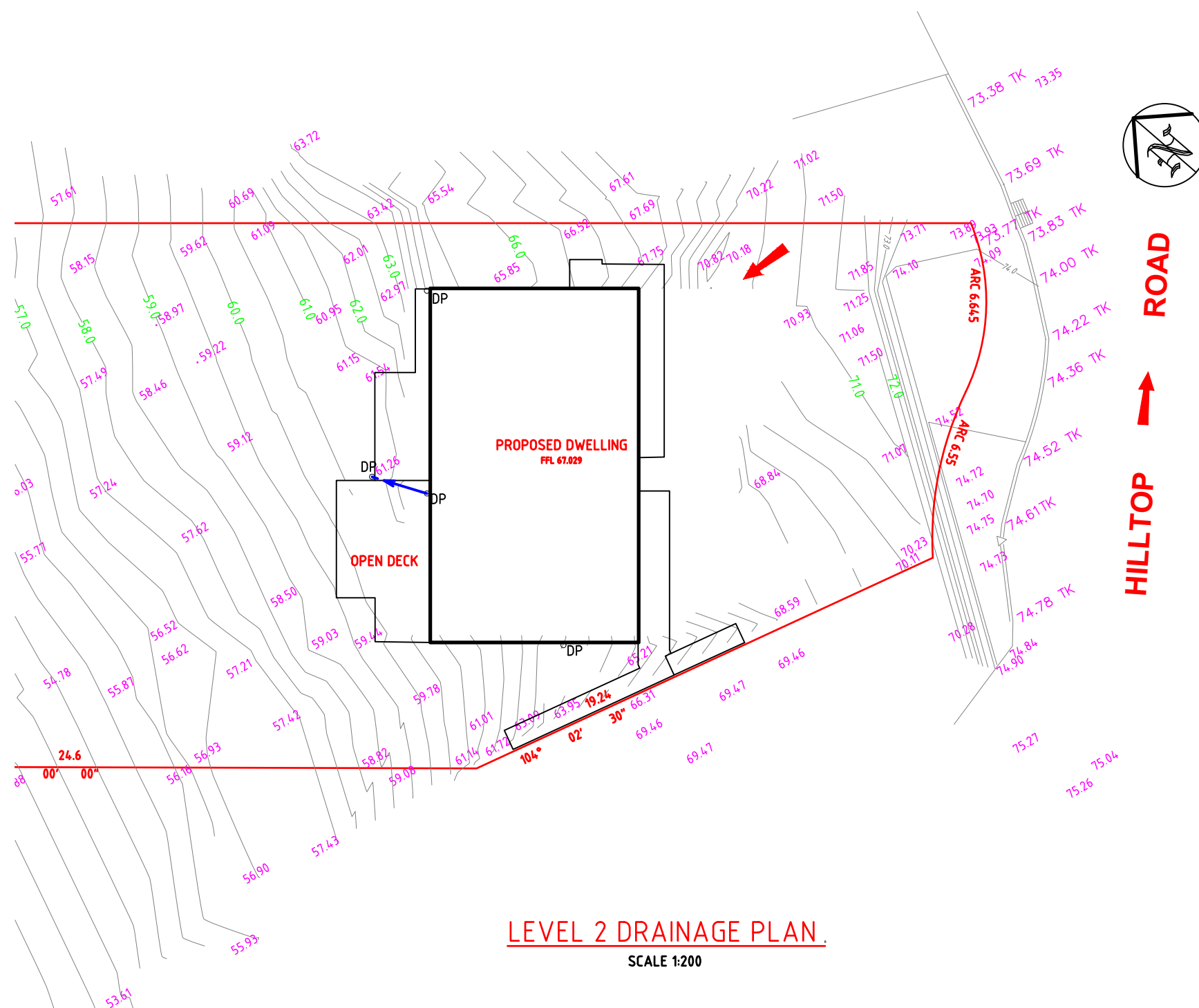
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LEVEL 3 DRAINAGE PLAN

Project No: 5652H Issue: B Date: 01.07.2024 Sheet No: **3** of 7

**LEVEL 2 DRAINAGE PLAN.**

SCALE 1:200

LEGEND

DP	DOWNPIPE
GP	GRATED PIT
SP	SILT ARRESTOR PIT
CP	CLEAN-OUT PIT
SL	SURFACE LEVEL
IL	INVERT LEVEL
	GRATED BOX DRAIN
	ROOF- WATER PIPELINE
	SURFACE- WATER PIPELINE
	EXISTING PIPELINE
	SURFACE RUNOFF DIRECTION
	EXISTING GROUND CONTOUR
	PROPOSED GROUND LEVEL

Paper size: **A3**

All dimensions are in millimetres. Do not scale the drawing. Use written dimensions. Dimensions must be confirmed prior to commencement. Location of services are approximate only. Dial 1100 before any excavation or demolition.

Revisions	
Absorption System Relocated	
Designed: CH	Checked: HN

Approved:

Quoc Huy Nguyen
PhD (Eng), MIEAust, CPEng,
NER Reg. No. 208 2513

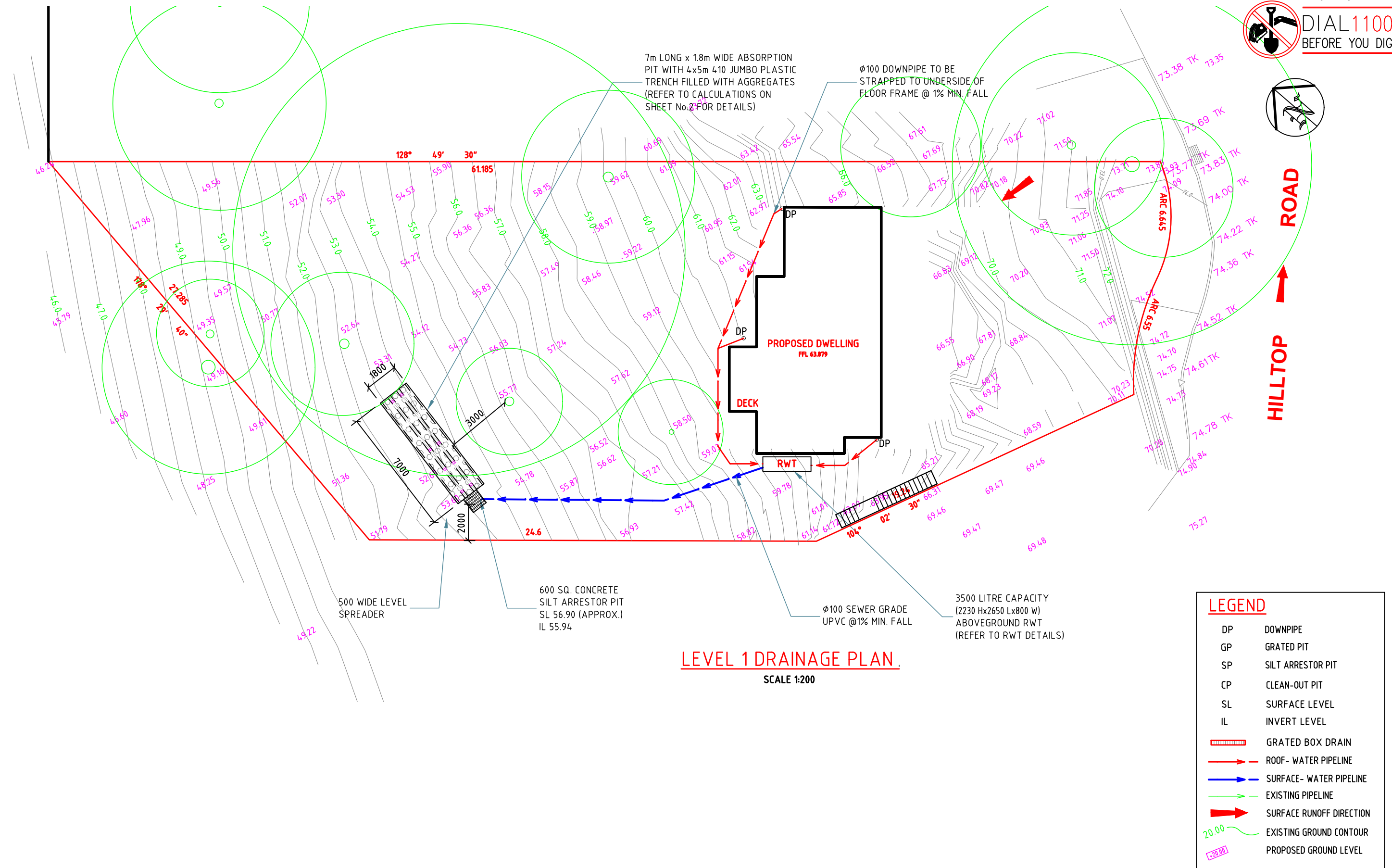
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LEVEL 2 DRAINAGE PLAN

Project No: 5652H Issue: B Date: 01.07.2024 Sheet No: **4** of 7



Paper size: **A3**

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Revisions	
Absorption System Relocated	
Designed: CH	Checked: HN

Approved:

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PhD (Eng), MIEAust, CPEng,
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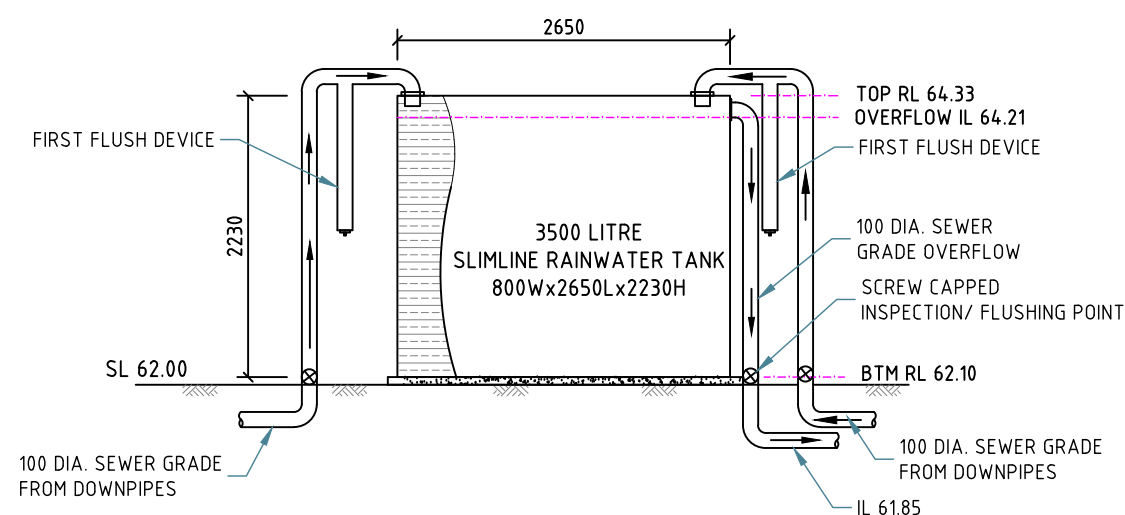
PROJECT: PROPOSED DWELLING
ADDRESS: 100 HILLTOP RD, AVALON
LGA: NORTHERN BEACHES COUNCIL

LEVEL 1 DRAINAGE PLAN

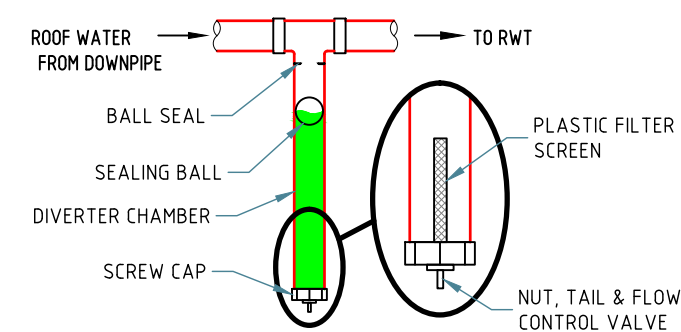
Project No: 5652H Issue: B Date: 01.07.2024 Sheet No: **5** of 7

RAINWATER TANK NOTES:

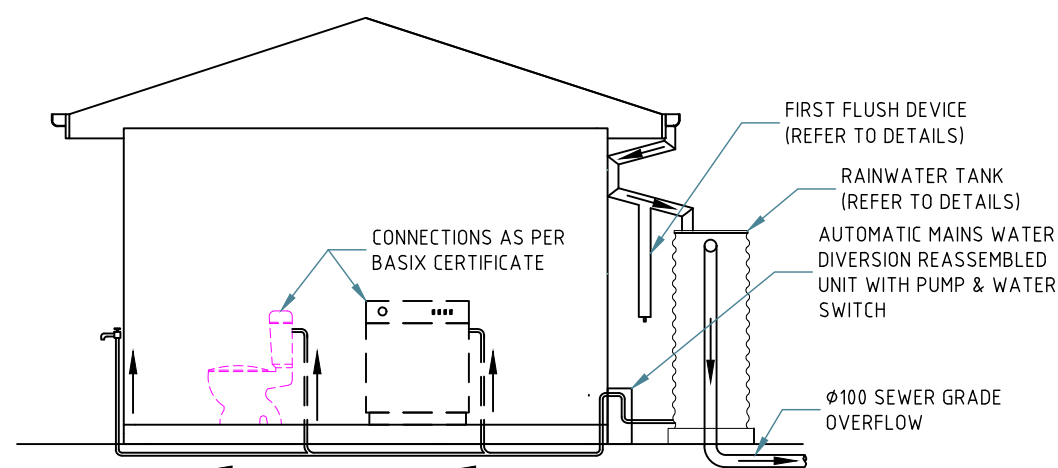
1. RAINWATER TANKS BY TANKWORKS AUSTRALIA (TEL: 1300 736 562) OR SIMILAR.
2. DIMENSIONS ARE INDICATIVE ONLY. EXACT DETAILS TO MANUFACTURER'S SPECIFICATIONS.
3. A FIRST FLUSH DEVICE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS SHALL BE FITTED TO RAINWATER TANK SYSTEM TO FLUSH OUT THE FIRST 0.5mm OF RUN-OFF FROM THE ROOF AREA THAT DRAINED INTO THE TANK (E.G. 0.5L/m²).
4. RAINWATER OUTLET CONNECTIONS AS PER BASIX CERTIFICATE.

**RAINWATER TANK DETAILS**

NOT TO SCALE

**FIRST FLUSH DEVICE DETAILS**

NOT TO SCALE

**ABOVEGROUND RWT INSTALLATION**

SCALE 1:50

Paper size: A3

All dimensions are in millimetres. Do not scale the drawing. Use written dimensions. Dimensions must be confirmed prior to commencement. Location of services are approximate only. Dial 1100 before any excavation or demolition.

Revisions	
Absorption System Relocated	
Designed: CH	Checked: HN

Approved:

Quoc Huy Nguyen
PhD (Eng), MIEAust, CPEng,
NER Reg. No. 208 2513

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RWT AND PIT DETAILS

Project No: 5652H Issue: B Date: 01.07.2024 Sheet No: 6 of 7

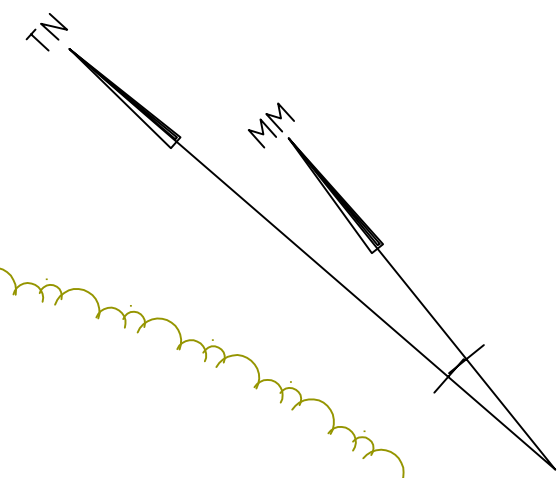


DEBRIS SCREEN DETAILS

NOT TO SCALE

11.7 Appendix VII – Boundary Identification Survey

SITE PLAN



15
DP 206296

VACANT

DP 260231

1004m²

3
DP 260241

CAUTION NOTES:

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THE OWNER/ARCHITECT/DEVELOPER AND ALL CONTRACTORS MUST MAKE THEIR OWN INQUIRIES REGARDING THE POSITION OF ALL UNDERGROUND SERVICES. FOR BELOW GROUND SERVICES THERE IS NO ABSOLUTE CERTAINTY AS TO THE POSITION, DEPTH OR LENGTH OF THE SERVICE. PRIOR TO ANY DESIGN, DEMOLITION, EXCAVATION OR CONSTRUCTION ON THE SITE, THE RELEVANT SERVICES AUTHORITIES SHOULD BE CONTACTED FOR LOCATION OF UNDERGROUND SERVICES AND DETAILED LOCATION OF ALL SERVICES. DIAL BEFORE YOU DIG SERVICE MUST BE USED.

THE PURPOSE OF THIS SURVEY WAS TO OBTAIN TOPOGRAPHICAL DETAIL AS REPRESENTED ON THIS PLAN. THE TITLE BOUNDARIES SHOWN WERE NOT MARKED AT THE TIME OF SURVEY AND HAVE BEEN DETERMINED FROM INFORMATION AVAILABLE ON PUBLIC RECORD. RELATIONSHIP OF IMPROVEMENTS TO BOUNDARIES ARE DIAGRAMMATIC ONLY. DISTANCES TO BOUNDARIES AND ALL SETOUT DIMENSIONS FOR CONSTRUCTION SHOULD BE SUBJECT TO FURTHER SURVEY.

LEVELS AND POSITION OF WINDOWS, WALLS AND RIDGES OF ADJOINING PROPERTIES HAVE BEEN MEASURED BY INDIRECT SURVEY METHODS WITHOUT ENTERING THE PROPERTIES AND ARE INDICATIVE ONLY.

TREE DIMENSIONS ARE APPROXIMATE ONLY
--- DENOTES OVERHEAD ELECTRICITY LINES

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Relationship of improvements to boundaries is diagrammatic only DO NOT SCALE OFF THIS DRAWING. Where offsets are critical they should be determined by a further survey.
Services shown hereon have been determined from visual evidence only. Prior to any demolition, excavation or construction on the site, the relevant authority should be contacted to establish detailed location and depth. The bearings on these plan boundaries are from Land Title Office plans. They are on MM at the date of the Deposited Plan.
Contours shown depict the topography, except at spot levels shown. They do not represent the exact level at any particular point.

SCALE 1:100
DATUM: AHD
ORIGIN: SSM38162
SURVEYED :GM & RJ
DRAWN : GM
DATE: 8/03/2022

GEOGRAPHIC SOLUTIONS
SURVEYORS
8 TRICKETT ROAD
CRONULLA
NSW 2230
Tel : (02) 9501 5207
Email: geographicolsns@optusnet.com.au

TITLE DESCRIPTION
LOT 2
DP 260241

L.G.A. NORTHERN BEACHES

100 HILLTOP ROAD
CLAREVILLE

CLIENT: OAK HOME IMPROVEMENTS

REF No. 3458

SHT 1

HILLTOP ROAD (VAR. WIDTH)

ONE STOREY CLAD COTTAGE NO.98

ELEVATED CARPORT

CONCRETE DRIVEWAY

VEHICLE CROSSING

ELECTRICITY POLE

DRAINAGE PIT

BENCHMARK PEG AT CORNER

74.44 AHD

BENCHMARK NAIL IN KERB

74.63 AHD

INGROUND SWIMMING POOL

TILED POOL SURROUND

WINDOW SILL 70.51 RL HEAD 71.73 RL

WINDOW SILL 72.74 RL HEAD 74.73 RL

WINDOW SILL 69.69 RL HEAD 71.73 RL

TERRACE FL 72.58 RL

LOWER WINDOW SILL 66.66 RL HEAD 68.68 RL

FLOOR LEVEL 69.63 RL

FIRST FL 72.68 RL

TWO STOREY

THREE STOREY

TWO AND THREE STOREY BRICK RESIDENCE No.102

BALCONY FL 66.39 RL

LOWER WINDOW SILL 66.66 RL HEAD 68.68 RL

WINDOW SILL 69.63 RL HEAD 71.73 RL

WINDOW SILL 70.51 RL HEAD 71.73 RL

WINDOW SILL 72.74 RL HEAD 74.73 RL

WINDOW SILL 69.69 RL HEAD 71.73 RL

WINDOW SILL 70.51 RL HEAD 71.73 RL

WINDOW SILL 72.74 RL HEAD 74.73 RL

WINDOW SILL 69.69 RL HEAD 71.73 RL

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WINDOW SILL 69.69 RL HEAD 71.73 RL

WINDOW SILL 70.51 RL HEAD 71.73 RL

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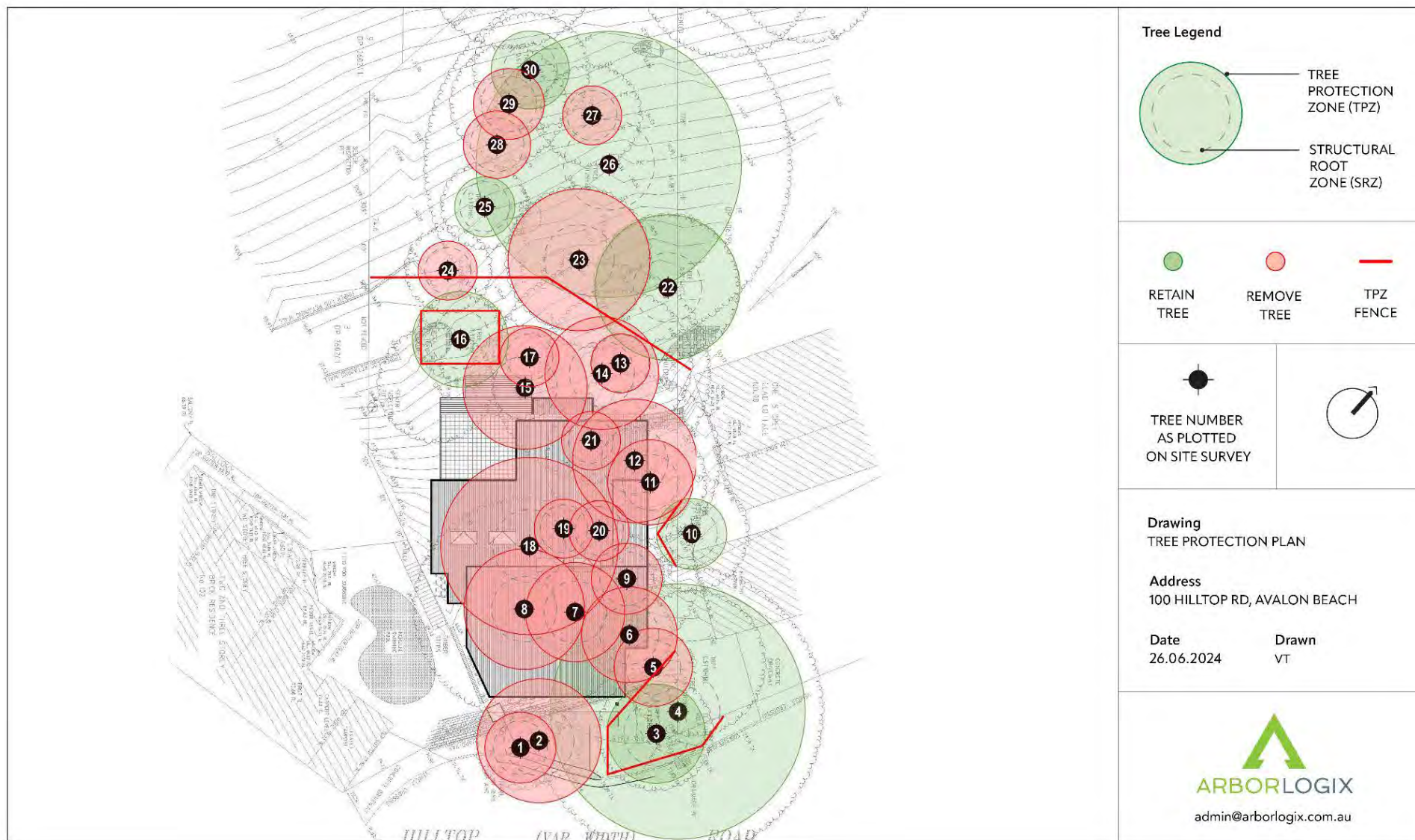
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11.8 Appendix VIII – Tree Protection and Removal Plan



11.9 Appendix IX – Credit reports



BAM Vegetation Zones Report

Proposal Details

Assessment Id	Assessment name	BAM data last updated *
00054926/BAAS24037/25/00054927	Construction of a dwelling house	28/10/2024
Assessor Name	Report Created	BAM Data version *
Brooke Thompson	22/04/2025	Current classification (live - default) (80)
Assessor Number	Assessment Type	BAM Case Status
BAAS24037	Part 4 Developments (Small Area)	Finalised
Assessment Revision	BOS entry trigger	Date Finalised
1	BOS Threshold: Biodiversity Values Map	22/04/2025

* 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.

Vegetation Zones

#	Name	PCT	Condition	Area	Minimum number of plots	Management zones
1	3234_Moderate	3234-Hunter Coast Lowland Spotted Gum Moist Forest	Moderate	0.1	1	

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00054926/BAAS24037/25/00054927	Construction of a dwelling house	28/10/2024
Assessor Name	Report Created	BAM Data version *
Brooke Thompson	22/04/2025	Current classification (live - default) (80)
Assessor Number	Assessment Type	BAM Case Status
BAAS24037	Part 4 Developments (Small Area)	Finalised
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1	BOS Threshold: Biodiversity Values Map	22/04/2025

* 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)
Black Bittern	<i>Ixobrychus flavicollis</i>	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Black-chinned Honeyeater (eastern subspecies)	<i>Melithreptus gularis gularis</i>	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Brown Treecreeper (eastern subspecies)	<i>Climacteris picumnus victoriae</i>	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Dusky Woodswallow	<i>Artamus cyanopterus cyanopterus</i>	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Eastern Coastal Free-tailed Bat	<i>Micronomus norfolkensis</i>	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Eastern Osprey	<i>Pandion cristatus</i>	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Flame Robin	<i>Petroica phoenicea</i>	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Gang-gang Cockatoo	<i>Callocephalon fimbriatum</i>	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	3234-Hunter Coast Lowland Spotted Gum Moist Forest

BAM Predicted Species Report

Large Bent-winged Bat	<i>Miniopterus orianae oceanensis</i>	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Little Bent-winged Bat	<i>Miniopterus australis</i>	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Little Eagle	<i>Hieraaetus morphnoides</i>	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Little Lorikeet	<i>Glossopsitta pusilla</i>	3234-Hunter Coast Lowland Spotted Gum Moist Forest
New Holland Mouse	<i>Pseudomys novaehollandiae</i>	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Regent Honeyeater	<i>Anthochaera phrygia</i>	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Rosenberg's Goanna	<i>Varanus rosenbergi</i>	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Scarlet Robin	<i>Petroica boodang</i>	3234-Hunter Coast Lowland Spotted Gum Moist Forest
South-eastern Glossy Black-Cockatoo	<i>Calyptorhynchus lathami lathami</i>	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Square-tailed Kite	<i>Lophoictinia isura</i>	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Superb Fruit-Dove	<i>Ptilinopus superbus</i>	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Swift Parrot	<i>Lathamus discolor</i>	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Varied Sittella	<i>Daphoenositta chrysoptera</i>	3234-Hunter Coast Lowland Spotted Gum Moist Forest
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	3234-Hunter Coast Lowland Spotted Gum Moist Forest
White-throated Needle-tail	<i>Hirundapus caudacutus</i>	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Yellow-bellied Sheath-tail-bat	<i>Saccolaimus flaviventris</i>	3234-Hunter Coast Lowland Spotted Gum Moist Forest

Threatened species Manually Added

None added

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
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BAM Candidate Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00054926/BAAS24037/25/00054927	Construction of a dwelling house	28/10/2024
Assessor Name	Report Created	BAM Data version *
Brooke Thompson	22/04/2025	Current classification (live - default) (80)
Assessor Number	Assessment Type	BAM Case Status
BAAS24037	Part 4 Developments (Small Area)	Finalised
Assessment Revision	BOS entry trigger	Date Finalised
1	BOS Threshold: Biodiversity Values Map	22/04/2025

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List of Species Requiring Survey

Name	Presence	Survey Months
<i>Chalinolobus dwyeri</i> Large-eared Pied Bat	Yes (surveyed)	<div> <input type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input type="checkbox"/> Sep <input type="checkbox"/> Oct <input checked="" type="checkbox"/> Nov <input checked="" type="checkbox"/> Dec </div> <input type="checkbox"/> Survey month outside the specified months?
<i>Rhizanthella slateri</i> Eastern Australian Underground Orchid	No (surveyed)	<div> <input type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input type="checkbox"/> Sep <input checked="" type="checkbox"/> Oct <input checked="" type="checkbox"/> Nov <input type="checkbox"/> Dec </div> <input type="checkbox"/> Survey month outside the specified months?

BAM Candidate Species Report

<i>Rhodamnia rubescens</i> Scrub Turpentine	No (surveyed)	<input type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input checked="" type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input type="checkbox"/> Sep <input checked="" type="checkbox"/> Oct <input checked="" type="checkbox"/> Nov <input checked="" type="checkbox"/> Dec <input type="checkbox"/> Survey month outside the specified months?
<i>Rhodomyrtus psidioides</i> Native Guava	No (surveyed)	<input type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input checked="" type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input type="checkbox"/> Sep <input checked="" type="checkbox"/> Oct <input checked="" type="checkbox"/> Nov <input checked="" type="checkbox"/> Dec <input type="checkbox"/> Survey month outside the specified months?
<i>Vespadelus trougtoni</i> Eastern Cave Bat	Yes (surveyed)	<input type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input type="checkbox"/> Sep <input type="checkbox"/> Oct <input checked="" type="checkbox"/> Nov <input checked="" type="checkbox"/> Dec <input type="checkbox"/> Survey month outside the specified months?

Threatened species Manually Added

None added

Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
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

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00054926/BAAS24037/25/00054927	Construction of a dwelling house	28/10/2024
Assessor Name	Report Created	BAM Data version *
Brooke Thompson	22/04/2025	Current classification (live - default) (80)
Assessor Number	BAM Case Status	Date Finalised
BAAS24037	Finalised	22/04/2025
Assessment Revision	BOS entry trigger	Assessment Type
1	BOS Threshold: Biodiversity Values Map	Part 4 Developments (Small Area)

* 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 SAI	Ecosystem credits
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BAM Credit Summary Report

Hunter Coast Lowland Spotted Gum Moist Forest												
1	3234_Moderate	Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion	42.4	42.4	0.1	Geographic Distribution	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00	True	2
											Subtotal	2
											Total	2

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 SAI	Species credits
Chalinolobus dwyeri / Large-eared Pied Bat (Fauna)									
3234_Moderate	42.4	42.4	0.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Endangered	Endangered	True	3
								Subtotal	3

<i>Vespadelus troughtoni / Eastern Cave Bat (Fauna)</i>									
3234_Moderate	42.4	42.4	0.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	3
								Subtotal	3



BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00054926/BAAS24037/25/00054927	Construction of a dwelling house	28/10/2024
Assessor Name	Assessor Number	BAM Data version *
Brooke Thompson	BAAS24037	Current classification (live - default) (80)
Proponent Names	Report Created	BAM Case Status
Oliver Keaveney	22/04/2025	Finalised
Assessment Revision	BOS entry trigger	Assessment Type
1	BOS Threshold: Biodiversity Values Map	Part 4 Developments (Small Area)
Date Finalised	* 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.	
22/04/2025		

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion	Endangered Ecological Community	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Species		
Chalinolobus dwyeri / Large-eared Pied Bat		



BAM Biodiversity Credit Report (Like for like)

Vespadelus troughtoni / Eastern Cave Bat

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT

No Changes

Predicted Threatened Species Not On Site

Name

No Changes

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
3234-Hunter Coast Lowland Spotted Gum Moist Forest	Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion	0.1	2	0	2

BAM Biodiversity Credit Report (Like for like)

3234-Hunter Coast Lowland Spotted Gum Moist 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: 3234, 3437	-	3234_Moderate	Yes	2	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

Species	Vegetation Zone/s	Area / Count	Credits
Chalinolobus dwyeri / Large-eared Pied Bat	3234_Moderate	0.1	3.00
Vespadelus troughtoni / Eastern Cave Bat	3234_Moderate	0.1	3.00

Credit Retirement Options

Like-for-like credit retirement options

Chalinolobus dwyeri / Large-eared Pied Bat	Spp	IBRA subregion
	Chalinolobus dwyeri / Large-eared Pied Bat	Any in NSW

BAM Biodiversity Credit Report (Like for like)

Vespadelus troughtoni / Eastern Cave Bat	Spp	IBRA subregion
	Vespadelus troughtoni / Eastern Cave Bat	Any in NSW

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00054926/BAAS24037/25/00054927	Construction of a dwelling house	28/10/2024
Assessor Name	Assessor Number	BAM Data version *
Brooke Thompson	BAAS24037	Current classification (live - default) (80)
Proponent Name(s)	Report Created	BAM Case Status
Oliver Keaveney	22/04/2025	Finalised
Assessment Revision	BOS entry trigger	Assessment Type
1	BOS Threshold: Biodiversity Values Map	Part 4 Developments (Small Area)

Date Finalised
22/04/2025

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Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion	Endangered Ecological Community	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Species		
Chalinolobus dwyeri / Large-eared Pied Bat		
Vespadelus troughtoni / Eastern Cave Bat		

Additional Information for Approval

PCT Outside Ibra Added

BAM Biodiversity Credit Report (Variations)

None added

PCTs With Customized Benchmarks

PCT

No Changes

Predicted Threatened Species Not On Site

Name

No Changes

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
3234-Hunter Coast Lowland Spotted Gum Moist Forest	Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion	0.1	2	0	2.00

3234-Hunter Coast Lowland Spotted Gum Moist 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: 3234, 3437	-	3234_Moderate	Yes	2	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

BAM Biodiversity Credit Report (Variations)

	Wet Sclerophyll Forests (Grassy sub-formation)	Tier 3 or higher threat status	3234_Moderate	Yes (including artificial)	2	IBRA Region: Sydney Basin, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
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Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Chalinolobus dwyeri / Large-eared Pied Bat	3234_Moderate	0.1	3.00
Vespadelus troughtoni / Eastern Cave Bat	3234_Moderate	0.1	3.00

Credit Retirement Options Like-for-like options

Chalinolobus dwyeri / Large-eared Pied Bat	Spp		IBRA region
	Chalinolobus dwyeri /Large-eared Pied Bat		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Endangered	Pittwater, Cumberland, Sydney Cataract, Wyong and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Vespadelus troughtoni / Eastern Cave Bat	Spp		IBRA region

BAM Biodiversity Credit Report (Variations)

	Vespadelus troughtoni/Eastern Cave Bat		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Pittwater, Cumberland, Sydney Cataract, Wyong and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.