



Commonwealth Environmental Protection and Biodiversity Conservation Act 1999 Impact Assessment

for

Bioenergy Facility

45 Wallum Place, Byron Bay

New South Wales 2481 Australia

Report prepared for Skala Australasia Pty Ltd

28/05/2021



Commonwealth Environmental Protection and Biodiversity Conservation Act 1999 Impact Assessment for Bioenergy Facility 45 Wallum Place, Byron Bay New South Wales 2481 Australia Report prepared for Skala Australasia Pty Ltd	
Report:	
Prepared for:	Skala Australasia Pty Ltd
Prepared by:	Land Eco Consulting Pty Ltd
Date:	28/05/2021
Version:	2.0

Disclaimer

The document may only be used for the purposes for which it was commissioned and in accordance with the Terms of the Engagement for the commission. This report and all information contained within is rendered void if any information herein is altered or reproduced without the permission of Land Eco Consulting. Unauthorised use of this document in any form whatsoever is prohibited. This report is invalid for submission to any third party or regulatory authorities while it is in draft stage. Land Eco Consulting Pty Ltd will not endorse this report if it has been submitted to council while it is still in draft stage. This document is and shall remain the property of Land Eco Consulting Pty Ltd. The sole purpose of this report and the associated services performed by Land Eco Consulting was to undertake a Biodiversity Development Assessment in association with a development application (DA) in accordance with the scope of services set out in the contract between Land Eco Consulting and the client who commissioned this report. That scope of

services, as described in this report, was developed with the client who commissioned this report. Any survey of flora and fauna will be unavoidably constrained in a number of respects. In an effort to mitigate those constraints, we applied the precautionary principle described in the methodology section of this report to develop our conclusions. Our conclusions are not therefore based solely upon conditions encountered at the site at the time of the survey. The passage of time, manifestation of latent conditions or impacts of future events may require further examination of the project and subsequent data analysis, and re-evaluation of the data, findings, observations and conclusions expressed in this report. Land Eco Consulting has prepared this report in accordance with the usual care and thoroughness of the consulting profession, for the sole purpose described above and by reference to applicable standards, guidelines, procedures and practices at the date of issue of this report. For the reasons outlined above, however, no other warranty or guarantee, whether expressed or implied, is made as to the data, observations and findings expressed in this report, to the extent permitted by law.

This report should be read in full and no excerpts are to be taken as representative of the findings. No responsibility is accepted by Land Eco Consulting for use of any part of this report in any other context. The review of legislation undertaken by Land Eco Consulting for this project does not constitute an interpretation of the law or provision of legal advice. None of the maps and drafts in this report are survey accurate nor have they been produced by a surveyor. None of the maps and figures in this report should be utilised for design or construction purposes. This report has not been developed by a legal professional and the relevant legislation should be consulted and/or legal advice sought, where appropriate, before applying the information in particular circumstances. This report has been prepared on behalf of, and for the exclusive use of, the client who commissioned this report, and is subject to and issued in accordance with the provisions of the contract between Land Eco Consulting and the client who commissioned this report. Land Eco Consulting accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this report by any third party. Land Eco Consulting Pty Ltd has completed this assessment in accordance with the relevant federal, state and local government legislation as well as current industry best practices including guidelines. Land Eco Consulting Pty Ltd accepts no liability for any loss or damages sustained as a result of reliance placed upon this report and any of its content or for any purpose other than that for which this report was intended.

Land Eco Consulting Pty Ltd


www.landeco.com.au

ABN 48 636 918 404

Report Certification

This report was produced by:

Kurtis Lindsay BSc (Hons)



Principal Ecologist
Accredited Biodiversity Assessor (#BAAS18059)
Land Eco Consulting
info@landeco.com.au
Ph: 0408765832

Document Control

Version	Document Name	Issue Date
Draft v1.0	Commonwealth Environmental Protection and Biodiversity Conservation Act 1999 Impact Assessment for Bioenergy Facility 45 Wallum Place, Byron Bay New South Wales 2481 Australia Report prepared for Skala Australasia Pty Ltd	
Draft v2.0	Commonwealth Environmental Protection and Biodiversity Conservation Act 1999 Impact Assessment for Bioenergy Facility 45 Wallum Place, Byron Bay New South Wales 2481 Australia Report prepared for Skala Australasia Pty Ltd	
Final 1.0	Commonwealth Environmental Protection and Biodiversity Conservation Act 1999 Impact Assessment for Bioenergy Facility 45 Wallum Place, Byron Bay New South Wales 2481 Australia Report prepared for Skala Australasia Pty Ltd	15/5/2021
Final 2.0	Commonwealth Environmental Protection and Biodiversity Conservation Act 1999 Impact Assessment for Bioenergy Facility 45 Wallum Place, Byron Bay New South Wales 2481 Australia Report prepared for Skala Australasia Pty Ltd	27/5/2021

Contents

Report Certification.....	ii
Document Control	ii
Contents	iii
Figures.....	iv
Tables.....	iv
Plates.....	iv
Glossary	v
1. Introduction	1
1.1 Description of Proposal.....	1
1.1.1 Proposed Development	1
1.1.2 Description of Biodiversity Impact.....	1
1.1.3 Site Description and Location.....	2
1.2 Avoid and minimise impacts (location and design).....	2
1.3 Native Vegetation in the Subject Property	2
2. Threatened Ecological Communities	3
3. Threatened Species.....	4
4. Impact Assessments	17
4.1 Threatened Species.....	17
4.2 Migratory Species.....	23
5. Conclusion	23
6. References	24
7. Appendices.....	26
Appendix A. Fauna recorded on Subject Land during Site Assessments by Land Eco Consulting between January, February and March 2021	27
Appendix B. Protected Matters Report	29

Figures

Figure 1. The location of the Subject Property and Subject Land	3
Figure 2. Proposed Development Layout (SHAC 2021)	1

Tables

Table 1. Determination of Presence/Absence of Threatened Ecological Communities in the Subject Property.	3
Table 3. Habitat Values on the Subject Property	4
Table 4. Threatened Species Likelihood Table and Survey Effort.....	5
Table 5. Assessment of Impact to Mitchell's Rainforest Snail in Accordance with the Significant Impact Criteria	17
Table 6. Assessment of Impact to Wallum Sedge-frog in Accordance with the Significant Impact Criteria	20

Plates

Figure 1. The location of the Subject Property and Subject Land	3
Figure 2. Proposed Development Layout (SHAC 2021)	1

Glossary

Acronym/ Term	Definition
AD	Anaerobic Digestion
BEF	Bioenergy Facility
BC Act	New South Wales Biodiversity Conservation Act 2016
BCD	Biodiversity and Conservation Division of DPIE
BDAR	Biodiversity Development Assessment Report
Biodiversity credit report	The report produced by the Credit Calculator that sets out the number and class of biodiversity credits required to offset the remaining adverse impacts on biodiversity values at a development site, or on land to be biodiversity certified, or that sets out the number and class of biodiversity credits that are created at a biodiversity stewardship site.
Biodiversity Offsets	Management actions that are undertaken to achieve a gain in biodiversity values on areas of land in order to compensate for losses to biodiversity from the impacts of development.
Biodiversity values	The composition, structure and function of ecosystems, including threatened species, populations and ecological communities, and their habitats.
BOS	NSW Biodiversity Offset Scheme
CHP	Combined heat and power unit
DA	Development Application
DCP	Byron Shire Development Control Plan 2014
DBH	Tree stem diameter at breast height (1.37m above ground).
DPIE	NSW Department of Planning, Infrastructure and Environment
Ecosystem credit	A credit that relates to a vegetation type and the threatened species that are reliably predicted by that vegetation type (as a habitat surrogate).
EEC	Endangered Ecological Community
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
ha	Hectare
HTE	High Threat Exotic
km	Kilometre
LEP	Byron Shire Local Environmental Plan 2014
LGA	Local Government Area
Locality	The area within a 10km radius of the Subject Land. The same meaning when describing a local population of a species or local occurrence of an ecological community.
m	metres
MNES	Matters of National Environmental Significance
Native Vegetation	means any of the following types of plants native to New South Wales: (a) trees (including any sapling or shrub or any scrub), (b) understorey plants, (c) groundcover (being any type of herbaceous vegetation), (d) plants occurring in a wetland.
NSW	The State of New South Wales
OEH	NSW Office of Environment and Heritage (now known as Department of Planning, Infrastructure and Environment)
PCT	NSW Plant Community Type
Priority weed	Priority weed in the Greater Sydney Region as per the <i>Biosecurity Act 2015</i>
Proposal	The development, activity or action proposed.
Remnant	In the context of this report, the term 'remnant' relates to those native canopy trees which are locally indigenous. The term does not suggest the trees are 'old growth' remnant as all of the trees on the Subject Land are regrowth since the land was clear-felled in the past. The term 'remnant' in this report describes the presence of a canopy comprised of locally indigenous trees, it helps to distinguish from those areas that do not contain locally indigenous trees.
SAIL	Serious and Irreversible Impacts
SAIL entity	Species and ecological communities that are likely to be the subject of serious and irreversible impacts (SAILs)
DCP	The Hornsby Development Control Plan
SEPP	State Environmental Planning Policy

Acronym/ Term	Definition
Species Credit	The class of biodiversity credits created or required for the impact on threatened species that cannot be reliably predicted to use an area of land based on habitat surrogates. Species that require Species Credits are listed in the Threatened Biodiversity Data Collection.
Study Area	The area that was subject to a site survey and assessed for direct or indirect impacts arising from construction and operation of the proposal.
STP	Sewage Treatment Plant
Subject Land	The location of the proposed activity (Industrial Units development footprint); the subject of this report.
Subject Property	Lot 12/DP1112906 at 45 Wallum Place, Byron Bay New South Wales 2481 Australia
The proponent	The developer of the property (Skala Australasia Pty Ltd)
Threatened biota	Threatened species, populations or ecological communities listed under the BC Act and/or the EPBC Act.
Threatened species, populations and ecological communities	Species, populations and ecological communities specified in Schedules 1, 1A and 2 and ' <i>threatened species, population or ecological community</i> ' means a species, population or ecological community specified in any of those Schedules.

1. Introduction

This report provides an assessment of the likelihood of occurrence of Matters of National Environmental Significance (MNES) listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) along with an assessment of the significance of impact of the proposed development upon all MNES that are confirmed present or considered likely to occur in the location of the Byron Bay Energy Facility (BEF). Details of the development are provided in the Biodiversity Development Assessment Report (BDAR) (Land Eco Consulting 2021).

It is concluded that the proposed development is not likely to incur a significant impact upon any MNES listed under the EPBC Act.

1.1 Description of Proposal

Land Eco Consulting (Land Eco) was commissioned by Skala Australasia Pty Ltd Pty Ltd. ('the proponent') to prepare this Biodiversity Development Assessment Report (BDAR) pursuant to section 7.7 of the NSW Biodiversity Conservation Act 2016 for Byron Shire Council's proposed development of a proposed Bioenergy Facility on Lot 12/DP1112906 at 45 Wallum Place, Byron Bay (hereafter referred to as 'the Subject Property') (**Figure 1**). This lot present contains the Byron Bay STP.

Land Eco have produced this report in order to assess any potential impacts associated with the DA and recommend appropriate measures to avoid, minimise, mitigate and offset any potential ecological impacts in line with the requirements of the regulatory authorities, Byron Shire Council and the NSW Department of Planning Industry and Environment (DPIE) Environment Energy and Science (EES).

1.1.1 Proposed Development

The proposed development will involve the construction and operation of a best practice Bioenergy Facility (BEF) receiving organic waste materials from households and businesses in the Byron and neighbouring local government areas. The facility will be enclosed and operate under negative pressure to ensure all emissions from the process are treated before release. Biogas will be collected and consumed onsite to generate electricity. No biogas will be exported from the site.

1.1.2 Description of Biodiversity Impact

The proposed development will require the clearing of approximately 0.88 hectares of derived grassland, of this only 0.52 ha consists of native-dominated grassland. No remnant vegetation will be impacted for the proposed development to proceed. The majority of the Subject Land consists of non-native vegetation, the majority being pasture grasses and forbs. The severity of weed infestation varies across the site, from moderate to severe. None of the native vegetation in the Subject Land is considered to be in good condition.

Ecologist targeted surveys carried out on:

- 27 January 2021,
- 16 - 18 February 2021, and
- 23 - 27 March 2021

revealed the presence of two EPBC Act listed threatened fauna species within and/or immediately adjacent the Subject Land:

- *Litoria longiburensis* (Wallum Sedge-frog) (EPBC Act: Vulnerable)
- *Thersites mitchellae* (Mitchell's Rainforest Snail) (EPBC Act: Critically Endangered).

Wallum Sedge-frog was found in the remnant wetland east and west of the Subject Land.

Mitchell's Rainforest Snail was found in the south-western corner of the proposed development footprint.

No threatened flora species were identified in or adjacent the Subject Land.

1.1.3 Site Description and Location

The proposed lot is located on the southern side of Wallum Place, west of Bayshore Drive, within the BBSTP. The development site is immediately to the south and west of existing infrastructure within the BBSTP. The site comprises a small 100 by 60 metre portion (approximately 0.88 ha) of the land contained in Lot 2, DP 706286.

The Subject Property consists of a single large lot which is predominantly vegetated with remnant vegetation associated with dune fields. The area to the north and south of the proposed development is the Byron Bay Sewage Treatment Plant and associated constructed wetlands. Natural Melaleuca and Wallum Swamp wetlands also occur in proximity to the development. The majority of the vegetation in the Subject Property comprises the 'West Byron BioBanking Agreement Site'. The proposed development does not affect the BioBanking site.

The lot includes three existing developments:

- a sewage treatment plant, owned and operated by BSC;
- a solar array and supporting infrastructure, owned and operated by BSC; and
- a herb nursery, operated by Byron Bay Herb Nursery a not for profit disability service charity

The BBSTP was constructed and licensed by the NSW Environment Protection Authority in July 2000. The solar array was granted consent by BSC in August 2019 (DA 10.2019.216.1), with an occupation certificate issued in January 2020.

No previous development application has been made for a BEF or similar organic recycling facility.



Figure 1. The location of the Subject Property and Subject Land

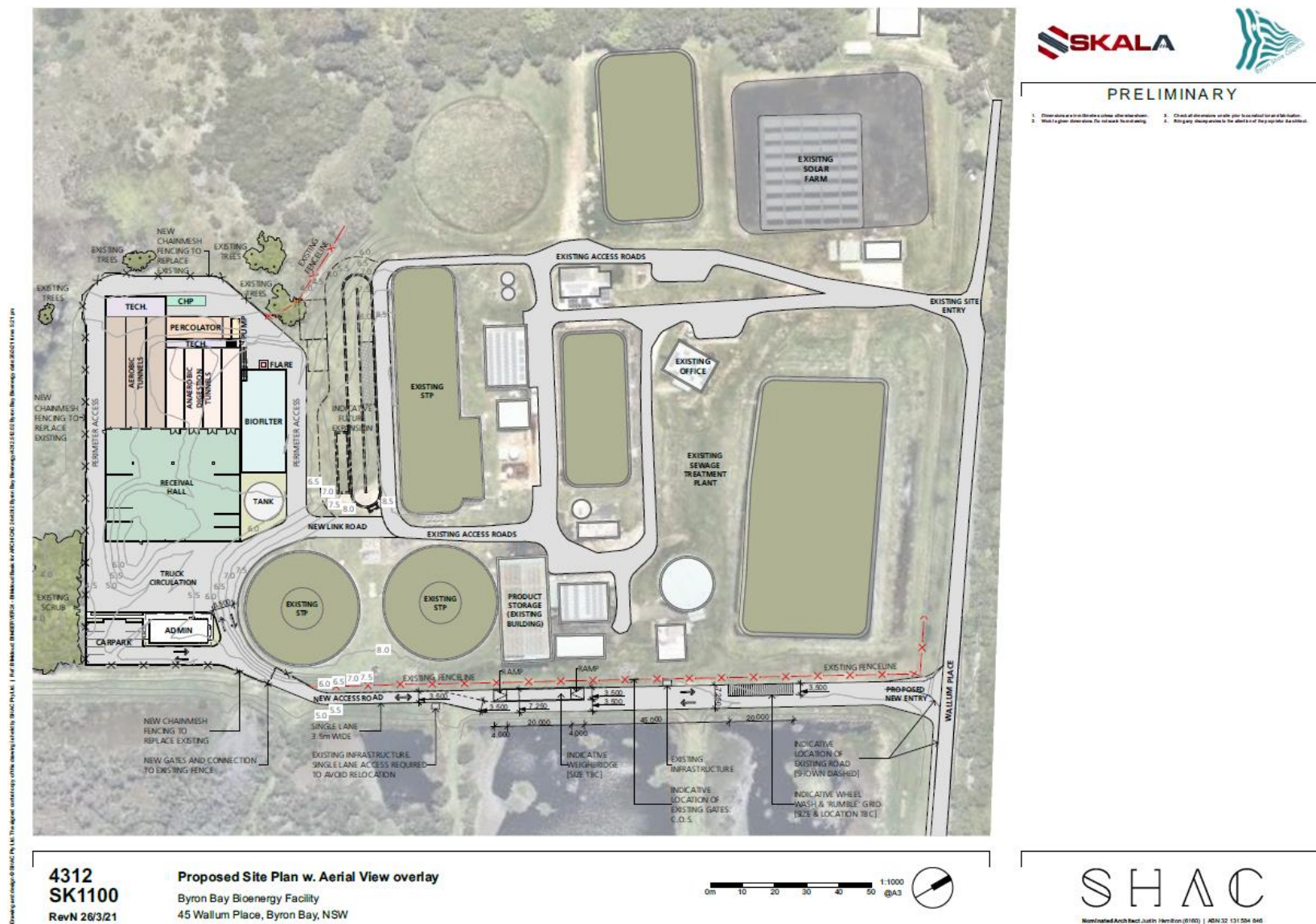


Figure 2. Proposed Development Layout (SHAC 2021)

1.2 Avoid and minimise impacts (location and design)

The proposed development is for a new industrial facility to be situated within the compound of an existing industrial facility, the Byron Bay Sewage Treatment Plant. The Subject Property is extensive and covers large extents of native vegetation and wetland. A small proportion of the Subject Property is occupied by the Sewage Treatment Plant compound, and a small proportion of this compound is, in turn, contemplated for the proposed development.

There is no remnant native vegetation in the Subject Site. The most significant patches of native vegetation in the locality of the Subject Property are small patches of mature *Melaleuca* Swamp which occurs outside of the proposed development, to the south-western and south-eastern corners respectively. These patches are dominated by fragmented remnant native vegetation that is floristically diverse, and structurally complex. The original development design required the clearing of these patches, however, in order to meet the principles of 'Avoid and Minimise', the design was altered at the expense of the applicant to avoid clearing this vegetation.

Between the Subject Land and the native vegetation (wetlands) to the west, a buffer of derived exotic grasslands occurs. This is dominated by the introduced pasture, *Setaria sphacelata* with a low density of native fern, sedges and herbs.

The proposed development has been deliberately positioned away from the 'West Byron Biobanking Agreement Site'. The Subject Land is separated by the Biobanking Agreement site by approximately 100 metres of native vegetation comprised mostly of wetlands.

1.3 Native Vegetation in the Subject Property

Only one native vegetation community was found to occur in the Subject Land PCT 1064: *Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion*.

A detailed description of the vegetation in the Subject Property is provided in the Biodiversity Development Assessment Report (BDAR) (Land Eco Consulting 2021).

2. Threatened Ecological Communities

A Protected Matters Search was conducted on 9th April 2021. A suite of threatened ecological communities (TEC) listed under the EPBC Act were modelled as having potential to occur within 10km of the Subject Property.

An assessment was carried-out into the presence/absence of TEC on the Subject Property (**Table 1**). It was concluded that no TEC occur in the Subject Land, therefore no further assessment of impacts to TEC is necessary for this proposal.

Table 1. Determination of Presence/Absence of Threatened Ecological Communities in the Subject Property.

Candidate TEC	EPBC Act Status	Present in or adjacent the Subject Land	Discussion
Coastal Swamp Oak (<i>Casuarina glauca</i>) Forest of New South Wales and South East Queensland ecological community	Endangered	No	The characteristic identifying species, <i>Casuarina glauca</i> is absent from the Subject Land and immediate surrounds.
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	Critically Endangered	No	The characteristic identifying species, <i>Eucalyptus</i> spp. are absent from the Subject Land and immediate surrounds.
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	Critically Endangered	No	The vegetation adjacent the Subject Land is dominated by <i>Melaleuca quinquenervia</i> (>60% canopy) with scattered mesic trees and shrubs in the subcanopy (<30% cover in total). There is no consistent rainforest canopy or subcanopy it was all interspersed with <i>Melaleuca quinquenervia</i> . The soil was inundated with freshwater for long periods (weeks), and supported a dense cover of <i>Cyperus</i> spp., <i>Gahnia</i> spp. and ferns more typical of a swamp than a rainforest. Littoral Rainforest typically has a sparse groundcover, the vegetation adjacent the Subject Land had a dense groundcover. Onshore wind-shear was not an obvious characteristic in the trees within this community.
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	No	There is no tidal influence within or near the Subject Land. The surrounding wetlands are freshwater.
Lowland Rainforest of Subtropical Australia		No	The Subject Land is less than 2km from the coast whereas Lowland Rainforest of Subtropical Australia typically occurs more than 2km from the coast (Commonwealth of Australia 2011b).

3. Threatened Species

A Protected Matters Search was conducted on 9th April 2021. A suite of threatened and migratory species under the EPBC Act were modelled as having potential to occur within 10km of the Subject Property.

The Land Eco Consulting Ecologists compiled a detailed summary of potential habitat for threatened fauna and flora species (**Table 2**).

A detailed list of all threatened flora and fauna species that are predicted by the Protected Matters Search Tool to occur in the Subject Property are presented along with an assessment of habitat suitability and likelihood of occurrence (**Table 3**).

All opportunistic species observed by Land Eco Consulting are presented (**Appendix A**).

Table 2. Habitat Values on the Subject Property

Habitat component	Site values
Coarse woody debris	Absent.
Rock outcrops and bush rock	Absent.
Caves, crevices and overhangs	Absent.
Culverts, bridges, mine shafts, or abandoned structures	Absent.
Nectar/lerp-bearing Trees	Absent from the Subject Land, however <i>Melaleuca quinquenervia</i> occurred adjacent the Subject Land and this is a nectar-bearing tree.
Nectar-bearing shrubs	Absent.
Mistletoes	Absent.
Koala browse trees	Absent from the Subject Land, however <i>Melaleuca quinquenervia</i> occurred adjacent the Subject Land and this is a Koala tree.
Large stick nests	Absent.
Sap and gum sources	Absent.
Soft-fruit-bearing trees	Absent from the Subject Land, but present in woodland adjacent to the Subject Land. Scattered subcanopy trees (<i>Archontophoenix cunninghamiana</i> , <i>Melicope elleryana</i> , <i>Acronychia imperforata</i>) in the Melaleuca Swamp.
Dense shrubbery	Absent.
Dense leaf litter	Litter present under <i>Setaria sphacelata</i> .
Tree hollows	Absent.
Wetlands, soaks and streams	Absent from the Subject Land, but present adjacent to the Subject Land. Wallum and reed wetlands. No streams adjacent the Subject Land.
Open water bodies	Absent from the Subject Land, but present adjacent to the Subject Land. Open waterbodies (ponds from STP operations)
Estuarine, beach, mudflats, and rocky foreshores	Absent
Orchid Habitat	There were no orchids of any species recorded within the Subject Land.

Table 3. Threatened Species Likelihood Table and Survey Effort

Classification	Scientific Name	EPBC Act Status	Suitable Habitat Present within/around the Subject Land?	Likelihood of Occurrence of Species on Subject Land
Aves	<i>Anous stolidus</i> Common Noddy	Migratory	No suitable habitat. This species only inhabits marine and estuarine environments. The few inland records are of windblown individuals during major storm events.	Unlikely
Aves	<i>Apus pacificus</i> Fork-tailed Swift	Migratory	This species only occurs in the region as an aerial forager. It may forage over the Subject Property on occasion, however the proposed development is not likely to impact on this species which is wide ranging and forages high in above the tree canopy.	Moderate. Fly-over only
Aves	<i>Hirundapus caudacutus</i> White-throated Needletail	Migratory Vulnerable	This species only occurs in the region as an aerial forager. It will forage over the Subject Property on occasion; however the proposed development is not likely to impact on this species which is wide ranging and forages high in above the tree canopy.	Likely. Fly-over only
Aves	<i>Monarcha melanopsis</i> Black-faced Monarch	Migratory	Suitable habitat occurs for this species in the Melaleuca swamp adjacent the Subject Land. It is likely to forage in the Subject Property on occasion. Habitat is considered too open for nesting.	Low. Foraging only, not breeding.
Aves	<i>Monarcha trivirgatus</i> Spectacled Monarch	Migratory	Suitable habitat occurs for this species in the Melaleuca swamp adjacent the Subject Land. It is likely to forage in the Subject Property on occasion. Habitat is considered too open for nesting.	Low. Foraging only, not breeding.
Aves	<i>Myiagra cyanoleuca</i> Satin Flycatcher	Migratory	This species is a vagrant to Byron Shire. It may forage in the Subject Property on occasion. Habitat is considered too open for nesting.	Low. Foraging only.
Aves	<i>Rhipidura rufifrons</i> Rufous Fantail	Migratory	Suitable habitat occurs for this species in the Melaleuca swamp adjacent the Subject Land. It is likely to forage in the Subject Property on occasion. Habitat is considered too open for nesting.	Low. Foraging only, not breeding.
Aves	<i>Motacilla flava</i> Yellow Wagtail	Migratory	This species is a vagrant. It may forage in the rank grassland on the property on rare occasions as it passes through. It does not breed in Australia.	Unlikely
Aves	<i>Ardenna carneipes</i> Flesh-footed Shearwater	Migratory	No suitable habitat. This species only inhabits marine and estuarine environments. The few inland records are of windblown individuals during major storm events.	Unlikely
Aves	<i>Ardenna grisea</i> Sooty Shearwater	Migratory	No suitable habitat. This species only inhabits marine and estuarine environments. The few inland records are of windblown individuals during major storm events.	Unlikely
Aves	<i>Calonectris leucomelas</i> Streaked Shearwater	Migratory	No suitable habitat. This species only inhabits marine and estuarine environments. The few inland records are of windblown individuals during major storm events.	Unlikely
Aves	<i>Anthochaera phrygia</i> Regent Honeyeater	Critically Endangered	The Subject Land is not included in the DPIE 'map of important habitat'. Occurrences of this species in Byron Shire has always been limited as it is close to the edge of the species range.	Unlikely
Aves	<i>Cuculus optatus</i> Oriental Cuckoo	Migratory	This species is a vagrant to Byron Shire. It may forage in the Subject Property on rare occasion however there is no suitable habitat in the Subject Land. It does not nest in Australia.	Unlikely
Aves	<i>Botaurus poiciloptilus</i> Australasian Bittern	Endangered	This species is known from the Byron Bay STP wetlands outside of the Subject Land. Most recent record was of one bird flushed from reeds opposite the visitor centre on 12/09/2020 (eBird 2021). There is no suitable brackish or freshwater wetlands in the Subject Land (e.g. reed habitat) however, individuals may shelter in the dense Setaria	Low. Foraging only, not breeding.

Classification	Scientific Name	EPBC Act Status	Suitable Habitat Present within/around the Subject Land?	Likelihood of Occurrence of Species on Subject Land
			sphacelata growth or hunt for frogs in the open grass areas during wet conditions on occasion.	
Aves	<i>Arenaria interpres</i> Ruddy Turnstone	Migratory	One historical record of this species in the Byron STP property from 20/01/2006 (eBird 2021). Recorded from the artificial wetlands outside of the Subject Land. Likely just sheltering during a high tide at the usual foraging location outside of the Subject Property. Not likely to utilise the Subject Land as there is no suitable forage or shelter habitat. No individuals were observed during surveys of the Subject Land by Land Eco over 1 day in January, 3 days in February of 5 days in March 2021.	Unlikely.
Aves	<i>Calidris alba</i> Sanderling	Migratory	No suitable habitat. This species only inhabits intertidal and estuarine environments. The few inland records are of windblown individuals during major storm events.	Unlikely
Aves	<i>Calidris acuminata</i> Sharp-tailed Sandpiper	Migratory	Known to forage on the edges of the artificial wetlands in the Byron STP property. The largest number reported at one time was 37 birds on 12/12/2019 (eBird 2021). May forage in the grass in the Subject Land during wet conditions, however foraging is not likely to take place regularly. No individuals were observed during surveys of the Subject Land by Land Eco over 1 day in January, 3 days in February of 5 days in March 2021.	Low. Foraging only on rare occasions, during wet conditions.
Aves	<i>Calidris canutus</i> Red Knot	Endangered Migratory	No historical records from the Byron STP. No suitable habitat. This species only inhabits intertidal and estuarine environments.	Unlikely
Aves	<i>Calidris ferruginea</i> Curlew Sandpiper	Critically Endangered Migratory	Known to forage on the edges of the artificial wetlands in the Byron STP property. The largest number reported at one time was 1 bird on 24/12/2019 (eBird 2021). Not likely to utilise the Subject Land as there is no suitable forage or shelter habitat. No individuals were observed during surveys of the Subject Land by Land Eco over 1 day in January, 3 days in February of 5 days in March 2021.	Unlikely
Aves	<i>Calidris melanotos</i> Pectoral Sandpiper	Migratory	No suitable habitat. Requires mudflats or intertidal areas for foraging. All of the wetland habitat in the Subject Property is too densely vegetated to provide foraging value for this species.	Unlikely
Aves	<i>Calidris tenuirostris</i> Great Knot	Critically Endangered Migratory	No suitable habitat. This species only inhabits intertidal and estuarine environments.	Unlikely
Aves	<i>Charadrius bicinctus</i> Double-banded Plover	Migratory	No suitable habitat. This species prefers intertidal and estuarine environments.	Unlikely
Aves	<i>Charadrius mongolus</i> Lesser Sand Plover	Endangered Migratory	Known to forage on the edges of the artificial wetlands in the Byron STP property. The largest number reported at one time was 1 bird on 24/12/2019 (eBird 2021). Not likely to utilise the Subject Land as there is no suitable forage or shelter habitat. No individuals were observed during surveys of the Subject Land by Land Eco over 1 day in January, 3 days in February of 5 days in March 2021.	Unlikely
Aves	<i>Cyclopsitta diophthalma coxeni</i> Coxen's Fig-Parrot	Endangered	No suitable habitat within the Subject Land or adjacent habitat. Requires, large, mature fruit-bearing trees. Has not been positively recorded in the Byron Bay region in over 20 years. Possibly extinct. No individuals were observed during surveys of the Subject Land by Land Eco over 1 day in January, 3 days in February of 5 days in March 2021.	Unlikely

Classification	Scientific Name	EPBC Act Status	Suitable Habitat Present within/around the Subject Land?	Likelihood of Occurrence of Species on Subject Land
Aves	<i>Diomedea antipodensis</i> Antipodean Albatross	Vulnerable Migratory	No suitable habitat. This species only inhabits marine environments. The few inland records are of windblown individuals during major storm events.	Unlikely
Aves	<i>Diomedea antipodensis gibsoni</i> Gibson's Albatross	Vulnerable Migratory	No suitable habitat. This species only inhabits marine environments. The few inland records are of windblown individuals during major storm events.	Unlikely
Aves	<i>Diomedea epomophora</i> Southern Royal Albatross	Vulnerable Migratory	No suitable habitat. This species only inhabits marine environments. The few inland records are of windblown individuals during major storm events.	Unlikely
Aves	<i>Diomedea exulans</i> Wandering Albatross	Vulnerable Migratory	No suitable habitat. This species only inhabits marine environments. The few inland records are of windblown individuals during major storm events.	Unlikely
Aves	<i>Diomedea sanfordi</i> Northern Royal Albatross	Endangered Migratory	No suitable habitat. This species only inhabits marine environments. The few inland records are of windblown individuals during major storm events.	Unlikely
Aves	<i>Erythrotriorchis radiatus</i> Red Goshawk	Vulnerable	No recent records from NSW for over 30 years. Likely to be extinct in the region.	Unlikely
Aves	<i>Falco hypoleucos</i> Grey Falcon	Vulnerable	This species is vagrant to Coastal NSW. It typically occurs west of the Great Dividing Range in arid landscapes.	Unlikely
Aves	<i>Fregata ariel</i> Lesser Frigatebird	Migratory	No suitable habitat. This species only inhabits marine environments. The few inland records are of windblown individuals during major storm events.	Unlikely
Aves	<i>Fregata minor</i> Great Frigatebird	Migratory	No suitable habitat. This species only inhabits marine environments. The few inland records are of windblown individuals during major storm events.	Unlikely
Aves	<i>Fregetta grallaria grallaria</i> White-bellied Storm-Petrel (Tasman Sea), Whitebellied Storm-Petrel (Australasian)	Vulnerable	No suitable habitat. This species only inhabits marine environments. The few inland records are of windblown individuals during major storm events.	Unlikely
Aves	<i>Gallinago hardwickii</i> Latham's Snipe	Migratory	Known to forage on the edges of the artificial wetlands in the Byron STP property. The largest number reported at one time was 30 birds on 12/01/2013. The most recent record was of 1 bird on the 14/02/2021 (eBird 2021). May forage in the grass in the Subject Land during wet conditions, however foraging is not likely to take place regularly. No individuals were observed during surveys of the Subject Land by Land Eco over 1 day in January, 3 days in February of 5 days in March 2021.	Unlikely
Aves	<i>Gallinago megala</i> Swinhoe's Snipe	Migratory	This species is a vagrant to the region. There are few records of this species.	Unlikely
Aves	<i>Gallinago stenura</i> Pin-tailed Snipe	Migratory	This species is a vagrant to the region. There are few records of this species.	Unlikely

Classification	Scientific Name	EPBC Act Status	Suitable Habitat Present within/around the Subject Land?	Likelihood of Occurrence of Species on Subject Land
Aves	<i>Grantiella picta</i> Painted Honeyeater	Vulnerable	This species requires dense mistletoe growth. No suitable habitat occurs in the Subject Property.	Unlikely
Aves	<i>Lathamus discolor</i> Swift Parrot	Critically Endangered	This species is a vagrant to the region. There are few records of this species.	Unlikely
Aves	<i>Limosa lapponica baueri</i> Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit	Vulnerable Migratory	This species is a vagrant to the region. There are few records of this species.	Unlikely
Aves	<i>Limosa limosa</i> Black-tailed Godwit	Migratory	This species is a vagrant to the region. There are few records of this species.	Unlikely
Aves	<i>Limosa lapponica lapponica</i> Bar-tailed Godwit	Migratory	Known to forage on the edges of the artificial wetlands in the Byron STP property. The most recent record was of 1 bird on the 14/01/2021 (eBird 2021). May forage in the grass in the Subject Land during wet conditions, however foraging is not likely to take place regularly. No individuals were observed during surveys of the Subject Land by Land Eco over 1 day in January, 3 days in February of 5 days in March 2021.	Unlikely
Aves	<i>Actitis hypoleucos</i> Common Sandpiper	Migratory	No suitable habitat. Requires mudflats or intertidal areas for foraging. All of the wetland habitat in the Subject Property is too densely vegetated to provide foraging value for this species.	Unlikely
Aves	<i>Macronectes giganteus</i> Southern Giant Petrel	Endangered Migratory	No suitable habitat. This species only inhabits marine environments. The few inland records are of windblown individuals during major storm events.	Unlikely
Aves	<i>Macronectes halli</i> Northern Giant Petrel	Vulnerable Migratory	No suitable habitat. This species only inhabits marine environments. The few inland records are of windblown individuals during major storm events.	Unlikely
Aves	<i>Numenius madagascariensis</i> Eastern Curlew	Critically Endangered Migratory	No suitable habitat. Requires mudflats or intertidal areas for foraging. All of the wetland habitat in the Subject Property is too densely vegetated to provide foraging value for this species.	Unlikely
Aves	<i>Numenius minutus</i> Little Curlew	Migratory	This species is a vagrant to the region. There are few records of this species.	Unlikely
Aves	<i>Numenius phaeops</i> Whimbrel	Migratory	No suitable habitat. Requires mudflats or intertidal areas for foraging. All of the wetland habitat in the Subject Property is too densely vegetated to provide foraging value for this species.	Unlikely
Aves	<i>Pandion haliaetus</i> Osprey	Migratory	Known to forage for prey and perch on trees within the Byron Bay STP. It forages for fish in the open waterbodies associated with the STP. No breeding records known. Last record was of one bird on 18/02/2021 (eBird 2021).	Likely. Fly-over only.
Aves	<i>Phoebastria fusca</i> Sooty Albatross	Vulnerable	No suitable habitat. This species only inhabits marine environments. The few inland records are of windblown individuals during major storm events.	Unlikely
Aves	<i>Pluvialis fulva</i> Pacific Golden Plover	Migratory	Known to forage on the edges of the artificial wetlands in the Byron STP property. The largest number reported at one time was 24 birds on 12/11/2010. The most recent	Unlikely

Classification	Scientific Name	EPBC Act Status	Suitable Habitat Present within/around the Subject Land?	Likelihood of Occurrence of Species on Subject Land
			record was of 1 bird on the 09/02/2021 (eBird 2021). May forage in the grass in the Subject Land during wet conditions, however foraging is not likely to take place regularly. No individuals were observed during surveys of the Subject Land by Land Eco over 1 day in January, 3 days in February of 5 days in March 2021.	
Aves	<i>Pluvialis squatarola</i> Grey Plover	Migratory	Known to forage on the edges of the artificial wetlands in the Byron STP property. The largest number reported at one time was 1 birds on 19/01/2008. The most recent record was of 1 bird on the 19/01/2008 (eBird 2021). May forage in the grass in the Subject Land during wet conditions, however foraging is not likely to take place regularly. No individuals were observed during surveys of the Subject Land by Land Eco over 1 day in January, 3 days in February of 5 days in March 2021.	Unlikely
Aves	<i>Tringa brevipes</i> Grey-tailed Tattler	Migratory	No suitable habitat. Requires mudflats or intertidal areas for foraging. All of the wetland habitat in the Subject Property is too densely vegetated to provide foraging value for this species.	Unlikely
Aves	<i>Tringa nebularia</i> Greenshank	Migratory	Known to forage on the edges of the artificial wetlands in the Byron STP property. The largest number reported at one time was 4 birds on 15/01/2008. The most recent record was of 2 birds on the 19/11/2019 (eBird 2021). May forage in the grass in the Subject Land during wet conditions, however foraging is not likely to take place regularly. No individuals were observed during surveys of the Subject Land by Land Eco over 1 day in January, 3 days in February of 5 days in March 2021.	Unlikely
Aves	<i>Tringa stagnatilis</i> Marsh Sandpiper, Little Greenshank	Migratory	Known to forage on the edges of the artificial wetlands in the Byron STP property. The largest number reported at one time was 6 birds on 16/11/2019. The most recent record was of 2 birds on the 28/11/2019 (eBird 2021). May forage in the grass in the Subject Land during wet conditions, however foraging is not likely to take place regularly. No individuals were observed during surveys of the Subject Land by Land Eco over 1 day in January, 3 days in February of 5 days in March 2021.	Unlikely
Aves	<i>Xenus cinereus</i> Terek Sandpiper	Migratory	No suitable habitat. This species only inhabits intertidal and estuarine environments. The few inland records are of windblown individuals during major storm events.	Unlikely
Aves	<i>Pachyptila turtur subantarctica</i> Fairy Prion (southern)	Vulnerable	No suitable habitat. This species only inhabits marine environments. The few inland records are of windblown individuals during major storm events.	Unlikely
Aves	<i>Rostratula australis</i> Australian Painted Snipe	Endangered	This species is a vagrant to the region. There are few records of this species. The most recent record at the Byron STP property is of 1 bird on 12/01/2012 (eBird 2021).	Unlikely
Aves	<i>Sternula albifrons</i> Little Tern	Migratory	No suitable habitat. This species mostly inhabits marine and estuarine environments. The few inland records are of windblown individuals during major storm events.	Unlikely
Aves	<i>Sternula nereis nereis</i> Australian Fairy Tern	Vulnerable	No suitable habitat. This species only inhabits marine and estuarine environments. The few inland records are of windblown individuals during major storm events.	Unlikely
Aves	<i>Thalassarche bulleri platei</i> Northern Buller's Albatross, Pacific Albatross	Vulnerable Migratory	No suitable habitat. This species only inhabits marine environments. The few inland records are of windblown individuals during major storm events.	Unlikely
Aves	<i>Thalassarche cauta</i> Shy Albatross	Endangered Migratory	No suitable habitat. This species only inhabits marine environments. The few inland records are of windblown individuals during major storm events.	Unlikely

Classification	Scientific Name	EPBC Act Status	Suitable Habitat Present within/around the Subject Land?	Likelihood of Occurrence of Species on Subject Land
Aves	<i>Thalassarche eremita</i> Chatham Albatross	Endangered Migratory	No suitable habitat. This species only inhabits marine environments. The few inland records are of windblown individuals during major storm events.	Unlikely
Aves	<i>Thalassarche impavida</i> Campbell Albatross, Campbell Black-browed Albatross	Vulnerable Migratory	No suitable habitat. This species only inhabits marine environments. The few inland records are of windblown individuals during major storm events.	Unlikely
Aves	<i>Thalassarche melanophrys</i> Black-browed Albatross	Vulnerable Migratory	No suitable habitat. This species only inhabits marine environments. The few inland records are of windblown individuals during major storm events.	Unlikely
Aves	<i>Thalassarche salvini</i> Salvin's Albatross	Vulnerable Migratory	No suitable habitat. This species only inhabits marine environments. The few inland records are of windblown individuals during major storm events.	Unlikely
Aves	<i>Thalassarche steadi</i> White-capped Albatross	Vulnerable Migratory	No suitable habitat. This species only inhabits marine environments. The few inland records are of windblown individuals during major storm events.	Unlikely
Aves	<i>Thinornis cucullatus cucullatus</i> Hooded Plover (eastern), Eastern Hooded Plover	Vulnerable	No suitable habitat. This species only inhabits marine and estuarine environments.	Unlikely
Mammalia	<i>Chalinolobus dwyeri</i> Large-eared Pied Bat	Vulnerable	No areas of rock outcrop occur on the Subject Property that would be considered suitable for shelter or breeding. The species may forage over the tree canopy near the Subject Land on occasion, however, no tree canopy will be removed from the Subject Land.	Unlikely.
Mammalia	<i>Pteropus poliocephalus</i> Grey-headed Flying-fox	Vulnerable	It is considered likely that the Grey-headed Flying-fox would forage on flowering and fruiting trees in the Melaleuca swamps surrounding the Subject Land, however, Land Eco carried-out 6 nights spotlighting between January and March 2021. Land Eco did not record any Grey-headed Flying-fox within or adjacent the Subject Land. Black Flying-foxes were abundant. The nearest known roost camp is in Byron Bay township. No suitable habitat within the Subject Land, may fly-over on occasion. May forage in <i>Melaleuca quinquenervia</i> trees near the Subject Land. None of these trees will be impacted during or post development (see Arborist Report Northern Tree Care 2021)	Low. No suitable habitat within the Subject Land, may fly-over on occasion. May forage in <i>Melaleuca quinquenervia</i> trees near the Subject Land. None of these trees will be impacted during or post development.
Mammalia	<i>Dasyurus maculatus maculatus</i> (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population)	Endangered	This species may occur anywhere within its distribution as it is highly mobile and capable of travelling long distance on foot, however, it is only likely to breed in areas containing suitable rock outcrops with crevices/caves and/or abundant coarse woody debris and/or large hollow-bearing trees. This species may pass through and/or hunt within the Subject Property on occasion however, it is not likely to breed locally. There is no suitable breeding habitat. Land Eco carried-out 15 nights x 5 infra-red cameras deployed around the Subject Land. Each camera was baited with honey/sardines/truffle oil. In addition Land Eco carried-out 6 nights spotlighting between January and March 2021. Land Eco did not record any signs of Quoll activity within or adjacent the Subject Land.	Low. Foraging only.
Mammalia	<i>Phascolarctos cinereus</i> (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)	Vulnerable	The Koala has been observed in the vicinity of the Byron STP in the past, however, no potential koala trees will be cleared to facilitate the development. Koalas may pass through the limited area of the Subject Land that is not fenced, on occasion as they move between forage trees. The only proximal feed trees are <i>Melaleuca quinquenervia</i> , which will be retained during and post development (Northern Tree Care 2021). Land Eco carried-out 6 nights spotlighting, scat searches, and call playback between January and March 2021 and did not record any signs of Koala activity within or adjacent the Subject	Low. Passing through only.

Classification	Scientific Name	EPBC Act Status	Suitable Habitat Present within/around the Subject Land?	Likelihood of Occurrence of Species on Subject Land
			Land. The development is located within a historically cleared and fenced portion of the STP. The existing chain wire fencing precludes access to the Subject Land by Koala. Risk of vehicle collision to any Koala passing through the Subject Land is not expected to be any higher than current risks associated with the existing operation of the Byron STP. Vehicle speed limits in the compound will remain low so that risk of collision with Koala is eliminated.	
Mammalia	<i>Potorous tridactylus tridactylus</i> Long-nosed Potoroo	Vulnerable	Marginally suitable forage habitat occurs in the Subject Property. Habitat is too open. There are no recent proximal records of this species. The population at Tyagarah is believed to be extinct. Land Eco carried-out 15 nights x 5 infra-red cameras deployed around the Subject Land. Each camera was baited with honey/sardines/truffle oil. In addition Land Eco carried-out 6 nights spotlighting between January and March 2021. Land Eco did not record any signs of Potoroo activity within or adjacent the Subject Land.	Unlikely.
Mammalia	<i>Pseudomys novaehollandiae</i> New Holland Mouse, Pookila	Vulnerable	No suitable habitat within or immediately surround the Subject Land. The substrate of the Subject Land and surrounds is regularly inundated with water, and not considered suitable inhabitation (burrowing) by New Holland Mouse.	Unlikely.
Mammalia	<i>Xeromys myoides</i> Water Mouse, False Water Rat, Yirrkoo	Vulnerable	Water Mouse typically occurs in mangroves and similar intertidal habitats. There is no suitable habitat for this species in the Subject Land.	Unlikely.
Mammalia	<i>Balaena glacialis australis</i> Southern Right Whale	Endangered Migratory	This species is strictly marine. No suitable habitat occurs in the Subject Property	Unlikely.
Mammalia	<i>Balaenoptera borealis</i> Sei Whale	Vulnerable Migratory	This species is strictly marine. No suitable habitat occurs in the Subject Property	Unlikely.
Mammalia	<i>Balaenoptera edeni</i> Bryde's Whale	Migratory	This species is strictly marine. No suitable habitat occurs in the Subject Property	Unlikely.
Mammalia	<i>Balaenoptera musculus</i> Blue Whale	Migratory	This species is strictly marine. No suitable habitat occurs in the Subject Property	Unlikely.
Mammalia	<i>Balaenoptera physalus</i> Blue Whale	Migratory	This species is strictly marine. No suitable habitat occurs in the Subject Property	Unlikely.
Mammalia	<i>Megaptera novaeangliae</i> Humpback Whale	Vulnerable	This species is strictly marine. No suitable habitat occurs in the Subject Property	Unlikely.
Mammalia	<i>Orcinus orca</i> Killer Whale, Orca	Migratory	This species is strictly marine. No suitable habitat occurs in the Subject Property	Unlikely.
Mammalia	<i>Sousa chinensis</i> Indo-Pacific Humpback Dolphin	Migratory	This species is strictly marine. No suitable habitat occurs in the Subject Property.	Unlikely.
Mammalia	<i>Dugong dugon</i> Dugong	Migratory	This species is strictly marine. No suitable habitat occurs in the Subject Property.	Unlikely.

Classification	Scientific Name	EPBC Act Status	Suitable Habitat Present within/around the Subject Land?	Likelihood of Occurrence of Species on Subject Land
Reptilia	<i>Natator depressus</i> Flatback Turtle	Vulnerable Migratory	This species is strictly marine. No suitable habitat occurs in the Subject Property.	Unlikely.
Reptilia	<i>Caretta caretta</i> Loggerhead Turtle	Endangered Migratory	This species is strictly marine. No suitable habitat occurs in the Subject Property.	Unlikely.
Reptilia	<i>Chelonia mydas</i> Green Turtle	Vulnerable Migratory	This species is strictly marine. No suitable habitat occurs in the Subject Property.	Unlikely.
Reptilia	<i>Eretmochelys imbricata</i> Hawksbill Turtle	Vulnerable Migratory	This species is strictly marine. No suitable habitat occurs in the Subject Property.	Unlikely.
Reptilia	<i>Dermochelys coriacea</i> Leatherback Turtle, Leathery Turtle	Endangered Migratory	This species is strictly marine. No suitable habitat occurs in the Subject Property.	Unlikely.
Reptilia	<i>Lepidochelys olivacea</i> Olive Ridley	Endangered Migratory	This species is strictly marine. No suitable habitat occurs in the Subject Property.	Unlikely.
Reptilia	<i>Natator depressus</i> Flatback Turtle	Vulnerable Migratory	This species is strictly marine. No suitable habitat occurs in the Subject Property.	Unlikely.
Amphibia	<i>Litoria alongburensis</i> Wallum Sedge Frog	Vulnerable	This species was confirmed to occur within the Byron STP property, including within 10 metres of the Subject Land. The maximum number recorded in one survey, was three individuals heard calling during the same night, all were calling from the Wallum habitat outside of the Subject Land. The only habitat in the Subject Land that may be utilised by the species is the long <i>Setaria sphacelata</i> grass. This habitat will only be used for intermittent shelter and foraging. There is not suitable breeding (wallum) habitat within the Subject Land.	Likely. Shelter and foraging only.
Amphibia	<i>Mixophyes fleayi</i> Fleay's Frog	Endangered	This species typically occurs in permanent flowing watercourses in rainforest and wet sclerophyll forests. Such habitat is absent from the Subject Land. Spotlighting and call playback was undertaken over 6 nights over February – March 2021. No individuals were recorded.	Unlikely.
Amphibia	<i>Mixophyes iteratus</i> Giant Barred Frog	Endangered	This species typically occurs in permanent flowing watercourses in rainforest and wet sclerophyll forests. Such habitat is absent from the Subject Land. Spotlighting and call playback was undertaken over 6 nights over February – March 2021. No individuals were recorded.	Unlikely.
Osteichthyes	<i>Epinephelus daemeli</i> Black Rockcod, Black Cod, Saddled Rockcod	Vulnerable	This species is strictly marine/estuarine. No suitable habitat occurs in the Subject Property.	Unlikely.
Osteichthyes	<i>Hippocampus whitei</i> White's Seahorse, Crowned Seahorse, Sydney Seahorse	Endangered	This species is strictly marine. No suitable habitat occurs in the Subject Property.	Unlikely.
Osteichthyes	<i>Maccullochella ikei</i> Clarence River Cod, Eastern Freshwater Cod	Endangered	This species only occurs in flowing freshwater rivers. No suitable habitat occurs in the Subject Property.	Unlikely.
Chondrichthyes	<i>Carcharhinus longimanus</i> Oceanic Whitetip Shark	Migratory	This species is strictly marine. No suitable habitat occurs in the Subject Property.	Unlikely.
Chondrichthyes	<i>Carcharodon carcharias</i>	Vulnerable Migratory	White Shark, Great White Shark	Unlikely.

Classification	Scientific Name	EPBC Act Status	Suitable Habitat Present within/around the Subject Land?	Likelihood of Occurrence of Species on Subject Land
Chondrichthyes	<i>Manta alfredi</i> Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray	Migratory	This species is strictly marine. No suitable habitat occurs in the Subject Property.	Unlikely.
Chondrichthyes	<i>Manta birostris</i> Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray	Migratory	This species is strictly marine. No suitable habitat occurs in the Subject Property.	Unlikely.
Chondrichthyes	<i>Lamna nasus</i> Porbeagle, Mackerel Shark	Migratory	This species is strictly marine. No suitable habitat occurs in the Subject Property.	Unlikely.
Chondrichthyes	<i>Rhincodon typus</i> Whale Shark	Migratory Vulnerable	This species is strictly marine. No suitable habitat occurs in the Subject Property.	Unlikely.
Lepidoptera	<i>Argynnis hyperbius inconstans</i> Australian Fritillary	Critically Endangered	Targeted surveys in January, February and March 2021 revealed no individuals of the host plant <i>Viola betonicifolia</i> in or around the Subject Land. This butterfly only occurs where the host plant grows.	Unlikely.
Lepidoptera	<i>Phyllodes imperialis smithersi</i> Pink Underwing Moth	Endangered	Targeted surveys in January, February and March 2021 revealed no individuals of the host plant <i>Carronia multisepealea</i> in or around the Subject Land. This moth only occurs where the host plant grows.	Unlikely.
Gastropoda	<i>Thersites mitchellae</i> Mitchell's Rainforest Snail	Critically Endangered	Targeted surveys in February and March 2021 revealed the presence of Mitchell's Rainforest Snail in the Subject Land. Out of a total 6 nights of spotlighting, the maximum number of individuals recorded was 8 on the night of 16/02/2021. Conditions were warm and wet. The largest number of individuals found in one night after that was 3. All of the snails were recorded within 5 metres of the chainwire fence that surrounds the compound. The long grass (<i>Setaria sphacelata</i>) on that southern side of the fence is regularly slashed over a distance of 2 metres from the fence, and this slashed grass displayed the highest snail activity. The northern side of the fence is regularly mowed short. Mitchell's Rainforest were never observed away from the remnant Melaleuca Swamp or long grass and were restricted to the southern and eastern edges of the Subject Land.	Confirmed Present
Plantae	<i>Acronychia littoralis</i> Scented Acronychia	Endangered	Targeted surveys carried out by Land Eco Consulting in January, February and March 2021 revealed no individuals of this distinct perennial tree within or adjacent to the Subject Land.	Unlikely.
Plantae	<i>Allocasuarina thalassoscopia</i>	Endangered	Targeted surveys carried out by Land Eco Consulting in January, February and March 2021 revealed no individuals of this distinct perennial shrub within or adjacent to the Subject Land.	Unlikely.
Plantae	<i>Arthraxon hispidus</i> Hairy-joint Grass	Vulnerable	Targeted surveys carried out by Land Eco Consulting in January, February and March 2021 revealed no individuals of this distinct grass within or adjacent to the Subject Land.	Unlikely.
Plantae	<i>Baloghia marmorata</i> Marbled Baloghia, Jointed Baloghia	Vulnerable	Targeted surveys carried out by Land Eco Consulting in January, February and March 2021 revealed no individuals of this distinct tree within or adjacent to the Subject Land.	Unlikely.

Classification	Scientific Name	EPBC Act Status	Suitable Habitat Present within/around the Subject Land?	Likelihood of Occurrence of Species on Subject Land
Plantae	<i>Bulbophyllum globuliforme</i> Miniature Moss-orchid, Hoop Pine Orchid	Vulnerable	This orchid is found almost exclusively in the McPherson Range between NSW and Queensland, at altitudes between 300 and 600 m. It also occurs at Maleny and Noosa in south-east Queensland. It grows on Hoop Pines (<i>Araucaria cunninghamii</i>) in upland subtropical rainforest. Such habitat was absent from the Subject Land.	Unlikely.
Plantae	<i>Corokia whiteana</i>	Vulnerable	Targeted surveys carried out by Land Eco Consulting in January, February and March 2021 revealed no individuals of this distinct perennial shrub within or adjacent to the Subject Land.	Unlikely.
Plantae	<i>Cryptocarya foetida</i> Stinking Cryptocarya, Stinking Laurel	Vulnerable	Targeted surveys carried out by Land Eco Consulting in January, February and March 2021 revealed no individuals of this distinct tree within or adjacent to the Subject Land.	Unlikely
Plantae	<i>Cryptostylis hunteriana</i> Leafless Tongue-orchid	Vulnerable	No orchids of any species were detected within the Subject Land. The soil substrate was regularly inundated and not suitable for <i>Cryptostylis hunteriana</i> .	Unlikely.
Plantae	<i>Cynanchum elegans</i> White-flowered Wax Plant	Endangered	Targeted surveys carried out by Land Eco Consulting in January, February and March 2021 revealed no individuals of this distinct vine within or adjacent to the Subject Land.	Unlikely.
Plantae	<i>Davidsonia jerseyana</i> Davidson's Plum	Endangered	Targeted surveys carried out by Land Eco Consulting in January, February and March 2021 revealed no individuals of this distinct tree within or adjacent to the Subject Land.	Unlikely
Plantae	<i>Davidsonia johnsonii</i> Smooth Davidsonia, Smooth Davidson's Plum, Smallleaved Davidson's Plum	Endangered	Targeted surveys carried out by Land Eco Consulting in January, February and March 2021 revealed no individuals of this distinct tree within or adjacent to the Subject Land.	Unlikely
Plantae	<i>Desmodium acanthocladum</i> Thorny Pea	Vulnerable	Targeted surveys carried out by Land Eco Consulting in January, February and March 2021 revealed no individuals of this distinct shrub within or adjacent to the Subject Land.	Unlikely.
Plantae	<i>Diploglottis campbellii</i> Small-leaved Tamarind	Endangered	Targeted surveys carried out by Land Eco Consulting in January, February and March 2021 revealed no individuals of this distinct tree within or adjacent to the Subject Land.	Unlikely
Plantae	<i>Elaeocarpus williamsianus</i> Hairy Quandong	Endangered	Targeted surveys carried out by Land Eco Consulting in January, February and March 2021 revealed no individuals of this distinct tree within or adjacent to the Subject Land.	Unlikely
Plantae	<i>Endiandra floydii</i> Floyd's Walnut	Endangered	Targeted surveys carried out by Land Eco Consulting in January, February and March 2021 revealed no individuals of this distinct tree within or adjacent to the Subject Land.	Unlikely
Plantae	<i>Endiandra hayesii</i> Rusty Rose Walnut, Velvet Laurel	Endangered	Targeted surveys carried out by Land Eco Consulting in January, February and March 2021 revealed no individuals of this distinct tree within or adjacent to the Subject Land.	Unlikely
Plantae	<i>Floydia praealta</i> Ball Nut, Possum Nut, Big Nut, Beefwood	Vulnerable	Targeted surveys carried out by Land Eco Consulting in January, February and March 2021 revealed no individuals of this distinct tree within or adjacent to the Subject Land.	Unlikely
Plantae	<i>Fontainea australis</i> Southern Fontainea	Vulnerable	Targeted surveys carried out by Land Eco Consulting in January, February and March 2021 revealed no individuals of this distinct tree within or adjacent to the Subject Land.	Unlikely
Plantae	<i>Gossia fragrantissima</i> Sweet Myrtle, Small-leaved Myrtle	Endangered	Targeted surveys carried out by Land Eco Consulting in January, February and March 2021 revealed no individuals of this distinct tree within or adjacent to the Subject Land.	Unlikely
Plantae	<i>Hicksbeachia pinnatifolia</i> Monkey Nut, Bopple Nut, Red Bopple, Red Bopple Nut, Red Nut, Beef Nut, Red Apple Nut, Red Boppel Nut, Ivory Silky Oak	Vulnerable	Targeted surveys carried out by Land Eco Consulting in January, February and March 2021 revealed no individuals of this distinct tree within or adjacent to the Subject Land.	Unlikely

Classification	Scientific Name	EPBC Act Status	Suitable Habitat Present within/around the Subject Land?	Likelihood of Occurrence of Species on Subject Land
Plantae	<i>Isoglossa eranthemoides</i> Isoglossa	Endangered	Targeted surveys carried out by Land Eco Consulting in January, February and March 2021 revealed no individuals of this distinct forb within or adjacent to the Subject Land.	Unlikely
Plantae	<i>Macadamia integrifolia</i> Macadamia Nut, Queensland Nut Tree, Smoothshelled Macadamia, Bush Nut, Nut Oak	Vulnerable	Targeted surveys carried out by Land Eco Consulting in January, February and March 2021 revealed no individuals of this distinct tree within or adjacent to the Subject Land.	Unlikely
Plantae	<i>Macadamia tetraphylla</i> Rough-shelled Bush Nut, Macadamia Nut, Roughshelled Macadamia, Rough-leaved Queensland Nut	Vulnerable	Targeted surveys carried out by Land Eco Consulting in January, February and March 2021 revealed no individuals of this distinct tree within or adjacent to the Subject Land.	Unlikely
Plantae	<i>Marsdenia longiloba</i> Clear Milkvine	Vulnerable	Targeted surveys carried out by Land Eco Consulting in January, February and March 2021 revealed no individuals of this distinct vine within or adjacent to the Subject Land.	Unlikely
Plantae	<i>Ochrosia moorei</i> Southern Ochrosia	Endangered	Targeted surveys carried out by Land Eco Consulting in January, February and March 2021 revealed no individuals of this distinct tree within or adjacent to the Subject Land.	Unlikely
Plantae	<i>Owenia cepiodora</i> Onionwood, Bog Onion, Onion Cedar		Targeted surveys carried out by Land Eco Consulting in January, February and March 2021 revealed no individuals of this distinct tree within or adjacent to the Subject Land.	Unlikely
Plantae	<i>Phaius australis</i> Lesser Swamp-orchid	Endangered	Suitable habitat occurs for this species in the remnant swamp vegetation outside of the Subject Land, however, the Subject Land itself is dominated by cleared, exotic-dominant (weed infested) grasslands. No orchids of any species were recorded in the Subject Land or immediate surrounds.	Unlikely
Plantae	<i>Plectranthus nitidus</i> Nightcap Plectranthus, Silver Plectranthus	Endangered	Targeted surveys carried out by Land Eco Consulting in January, February and March 2021 revealed no individuals of this distinct forb within or adjacent to the Subject Land.	Unlikely
Plantae	<i>Randia moorei</i> Spiny Gardenia	Endangered		Unlikely
Plantae	<i>Rhodamnia rubescens</i> Scrub Turpentine	Critically Endangered	Targeted surveys carried out by Land Eco Consulting in January, February and March 2021 revealed no individuals of this distinct tree within or adjacent to the Subject Land.	Unlikely
Plantae	<i>Rhodomyrtus psidioides</i> Native Guava	Critically Endangered	Targeted surveys carried out by Land Eco Consulting in January, February and March 2021 revealed no individuals of this distinct tree within or adjacent to the Subject Land.	Unlikely
Plantae	<i>Sarcophilus fitzgeraldii</i> Ravine Orchid	Vulnerable		
Plantae	<i>Sophora fraseri</i> Brush Sophora	Vulnerable	Targeted surveys carried out by Land Eco Consulting in January, February and March 2021 revealed no individuals of this distinct shrub within or adjacent to the Subject Land.	Unlikely
Plantae	<i>Symplocos baeuerlenii</i> Small-leaved Hazelwood, Shrubby Hazelwood	Vulnerable	Targeted surveys carried out by Land Eco Consulting in January, February and March 2021 revealed no individuals of this distinct tree within or adjacent to the Subject Land.	Unlikely
Plantae	<i>Syzygium hodgkinsoniae</i> Smooth-bark Rose Apple, Red Lilly Pilly	Vulnerable	Targeted surveys carried out by Land Eco Consulting in January, February and March 2021 revealed no individuals of this distinct tree within or adjacent to the Subject Land.	Unlikely
Plantae	<i>Syzygium moorei</i> Rose Apple, Coolamon, Robby, Durobby, Watermelon Tree, Coolamon Rose Apple	Vulnerable	Targeted surveys carried out by Land Eco Consulting in January, February and March 2021 revealed no individuals of this distinct tree within or adjacent to the Subject Land.	Unlikely
Plantae	<i>Thesium australe</i> Austral Toadflax, Toadflax	Vulnerable	Targeted surveys carried out by Land Eco Consulting in January, February and March 2021 revealed no individuals of this distinct herb within or adjacent to the Subject Land.	Unlikely

Classification	Scientific Name	EPBC Act Status	Suitable Habitat Present within/around the Subject Land?	Likelihood of Occurrence of Species on Subject Land
Plantae	<i>Tylophora woollsii</i>	Endangered	Targeted surveys carried out by Land Eco Consulting in January, February and March 2021 revealed no individuals of this distinct vine within or adjacent to the Subject Land.	Unlikely

4. Impact Assessments

The proposed development will introduce negligible impacts to EPBC Act listed MNES and their habitat. A detailed assessment of development and operational related impacts is provided in the BDAR (Land Eco 2021).

Assessment of impacts upon all MNES confirmed present within and immediately adjacent the proposed development are assessed in the following sections of this report.

4.1 Threatened Species

Of all of the MNES threatened species identified by the Protected Matters Search, only two were confirmed present within the Subject Property:

- *Litoria longgburensis* (Wallum Sedge-frog) (EPBC Act: Vulnerable)
- *Thersites mitchellae* (Mitchell's Rainforest Snail) (EPBC Act: Critically Endangered)

An assessment into the Significance of Impact of the development upon these three species was undertaken.

Table 4. Assessment of Impact to Mitchell's Rainforest Snail in Accordance with the Significant Impact Criteria

Matters of National Environmental Significance Significant Impact Guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999 Critically endangered and endangered species Significant impact criteria	
Mitchell's Rainforest Snail <i>Thersites mitchellae</i> EPBC Act: Critically Endangered	
An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:	
• lead to a long-term decrease in the size of a population	<p>The proposed development is not likely to cause a long-term decrease in the size of a population. During the targeted survey effort carried-out on the nights of the 16 and 17 February 2021, and 23 to the 27 March 2021, the highest number of Mitchell's Rainforest Snail observed in one night was 8 animals. These animals occurred on the ecotone between unmowed and mowed exotic dominated grassland. The action will result in a small reduction of available habitat (maximum loss of 0.88 hectares) however, it is expected that as few as 8 adult Mitchell's Rainforest Snail occupy this area of habitat. Works will occur to capture and relocate Mitchell's Rainforest Snail from the proposed development site prior to the vegetation clearing and earthworks, it is expected that the majority (if not all) of Mitchell's Rainforest Snail will be salvaged and translocated to nearby, higher quality habitat prior to development activity.</p>
• reduce the area of occupancy of the species	<p>The maximum area of habitat to be removed for the proposal is 0.88 hectares. A conservative estimate of the Area of Occupancy is 5km². This is a loss of 0.17% of the Area of Occupancy of the species. Expert advice suggests that the actual area of Occupancy is substantially higher (S. Clarke pers. comm. 2019 referenced in Land Eco Consulting 2021).</p> <p>Further to this:</p> <ul style="list-style-type: none"> • additional habitat occurs offsite; and this habitat will remain preferred, suitable and viable for the species during and post development, • the area impacted by the proposal is negligible in relevance to the available habitat; • the habitat offsite is likely to be the critical/ core habitat of the local population. This population is effectively based around the swamp forest that is bound by Ewingsdale Road to the south, the industrial area to the east, cleared farmland to the south-west and sandplain/hind dune to the north and north west.

**Matters of National Environmental Significance
Significant Impact Guidelines 1.1
Environment Protection and Biodiversity Conservation Act 1999
Critically endangered and endangered species Significant impact criteria**

<p>•fragment an existing population into two or more populations</p>	<p>The proposed development will involve the removal of a fringe of derived grassland located within and immediately surrounding a sewage treatment plant compound. This habitat is subject to routine weed spraying and mowing and is considered to be of low quality. The habitat is surrounded by larger areas of remnant Melaleuca swamp and wallum swamp vegetation which will not be impacted by the proposed development. The surrounding remnant vegetation is connected to Tyagarah Nature Reserve and the West Byron BioBanking Agreement Site. The Mitchell's Rainforest Snail that inhabit the locality exist as a single population and will continue to exist as such, during and post development and operation of the proposed BEF.</p>
<p>• adversely affect habitat critical to the survival of a species</p>	<p>No habitat critical to the survival of Mitchell's Rainforest Snail will be adversely affected.</p> <p>All of the habitat proposed to be impacted by the proposal has been completely cleared of vegetation in the past. The remaining vegetation consists of mixed native and exotic grassland. The presence of the species at this location reflects its ability to adapt to disturbed, habitats located on the edge of core habitat, specifically the remnant swampland.</p> <p>The proposed development will involve the removal of a fringe of derived grassland located within and immediately surrounding an existing operational sewage treatment plant compound. This habitat is subject to routine weed spraying and mowing and is considered to be of low quality. This habitat is not considered to be critical to the survival of the species.</p> <p>Further to this:</p> <ul style="list-style-type: none"> • additional habitat occurs offsite; and this habitat will remain suitable and viable for the species during and post development, • the area impacted by the proposal is negligible in relevance to the available habitat; • the habitat offsite is likely to be the critical/ core habitat of the local population. This population is effectively based around the swamp forest that is bound by Ewingsdale Road to the south, the industrial area to the east, cleared farmland to the south-west and sandplain/hind dune to the north and north west. <p>The following additional indirect impacts to habitat may occur however, it is believed that the likelihood of impact to the viable local population is low. The impacts with low likelihood of impact causation include:</p> <ul style="list-style-type: none"> • accidental mortality during clearing/grubbing/construction – individuals may be killed during the early stage of the construction process, however, a management plan will be implemented, and a thorough pre-clearing survey and relocation effort will be delivered prior to any vegetation clearing or soil disturbance • accidental mortality from vehicle strike – speed limits will remain low, individuals may be run over on rare occasion, however risk is not expected to increase significantly above current base levels. • Changes to water quality and increased surface runoff- these two impacts are not likely to effect Mitchell's Rainforest Snail. Hydrological Engineers have designed appropriate stormwater storage and treatment facilities on site to mitigate the impact. • Soil and erosion – this risk will be managed from pre-construction to final development and operation of the site. It is not likely to pose an impact to Mitchells Rainforest Snail. • Light spill – The location where the Mitchell's Rainforest Snail were foraging throughout the survey by Land Eco were all located close to the existing STP facility which emits artificial light associated with buildings and plant. It is not likely that light spill will increase significantly above the base levels associated with the STP that would cause impacts that could effect habitat critical to the survival of the species.

**Matters of National Environmental Significance
Significant Impact Guidelines 1.1
Environment Protection and Biodiversity Conservation Act 1999
Critically endangered and endangered species Significant impact criteria**

	<ul style="list-style-type: none"> Shading – Mitchell's Rainforest Snail is largely nocturnal and shelters during the day in shaded locations. Shading is not likely to impact the species. <p>All potential indirect impacts will be further managed through ensuring construction crew and personnel are aware of the need to avoid and protect adjacent wetland and terrestrial vegetation during the clearing, grubbing, earthworks, construction, and operation.</p>
•disrupt the breeding cycle of a population	<p>The proposed development is not likely to disrupt the breeding cycle of a population of Mitchell's Rainforest Snail. Prior to development, the proponent will implement a Mitchell's Rainforest Snail Management Plan which will include the translocation of approximately 8 mature Mitchell's Rainforest Snail before clearing takes place. The snails will be translocated to suitable habitat within the same property as the development, no less than 50 metres from the development. These snails may be temporarily disturbed; however they will not be affected in a manner that interrupts their breeding cycle. Mitchell's Rainforest Snail will continue to occur and breed within the extensive remnant and derived habitat surrounding the development site during and post development.</p>
• modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	<p>The proposed development will involve the removal of 0.88 hectares of derived grassland located within and immediately surrounding an existing operational sewage treatment plant compound. This habitat is subject to routine weed spraying and mowing and is considered to be of low quality. The low extent of low-quality habitat to be removed is not considered to be important to the survival of the species. At least 500 hectares of habitat will continue to exist within 2km of the Subject Land.</p> <p>Vehicle and plant activity will occur across the sewage treatment compound during construction and operation of the proposed BEF, however, it is not expected that this activity will increase risk of impact to Mitchell's Rainforest Snail substantially above the current base-level of risk associated with vehicle and plant movements required for day to day operation of the existing sewage treatment plant, especially considering the majority of the activity of Mitchell's Rainforest Snail is during night-time hours when construction and operations crew will not be operating.</p>
• result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	<p>During the targeted survey, Land Eco identified that Mitchell's Rainforest Snail were foraging in an area of intensely managed, weed-dominant grassland that supported high abundance of three introduced exotic gastropods as well as Black Rat and Cane Toad. These species appeared to co-exist with the Mitchell's Rainforest Snail. It is unlikely that the proposed development would cause the introduction of any other pest species that would be considered harmful to the Mitchell's Rainforest Snail.</p>
•introduce disease that may cause the species to decline, or	<p>There are no known diseases that may be transported into the area such that could cause the species to decline.</p> <p>It is unlikely that the proposed development would increase the risk of introduction of deleterious pathogens beyond the status quo as the development is located in an existing operation sewage treatment compound that is subject to regular movement of vehicles and site personnel.</p>
•interfere with the recovery of the species.	<p>The proposed development is located in habitat that is densely infested with weeds, degraded and disturbed through routine slashing, mowing, herbicide spraying. The finding of Mitchell's Rainforest Snail in this habitat came as a surprise. It is not expected that this habitat is important to the species, and therefore, it is not expected that the proposed development will interfere with the species recovery.</p> <p>Construction crew and site personnel will be informed of the presence of habitat for Mitchell's Rainforest Snail within and surrounding the development site. Effort will be taken to ensure the wallum and wetland habitats surrounding the proposed development are not indirectly impacts</p>

**Matters of National Environmental Significance
Significant Impact Guidelines 1.1
Environment Protection and Biodiversity Conservation Act 1999
Critically endangered and endangered species Significant impact criteria**

through clearing or otherwise during the development process. A Construction Environmental Management Plan (CEMP) will be prepared for the clearing and earthworks component of the development. This will detail impact mitigation measures for construction operators and site personnel to implement.

Table 5. Assessment of Impact to Wallum Sedge-frog in Accordance with the Significant Impact Criteria

Matters of National Environmental Significance Significant Impact Guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999 Critically endangered and endangered species Significant impact criteria	
Wallum Sedge-frog <i>Litoria alongburensis</i> Status: Vulnerable	
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	
• lead to a long-term decrease in the size of an important population of a species	<p>The proposed development will not lead to a long-term decrease in the size of an important population of the species.</p> <p>A total of three individual Wallum Sedge-frog were recorded during the targeted survey effort carried-out on the nights of the 16 and 17 February 2021, and 23 to the 27 March 2021. None of these individuals were recorded within the proposed development footprint.</p> <p>Wallum Sedge-frogs were confined to the Wallum Swampland, and Melaleuca Swamp that occurred outside of the proposed development site. No individual Wallum Sedge-frog was recorded in the disturbed, weed-infested habitat where the proposed development is expected to take place. Suitable habitat will continue to occur in the West Byron BioBanking Agreement Site and adjoining Tyagarah Nature Reserve. Both of these areas combined with adjoining habitat corridors comprise over 500 hectares of potential habitat.</p> <p>It is not considered that the habitat within the proposed development site is important to the species.</p>
• reduce the area of occupancy of an important population	<p>The proposed development will not reduce the area of occupancy of an important population.</p> <p>A total of three individual Wallum Sedge-frog were recorded during the targeted survey effort carried-out on the nights of the 16 and 17 February 2021, and 23 to the 27 March 2021. None of these individuals were recorded within the proposed development footprint.</p> <p>Wallum Sedge-frogs were confined to the Wallum Swampland, and Melaleuca Swamp that occurred outside of the proposed development site. Suitable Wallum habitat occurs over 100 hectares across the adjacent West Byron BioBank Site and Tayagarah Nature Reserve. This is likely to form the core habitat of the species and will remain unimpacted by the development.</p> <p>No individual Wallum Sedge-frog was recorded in the disturbed, weed-infested habitat where the proposed development is expected to take place.</p> <p>It is not considered that the habitat within the proposed development site is important to the species, and it is not expected that the area of occupancy will be reduced.</p>
• fragment an existing important population into two or more populations	<p>The local population of Wallum Sedge-frog will continue to occur as a single population during and post operation of the proposed BEF.</p> <p>The proposed development will not fragment an existing important population into two or more populations. All of the habitat found to support Wallum Sedge-frog will continue to support the same population of Wallum Sedge-frog.</p>

**Matters of National Environmental Significance
Significant Impact Guidelines 1.1
Environment Protection and Biodiversity Conservation Act 1999
Critically endangered and endangered species Significant impact criteria**

• adversely affect habitat critical to the survival of a species

The proposed development will not adversely affect habitat critical to the survival of a species. There is no habitat within or adjacent the proposed development which is considered to be critical to the survival of the Wallum Sedge-frog

No habitat critical to the survival of Wallum Sedge-frog will be adversely affected.

All of the habitat proposed to be impacted by the proposal has been completely cleared of vegetation in the past. The remaining vegetation consists of mixed native and exotic grassland. The presence of the species at this location reflects its ability to adapt to disturbed, habitats located on the edge of core habitat, specifically the remnant swampland.

The proposed development will involve the removal of a fringe of derived grassland located within and immediately surrounding an existing operational sewage treatment plant compound. This habitat is subject to routine weed spraying and mowing and is considered to be of low quality. This habitat is not considered to be critical to the survival of the species.

Further to this:

- additional habitat occurs offsite; and this habitat will remain suitable and viable for the species during and post development,
- the area impacted by the proposal is minor in relevant to the available habitat;
- the habitat offsite is likely to be the critical/ core habitat of the local population. This population is effectively based around the swamp forest that is bound by Ewingsdale Road to the south, the industrial area to the east, cleared farmland to the south-west and sandplain/hind dune to the north and north west.

The following additional indirect impacts to habitat may occur however, it is believed that the likelihood of impact to the viable local population is low. The impacts with low likelihood of impact causation include:

- accidental mortality during clearing/grubbing/construction – individuals may be killed during the early stage of the construction process, however, a management plan will be implemented, and a thorough pre-clearing survey and relocation effort will be delivered prior to any vegetation clearing or soil disturbance
- accidental mortality from vehicle strike – speed limits will remain low, individuals may be run over on rare occasion, however risk is not expected to increase significantly above current base levels.
- Changes to water quality and increased surface runoff- these two impacts are not likely to effect Wallum Sedge-frog. Hydrological Engineers have designed appropriate stormwater storage and treatment facilities on site to reduce risk of this impact.
- Soil and erosion – this risk will be managed from pre-construction to final development and operation of the site. It is not likely to pose an impact to Mitchells Rainforest Snail.
- Light spill – The location where the Wallum Sedge-frog were foraging throughout the survey by Land Eco were all located close to the existing STP facility which emits artificial light associated with buildings and plant. It is not likely that light spill will increase significantly above the base levels associated with the STP that would cause impacts that could effect habitat critical to the survival of the species.
- Shading – Wallum Sedge-frog is largely nocturnal and shelters during the day in shaded locations. Shading is not likely to impact the species.

The proposed development involves the clearing of derived grasslands which are already severely weed infested and intensively managed. No Wallum Sedge-frogs were observed in this habitat. The proposed development will not adversely affect habitat critical to the survival of a species.

Matters of National Environmental Significance
Significant Impact Guidelines 1.1
Environment Protection and Biodiversity Conservation Act 1999
Critically endangered and endangered species Significant impact criteria

	<p>All indirect impacts will be further managed through ensuring construction crew and personnel are aware of the need to avoid and protect adjacent wetland and terrestrial vegetation during the clearing, grubbing, earthworks, construction, and operation.</p>
<p>• disrupt the breeding cycle of an important population</p>	<p>The proposed development involves the clearing of derived grasslands which are already severely weed infested and intensively managed. No Wallum Sedge-frogs were observed in this habitat.</p> <p>Wallum Sedge-frogs are likely to breed within the wallum wetlands and to a lesser extent, the melaleuca swamp that occur within 20 metres of the proposed development. The proposed development has been designed and engineered in a manner that will prevent discharge of stormwater or wastewater into the wetland habitat surrounding the development site.</p> <p>Construction crew and site personnel will be informed of the presence of breeding habitat for the Wallum Sedge-frog surrounding the development site. Effort will be taken to ensure the wallum and wetland habitats surrounding the proposed development are not indirectly impacts through clearing or otherwise during the development process. A Construction Environmental Management Plan (CEMP) will be prepared for the clearing and earthworks component of the development. This will detail impact mitigation measures for construction operators and site personnel to implement.</p> <p>It is not likely that the development will disrupt the breeding cycle of an important population</p>
<p>• modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>	<p>The proposal is not likely to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p> <p>The proposed development involves the clearing of derived grasslands which are already severely weed infested and intensively managed. No Wallum Sedge-frogs were observed in this habitat.</p> <p>Vehicle and plant activity will occur across the sewage treatment compound during construction and operation of the proposed BEF, however, it is not expected that this activity will increase risk of impact to Wallum Sedge-frog substantially above the current base-level of risk associated with vehicle and plant movements required for day to day operation of the existing sewage treatment plant.</p>
<p>• result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</p>	<p>During the targeted survey, Land Eco identified that Wallum Sedge Frog occurred in structurally complex wetland habitat. In the proposed development site, a high abundance of three introduced exotic gastropods as well as Black Rat and Cane Toad. These animals were restricted to the disturbed historically cleared habitats rather than the wetlands. The wetland habitat that was found to support Wallum Sedge-frog will continue to support Wallum Sedge Frog. It is unlikely that the proposed development would cause the introduction of any other pest species that would be considered harmful to the Wallum Sedge-frog.</p>
<p>• introduce disease that may cause the species to decline, or</p>	<p>If chytrid fungus is not present, it is expected that it will eventually occur at the site owing to the extensive movement of waterbirds and human activity in and out of the site. It is not considered likely that the proposed development would increase the risk of introducing disease any higher than current risks associated with daily operation of the existing sewage treatment plant.</p> <p>The Subject Land supported very large populations of Striped Marsh Frog (<i>Limnodynastes peronii</i>) and Dwarf Sedge-frog (<i>Litoria fallax</i>). Both of these species are known vectors for chytrid fungus. It is expected that chytrid fungus is already present in the sewage treatment plant.</p>

**Matters of National Environmental Significance
Significant Impact Guidelines 1.1
Environment Protection and Biodiversity Conservation Act 1999
Critically endangered and endangered species Significant impact criteria**

<ul style="list-style-type: none"> • interfere substantially with the recovery of the species. 	<p>It is unlikely that the proposed development would increase the risk of introduction of deleterious pathogens beyond the status quo as the development is located in an existing operation sewage treatment compound that is subject to regular movement of vehicles and site personnel.</p>
--	---

All other threatened species identified by the Protected Matters Search were considered unlikely or having low likelihood of occurrence in the Subject Property. No further impact assessment was considered necessary.

4.2 Migratory Species

The following migratory species were considered as having moderate to high likelihood to occur within the Subject Property at a point in their lifecycles:

- Black-faced Monarch
- Spectacled Monarch
- Rufous Fantail
- Fork-tailed Swift
- White-throated Needletail

Owing to the small area of the Subject Property and/or the lack of suitable wet sclerophyll habitat, it is not expected that the Subject Property would support important populations of any of these species. This was determined in reference to the 'Draft Referral guideline for 14 birds listed as migratory species under the EPBC Act' (DoE 2015). No further impact assessment upon EPBC Act listed Migratory Species was considered necessary for this development.

5. Conclusion

It is concluded that the proposed development is not likely to incur a significant impact upon any MNES listed under the EPBC Act.

6. References

- Atlas of Living Australia (ALA) (2021) Atlas of Living Australia. Spatial Portal <http://spatial.ala.org.au/> [accessed 11/04/2021]
- Australian Government Department of the Environment Department of Environment, Water, Heritage and The Arts (2013) Matters of National Environmental Significance Significant Impact Guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999
- Australian Government Department of the Environment (DoE) (2015) Referral guideline for 14 birds listed as migratory species under the EPBC Act. September 2015.
- Australian Government Department of the Environment (DoE) (2020) National Flying-fox Monitoring Viewer <http://www.environment.gov.au/biodiversity/threatened/species/flying-fox-monitoring> [accessed 11/04/2021]
- Australian Government Department of Agriculture, Water and the Environment (DAWE) Species Profile and Threats Database http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=66774 [accessed 11/04/2021]
- Bureau of Meteorology (BOM) (2021) Byron Bay, New South Wales March 2021 Daily Weather Observations <http://www.bom.gov.au/climate/dwo/IDCJDW2022.latest.shtml> [accessed 11/04/2021]
- Chapman and Murphy (1989) Soil Landscapes of the Sydney 1:100 000 Sheet. Soil. Conservation Service of NSW, Sydney.
- Churchill, S. (1998) Australian Bats, Reed New Holland, Sydney.
- Commonwealth of Australia (2010a) Survey guidelines for Australia's threatened birds. Guidelines for detecting birds listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999
- Commonwealth of Australia (2010b) Survey guidelines for Australia's threatened bats. Guidelines for detecting bats listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999
- Commonwealth of Australia (2011a) Survey guidelines for Australia's threatened mammals. Guidelines for detecting mammals listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999
- Commonwealth of Australia (2011b) Approved Conservation Advice for the Lowland Rainforest of Subtropical Australia (s266B of the Environment Protection and Biodiversity Conservation Act 1999). Dated 11 November 2011.
- Commonwealth of Australia (2013) Survey guidelines for Australia's threatened orchids. Guidelines for detecting orchids listed as 'threatened' under the Environment Protection and Biodiversity Conservation Act 1999
- Commonwealth of Australia Department of the Environment (DotE) (2021) Protected Matters Search Tool <http://www.environment.gov.au/epbc/protect/index.html> [accessed 11/04/2021]
- Cropper S.C. (1993) Management of Endangered Plants. CSIRO Publishing, Collingwood, Victoria, Australia
- eBird Australia (2021) West Byron Wetlands (Restricted access - Council key required) Byron New South Wales AU <https://ebird.org/hotspot/L1035466> [accessed 11/04/2021]
- Harden, G.J. (ed) (2002). Flora of New South Wales Volume 2. NSW University Press: Sydney.
- Harden, G.J. (ed) (1992). Flora of New South Wales Volume 3. NSW University Press: Sydney.
- Harden, G.J. (ed) (1993). Flora of New South Wales Volume 4. NSW University Press: Sydney.
- Harden, G.J. (ed) (2000). Flora of New South Wales Volume 1. NSW University Press: Sydney.
- Landcom (2004) Managing Urban Stormwater: Soils and Construction 'The Blue Book', Volume 1, Fourth Edition, New South Wales Government, ISBN 0-9752030-3-7

Land Eco Consulting (2021) Biodiversity Development Assessment Report for Bioenergy Facility 45 Wallum Place, Byron Bay New South Wales 2481 Australia Report prepared for Skala Australasia Pty Ltd

Mitchell, P., (2002) Descriptions for NSW (Mitchell) Landscapes Version 2 (2002)

NSW Government (2018) Spatial Services: Six Maps Clip & Ship

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

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

NSW Department of Environment and Conservation (DEC) (2009) Threatened species survey and assessment guidelines: field survey methods for fauna: Amphibians

NSW Department of Planning Industry and Environment (DPIE) (2021 a) Planning Portal ePlanning Spatial Viewer <https://www.planningportal.nsw.gov.au/> [accessed 11/04/2021]

NSW Department of Planning Industry and Environment (DPIE) (2021 b) Biodiversity Values Map and Threshold Tool <https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BOSETMap> [accessed 11/04/2021]

NSW Department of Planning Industry and Environment (2021c) NSW Bionet. The website of the Atlas of NSW Wildlife <http://www.bionet.nsw.gov.au/> [accessed 11/04/2021]

NSW Department of Planning Industry and Environment (2021 d) Threatened biodiversity profile search <https://www.environment.nsw.gov.au/threatenedspeciesapp/> [accessed 11/04/2021]

NSW Office of Environment and Heritage (OEH) (2016a) The Native Vegetation of the Sydney Metropolitan Area. Volume 1: Technical Report. Version 2.0, Department of Premier and Cabinet, Sydney.

NSW Office of Environment and Heritage (OEH) (2016b) The Native Vegetation of the Sydney Metropolitan Area. Volume 2: Vegetation Community Profiles. Version 3.0, Department of Premier and Cabinet, Sydney.

NSW Office of Environment and Heritage (OEH) (2016c) NSW Guide to Surveying Threatened Plants

Northern Tree Care (2021) Arboricultural Impact Assessment Report Wallum Place, Byron Bay Report compiled by Northern Tree Care ABN 73 674 526 681 6 Abalone Place Ballina NSW 2478. 19 Apr 2021 Client: Skala Australasia Pty Ltd 13/21 Babilla Ct Beresfield NSW 2322

Parkyn, J. L. (2016) Investigation of Whether Mitchell's Rainforest Snail Is Likely to be Present in Biobanking Offset Areas. Unpublished report to Byron Shire Council.

Parkyn, J., Challisthianagara, A., Brooks, L., Specht, A., McMullan-Fisher, S. & Newell, D. (2015) The natural diet of the endangered camaenid land snail *Thersites mitchellae* (Cox, 1864) in northern New South Wales, Australia. *Australian Zoologist* 37(3), 343-349.

Parkyn, J., Brooks, L., and Newell, D. (2012) Movements of *Thersites mitchellae* (Cox, 1864) (Camaenidae): an investigation of habitat usage using radio-telemetry. Molluscs 2012 Triennial Conference. The Malacological Society of Australasia. University of Melbourne, Victoria.

PlantNET (2021) The NSW Plant Information Network System, Royal Botanic Gardens and Domain Trust, Sydney. <http://plantnet.rbgsyd.nsw.gov.au> [accessed 11/04/2021]

7. Appendices

Appendix A. Fauna recorded on Subject Land during Site Assessments by Land Eco Consulting between February and April 2021

Appendix B. Protected Matters Report

Appendix A. Fauna recorded on Subject Land during Site Assessments by Land Eco Consulting between January, February and March 2021

Class	Scientific Name	Species	Status EPBC Act
Aves	<i>Acanthiza pusilla</i>	Brown Thornbill	
Aves	<i>Alectura lathamii</i>	Australian Brush Turkey	
Aves	<i>Anas superciliosa</i>	Pacific Black Duck	
Aves	<i>Anthochaera chrysoptera</i>	Little Wattlebird	
Aves	<i>Artamus leucorhynchus</i>	White-breasted Woodswallow	
Aves	<i>Aythya australis</i>	Hardhead	
Aves	<i>Bubulcus ibis</i>	Cattle Egret	
Aves	<i>Cacatua sanguinea</i>	Little Corella	
Aves	<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo	
Aves	<i>Cacomantis variolosus</i>	Brush Cuckoo	
Aves	<i>Chrysococcyx basalis</i>	Horsfields Bronze Cuckoo	
Aves	<i>Chrysococcyx lucidus</i>	Shining Bronze Cuckoo	
Aves	<i>Cisticola exilis</i>	Golden-headed Cisticola	
Aves	<i>Colluricincla harmonica</i>	Grey Shrike-thrush	
Aves	<i>Colluricincla megarhyncha</i>	Little Shrike-thrush	
Aves	<i>Columba leucomela</i>	White-headed Pigeon	
Aves	<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	
Aves	<i>Corvus orru</i>	Torresian Crow	
Aves	<i>Cracticus tibicen</i>	Australian Magpie	
Aves	<i>Cracticus torquatus</i>	Grey Butcherbird	
Aves	<i>Cygnus atratus</i>	Black Swan	
Aves	<i>Dacelo novaehollandiae</i>	Laughing Kookaburra	
Aves	<i>Dendrocygna arcuata</i>	Wandering Whistling Duck	
Aves	<i>Dicaeum hirundinaceum</i>	Mistletoebird	
Aves	<i>Dicrurus bracteatus</i>	Spangled Drongo	
Aves	<i>Egretta novaehollandiae</i>	White-faced Heron	
Aves	<i>Elseyornis melanops</i>	Black-fronted Dotterel	
Aves	<i>Entomyzon cyanotis</i>	Blue-faced Honeyeater	
Aves	<i>Eopsaltria australis</i>	Eastern Yellow Robin	
Aves	<i>Gallinula tenebrosa</i>	Dusky Moorhen	
Aves	<i>Geopelia humeralis</i>	Bar-shouldered Dove	
Aves	<i>Gerygone olivacea</i>	White-throated Gerygone	
Aves	<i>Glossopsitta concinna</i>	Musk Lorikeet	
Aves	<i>Grallina cyanoleuca</i>	Magpie-lark	
Aves	<i>Haliaeetus leucogaster</i>	White-bellied Sea Eagle	Marine
Aves	<i>Hirundapus caudacutus</i>	White-throated Needletail	
Aves	<i>Hirundo neoxena</i>	Welcome Swallow	
Aves	<i>Lalage leucomela</i>	Varied Triller	
Aves	<i>Lichmera indistincta</i>	Brown Honeyeater	
Aves	<i>Malurus cyaneus</i>	Superb Fairywren	
Aves	<i>Manorina melanocephala</i>	Noisy Miner	Key Threatening Process
Aves	<i>Megalurus grammurus</i>	Little Grassbird	
Aves	<i>Meliphaga lewinii</i>	Lewin's Honeyeater	
Aves	<i>Merops ornatus</i>	Rainbow Bee-eater	
Aves	<i>Neochmia temporalis</i>	Red-browed Finch	
Aves	<i>Pachycephala pectoralis</i>	Golden Whistler	
Aves	<i>Pachycephala rufiventris</i>	Rufous Whistler	
Aves	<i>Petrochelidon ariel</i>	Fairy Martin	

Class	Scientific Name	Species	Status EPBC Act
Aves	<i>Petrochelidon nigricans</i>	Tree Martin	
Aves	<i>Philemon corniculatus</i>	Noisy Friarbird	
Aves	<i>Phylidonyris niger</i>	White-cheeked Honeyeater	
Aves	<i>Platalea regia</i>	Royal Spoonbill	
Aves	<i>Plectorhyncha lanceolata</i>	Striped Honeyeater	
Aves	<i>Podargus strigoides</i>	Tawny Frogmouth	
Aves	<i>Porphyrio melanotus</i>	Australasian Purple Swamphen	
Aves	<i>Psophodes olivaceus</i>	Eastern Whipbird	
Aves	<i>Rhipidura albiscapa</i>	Grey Fantail	
Aves	<i>Rhipidura leucophrys</i>	Willie Wagtail	
Aves	<i>Sericornis frontalis</i>	White-browed Scrubwren	
Aves	<i>Sphecotheres vieilloti</i>	Australasian Figbird	
Aves	<i>Strepera graculina</i>	Pied Currawong	
Aves	<i>Taeniopygia bichenovii</i>	Double-barred Finch	
Aves	<i>Todiramphus macleayii</i>	Forest Kingfisher	
Aves	<i>Trichoglossus chlorolepidotus</i>	Scaly-breasted Lorikeet	
Aves	<i>Trichoglossus haematodus</i>	Rainbow Lorikeet	
Aves	<i>Vanellus miles novaehollandiae</i>	Masked Lapwing	
Aves	<i>Zosterops lateralis</i>	Silvereye	
Gastropoda	<i>Helix aspersa</i>	Common Garden Snail	Not Protected Pest
Gastropoda	<i>Laevicaulis alte</i>	Tropical Leatherleaf Slug	Not Protected Pest
Gastropoda	<i>Limax maximus</i>	Giant Leopard Slug	Not Protected Pest
Gastropoda	<i>Thersites mitchellae</i>	Mitchell's Rainforest Snail	Critically Endangered
Mammalia	<i>Melomys cervinipes</i>	Fawn-footed Melomys	
Mammalia	<i>Pteropus alecto</i>	Black Flying-fox	
Mammalia	<i>Rattus rattus</i>	Black Rat	Not Protected Pest
Mammalia	<i>Wallabia bicolor</i>	Swamp Wallaby	
Reptilia	<i>Eulamprus quoyii</i>	Eastern Water Skink	
Reptilia	<i>Intellagama lesueurii</i>	Eastern Water Dragon	
Reptilia	<i>Lygisaurus foliorum</i>	Iridescent Litter-skink	
Reptilia	<i>Pseudechis porphyriacus</i>	Red-bellied Black Snake	
Amphibia	<i>Litoria fallax</i>	Eastern Dwarf Sedge-frog	
Amphibia	<i>Litoria gracilentia</i>	Dainty Tree Frog	
Amphibia	<i>Litoria caerulea</i>	Green Tree Frog	
Amphibia	<i>Litoria dentata</i>	Bleating Tree Frog	
Amphibia	<i>Litoria olongburensis</i>	Wallum Sedge Frog	Vulnerable
Amphibia	<i>Litoria nasuta</i>	Rocket Frog	
Amphibia	<i>Litoria peronii</i>	Peron's Tree Frog	
Amphibia	<i>Litoria tyleri</i>	Tyler's Tree Frog	
Amphibia	<i>Limnodynastes peronii</i>	Striped Marsh Frog	
Amphibia	<i>Crinia signifera</i>	Common Brown Froglet	
Amphibia	<i>Crinia tinnula</i>	Wallum Froglet	
Amphibia	<i>Bufo marinus</i>	Cane Toad	Not Protected Pest

Appendix B. Protected Matters Report



www.landeco.com.au