

12 October 2018

Stephen Beauflis
Austcorp 601
c/o Urban Apartments
Level 10, 11-15 Deane St,
Burwood NSW 2134

Dear Stephen

Re: Biodiversity constraints assessment for Lot 100 Lawrence Hargrave Drive, Coalcliff
Project no. 28055

Biosis Pty Ltd was commissioned by Urban Apartments to complete an ecological constraints assessment to describe the biodiversity values and constraints to support the development application (DA) for proposed vegetation rehabilitation works at Lot 100 DP 715376 Lawrence Hargrave Drive, Coalcliff (the study area).

Biosis understands that Urban Apartments proposes to undertake 'site improvement' works to increase the ecotourism value of the property for future purposes yet to be decided upon (the project).

The objective of this flora and fauna constraints assessment is to determine the presence of any threatened flora, fauna, populations or ecological communities (biota) within the study area and, where applicable, assess the impacts of the project on any such species or their habitats, listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), *NSW Biodiversity Conservation Act 2016* (BC Act) and/or *Fisheries Management Act 1994* (FM Act).

Background

The study area consists of two parcels of land intersected by Lawrence Hargrave Drive. The eastern portion is approximately 1.25 hectares and the western portion, situated up-slope on the escarpment edge is approximately 4.5 hectares. The boundary of the eastern extent of the study area is defined by the cliff edge overhanging the Pacific Ocean.

The study area is within the City of Wollongong Local Government Area (LGA) and is zoned E2 Environmental Conservation, with a minimum lot size of 40 hectares imposed under the Wollongong Local Environmental Plan 2009. The surrounding land use is predominantly set aside for environmental conservation purposes, including the Illawarra Escarpment State Conservation Area. Low levels of residential development are present along the narrow coastal strip.

Method

Database and literature review

Prior to completing the field investigation, information provided by Urban Apartments as well as other key information was reviewed, including:

- Commonwealth Department of the Environment and Energy (DEE) Protected Matters Search Tool for matters protected by the EPBC Act
- NSW Office of Environment and Heritage (OEH) BioNet Atlas of NSW Wildlife, for items listed under the BC Act
- NSW DPI WeedWise database for *Biosecurity Act 2015* (Biosecurity Act) listed Priority listed weeds for the South East Local Land Services (LLS) area
- *Native Vegetation of the Illawarra Escarpment and Coastal Plain* (National Parks and Wildlife Service 2002).

The implications for the project were assessed in relation to key biodiversity legislation and policy including:

- EPBC Act
- BC Act
- *Environmental Planning and Assessment Act 1979* (EP&A Act)
- *Local Land Services Act 2016*
- *Biosecurity Act 2015* (Biosecurity Act).

Field investigation

A field investigation of the study area was undertaken on 27 September 2018 by Bianca Klein (Botanist). Vegetation within the study area was surveyed using the random meander technique (Cropper 1993) over three person hours.

A habitat-based assessment was completed to determine the presence of suitable habitat for threatened species previously recorded (OEH 2018) or predicted to occur (Commonwealth of Australia 2018) within 10 kilometres. This list was filtered according to species descriptions, life history, habitat preference and soil preference to determine those species most likely to be present within the study area.

Results

The study area is subject to moderate levels of disturbance related to human activities including bush walking, camping and trail bike riding. Steeper sections of intact vegetation are relatively undisturbed.

Regional soil landscape mapping indicates that the study area occurs on the Illawarra Escarpment Soils Landscape (Hazelton & Tille 1990). The Illawarra Escarpment soils landscape is characterised by steep slopes on Quaternary talus, with loose dark brown sands, moderately pedal sandy clay loams and moderately pedal sandy clays. The composition of the soil is highly influential on the vegetation communities observed.

Vegetation within the study area is fragmented by Lawrence Hargrave Drive, with a larger more extensive patch located to the west, connecting with the Illawarra State Conservation Area. The study area supports a mix of landscape features including rocky cliffs, one hollow bearing tree, large sandstone boulders and

minor rocky outcropping. A small bird's nest was also present in a Coast Banksia *Banksia integrifolia* subsp. *integrifolia* tree (Figure 2).

Threatened species

Background searches identified 28 threatened flora species and 91 threatened fauna species recorded (OEH 2018) or predicted to occur (DEE 2018) within 10 kilometres of the study area. Those species considered most likely to have habitat within the study area based on the background research are as follows:

Flora

- Netted Bottle Brush *Callistemon linearifolius* (Vulnerable, BC Act)
- Prickly Bush-pea *Pultenaea aristata* (Vulnerable, EPBC Act and BC Act)
- Woronora Beard-heath *Leucopogon exolasius* (Vulnerable, EPBC Act and BC Act)
- Villous Mint-bush *Prostanthera densa* (Vulnerable, EPBC Act and BC Act).

Fauna

- Eastern Bentwing-bat *Miniopterus schreibersii oceanensis* (Vulnerable, BC Act)
- Eastern Freetail-bat *Mormopterus norfolkensis* (Vulnerable, BC Act)
- Greater Glider *Petauroides volans* (Vulnerable, EPBC Act and Endangered, BC Act)
- Grey-headed Flying-fox *Pteropus poliocephalus* (Vulnerable, EPBC Act and BC Act)
- Eastern Pygmy-possum *Cercartetus nanus* (Vulnerable, BC Act)
- Large-eared Pied Bat *Chalinolobus dwyeri* (Vulnerable, EPBC Act and BC Act)
- Little Bentwing-bat *Miniopterus australis* (Vulnerable, BC Act)
- Osprey *Pandion cristatus* (Vulnerable, BC Act)
- Powerful Owl *Ninox strenua* (Vulnerable, BC Act)
- Sooty Owl *Tyto tenebricosa* (Vulnerable, BC Act)
- Southern Myotis *Myotis macropus* (Vulnerable, BC Act)
- Spotted-tailed Quoll *Dasyurus maculatus* (Endangered, EPBC Act and Vulnerable BC Act)
- Squirrel Glider *Petaurus norfolcensis* (Vulnerable, BC Act).

An assessment of the habitat values of the study area is provided in Table 1 for threatened flora species and Table 2 for threatened fauna species.

Table 1 Assessment of habitat for threatened flora species

Species	Local distribution and habitat requirements	Likelihood of occurrence or impact
Prickly Bush-pea	Has been recorded within 1 km of the study area. Prickly Bush-pea has a restricted distribution on the Woronora Plateau between Helensburgh and Mount Keira in a range of habitats on sandstone substrates.	This species has a moderate likelihood of occurrence within the study area, more likely to occur at higher elevations in the western extent closer to the Woronora Plateau. Due to the steepness of the slope near the escarpment edge, no works are proposed in this area.
Netted Bottle Brush	Has been recorded within 1 km of the study area. Netted Bottle Brush grows on the coast and adjacent ranges in a variety of communities including Dry Sclerophyll Forest on the coast and ranges.	The habitat requirements of this species are present in the study area, thus has a moderate likelihood of occurrence. The preliminary ecological constraints field survey did not record this species.
Woronora Beard-heath	Has been recorded within 5 km of the study area. It is an erect shrub confined to the upper Georges River area and Heathcote National Park. It grows in a variety of communities on sandstone substrates.	The habitat requirements of this species are present in the study area, thus has a moderate likelihood of occurrence. The preliminary ecological constraints field survey did not record this species.
Villous Mint-bush	This species has been recorded within 10km of the study area. It is a medium sized erect shrub which grows on the coastal strip between Jervis Bay in the south and Port Stephens in the north. It inhabits rocky slopes and hillsides near coastal headlands on sandstone substrates.	The habitat requirements of this species are present in the study area, thus has a moderate likelihood of occurrence. The preliminary ecological constraints field survey did not record this species.

Based on the size of the study area, the survey effort is not considered comprehensive for the flora species outlined in Table 1. Due to safety restrictions and no works proposed within the western extent of the study area, the majority of this area was not surveyed. Further survey of the western slope is recommended if works are proposed in this area in the future.

Table 2 Assessment of habitat for threatened fauna species

Habitat feature	Threatened fauna association	Likelihood of occurrence or impact
Feed trees	Flowering perennial species including Eucalypts and Banksias recorded in the study area may provide nectar resources suitable for a range of terrestrial and arboreal fauna whilst in flower.	Based on the transient nature of the species listed above that are likely to utilise the study area as a foraging and dispersal resource, including; Eastern Pygmy-possum, Grey-headed Flying Fox, Squirrel Glider and Greater Glider, combined with the adequate level of connectivity of the study area to surrounding resources within the broader landscape there is not likely to be an impact to these species.

Habitat feature	Threatened fauna association	Likelihood of occurrence or impact
Hollow-bearing trees	One potential hollow-bearing tree (Coast Banksia <i>Banksia integrifolia</i> subsp. <i>integrifolia</i>) was recorded in the study area (Appendix 1; Figure 2) containing a small sized hollow with dimensions of approximately 10 cm. This tree hollow may provide potential roosting and/or nesting habitat for microbats including the threatened Eastern Freetail-bat, Eastern Bentwing-bat and Southern Myotis and but is unlikely to provide roosting habitat for Barking Owl and Powerful Owl due to the small dimensions of the hollow.	It is recommended that if possible, the hollow-bearing tree be retained as an important habitat feature in the landscape that may be used by threatened microbats, as well as providing feeding and perching habitat for other generic avifauna.
Cliff edge/rocky overhangs	The eastern boundary of the study area is defined by a steep, rocky cliff edge, characterizing the coast. Threatened fauna species such as Osprey and the Large-eared Pied-bat, which are known to roost in sandstone caves and overhangs.	Cliff edges and rocky overhangs will not be impacted by the proposed project.

Based on the size of the study area, the survey effort is considered comprehensive to assess habitat presence for the species outlined in Table 2. Taking all of these factors into consideration, there is a low likelihood of impact for the above listed nomadic species.

Vegetation communities

Prior to the field investigation, Biosis confirmed that various native vegetation communities have been mapped in the broader landscape (NPWS 2002), these include:

- *Exposed Bangalay-Banksia Woodland*
- *Coastal Headland Banksia Scrub*
- *Littoral Windshear Thicket* consistent with the Endangered Ecological Community (EEC): *Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* (NSW TSSC 2004).
- *Cleared land.*

A key focus of the field investigation was to assess the vegetation of the study area against the final determinations for the above listed EEC to determine presence or absence.

The vegetation of the study area comprises one native vegetation community with patches in varying conditions; *Plant Community Type 771 Coast Banksia – Coast Tea-tree low moist forest on coastal sands and headlands, Sydney Basin Bioregion and South East Corner Bioregion* (Figure 2, Plate 1).

This community was characterised by a scrubby heath of up to 5 metres with a canopy of dry sclerophyll species including Coast Banksia, Tuckeroo *Cupaniopsis anacardioides* and occasional Bangalay *Eucalyptus botryoides* over a dense shrub layer of Coast Tea-tree *Leptospermum laevigatum*, and vines such as Climbing Guinea Flower *Hibbertia Scandens*. Native grasses and graminoids including Spiky-headed Mat Rush *Lomandra longifolia*, Blady Grass *Imperata cylindrica*, Weeping Grass *Microlaena stipoides* were present in the groundcover. The community was assessed to be in good, moderate and poor conditions based on extent

of exotic species cover and presence of native midstorey species, likely an effect of variable exposure to prevailing coastal winds.

Priority weeds

The *Biosecurity Act 2015* (Biosecurity Act) outlines biosecurity risks and impacts, which in relation to the current assessment includes those risks and impacts associated with weeds. A biosecurity risk is defined as the risk of a biosecurity impact occurring, which for weeds includes:

- The introduction, presence, spread or increase of a pest into or within the State or any part of the State.
- A pest plant has the potential to:
 - out-compete other organisms for resources, including food, water, nutrients, habitat and sunlight
 - harm or reduce biodiversity.

Four Priority Weeds for the Wollongong LGA were recorded in the study area and are listed in Table 1.

Table 3 Priority weeds within the study area

Scientific Name	Common Name	General Biosecurity Duty
<i>Asparagus aethiopicus</i>	Ground Asparagus	Land managers should mitigate the risk of new weeds being introduced to their land. Plant should not be bought, sold, grown, carried or released into the environment.
<i>Chrysanthemoides monilifera</i> subsp. <i>rotundata</i>	Bitou Bush	The study area is located within the 'Biosecurity Zone' of this Priority Weed, therefore the weed must be eradicated where practicable, or as much of the weed destroyed as practicable, and any remaining weed suppressed.
<i>Lantana camara</i>	Lantana	Land managers should mitigate the risk of new weeds being introduced to their land.
<i>Rubus fruticosus</i>	Blackberry	Plant should not be bought, sold, grown, carried or released into the environment.

Constraints assessment

The ecological constraints within the study area are provided in Figure 3. These constraints are ranked as moderate or low, based on the criteria outlined in Table 4.

Table 4: Ecological constraints in the study area

Constraint	Value	Justification	Recommendations
Moderate	<ul style="list-style-type: none"> Native vegetation including good, moderate and poor condition patches. 	<ul style="list-style-type: none"> Does not constitute a Threatened Ecological Community Provides potential dispersal and foraging habitat for threatened fauna species Provides limited roosting habitat for threatened fauna species Provides potential habitat for threatened flora. Presence of one hollow bearing tree 	<ul style="list-style-type: none"> Impacts to areas should be avoided where possible.
Low	<ul style="list-style-type: none"> Exotic/cleared vegetation 	<ul style="list-style-type: none"> Does not form part of an ecological community Does not contain any hollow bearing trees Is unlikely to provide potential habitat for threatened flora or fauna. 	<ul style="list-style-type: none"> Development suitable in these areas.

Conclusion and recommendations

The flora and fauna constraints assessment has highlighted a range of values and constraints within the study area. The following recommendations have been made regarding the implications on biodiversity values from the project:

- Avoid impacts to native vegetation where practicable. Under the Biodiversity Offsets Scheme (BOS), a native vegetation clearing threshold of 0.5 hectares applies to the study area before triggering entry into the scheme.
- Retain the hollow bearing tree that provides potential shelter and/or roosting habitat for hollow dependent threatened microbats and other native fauna species.
- Qualified contractors will undertake weed control works associated with the proposed vegetation rehabilitation works.
- All weed material removed from site will be disposed of to a licenced facility.
- Priority Weed removal using manual methods – dig, hand pull or cut and paint to avoid impacts to retained native groundcover.

I trust that this advice is of assistance to you however please contact me if you would like to discuss any elements of this ecological advice further.

Yours sincerely



Bianca Klein

Botanist

References

Commonwealth of Australia 2018. Protected Matters Search Tool. Australian Government Department of the Environment, Water, Heritage & the Arts, Canberra. Accessed 27/09/2018 at <https://www.environment.gov.au/epbc/protected-matters-search-tool>

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Hazleton PA. and Tille PJ. 1990. *Soil Landscapes of the Wollongong – Port Hacking 1:100 000 Sheet*. Soil Conservation Service of NSW, Sydney.

OEH 2018. BioNet the website for the Atlas of NSW Wildlife.

NPWS 2002. Native Vegetation of the Illawarra Escarpment and Coastal Plain. National Parks and Wildlife Service, Goulburn St, Sydney, NSW 2000. Available online at: <https://www.environment.nsw.gov.au/resources/nature/surveys/020107NatVegIll.pdf>

NSW TSSC 2004. Littoral rainforest in the NSW North Coast, Sydney Basin and South East Corner bioregions - endangered ecological community listing Final Determination. Available online at: <https://www.environment.nsw.gov.au/determinations/LittoralRainforestEndSpListing.htm>

Appendices

Appendix 1 Figures

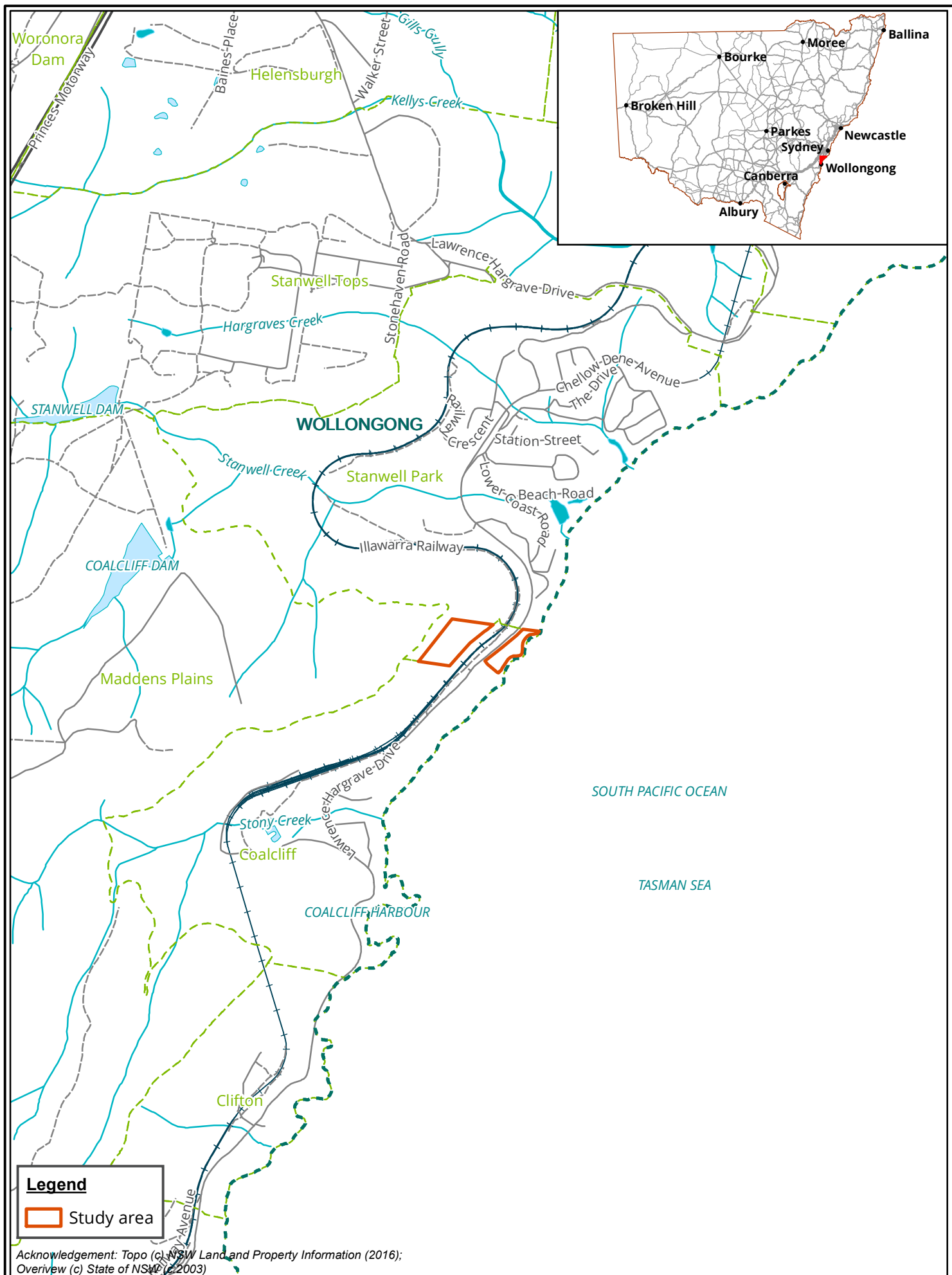
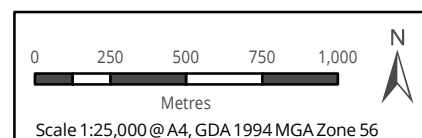


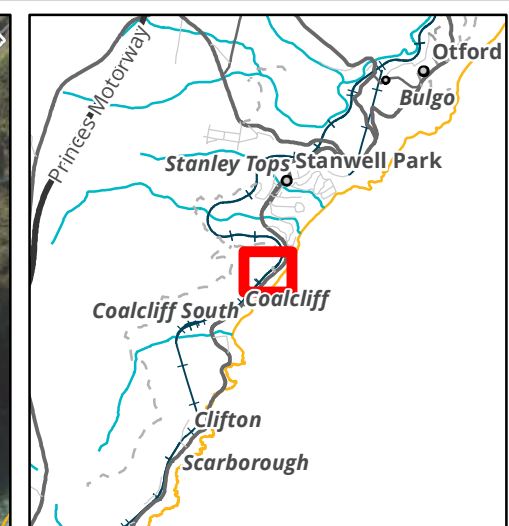
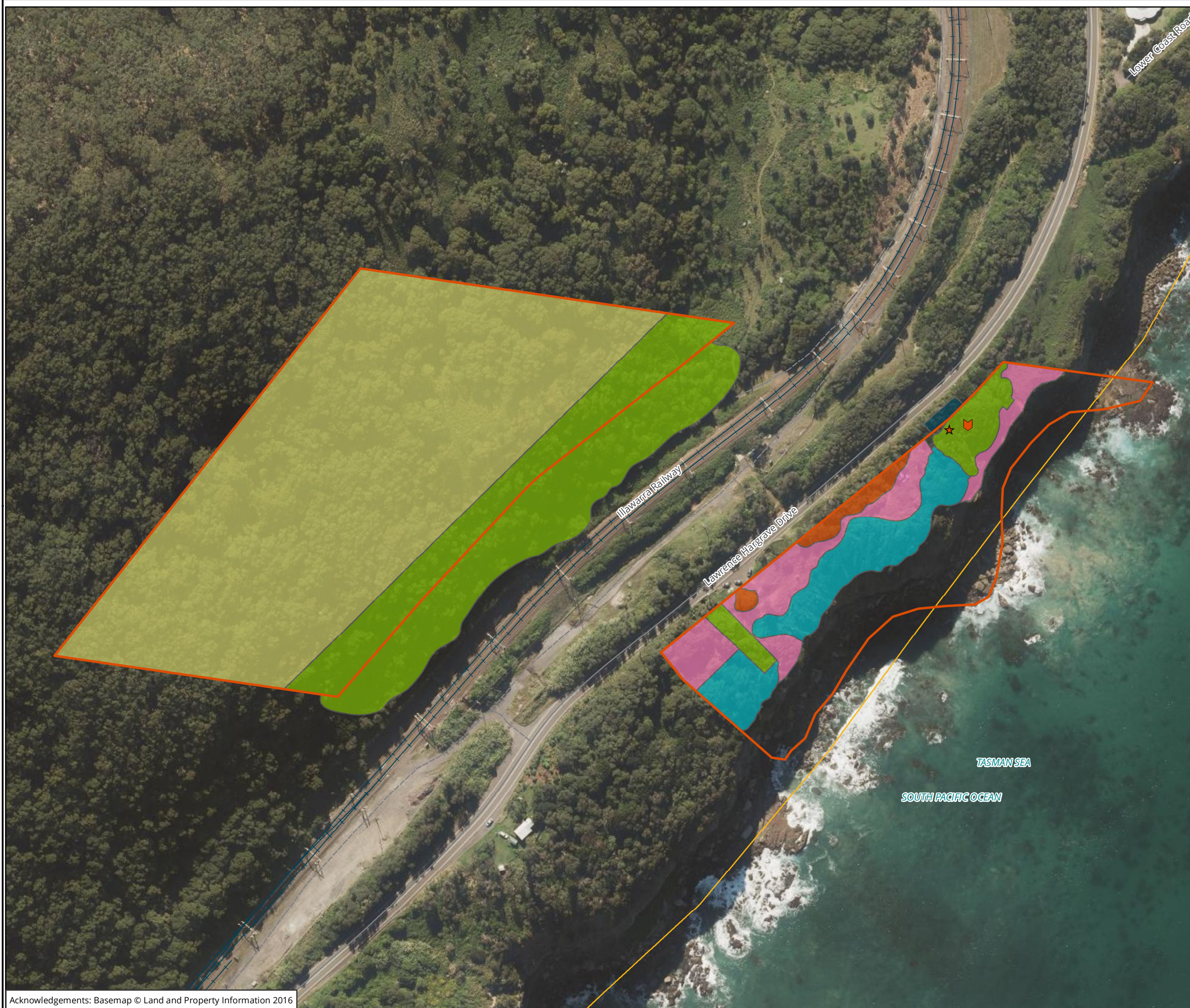
Figure 1: Location of the study area



Biosis Pty Ltd
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Matter: 28055
Date: 01 October 2018,
Checked by: BAK, Drawn by: DK, Last edited by: dkazemi
Location: P:\28000s\28055\Mapping\





Legend

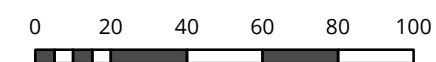
- Study
- Hollow bearing
- Bird nest

Vegetation

PCT 771 (Coast Banksia - Coast Tea-tree low moist forest on coastal sands and headlands, Sydney Basin Bioregion and South East Corner Bioregion)

- Good
- Moderate
- Poor
- Not assessed, likely PCT
- Native revegetation
- Cleared/exotic vegetation

Figure 2: Ecological Values

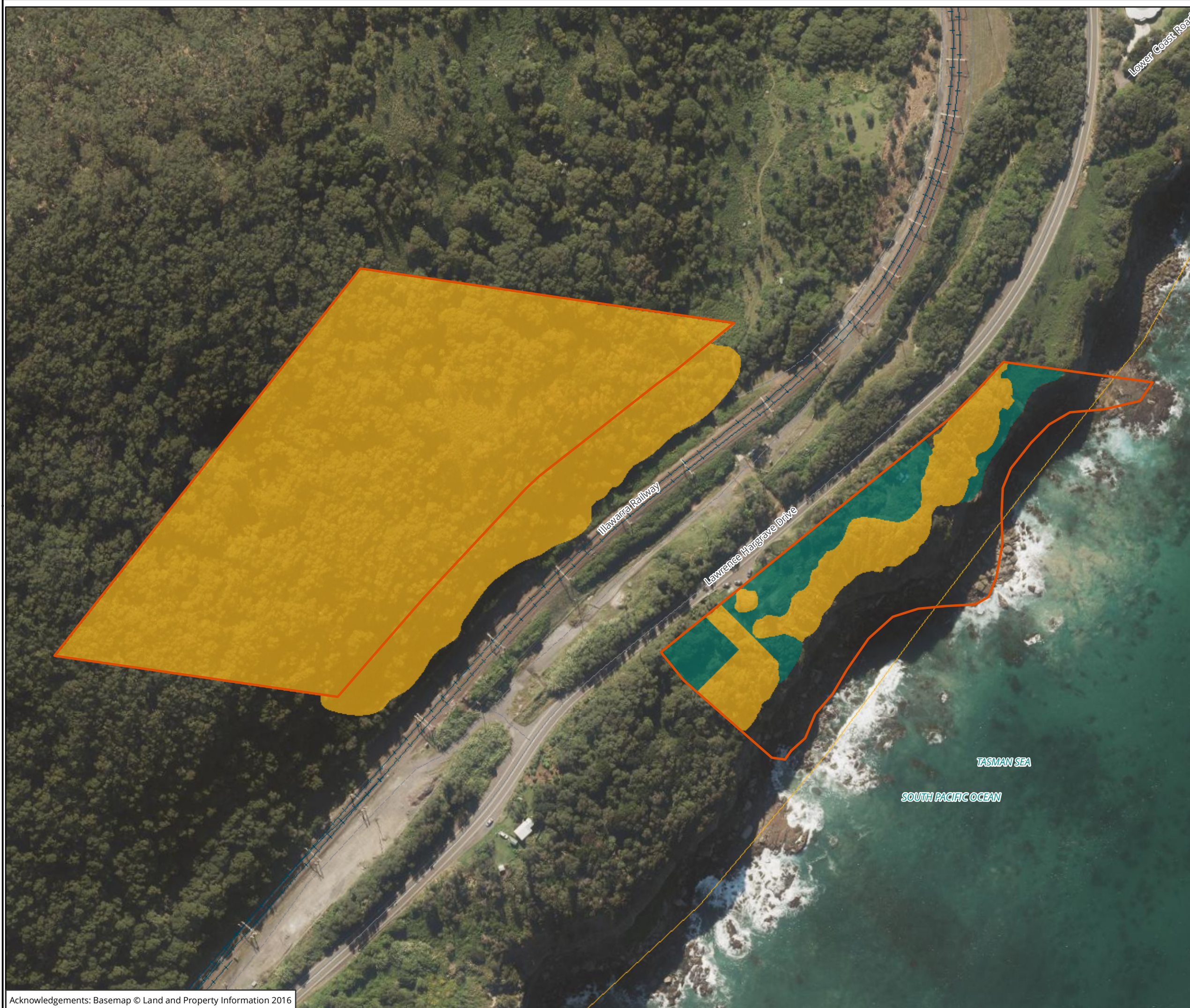


Scale: 1:2,000 @ A3
Coordinate System: GDA 1994 MGA Zone 56



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Matter: 28055
Date: 04 October 2018
Checked by: BAK, Drawn by: DK, Last edited by: dkazemi
Location: P:\28000s\28055\mapping\28055_F2_EcologicalValue



Legend

Study area

Ecological Constraints

Low

Medium

Figure 3: Ecological constraints

0 20 40 60 80 100
Metres

Scale: 1:2,000 @ A3
Coordinate System: GDA 1994 MGA Zone 56



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Matter: 28055
Date: 09 October 2018,
Checked by: BAK, Drawn by: DK, Last edited by: dkazemi
Location: \\bio-data-01\matters\28000s\28055\Mapping\28055_E3_EcologicalConstrain

Appendix 2 Plates



Plate 1 PCT 771 (good condition) in the eastern extent of the study area.



Plate 2 Recent revegetation along the Lawrence Hargrave Drive cycleway adjacent to the study area.



Plate 3 Eastern boundary of the study area facing south showing exposed cliff face.