



BIODIVERSITY REVIEW REPORT
PREPARED FOR GATEWAY APPLICATION
FOR
PROPOSED REZONING
LOTS 437 & 438 DP 755266 & LOT 1 DP 626787
PACIFIC HIGHWAY
LAKE MUNMORAH

FEBRUARY 2019
REF: 8072

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PREFACE

This Biodiversity Review Report has been prepared by *Conacher Consulting* to accompany a planning proposal for a Gateway determination for the rezoning of land within Lots 437 & 438 DP 755266 & Lot 1 DP 626787, Pacific Highway, Lake Munmorah, NSW.

This Report has been prepared to provide details on the environmental characteristics of the site in relation to biodiversity, consistent with the requirements of the document titled 'A guide to preparing planning proposals' (Planning and Environment 2016).

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SECTION 1

INTRODUCTION

1.1 BACKGROUND

Conacher Consulting has been engaged to prepare a Biodiversity Review Report to accompany a planning proposal for a Gateway determination for the rezoning of land within Lots 437 & 438 DP 755266 & Lot 1 DP 626787, Pacific Highway Lake Munmorah.

This Report has been prepared to provide details on the environmental characteristics of the site in relation to biodiversity, consistent with the requirements of the document titled 'A guide to preparing planning proposals' (Planning and Environment 2016). Section C of this document identifies that:

'A planning proposal that is submitted for a Gateway determination should identify if the land subject to the proposal has the potential to contain critical habitat or threatened species, populations or ecological communities, or their habitats. If it is likely that the land may contain critical habitat or threatened species, populations or ecological communities, or their habitats the proposal should identify what studies are necessary to confirm the presence of these species or habitats and their significance. An assessment of its significance and / or consultation should not take place until after, and if required by, the Gateway determination'.

1.2 SITE DETAILS

Details of the subject site are provided in Table 1.1.

TABLE 1.1 SITE DETAILS	
Subject Site Location	Lots 437 & 438 DP 755266 & Lot 1 DP 626787, Pacific Highway Lake Munmorah
Area of Proposed Works	Approximately 23.1 ha
Local Government Area	Central Coast
Existing Land Use	Rural - Residential

1.3 DESCRIPTION OF THE PROPOSAL

The planning proposal is for the rezoning of the site to R2 Low Density Residential. Plans of the proposal have been provided as separate documentation to this Report.

SECTION 2

FLORA AND FAUNA
SURVEY AND ASSESSMENT METHODOLOGY

2.1 LITERATURE REVIEW

- A review of available literature for the area was undertaken to obtain reference material and background information for this study.
- A search of the Bionet Atlas of NSW Wildlife (NSW Government OEH 2019a) was undertaken to identify records of threatened species located within 1500m of the site. This enabled the preparation of a predictive list of threatened species that could possibly occur within the habitats found on the site. The publically accessible locations of threatened species from this database search are mapped in Figure 2.1.
- A review of Council's vegetation mapping prepared by ELA (2016) was undertaken to identify the location and extent of native vegetation across the site. This mapping is provided in Figure 2.2 and was utilised as a basis for completing further surveys.
- Aerial photographs were utilised to identify the extent of vegetation and habitats with respect to the site and surrounding areas.

2.2 FLORA AND FAUNA SURVEY DETAILS

The vegetation types and fauna habitats present were determined following site surveys on 25 October 2018 (4.5hrs x 2 persons) and 17 December 2018 (6hrs x 2 persons) and by a review of Council's vegetation maps for the area (ELA 2016).

Further detailed seasonal flora and fauna surveys are currently being undertaken within the site to inform a future rezoning proposal. These surveys will be compliant with the requirements of Stage 1 of the Biodiversity Assessment Methodology (NSW OEH 2017).



Legend

- Subject Site Boundary
- 1500m Buffer from Subject Site

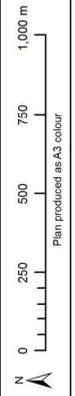
Bionet Atlas (2018) Search Results

Threatened Flora Locations

- Angophora inopinata*
- Syzygium paniculatum*
- Tetratheca juncea*

Threatened Fauna Locations

- Eastern Bentwing-bat
- Eastern Cave Bat
- Eastern False Pipistrelle
- Eastern Freetail-bat
- Greater Broad-nosed Bat
- Grey-headed Flying-fox
- Little Bentwing-bat
- Little Lorikeet
- Southern Myotis
- Squirrel Glider
- Swift Parrot
- Varied Sittella
- Wallum Froglet
- White-bellied Sea-Eagle
- White-fronted Chat



Drawn By: AM
 Drawing Version: 1
 Drawing No: 8042
 Date: 20/12/2018
 * Plan for indicative purposes only. Not for detailed measurement.
 Source: Aerial © Nearmap (2018) Air Photo Date: 22/09/2018

Figure 2.1
Bionet Atlas Threatened Species Locations Map (OEH 2018)
 Pacific Highway, Lake Munmorrah



Figure 2.2
Vegetation Community Mapping (ELA 2016)
 Pacific Highway, Lake Munmorah

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 Drawing Version: 1
 Drawing No: 8042
 Date: 20/12/2018
 * Plan for indicative purposes only. Not for detailed measurement.
 Source: Aerial © Nearmap (2018) Air Photo Date: 22/09/2018

0 50 100 150 200 m
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Legend

- Subject Site Boundary

Vegetation Communities (ELA 2016)

- Munmorah Impeded Sand Sedgeland
- Narrabeen Alluvial Drainage Line Complex
- Narrabeen Doyalson Coastal Woodland
- Narrabeen Doyalson Coastal Woodland (Moist heath variant)
- Narrabeen Snappy Gum Forest



SECTION 3

FLORA AND FAUNA CHARACTERISTICS

3.1 FLORA & FAUNA CHARACTERISTICS

3.1.1 *Plant Community Types and Threatened Ecological Communities*

The following plant community types were observed and are mapped in Figures 3.1.

- PCT 1638 – Smooth-barked Apple, Red Bloodwood, Scribbly Gum grass – shrub woodland on lowlands of the Central Coast;
- PCT 1649 – Smooth-barked Apple, Red Mahogany, Swamp Mahogany, Melaleuca sieberi heathy swamp woodland of coastal lowlands; and;
- PCT 1737 Typha Rushland.

Areas of cleared land are also mapped in Figure 3.1, these areas contain mostly exotic vegetation. Vegetation community descriptions are provided below.

PCT 1638 – SMOOTH-BARKED APPLE, RED BLOODWOOD, SCRIBBLY GUM GRASS – SHRUB WOODLAND ON LOWLANDS OF THE CENTRAL COAST

Structure:

Upper Stratum:	To 20 metres high, with 30% Projected Foliage Cover (PFC).
Mid Stratum (upper layer):	To 10 metres high, with 40% PFC.
Mid Stratum (lower layer):	To 0.5 metres high, with 1-10% PFC
Lower Stratum:	To 1.5 metres high, with 70% PFC.

Floristics:

(Characteristic Species)

Upper Stratum:	<i>Angophora costata</i> , <i>Corymbia gummifera</i> , <i>Eucalyptus haemastoma</i> and <i>Eucalyptus capitellata</i> .
Mid Stratum (upper layer):	<i>Eucalyptus haemastoma</i> , <i>Corymbia gummifera</i> and <i>Allocasuarina littoralis</i> .
Mid Stratum: (lower layer)	<i>Acacia myrtifolia</i> , <i>Banksia collina</i> , <i>Leptospermum trinervium</i> , <i>Acacia suaveolens</i> , <i>Acacia longifolia</i> and <i>Pittosporum undulatum</i> .
Lower Stratum:	<i>Themeda triandra</i> , <i>Lomandra obliqua</i> , <i>Epacris pulchella</i> , <i>Pimelea linifolia</i> , <i>Pteridium esculentum</i> , <i>Imperata cylindrica</i> and <i>Pratia purpurascens</i> .
Exotics:	<i>Pinus radiata</i> , <i>Axonopus fissifolius</i> , <i>Stenotaphrum secundatum</i> , <i>Hypochaeris radicata</i> , <i>Richardia brasiliensis</i> and <i>Briza subaristata</i> .

Variation:

Within the western allotment the understorey vegetation has been disturbed by horse grazing. Within the central allotment infrequent management of the understorey vegetation occurs and a mixture of regenerating native plants and overgrown weeds are present. The eastern allotment contains higher levels of native understorey plants which have been left in patches around the bases of the remnant trees present.

Disturbance:

All area of the site has been disturbed by management of the understorey, grazing and/or slashing.

Weed Invasion:

Weed invasion is highest within the understorey of the western and central allotments.

Location and Distribution:

This community occupies approximately 7.96 hectares, as mapped in Figure 3.1.

Classification:

This vegetation community has been mapped as Map Unit E31 Narrabeen Doyalson Coastal Woodland by ELA (2016).

This plant community types does not correspond to a threatened ecological community listed under the *BC Act* (2016) or the *EPBC Act* (1999).



Plate 1 PCT 1638 within western allotment with heavily managed understorey.



Plate 2 PCT 1638 within central allotment with overgrown weed-infested understorey.



Plate 3 PCT 1638 within eastern allotment with lightly managed native understorey.

PCT 1649 – Smooth-barked Apple, Red Mahogany, Swamp Mahogany, *Melaleuca sieberi* heathy swamp woodland of coastal lowlands

Structure:

Upper Stratum: To 20 metres high, with 40% PFC.

Mid Stratum: To 2.4 metres high, with <1 % PFC.

Lower Stratum: To 1.5 metre high, with 100% PFC.

Floristics: (Characteristic Species)

Upper Stratum: *Eucalyptus robusta*, *Eucalyptus resinifera*, *Angophora floribunda*, *Melaleuca sieberi* and *Melaleuca quinquenervia*.

Mid Stratum: *Pittosporum undulatum* and *Glochidion ferdinandi*.

Lower Stratum: *Cynodon dactylon*.

Exotics: *Cinnamomum camphora*, *Secundatum* *Stenotaphrum* and *Hydrocotyle bonariensis*.

Disturbance:

This PCT consists of small patches of remnant trees and shrubs, the understorey has been subject to intensive management and consists mostly of exotic species.

Weed Invasion:

High levels of weeds are present, particularly within the understorey strata.

Location and Distribution:

This PCT occurs in the low-lying northern corner of the site and along a predominantly cleared drainage line which intersects the central and eastern allotments. This PCT occupies approximately 0.73ha within the site.

Classification:

This vegetation community corresponds to Map Unit E26 – Narrabeen Alluvial Drainage Line Complex, as described by ELA (2016).

This vegetation community also corresponds to the endangered ecological community Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions as listed within the *BC Act* (2016).

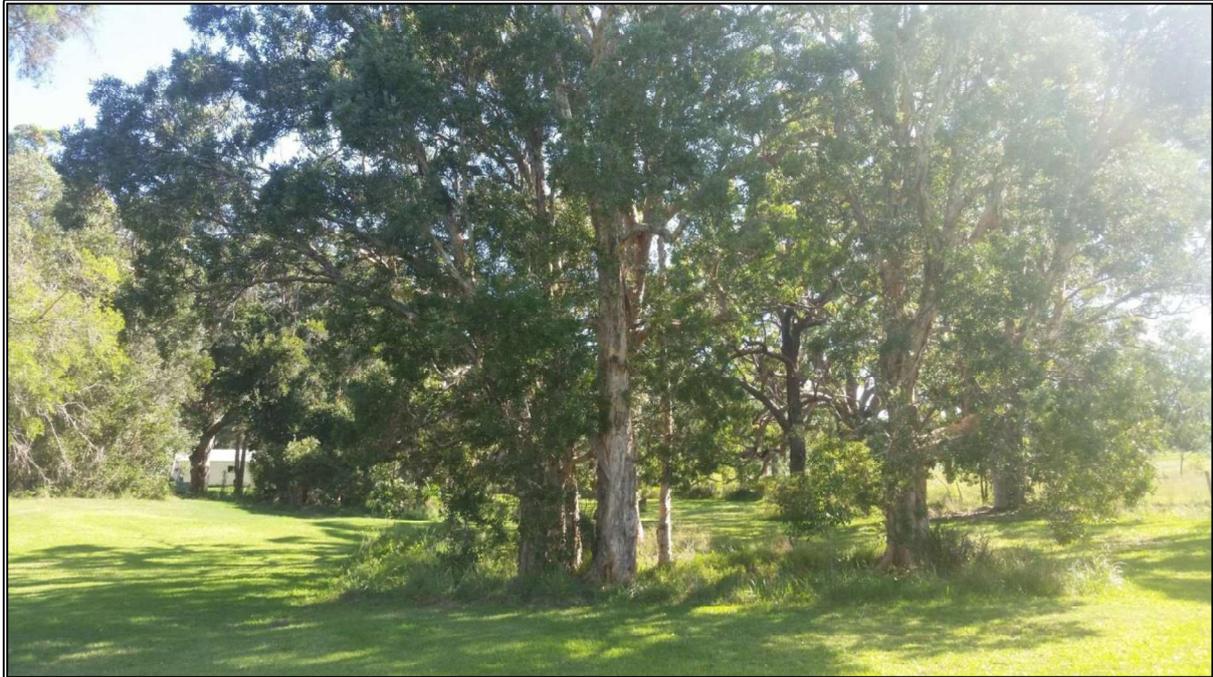


Plate 4. PCT 1649 – Smooth-barked Apple, Red Mahogany, Swamp Mahogany, *Melaleuca sieberi* heathy swamp woodland of coastal lowlands.

PCT 1737 TYPHA RUSHLAND

Structure:

Upper Stratum: To 2 metres high, with 80% PFC.

Lower Stratum: To 0.5 metres high, with 10-100% PFC.

Floristics:

(Characteristic Species)

Upper Stratum: *Typha orientalis*

Lower Stratum: *Villarsia exaltata* and *Persicaria hydropiper*.

Exotics: *Hydrocotyle bonariensis* and *Stenotaphrum secundatum*.

Variation:

A dense cover of *Typha orientalis* dominates the areas of this PCT which are subject to higher levels of inundation.

Disturbance:

This vegetation type is likely to have regrown following clearing of a forested wetland community.

Weed Invasion:

High levels of weeds were observed on the edge areas of this PCT adjoining areas of cleared land.

Location and Distribution:

This PCT occupies approximately 0.14 hectares in the north-eastern section of the site, as mapped in Figure 3.1.

Classification:

This PCT corresponds to Map Unit E 14 Freshwater Wetlands of ELA (2016).

This vegetation community corresponds to the endangered ecological community Freshwater Wetlands on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions as listed within the *BC Act* (2016).



Plate 5: PCT 1737 Typha Rushland

CLEARED LAND / EXOTIC VEGETATION

Areas of Cleared Land dominated by exotic vegetation are present throughout the site as mapped in Figure 3.1. These areas occupy approximately 14.28 ha.



Plate 6: Cleared Land / Exotic Vegetation

3.2 THREATENED SPECIES

The Biodiversity Assessment Method Calculator was utilised to provide a preliminary list of the threatened species with potential to occur within the site, and supplement the list of threatened species identified from the Bionet Atlas Search (NSW OEH 2018).

The ecosystem credit type threatened species, predicted to occur at the site, with suitable habitat present are listed in Table 3.1.

TABLE 3.1 PREDICTED ECOSYSTEM CREDIT SPECIES WITH SUITABLE HABITAT PRESENT			
Species	Associated PCT	NSW Listing Status	National Listing Status
<u>Anseranas semipalmata</u> Magpie Goose	1737	Vulnerable	-
<u>Anthochaera phrygia</u> Regent Honeyeater (Foraging)	1649	Critically Endangered	Critically Endangered
<u>Botaurus poiciloptilus</u> Australasian Bittern	1737	Endangered	Endangered
<u>Circus assimilis</u> Spotted Harrier	1737	Vulnerable	-
<u>Daphoenositta chrysoptera</u> Varied Sittella	1638 / 1649	Vulnerable	-
<u>Dasyurus maculatus</u> Spotted-tailed Quoll	1638 / 1649	Vulnerable	Endangered
<u>Ephippiorhynchus asiaticus</u> Black-necked Stork	1737	Endangered	-
<u>Epthianura albigrons</u> White-fronted Chat	1737	Vulnerable	-
<u>Glossopsitta pusilla</u> Little Lorikeet	1638 / 1649	Vulnerable	-
<u>Haliaeetus leucogaster</u> White-bellied Sea-Eagle (Foraging)	1638 / 1649 / 1737	Vulnerable	-
<u>Hieraetus morphnoides</u> Little Eagle (Foraging)	1737	Vulnerable	-
<u>Ixobrychus flavicollis</u> Black Bittern	1737	Vulnerable	-
<u>Ninox connivens</u> Barking Owl (Foraging)	1638 / 1649	Vulnerable	-

**TABLE 3.1
PREDICTED ECOSYSTEM CREDIT SPECIES
WITH SUITABLE HABITAT PRESENT**

Species	Associated PCT	NSW Listing Status	National Listing Status
<u>Pandion cristatus</u> Eastern Osprey (Foraging)	1649 / 1737	Vulnerable	-
<u>Rostratula australis</u> Australian Painted Snipe	1737	Endangered	Endangered

The species credit type threatened species, with potential to occur at the site are listed in Table 3.2, the suitable survey periods and recorded or potential for occurrence is identified for each species.

**TABLE 3.2
PREDICTED SPECIES CREDIT SPECIES
WITH SUITABLE HABITAT PRESENT**

Species	Confirmed Candidate Species & Likelihood of occurrence	Survey Period	NSW Listing Status	National Listing Status
<u>Acacia bynoeana</u> Bynoe's Wattle	Yes / Moderate	Sep - Mar	Endangered	Vulnerable
<u>Angophora inopina</u> Charmhaven Apple	Yes / One individual observed during initial surveys.	All year	Vulnerable	Vulnerable
<u>Anthochaera phrygia</u> Regent Honeyeater (Breeding)	Yes / Low	Sep - Dec	Critically Endangered	Critically Endangered
<u>Burhinus grallarius</u> Bush Stone-curlew	Yes / Low	All year	Endangered	-
<u>Calidris ferruginea</u> Curlew Sandpiper (Breeding)	No / Not likely	NA	Endangered	Critically Endangered
<u>Calidris tenuirostris</u> Great Knot (Breeding)	No / Not likely	NA	Vulnerable	Critically Endangered
<u>Callistemon linearifolius</u> Netted Bottle Brush	Yes / Moderate	Sep - Mar	Vulnerable	-
<u>Crinia tinnula</u> Wallum Froglet	Yes / moderate to high	All year	Vulnerable	-
<u>Cryptostylis hunteriana</u> Leafless Tongue Orchid	Yes / low to moderate	Nov - Feb	Vulnerable	Vulnerable
<u>Diuris praecox</u> Rough Doubletail	Yes / Moderate	Jul - Aug	Vulnerable	Vulnerable
<u>Genoplesium insigne</u> Variable Midge Orchid	Yes / Low to moderate	Sep - Oct	Critically Endangered	Critically Endangered

**TABLE 3.2
PREDICTED SPECIES CREDIT SPECIES
WITH SUITABLE HABITAT PRESENT**

Species	Confirmed Candidate Species & Likelihood of occurrence	Survey Period	NSW Listing Status	National Listing Status
<u>Grevillea parviflora</u> <u>subsp. parviflora</u> Small-flower Grevillea	Yes / Moderate to high	All year	Vulnerable	Vulnerable
<u>Haliaeetus leucogaster</u> White-bellied Sea-Eagle (Breeding)	Yes / Low	Jul - Dec	Vulnerable	-
<u>Hieraaetus morphnoides</u> Little Eagle (Breeding)	Yes / Low	Aug - Oct	Vulnerable	-
<u>Limicola falcinellus</u> Broad-billed Sandpiper (Breeding)	No / Not likely	NA	Vulnerable	-
<u>Limosa limosa</u> Black-tailed Godwit (Breeding)	No / Not likely	NA	Vulnerable	-
<u>Litoria aurea</u> Green and Golden Bell Frog	Yes / low	Nov - Mar	Endangered	Vulnerable
<u>Litoria brevipalmata</u> Green-thighed Frog	Yes / low	Oct - Mar	Vulnerable	-
<u>Maundia triglochinos</u> Maundia triglochinos	Yes / Low to moderate	Nov - Mar	Vulnerable	-
<u>Melaleuca biconvexa</u> Biconvex Paperbark	Yes / Low	All year	Vulnerable	Vulnerable
<u>Myotis macropus</u> Southern Myotis	Yes / Moderate to high	Nov - Mar	Vulnerable	-
<u>Nettapus coromandelianus</u> Cotton Pygmy-Goose	No / Not likely	NA	Endangered	-
<u>Ninox connivens</u> Barking Owl (Breeding)	Yes / Low	May - Dec	Vulnerable	-
<u>Ninox strenua</u> Powerful Owl (Breeding)	Yes / Low	May - Aug	Vulnerable	-

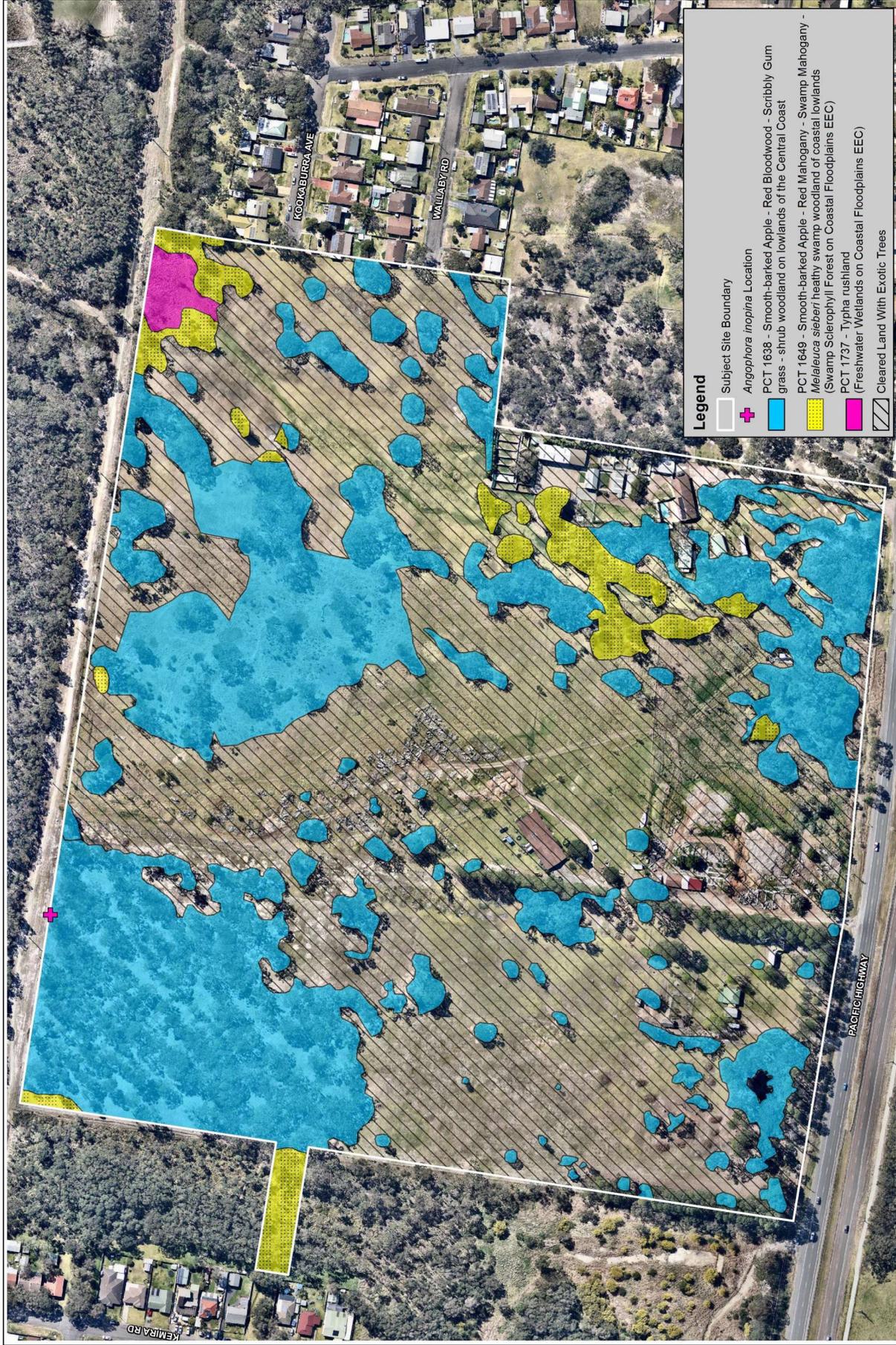
**TABLE 3.2
PREDICTED SPECIES CREDIT SPECIES
WITH SUITABLE HABITAT PRESENT**

Species	Confirmed Candidate Species & Likelihood of occurrence	Survey Period	NSW Listing Status	National Listing Status
<u>Pandion cristatus</u> Eastern Osprey (Breeding)	Yes / Moderate	Apr - Nov	Vulnerable	-
<u>Persicaria elatior</u> Tall Knotweed	Yes / Moderate	Dec - May	Vulnerable	Vulnerable
<u>Petalura gigantea</u> Giant Dragonfly	Yes / Low	Dec - Jan	Endangered	-
<u>Petaurus norfolcensis</u> Squirrel Glider	Yes / High	All year	Vulnerable	-
<u>Rutidosia heterogama</u> Heath Wrinklewort	Yes / Low	All year	Vulnerable	Vulnerable
<u>Tetradlea juncea</u> Black-eyed Susan	Yes / Moderate	Jul - Dec	Vulnerable	Vulnerable
<u>Turnix maculosus</u> Red-backed Button-quail	Yes / Low	All year	Vulnerable	-
<u>Tyto novaehollandiae</u> Masked Owl (Breeding)	Yes / Low	May - Aug	Vulnerable	-
<u>Uperoleia mahonyi</u> Mahony's Toadlet	Yes / Low	Oct - Mar	Endangered	-
<u>Xenus cinereus</u> Terek Sandpiper (Breeding)	No / Not likely	NA	Vulnerable	-
<u>Zannichellia palustris</u> Zannichellia palustris	No / Not likely	Mar - Nov	Endangered	-

3.3 HABITAT CONNECTIVITY

The habitats present within the site are disturbed and have been fragmented by historical clearing. Wildlife connectivity is likely to be restricted between the site and the land to the east by existing residential development and between the site and land to the south by the Pacific Highway. Connectivity is present between the site and the land to the north which is naturally vegetated and between the site and the land to the west which contains a drainage reserve.

Fauna connectivity is proposed to be maintained through a riparian corridor through the site. Road crossings over the proposed riparian corridor and the drainage reserve to the west should consider maintaining fauna movements through the use of bridge structures with underpasses, the retention of trees and planting of native vegetation.



- Legend**
- Subject Site Boundary
 - ✚ *Angophora inopina* Location
 - PCT 1638 - Smooth-barked Apple - Red Bloodwood - Scribbly Gum grass - shrub woodland on lowlands of the Central Coast
 - PCT 1649 - Smooth-barked Apple - Red Mahogany - Swamp Mahogany - *Melaleuca sieberi* heathy swamp woodland of coastal lowlands (Swamp Sclerophyll Forest on Coastal Floodplains EEC)
 - PCT 1737 - Typha rushland (Freshwater Wetlands on Coastal Floodplains EEC)
 - ▨ Cleared Land With Exotic Trees

Drawn By: AM
 Drawing Version: 1
 * Plan for indicative purposes only. Not for detailed measurement.
 Source: Aerial © Nearmap (2018) Air Photo Date: 22/09/2018

Drawing No: 8042
 Date: 20/12/2018

200 m
 150
 100
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Plan produced as A3 colour

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Figure 3.1
Plant Community Types
 Pacific Highway, Lake Munmorrah

SECTION 4

STATUTORY BIODIVERSITY CONSIDERATIONS

4.1 BIODIVERSITY CONSERVATION ACT (2016)

The site is located on the Biodiversity Values map as shown in Figure 4.1. A Biodiversity Development Assessment Report will be required for a future development application for site subdivision. Stage 1 of the BAM should be completed to inform a future application for rezoning, following gateway approval and suitable targeted surveys will be completed by *Conacher Consulting* for this purpose.

4.2 STATE ENVIRONMENTAL PLANNING POLICIES

i. *State Environmental Planning Policy (Coastal Management)*

The north-western section of the site contains a mapped “Coastal Wetlands” area and “Proximity Area for Coastal Wetlands” area. The approximate location of these areas are shown in Figure 4.2.

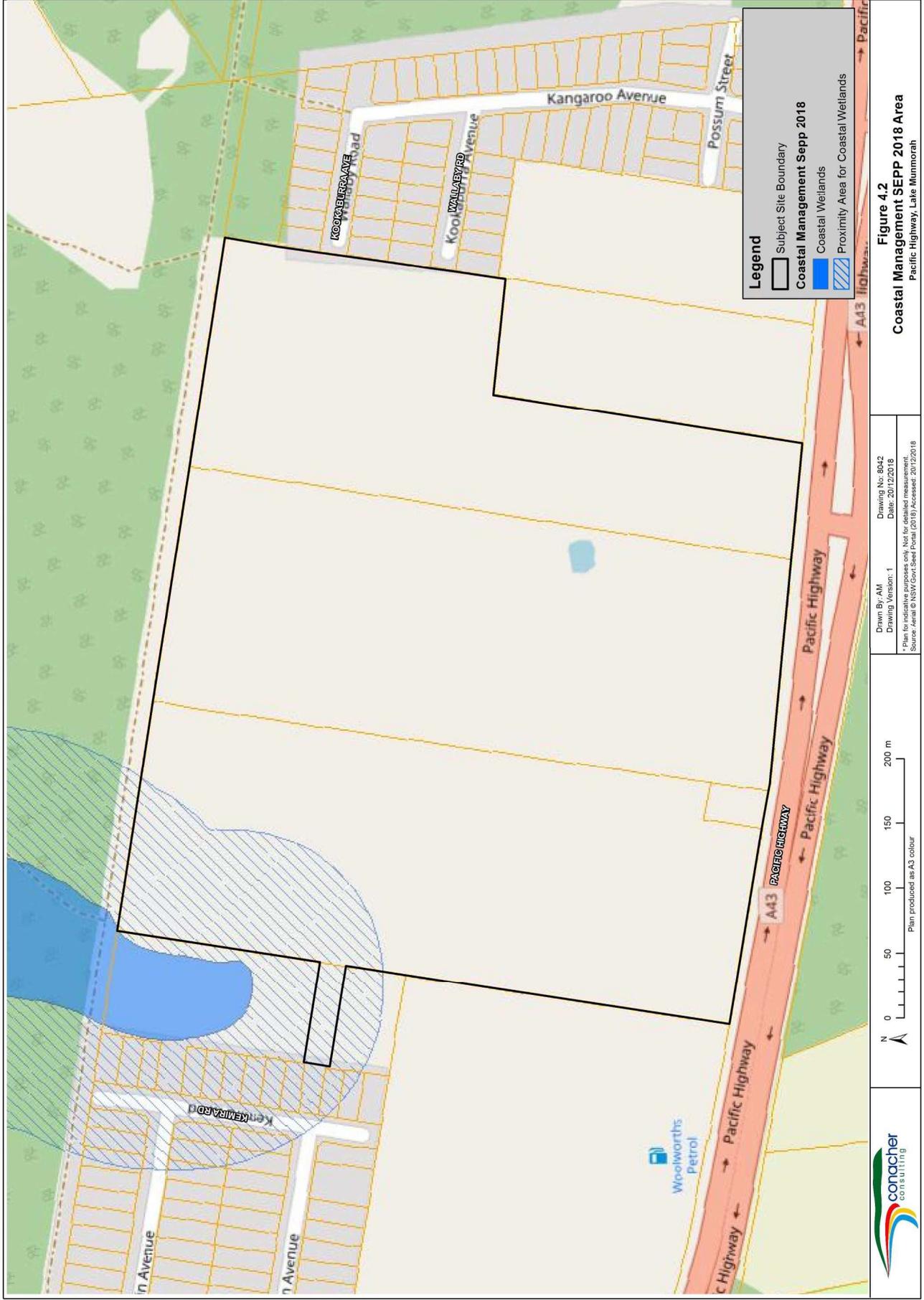
ii. *State Environmental Planning Policy 44 Koala Habitat Protection*

No koalas were observed within the site during preliminary surveys, however it is likely that the site would constitute potential koala habitat as defined under this SEPP. There are no historical records for Koalas within the site on the Bionet Atlas (NSW OEH 2018). It is recommended that further surveys for Koalas be undertaken following Gateway approval.

4.3 CONCLUDING COMMENTS

Based on the detailed field survey and information provided in this report it is concluded that:

- i. The threatened flora species, *Angophora inopina*, was observed within the northern section of the subject site during surveys;
- ii. No threatened fauna species were observed within the subject site during preliminary surveys;
- iii. The following endangered ecological communities are present within the subject site:
 - Freshwater Wetland on Coastal Floodplain; and
 - Swamp Sclerophyll Forest on Coastal Floodplain.
- iv. Stage 1 of the Biodiversity Assessment Methodology (NSW OEH 2017) should be completed to further inform the rezoning proposal, subject to and following Gateway approval.



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