

ECOLOGICAL SURVEY REPORT

PREMIUM ECOTOURISM PRODUCTS, COOLOOLA GREAT WALK

**Prepared for
Department of Environment and Science**



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EXECUTIVE SUMMARY

Following the completion of a desktop review of expected environmental opportunities and constraints to premium ecotourism products within the vicinity of the Coolooloa Great Walk, the Queensland Government, through the Department of Environment and Science (DES), commissioned a subsequent environmental review involving a baseline ecological survey to verify the on-ground values in the vicinity of each proposed area of impact associated with the development of eco-accommodation sites along the Coolooloa Great Walk. This would further inform project design in terms of opportunities and constraints, and enable an assessment of impacts to matters of national and state environmental significance to inform necessary approvals.

Following the completion of preliminary site selections, a total of 16 sites required investigation:

- near Teewah Village - 1 site option: Site T1;
- near the Noosa River and existing Dutgee walkers' camp - 4 site options:
 - Site N1;
 - Site N2;
 - Site N3;
 - Site N4;
- near the existing Litoria walkers' camp - 3 site options:
 - Site L1;
 - Site L2;
 - Site L3;
 - Site L4;
- near the existing Kauri walkers' camp - 3 site options:
 - Site K1;
 - Site K2;
 - Site K3;
- near Poona Lake - 1 site option: Site P1; and
- Double Island Point - 3 site options:
 - Site D1;
 - Site D2;
 - Site D3.

METHODOLOGY

FIELD SURVEY

The field survey was undertaken on 29 July to the 2 August 2019, inclusive. The survey aimed to confirm the actual or likely presence or absence of matters of national and state environmental significance within and around each proposed area of impact associated with the development of eco-accommodation sites, utilising various, relatively non-invasive survey techniques. These included verification of the identity, extent and status of vegetation communities and associated habitat types, habitat suitability assessment and targeted searches for Endangered, Vulnerable or Near Threatened (EVNT) flora species listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and/or the Queensland *Nature Conservation Act 1992* (NC Act), and habitat suitability assessment and targeted searches for EVNT fauna.

IMPACT ASSESSMENT

Following the field survey, data were analysed and interpreted to enable an informed assessment of species presence/absence, relative habitat value, and the accuracy of current State mapping of ecological values. An assessment of the likelihood of conservation significant species occurring at each site was informed by survey and database records, known distributions, and specific habitat requirements. Potential impacts to the identified values as a result of the proposed development of each site were then identified, and the significance of the potential impacts assessed in accordance with the Commonwealth Department of Environment and Energy's (DoEE) Significant Impact Guidelines for matters of national environmental significance (MNES) and the Queensland Parks and Wildlife Service's (QPWS) Operational Policy and Procedural Guide for assessing the impact of QPWS actions on natural and cultural values.

ECOLOGICAL VALUES

MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE (MNES)

Patches of vegetation in the vicinity Kauri walkers' camp (Sites K1 and K3) and Poona Lake (Site P1) are likely to represent either the Lowland Rainforest of Subtropical Australia threatened ecological community (TEC), or the Littoral Rainforests and Coastal Vine Thickets of Eastern Australia TEC, both of which are listed as Critically Endangered under the EPBC Act. Further sampling effort across each patch (including areas beyond that assessed as part of this study) would be required to confirm which TEC is represented.

The field survey confirmed the presence of the following threatened flora species within or within close vicinity to one or more proposed accommodation sites:

- *Archidendron lovelliae* (listed as Vulnerable under the EPBC Act) - recorded throughout vegetation surrounding the existing Kauri Walkers' camp (Site K1). Also present in habitat represented within and around Site K3 and Site P1, although not detected within 100m of these sites.
- *Cryptocarya foetida* (Vulnerable) - recorded in vegetation around the existing Kauri Walkers' camp (Site K1). Also present in habitat within and around Site K3, although not within 100m of this site.
- *Macrozamia pauli-guilielmi* (Endangered) – recorded throughout the existing Litoria Walkers' camp, and particularly abundant at Site L3 and near Sites L2 and L4.

The field survey confirmed the presence of Black-breasted Button-Quail *Turnix melanogaster* (listed as Vulnerable under the EPBC Act) at Site K1 in the form of old platelets (foraging evidence). The results of the survey also indicate potential habitat for the following species occurs at one of more of the proposed accommodation sites, based on habitat type and condition:

- Three-toed Snake-tooth Skink *Coeranoscincus reticulatus* (Vulnerable) – Sites N2, N3, N4, L1, L2, L3, L4, K1, K2 and P1.
- Wallum Sedgefrog *Litoria olongburensis* (Vulnerable) – Site N1 and near Site L3.
- Grey-headed Flying-fox *Pteropus poliocephalus* (Vulnerable) – Sites N1, N4, L1, L2, L3, L4, K1, K2 and K3.
- Black-breasted Button-Quail (Vulnerable) – Sites T1 and P1.

Potential habitat for the following Migratory species occurs at one of more of the proposed accommodation sites, based on habitat type and condition:

- Black-faced Monarch *Monarcha melanopsis* – Sites N4, L3, K1, K3 and P1.
- Rufous Fantail *Rhipidura rufifrons* – Sites T1, N1, N2, N3, N4, L1, L2, L3, L4, K1, K2, K3 and P1.
- Spectacled Monarch *Symposiachrus trivirgatus* – Sites K1 and P1.

MATTERS OF STATE ENVIRONMENTAL SIGNIFICANCE (MSES)

The following Of Concern regional ecosystems (REs) were confirmed within the vicinity of one or more proposed accommodation sites:

- 12.2.1 Notophyll vine forest on parabolic high dunes - including K1, K3 and P1.
- 12.2.3 Araucarian microphyll/notophyll vine forest on parabolic dunes. - just east of Site P1.
- 12.2.4 *Syncarpia hillii*, *Lophostemon confertus* tall open to closed forest on parabolic high dunes - including the area just south of Site K1, and just east of Site P1.
- 12.2.12 Closed heath on seasonally waterlogged sand plains - just south of Site N2 and surrounding the existing Dutgee Walkers' Camp (near N3).
- 12.12.19 Vegetation complex of rocky headlands on Mesozoic to Proterozoic igneous rocks - around (but not within) Sites D1, D2 and D3.

Mapped Essential Habitat for EVNT flora and fauna species was also confirmed within or within close proximity to all proposed sites other than T1.

High value wetland habitats and watercourses were confirmed within the vicinity of sites N1-4, L3 and P1.

The field survey confirmed the presence of the Endangered or Vulnerable flora species within or within close vicinity of one or more proposed accommodation sites, consistent with those listed under the EPBC Act. The field survey also confirmed the presence of *Boronia rivularis* (listed as Near Threatened under the NC Act) throughout Sites N2 and N3, and in areas surrounding Sites N1 and N4.

In addition to known and potential habitat for Black-breasted Button-Quail and Wallum Sedgefrog (both listed as Vulnerable under the NC Act), potential habitat for the following species occurs at one or more of the proposed accommodation sites:

- Glossy Black-Cockatoo *Calyptorhynchus lathami* (Vulnerable) – Sites L2, L4 and K2.
- Wallum Froglet *Crinia tinnula* (Vulnerable) – Site N1 and near Site L3.
- Southern Emu-wren *Stipiturus malachurus* (Vulnerable) – Sites N2, N3 and L1.

The field survey also indicates potential habitat for Cooloola Blind Snake *Ramphotyphlops silvia* (Near Threatened) at Site P1.

IMPACT ASSESSMENT

IMPACT MECHANISMS

It is expected some removal of vegetation will need to occur for the siting and construction of accommodation infrastructure and access tracks. Removal of vegetation reduces the amount of habitat and populations of flora and fauna, and can result in fragmentation of habitats and populations, changes to remaining vegetation that cause the loss of food, breeding and shelter resources for fauna, and exposure to introduced species that are either competitors or predators. The removal of vegetation can also result in direct loss of EVNT flora species and large trees that provide breeding and sheltering resources for fauna, and can result in the mortality of fauna present at the time of vegetation removal.

The construction and operation of the accommodation sites (and the expected associated increase in use of the existing Cooloola Great Walk track) also have the potential to result in on-going disturbance to surrounding habitats. Artificial lighting and noise may affect the behaviour of native fauna, while construction/maintenance vehicles and accommodation guests have the potential to introduce and/or spread weed species and plant pathogens, and damage vegetation (including EVNT flora species and important habitat features) through unauthorised or inadvertent access to adjacent habitats. General waste and land disturbance also has the potential to attract highly competitive and/or predatory exotic fauna species.

Increased human presence has the potential to increase the frequency of accidental fires within vegetated areas, adversely affecting habitat structure and, therefore, habitat value for a range of significant species.

Degradation of adjacent and downstream habitats can also result from increased local nutrient loads (e.g. from insufficiently treated/contained wastewater), contamination (from insufficiently contained hazardous substances) and altered drainage.

IMPACT MANAGEMENT

The most effective means of avoiding direct impacts associated with the removal of vegetation and associated loss of habitat and flora species is through appropriate development footprint location and design. It is also assumed that, once the preferred sites are selected, additional measures will be incorporated to avoid and/or mitigate impacts to ecological values, including:

- Positioning of sites and associated infrastructure to include existing cleared areas and/or avoid the removal of large trees and other important habitat features, where feasible.
- Use of appropriately qualified flora and fauna spotters during final site footprint selection and vegetation clearing to ensure direct impacts to EVNT flora species are avoided and any resident fauna and important habitat features are appropriately managed.
- Incorporating site designs that minimises impacts from artificial lighting.
- Raised accommodation structures and storage that enable natural stormwater flows to continue unaffected.
- Fully contained septic/wastewater systems, with all waste products removed from site at appropriate intervals.
- Dedicated storage structures for flammable liquids and other hazardous substances.
- Limiting guests per night/tour to small numbers (up to 16), with all guests accompanied and supervised by highly trained guides and educated on the avoidance of environmental impact.
- Cancelling or postponing tours during periods of extreme bushfire risk and/or in response to high biosecurity risks.
- Preparation and implementation of Environmental Management Plans that commit to the ongoing maintenance of the sites and appropriate environmental standards over the life of the project, and the ongoing monitoring and management of avoidable impacts.

SIGNIFICANCE OF RESIDUAL IMPACTS UPON MATTERS OF ENVIRONMENTAL SIGNIFICANCE

The field survey has confirmed that the project may result in residual impacts upon the following MNES:

- **Critically Endangered TECs**, including either the Lowland Rainforest of Subtropical Australia, or the Littoral Rainforests and Coastal Vine Thickets of Eastern Australia.
- **Endangered Flora Species**, including *Acronychia littoralis* and *Macrozamia pauli-guilielmi*.
- **Vulnerable Flora Species**, including *Archidendron lovelliae* and *Cryptocarya foetida*.
- **Vulnerable Fauna Species**, including Wallum Sedgefrog, Three-toed Snake-tooth Skink, Black-breasted Button-Quail and Grey-headed Flying-fox.
- **Migratory Fauna Species**, including , Rufous Fantail, Black-faced Monarch and Spectacled Monarch.

The field survey has confirmed the project may result in residual impacts upon the following MSES:

- **Regulated Vegetation**, including Of Concern REs, remnant vegetation intersecting with a wetland, remnant vegetation within the defined distance of a watercourse; and essential habitat.
- **Wetlands of High Ecological Significance.**

- **Protected Wildlife Habitat for Endangered or Vulnerable Flora Species**, including *Archidendron lovelliae*, *Cryptocarya foetida*, *Macrozamia pauli-guilielmi*, *Acronychia littoralis* and *Blandfordia grandiflora*.
- **Protected Wildlife Habitat for Endangered or Vulnerable Fauna Species**, including Glossy Black-Cockatoo, Wallum Froglet, Wallum Sedgefrog, Southern Emu-wren and Black-breasted Button-Quail.

Overall, the majority of proposed sites are unlikely to result in significant impacts upon MNES, MSES or other important ecological values, provided the assumed key avoidance and mitigation measures outlined above have been implemented. The main exceptions are Sites N1 and L3, the establishment and operation of which is likely to lead to significant impacts upon MNES and/or MSES, such that they would meet the definition of a “Class 5 Impact” under the QPWS Operational Policy and Procedural Guide for assessing the impact of QPWS actions on natural and cultural values. The establishment and operation of Site K1 and Site L2 or L4 could also lead to significant impacts upon MNES and/or MSES, and these should also be considered potential “Class 5 Impacts”.

The establishment and operation of Sites N2 and N3 is likely to lead to significant impacts upon the Near Threatened species *Boronia rivularis*, and would meet the definition of a “Class 3 Impact”.

For all other sites, the proposed works would meet the definition of “Class 2 Impact” under the QPWS Operational Policy and Procedural Guide for assessing the impact of QPWS actions on natural and cultural values.

Even so, where no significant impacts are expected, consideration should also be given to the overarching principle of relevant State and Commonwealth government environmental protection policies relating to impact management, in that impacts should be avoided as much as possible in the first instance. In this respect, the recommended preferred sites (from an ecological perspective) for each general location are as follows:

- near Teewah Village – Site T1.
- near the Noosa River and existing Dutgee walkers’ camp - Site N4 or an identified alternative site (NA1).
- near the existing Litoria walkers’ camp - an identified alternative site (LA3b).
- near the existing Kauri walkers’ camp – one of two identified alternative sites (KA2 or KA3).
- Double Island Point – one of three identified alternative sites (DA2a, DA2b or DA3).

ECOLOGICAL SURVEY REPORT

Premium Ecotourism Products, Cooloola Great Walk

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Table of Terms and Abbreviations

BAAM	Biodiversity Assessment and Management Pty Ltd
DES	Queensland Department of Environment and Science
DoEE	Commonwealth Department of Environment and Energy
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>
EVNT	Species listed as endangered, vulnerable or near threatened under the EPBC Act or NC Act
MNES	Matters of National Environmental Significance
MSES	Matters of State Environmental Significance
NC Act	Queensland <i>Nature Conservation Act 1992</i>
QPWS	Queensland Parks and Wildlife Service
RE	Regional Ecosystem
TEC	Threatened Ecological Community
VM Act	Queensland <i>Vegetation management Act 1999</i>

1.0 INTRODUCTION

It is understood the Queensland Government seeks to raise the profile of the State's protected area estate (including national parks) by creating iconic, sustainable ecotourism experiences that showcase landscapes and nature-based experiences. This will include partnering with the private sector to deliver new tourism infrastructure in regional Queensland, beginning with three trails - Thorsborne Trail, Cooloola Great Walk and Whitsunday Island Trail. These trails are envisioned to feature multiple nodes stemming from each trail permitting diverse styles of eco-accommodation to complement existing (and continuing) State-owned campsites on the trails.

Following the completion of a desktop review of expected environmental opportunities and constraints to premium ecotourism products within the vicinity of the Cooloola Great Walk, the Queensland Government, through the Department of Environment and Science (DES), commissioned a subsequent environmental review involving a baseline ecological survey to verify the on-ground values in the vicinity of each proposed area of impact associated with the development of eco-accommodation sites along the Cooloola Great Walk (**Figure 1.1**). This would further inform project design in terms of opportunities and constraints, and enable an assessment of impacts to matters of national and state environmental significance to inform necessary approvals.

This report documents the results of the baseline ecological survey and the assessment of the significance of potential impacts to matters of national and state environmental significance resulting from the development of each proposed accommodation site.

Following the completion of preliminary site selections by potential proponents, a total of 16 sites required investigation at the following general locations (refer **Figure 1.1**):

- near Teewah Village - 1 site option:
 - Site T1;
- near the Noosa River and existing Dutgee walkers' camp - 4 site options:
 - Site N1;
 - Site N2;
 - Site N3;
 - Site N4;
- near the existing Litoria walkers' camp - 3 site options:
 - Site L1;
 - Site L2;
 - Site L3;
 - Site L4;
- near the existing Kauri walkers' camp - 3 site options:
 - Site K1;
 - Site K2;
 - Site K3;
- near Poona Lake - 1 site option:
 - Site P1;
 - and
- Double Island Point - 3 site options:
 - Site D1;
 - Site D2;
 - Site D3.

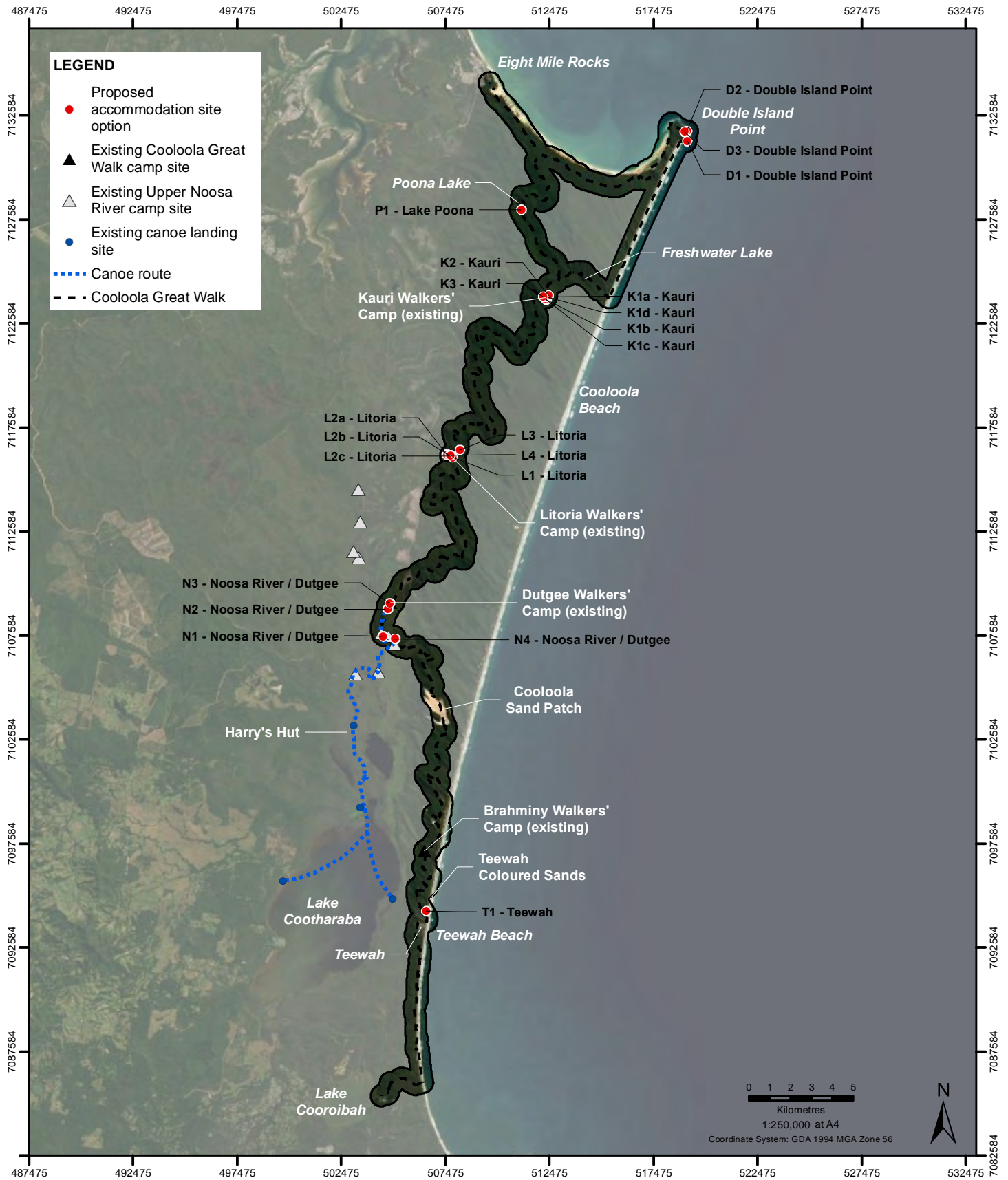


Figure: 1.1
Title: Potential Accommodation Site Locations
Project: Premium Ecotourism Products – Cooloola Great Walk
Client: Department of Environment and Science

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2.0 METHODOLOGY

2.1 FIELD SURVEY

The field survey was undertaken by BAAM Principal Wildlife Expert Adrian Caneris and Senior Botanist Jarrah Wills on 29 July to the 2 August 2019, inclusive. The survey aimed to confirm the actual or likely presence or absence of matters of national and state environmental significance within and around each proposed area of impact associated with the development of eco-accommodation sites, utilising various, relatively non-invasive survey techniques.

The survey team inspected each proposed accommodation site, focusing within a 100m radius of the proposed area of direct impact (assumed to be up to 3000m²). Specific techniques included:

- Verification of the identity, extent and status of vegetation communities and associated habitat types, with particular focus on Threatened Ecological Communities (TECs) listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and Endangered or Of Concern regional ecosystems (REs) listed under the Queensland *Vegetation Management Act 1999* (VM Act). This involved recording floristic information concerning the structure and composition of the vegetation type together with verification of the underlying geology/landzone. Where a suspected TEC had specific diagnostic criteria and/or condition thresholds, these were assessed as per the Commonwealth's guidelines.
- Habitat suitability assessment and targeted searches for Endangered, Vulnerable or Near Threatened (EVNT) flora species listed under the EPBC Act and/or the Queensland *Nature Conservation Act 1992* (NC Act), generally in accordance with the Queensland Government's *Flora Survey Guidelines – Protected Plants*. For any EVNT flora species encountered, supplementary information was collected such as the number of individuals and the characteristics of the population and supporting habitat.
- Habitat suitability assessment and targeted searches for EVNT fauna, including:
 - Observed presence of foraging, nesting and/or refuge resources (such as hollow bearing trees).
 - Surveys for birds (focusing on early morning and late afternoon) through a

series of standardised, 2 ha area searches using the Birds Australia census method, during which all birds seen and heard calling were recorded. Where considered necessary and appropriate, call playback was also used as a supplementary, targeted method to elicit responses from cryptic species within suitable habitat.

- Searches for reptiles and amphibians beneath rocks, logs, woody debris and other microhabitats, supplemented by dusk chorus surveys and call playback for frogs within suitable habitat, as considered necessary and appropriate.
- Spotlighting for owls, flying foxes and arboreal mammals, facilitated by call play-back where considered necessary and appropriate.
- Systematic searches to identify and record incidental wildlife traces from faecal scats, scratches, diggings, bones, feathers, burrows and tracks.

All survey work was performed in accordance with BAAM's Permit to Take, Use, Keep or Interfere with Cultural or Natural Resources (WITK17726616-2).

2.2 IMPACT ASSESSMENT

Following the field survey, data were analysed and interpreted to enable an informed assessment of species presence/absence, relative habitat value, and the accuracy of current State mapping of ecological values. An assessment of the likelihood of conservation significant species occurring at each site was informed by survey and database records, known distributions, and specific habitat requirements.

Potential impacts to the identified values as a result of the proposed development of each site were then identified, and the significance of the potential impacts assessed in accordance with the Commonwealth Department of Environment and Energy's (DoEE) Significant Impact Guidelines for matters of national environmental significance (MNES) and the Queensland Parks and Wildlife Service's (QPWS) Operational Policy and Procedural Guide for assessing the impact of QPWS actions on natural and cultural values.

Recommendations for the avoidance and/or mitigation of potential impacts (including possible alternative sites) have also been made, where considered necessary.

3.0 ECOLOGICAL VALUES

The following sections provide an overview of MNES and matters of state environmental significance (MSES) known or potentially occurring within the vicinity of the Cooloola Great Walk based on the initial desktop assessment, and their known or potential occurrence at one or more of the proposed accommodation sites based on the field survey. **Table 3.1** provides a summary of the ecological values recorded at each of the accommodation sites, including known or potentially occurring MNES and MSES.

3.1 MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE (MNES)

3.1.1 Wetlands of International Importance (Ramsar)

The Great Sandy Strait Ramsar site lies adjacent to the northern portion of the Cooloola Great Walk. None of the proposed accommodation sites are located in close proximity to this wetland.

3.1.2 Threatened Ecological Communities

The EPBC Protected Matters Search indicates three EPBC listed TECs could potentially occur within the vicinity of the accommodation sites:

- Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community (currently listed as Endangered).
- Lowland Rainforest of Subtropical Australia (Critically Endangered).
- Subtropical and Temperate Coastal Saltmarsh (Vulnerable).

The results of the field survey indicate patches of vegetation mapped as RE 12.2.1 and 12.2.3 in the vicinity Kauri walkers' camp (Sites K1 and K3) and Poona Lake (Site P1) are likely to represent either the Lowland Rainforest of Subtropical Australia TEC, or the Littoral Rainforests and Coastal Vine Thickets of Eastern Australia TEC (Critically Endangered). Further sampling effort across each patch (including areas beyond that assessed as part of this study) would be required to confirm which TEC is represented; in the meantime, it should be assumed one of these Critically Endangered TECs is present.

A summary description of vegetation recorded at each site is provided in **Table 3.1**, with more detailed Quaternary site data provided in **Appendix A**.

3.1.3 Threatened Species

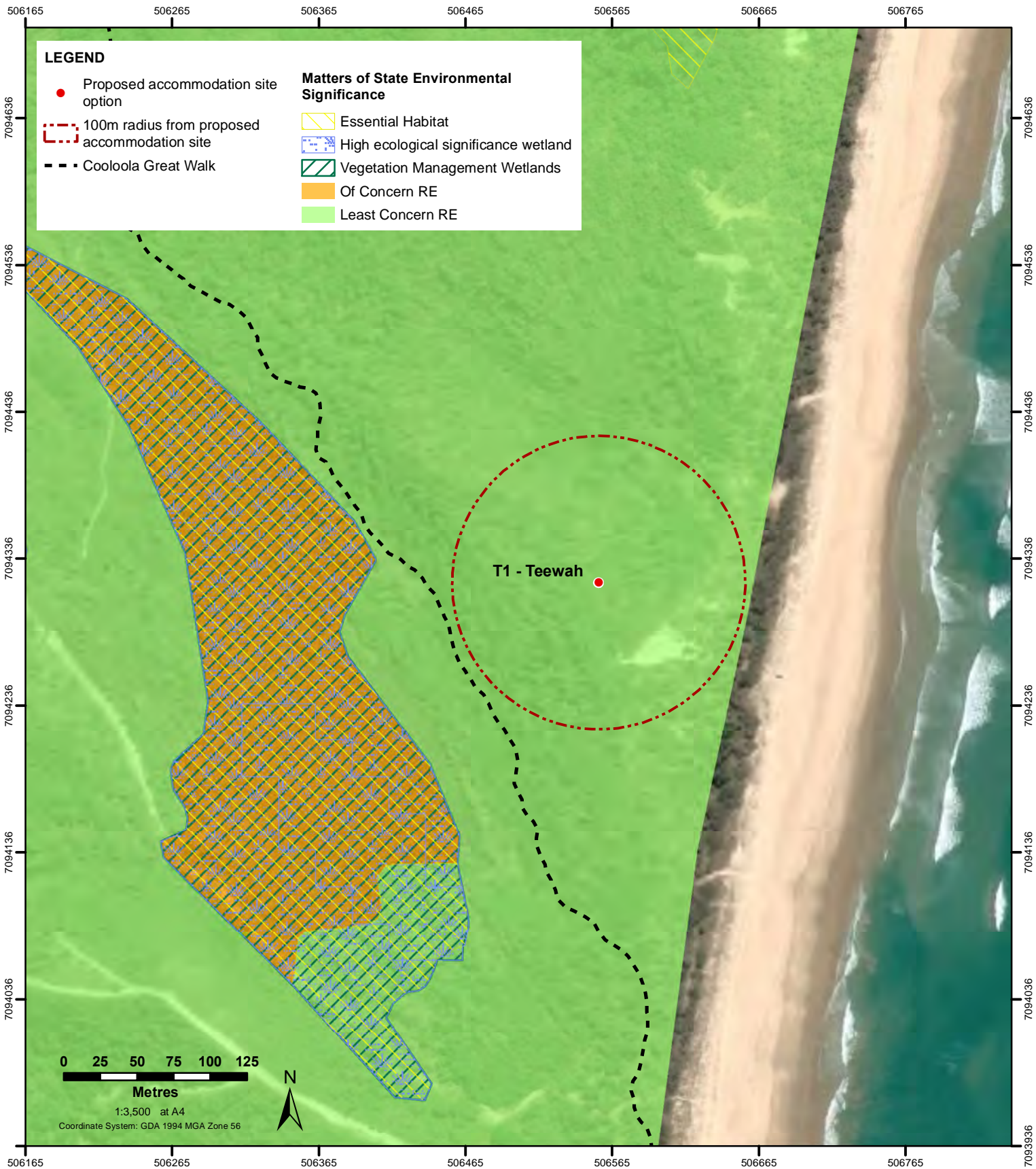
Flora

The EPBC Protected Matters Search indicates numerous EPBC listed threatened flora species could potentially occur. Those species known to occur within the vicinity of the Cooloola Great Walk based on previous records include:

- *Acacia attenuata* (Vulnerable).
- *Acronychia littoralis* (Endangered).
- *Allocasuarina emuina* (Endangered).
- *Archidendron lovelliae* (Vulnerable).
- *Arthraxon hispidus* (Vulnerable).
- *Boronia keysii* (Vulnerable).
- *Bosistoa transversa* (Vulnerable).
- *Cryptocarya foetida* (Vulnerable).
- *Eucalyptus conglomerata* (Endangered).
- *Floydia praealta* (Vulnerable).
- *Macadamia integrifolia* (Vulnerable).
- *Macadamia ternifolia* (Vulnerable).
- *Prostanthera spathulata* (Vulnerable).
- *Romnaldia strobilacea* (Vulnerable).
- *Xanthostemon oppositifolius* (Vulnerable).

The field survey confirmed the presence of the following species within or within close vicinity to one or more proposed accommodation sites, as shown on **Figure 3.1**:

- *Archidendron lovelliae* (Vulnerable) (**Photo 1**) - recorded as seedlings, saplings and canopy trees throughout the vegetation surrounding the existing Kauri Walkers' camp (Site K1). Also present in habitat represented within and around Site K3 and Site P1, although not detected within 100m of these sites.
- *Cryptocarya foetida* (Vulnerable) - sapling recorded in vegetation around the existing Kauri Walkers' camp (Site K1). Also present in habitat represented within and around Site K3, although not detected within 100m of this site.
- *Macrozamia pauli-guilielmi* (Endangered) (**Photo 2**) – recorded throughout the existing Litoria Walkers' camp, and particularly abundant at Site L3 and near Sites L2 and L4.



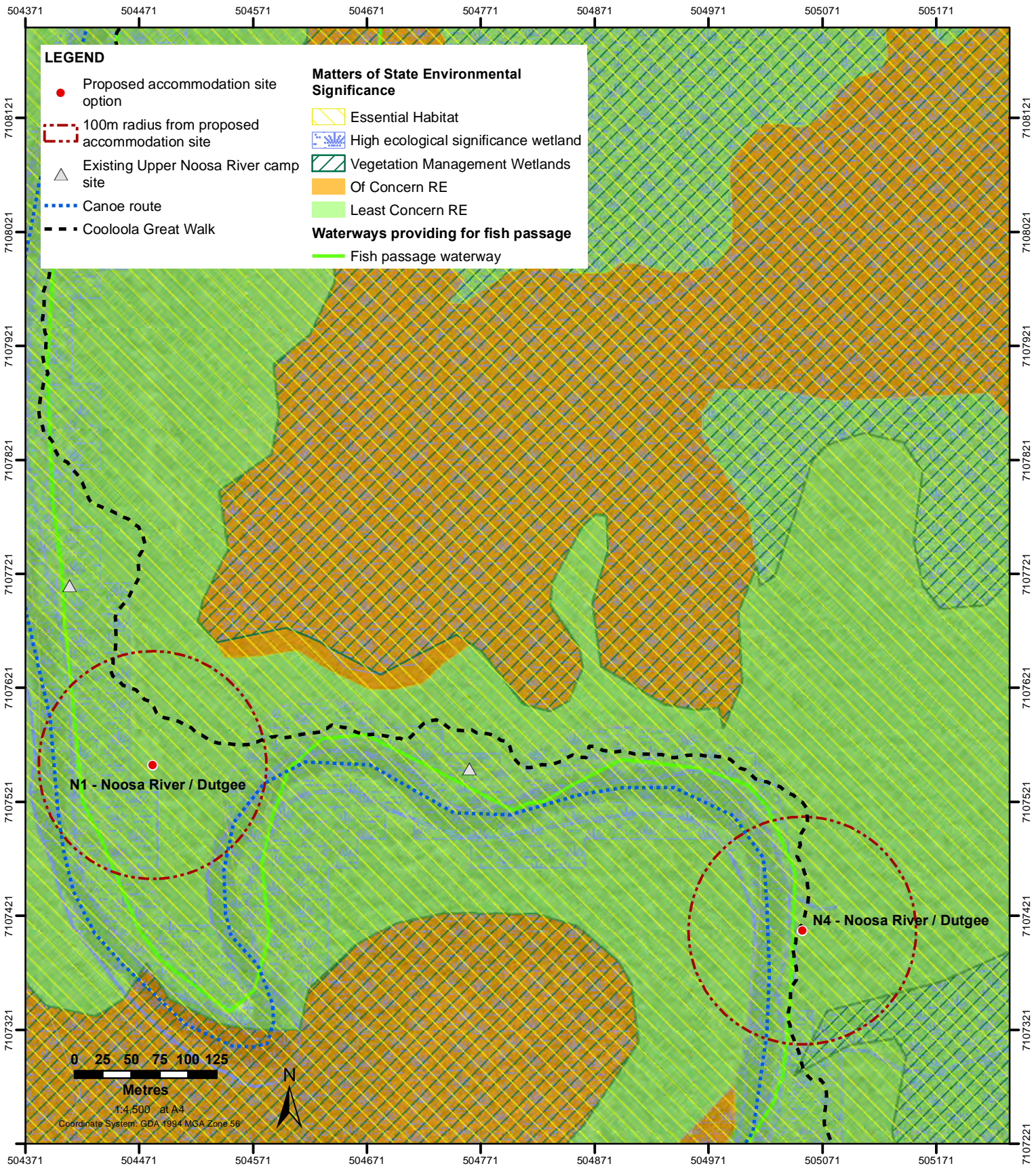
Data Sources:
 MSES - Regulated vegetation - Essential habitat - Queensland
 MSES - High Ecological Significance (HES) wetlands
 Vegetation management wetlands mapping - v5.02
 Regional Ecosystems - Vegetation management regional ecosystem map - v11.0
 Potential TEC - Extract from Regional Ecosystems
 - Vegetation management regional ecosystem map - v11.0
 State of Queensland (Department of Environment and Science) 2019

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Drawn By: KM Reviewed by: JA Date: 31/03/2020

Figure: 3.1a
Title: Confirmed MNES and MSES - Teewah
Project: Premium Ecotourism Products – Coolooloa Great Walk
Client: Department of Environment and Science





Site Locations



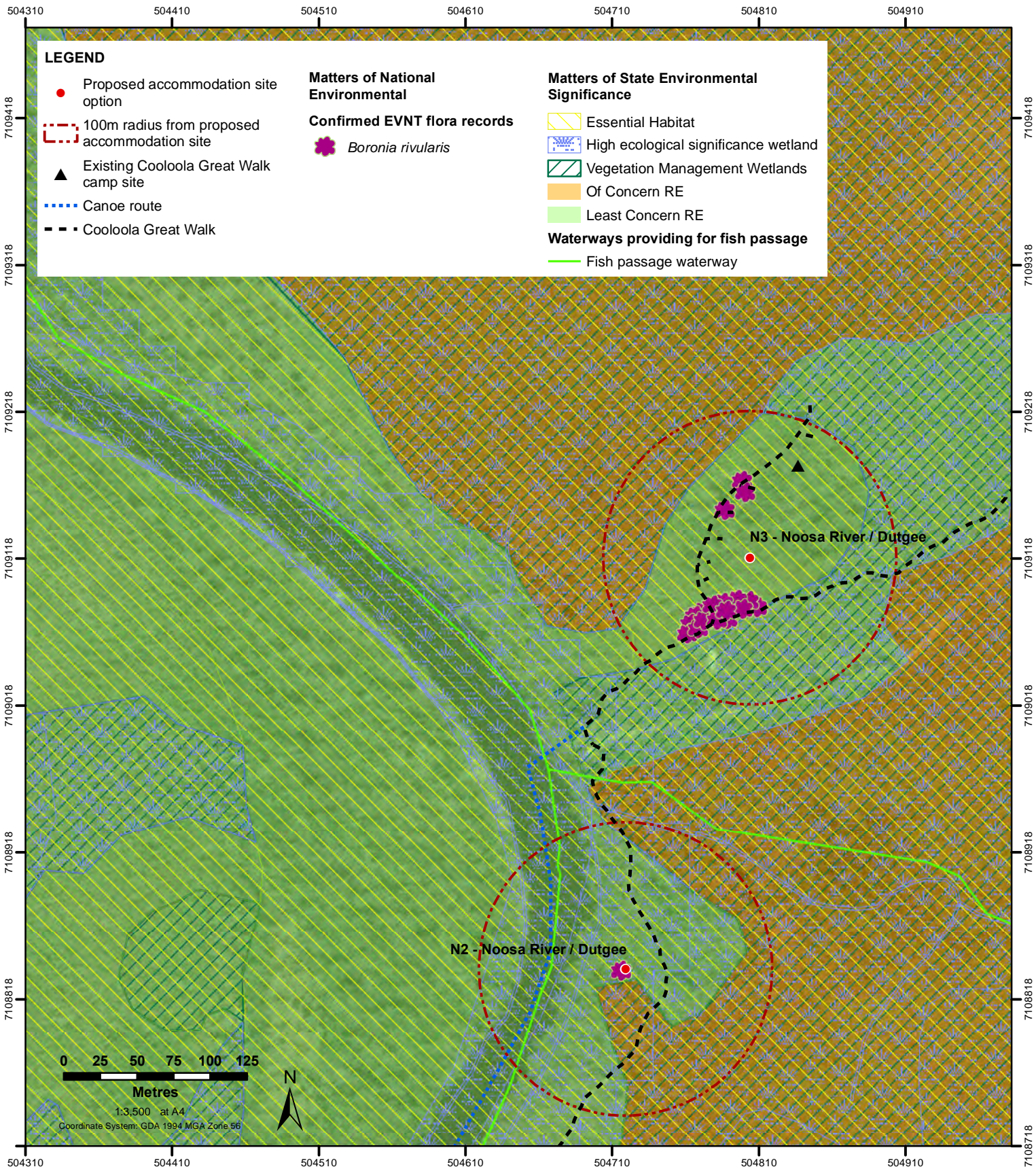
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 MSES - High Ecological Significance (HES) wetlands
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 Regional Ecosystems - Vegetation management regional ecosystem map - v11.0
 Potential TEC - Extract from Regional Ecosystems
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Drawn By: KM Reviewed by: JA Date: 31/03/2020

Figure: 3.1b
Title: Confirmed MNES and MSES - Dutgee (Sites N1 & N4)
Project: Premium Ecotourism Products – Coolooloa Great Walk
Client: Department of Environment and Science





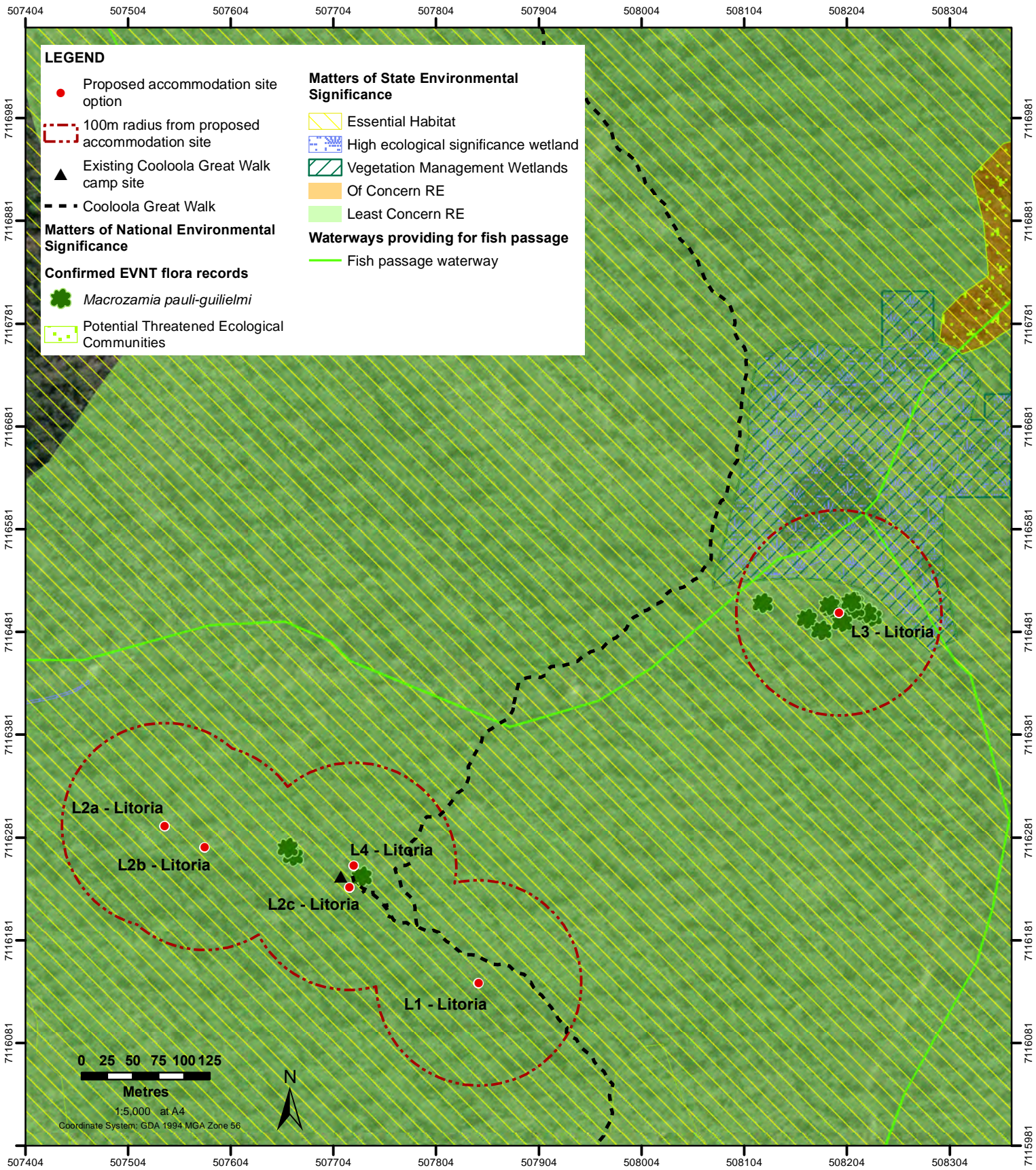
Data Sources:
 MSES - Regulated vegetation - Essential habitat - Queensland
 MSES - High Ecological Significance (HES) wetlands
 Vegetation management wetlands mapping - v5.02
 Regional Ecosystems - Vegetation management regional ecosystem map - v11.0
 Potential TEC - Extract from Regional Ecosystems
 - Vegetation management regional ecosystem map - v11.0
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Drawn By: KM Reviewed by: JA Date: 31/03/2020

Figure: 3.1c
Title: Confirmed MNES and MSES - Dutgee (Sites N2 & N3)
Project: Premium Ecotourism Products – Cooloola Great Walk
Client: Department of Environment and Science



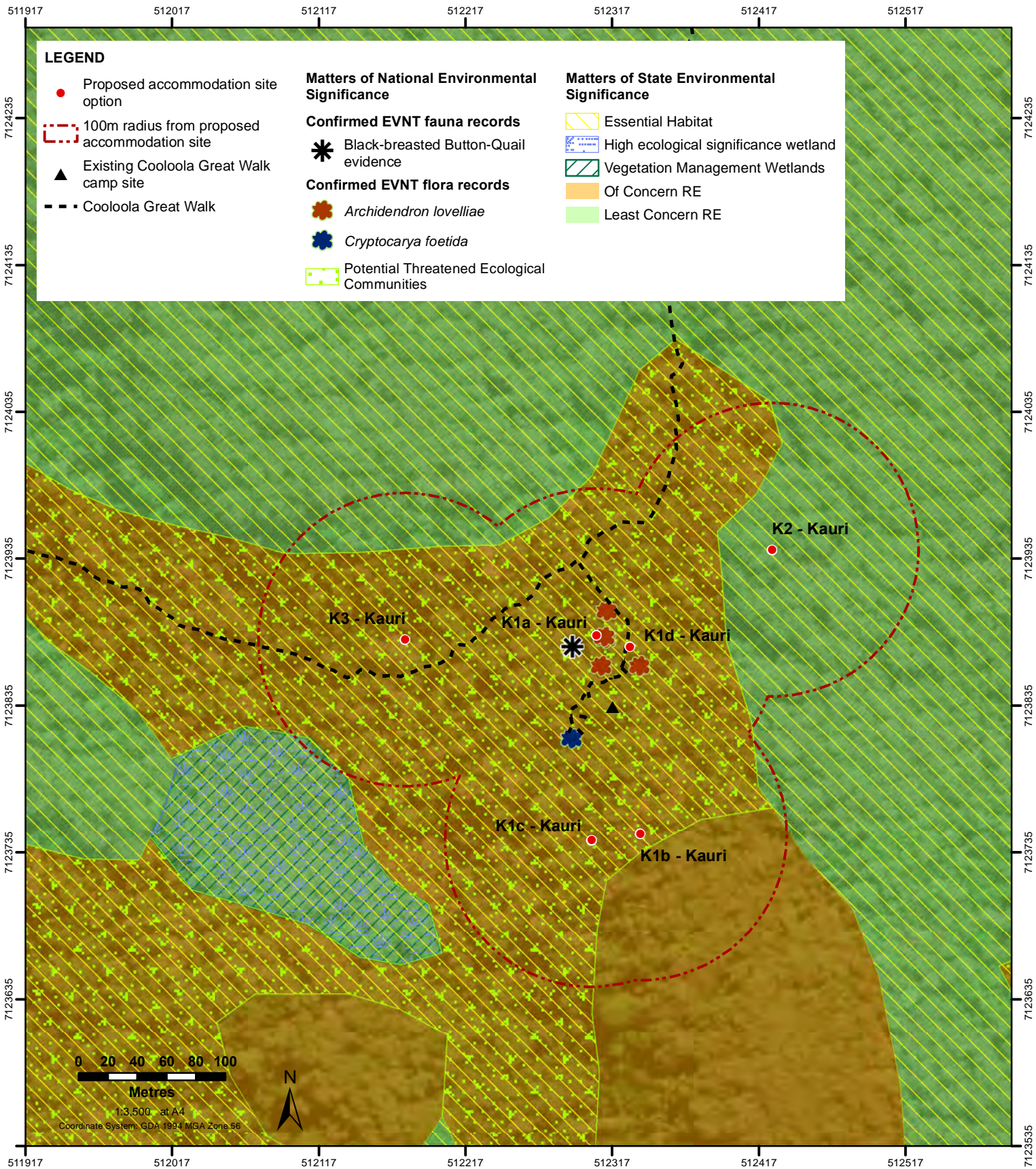


Data Sources:
 MSES - Regulated vegetation - Essential habitat - Queensland
 MSES - High Ecological Significance (HES) wetlands
 Vegetation management wetlands mapping - v5.02
 Regional Ecosystems - Vegetation management regional ecosystem map - v11.0
 Potential TEC - Extract from Regional Ecosystems
 - Vegetation management regional ecosystem map - v11.0
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 Drawn By: KM Reviewed by: JA Date: 29/03/2020

Figure: 3.1d
Title: Confirmed MNES and MSES - Litoria
Project: Premium Ecotourism Products – Cooloola Great Walk
Client: Department of Environment and Science





Site Locations



Data Sources:

MSES - Regulated vegetation - Essential habitat - Queensland
 MSES - High Ecological Significance (HES) wetlands
 Vegetation management wetlands mapping - v5.02
 Regional Ecoystems - Vegetation management regional ecosystem map - v11.0
 Potential TEC - Extract from Regional Ecoystems
 - Vegetation management regional ecosystem map - v11.0
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Drawn By: KM Reviewed by: JA Date: 31/03/2020

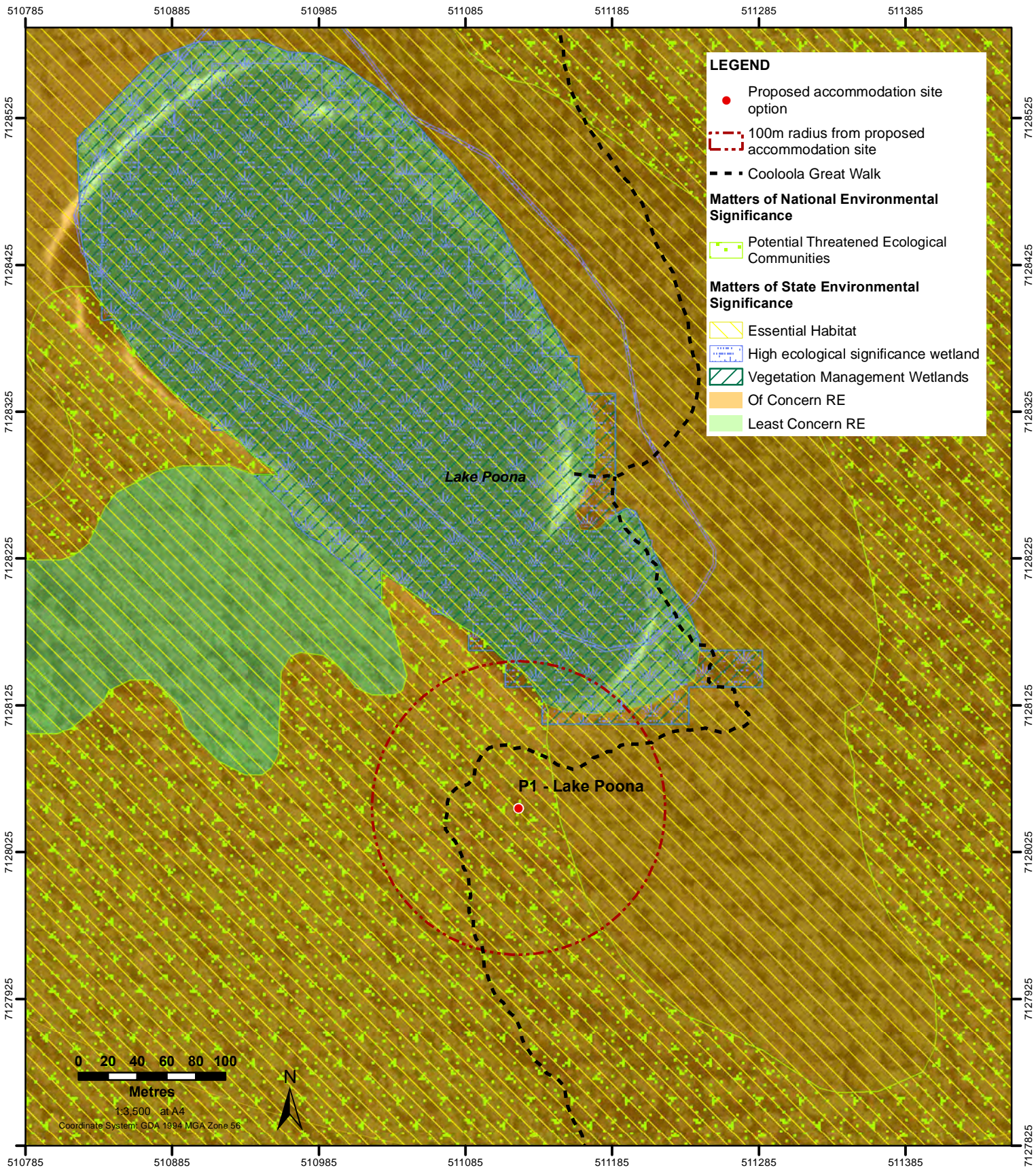
Figure: 3.1e

Title: Confirmed MNES and MSES - Kauri

Project: Premium Ecotourism Products – Cooloolo Great Walk

Client: Department of Environment and Science



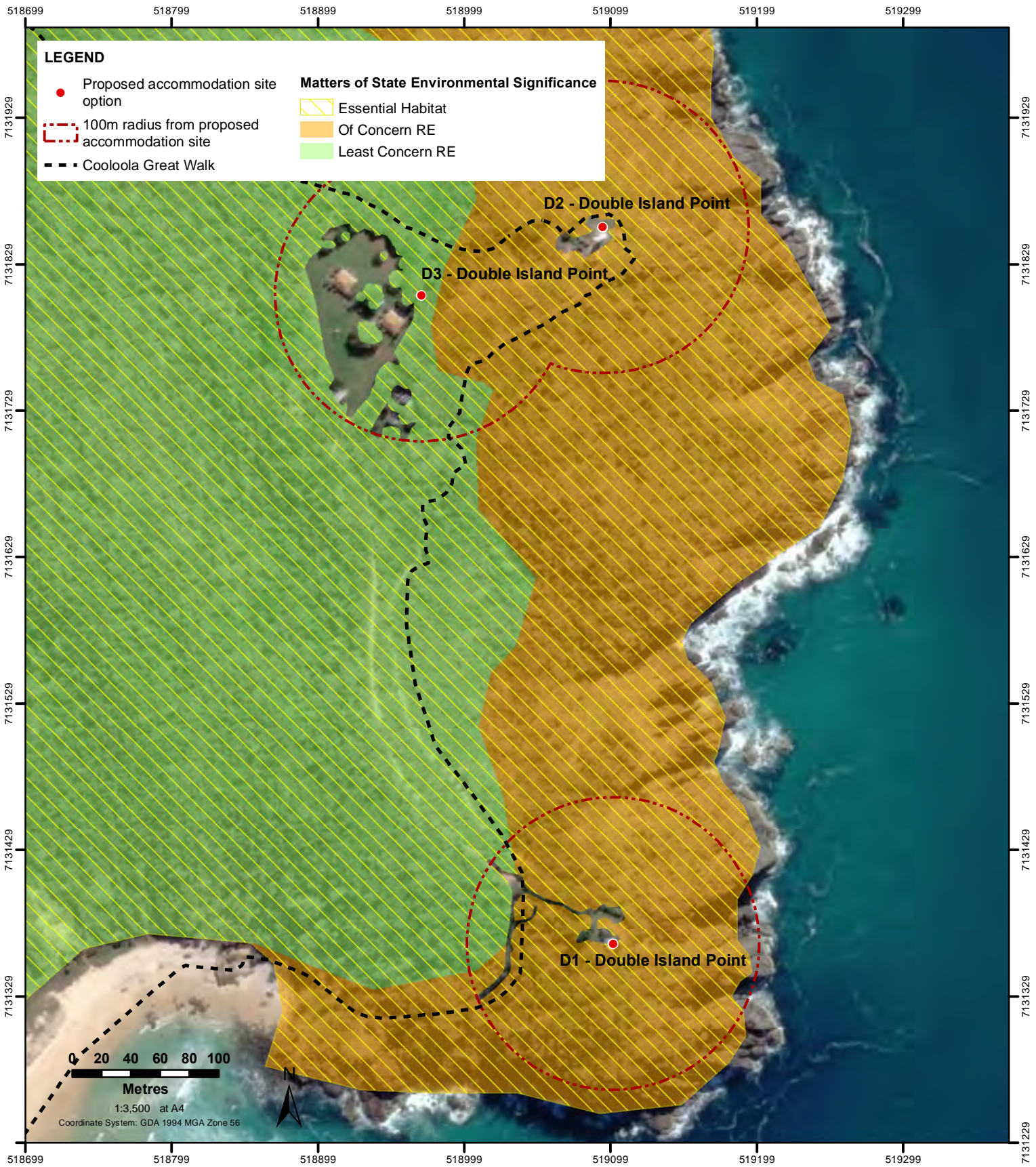


Data Sources:
 MSES - Regulated vegetation - Essential habitat - Queensland
 MSES - High Ecological Significance (HES) wetlands
 Vegetation management wetlands mapping - v5.02
 Regional Ecosystems - Vegetation management regional ecosystem map - v11.0
 Potential TEC - Extract from Regional Ecosystems
 - Vegetation management regional ecosystem map - v11.0
 State of Queensland (Department of Environment and Science) 2019

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 Drawn By: KM Reviewed by: JA Date: 29/03/2020

Figure: 3.1f
Title: Confirmed MNES and MSES - Lake Poona
Project: Premium Ecotourism Products – Coolooloa Great Walk
Client: Department of Environment and Science





Data Sources:
 MSES - Regulated vegetation - Essential habitat - Queensland
 Regional Ecosystems - Vegetation management regional ecosystem map - v11.0
 State of Queensland (Department of Environment and Science) 2019

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Drawn By: KM Reviewed by: JA Date: 29/03/2020

Figure: 3.1g
Title: Confirmed MNES and MSES - Double Island Point
Project: Premium Ecotourism Products – Coolooloa Great Walk
Client: Department of Environment and Science



Based on habitat preferences and known records, *Acronychia littoralis* is also likely to occur in the vicinity of the exiting Kauri Walkers' camp (Sites K1 and K3) and Poona Lake (Site P1).



Photo 1: *Archidendron lovelliae* specimen recorded during the survey.



Photo 2: *Macrozamia pauli-guilielmi* specimen recorded during the survey.

Fauna

The EPBC Protected Matters Search indicates numerous EPBC listed threatened fauna species could potentially occur. Those species known to occur within the vicinity of the Cooloola Great Walk based on previous records (excluding species exclusively or primarily associated with the open ocean, beaches, estuaries or intertidal environments, and/or lacustrine or riverine wetlands) include:

- Three-toed Snake-tooth Skink *Coeranoscincus reticulatus* (Vulnerable)
- Spotted-tailed Quoll (southern subspecies) *Dasyurus maculatus maculatus* (Endangered)
- Red Goshawk *Erythrotriorchis radiatus* (Vulnerable)
- Painted Honeyeater *Grantiella picta* (Vulnerable)
- Wallum Sedgefrog *Litoria olongburensis* (Vulnerable)
- Oxleyan Pygmy Perch *Nannoperca oxleyana* (Endangered)
- Southern Greater Glider *Petauroides volans volans* (Vulnerable)
- Koala *Phascolarctos cinereus* (Vulnerable)
- Grey-headed Flying-fox *Pteropus poliocephalus* (Vulnerable)
- Australian Painted Snipe *Rostratula australis* (Endangered)
- Black-breasted Button-Quail *Turnix melanogaster* (Vulnerable).

The field survey confirmed the presence of Black-breasted Button-Quail (Vulnerable) at Site K1 in the form of old platelets (foraging evidence), as shown in **Figure 3.1**. The results of the survey also indicate potential habitat for the following species occurs at one of more of the proposed accommodation sites, based on habitat type and condition:

- Three-toed Snake-tooth Skink (Vulnerable) – Sites N2, N3, N4, L1, L2, L3, L4, K1, K2 and P1.
- Wallum Sedgefrog (Vulnerable) – Site N1 (**Photo 3**) and near Site L3.
- Grey-headed Flying-fox (Vulnerable) – Sites N1, N4, L1, L2, L3, L4, K1, K2 and K3.
- Black-breasted Button-Quail (Vulnerable) – Sites T1 and P1.



Photo 3: Wallum Sedgefrog habitat at Site N1.

3.1.4 Migratory Species

The EPBC Protected Matters Search indicates numerous EPBC listed migratory fauna species could potentially occur. Those species known to occur within the vicinity of the Cooloola Great Walk based on previous records (excluding species exclusively or primarily associated with the open ocean, beaches, estuaries or intertidal environments, and/or lacustrine or riverine wetlands) include:

- Oriental Cuckoo *Cuculus optatus*
- Latham's Snipe *Gallinago hardwickii*
- Black-faced Monarch *Monarcha melanopsis*
- Satin Flycatcher *Myiagra cyanoleuca*
- Eastern Osprey *Pandion cristatus*
- Glossy Ibis *Plegadis falcinellus*
- Rufous Fantail *Rhipidura rufifrons*
- Spectacled Monarch *Symposiachrus trivirgatus*.

While none of these species were detected during the field survey, potential habitat for the following species occurs at one of more of the proposed accommodation sites, based on habitat type and condition:

- Black-faced Monarch – Sites N4, L3, K1, K3 and P1.
- Rufous Fantail – Sites T1, N1, N2, N3, N4, L1, L2, L3, L4, K1, K2, K3 and P1.
- Spectacled Monarch – Sites K1 and P1.

3.2 MATTERS OF STATE ENVIRONMENTAL SIGNIFICANCE (MSES)

3.2.1 Regulated Vegetation

State mapping of regulated vegetation indicates numerous Of Concern REs and vegetated wetlands occur within the vicinity of the Cooloola Great Walk. A large proportion of these and other remnant REs are also mapped as essential habitat for State-listed threatened species, while numerous watercourses associated with remnant vegetation are also mapped.

The field survey confirmed the State mapping of regulated vegetation is generally accurate, as shown on **Figure 3.1**. The exception is the mapping of remnant vegetation within Sites D1 – D3 at Double Island Point; these locations are adjacent to existing infrastructure and were found to comprise mown grass, concrete and horticultural flora species, rather than native vegetation communities. Existing infrastructure and cleared areas associated with Sites D1 – D3 have been removed from the regulated vegetation mapping on **Figure 3.1**.

The following Of Concern REs were confirmed within the vicinity of one or more proposed accommodation sites:

- 12.2.1 Notophyll vine forest on parabolic high dunes - including K1, K3 and P1.
- 12.2.3 Araucarian microphyll/notophyll vine forest on parabolic dunes. - just east of Site P1.
- 12.2.4 *Syncarpia hillii*, *Lophostemon confertus* tall open to closed forest on parabolic high dunes - including the area just south of Site K1, and just east of Site P1.
- 12.2.12 Closed heath on seasonally waterlogged sand plains - just south of Site N2 and surrounding the existing Dutgee Walkers' Camp (near N3).
- 12.12.19 Vegetation complex of rocky headlands on Mesozoic to Proterozoic igneous rocks - around (but not within) Sites D1, D2 and D3.

The following vegetated wetlands were confirmed within the vicinity of one or more proposed accommodation sites:

- 12.2.12 Closed heath on seasonally waterlogged sand plains - just south of Site N2 and surrounding the existing Dutgee Walkers' Camp (near N3).

- 12.3.5 *Melaleuca quinquenervia* open forest on coastal alluvium – Site N1, just south of Site N4 and surrounding and within the northern section of the existing Dutgee Walkers' Camp (near Site N3).
- 12.3.13 Closed heathland on seasonally waterlogged alluvial plains usually near coast - just south of Site N2 and surrounding the existing Dutgee Walkers' Camp (near N3).

All mapped Essential Habitat was confirmed (i.e. within or within close proximity to all proposed sites other than T1).

3.2.2 Wetlands and Watercourses

State mapping indicates wetlands of high ecological significance occur in close proximity to the Noosa River Camps (Site N1 and N4), Dutgee Walkers' Camp (Sites N2 and N3), Site L3 and Site P1.

The field survey confirmed this mapping, with wetland habitats and watercourses evident within the vicinity of these sites.

3.2.1 Protected Wildlife Habitat

Areas mapped by the State as essential habitat indicate the potential presence of protected wildlife habitat. This mapping layers cover the majority of the Cooloola Great Walk and adjacent areas.

Flora species listed as Endangered or Vulnerable under the NC Act that are known to occur within the vicinity of the Cooloola Great Walk based on previous records include:

- *Acacia attenuata* (Vulnerable)
- *Acacia baueri* subsp. *Baueri* (Vulnerable)
- *Acronychia littoralis* (Endangered)
- *Allocasuarina emuina* (Endangered)
- *Archidendron lovelliae* (Vulnerable)
- *Arthraxon hispidus* (Vulnerable)
- *Blandfordia grandiflora* (Endangered)
- *Boronia keysii* (Vulnerable)
- *Bosistoia transversa* (Vulnerable)
- *Carex breviscapa* (Vulnerable)
- *Cryptocarya foetida* (Vulnerable)
- *Eucalyptus conglomerata* (Endangered)
- *Floydia praealta* (Vulnerable)

- *Macadamia integrifolia* (Vulnerable)
- *Macadamia ternifolia* (Vulnerable)
- *Mallotus megadontus* (Vulnerable)
- *Marsdenia coronata* (Vulnerable)
- *Parsonsia sankowskyana* (Endangered)
- *Pomaderris crassifolia* (Vulnerable)
- *Prostanthera spathulata* (Vulnerable)
- *Ricinocarpos speciosus* (Vulnerable)
- *Romnalda strobilacea* (Vulnerable)
- *Xanthostemon oppositifolius* (Vulnerable).

The field survey confirmed the presence of the following Endangered or Vulnerable flora species within or within close vicinity of one or more proposed accommodation sites, as shown on **Figure 3.1**:

- *Archidendron lovelliae* (Vulnerable) - recorded as seedlings, saplings and canopy trees throughout the vegetation surrounding the existing Kauri Walkers' camp (Site K1). Also present in habitat represented within and around Site K3 and Site P1, although not detected within 100m of these sites.
- *Cryptocarya foetida* (Vulnerable) - recorded as a sapling from vegetation surrounding the existing Kauri Walkers' camp (Site K1). Also present in habitat represented within and around Site K3, although not detected within 100m of this site.
- *Macrozamia pauli-guilielmi* (Endangered) – recorded throughout the existing Litoria Walkers' camp, and particularly abundant at Site L3 and near Sites L2 and L4.

The field survey also confirmed the presence of *Boronia rivularis* (**Photo 4**) (listed as Near Threatened under the NC Act) throughout Sites N2 and N3, and in areas surrounding Sites N1 and N4. Although Near Threatened species are not technically recognised as MSES, these species are protected under the State's protected plant framework in accordance with the NC Act, and are also recognised as important values under the QPWS Operational Policy and Procedural Guide for assessing the impact of QPWS actions on natural and cultural values.

Based on habitat preferences and known records, the following EVNT flora species are also likely to occur:

- *Acronychia littoralis* (Endangered) - potential to occur in the vicinity of Kauri Walkers' camp

(near Sites K1 and K3) and Poona Lake (near Site P1).

- *Blandfordia grandiflora* (Endangered) – potential to occur in the sedge/swamp and wet heath habitat near the Noosa River and Dutgee sites.
- *Glycine argyrea* (Near Threatened) – likely to occur in ecotone areas between open forest and rainforest in the vicinity of Kauri Walkers' camp (near Sites K1 and K3) and Poona Lake (near Site P1).
- *Tecomanthe hillii* (Near Threatened) – potential to occur in rainforest at Kauri Walkers' camp (near Sites K1 and K3) and Poona Lake (near Site P1).



Photo 4: *Boronia rivularis* specimen recorded during the survey.

Fauna species listed as Endangered or Vulnerable under the NC Act that are known to occur within the vicinity of the Cooloola Great Walk based on previous records (excluding species exclusively or primarily associated with the open ocean, beaches, estuaries or intertidal environments, and/or lacustrine or riverine wetlands) include:

- Common Death Adder *Acanthophis antarcticus* (Vulnerable)
- Tusked Frog *Adelotus brevis* (Vulnerable)
- Glossy Black-Cockatoo *Calyptorhynchus lathamii* (Vulnerable)
- Wallum Froglet *Crinia tinnula* (Vulnerable)
- Spotted-tailed Quoll (southern subspecies) (Vulnerable)
- Red Goshawk (Endangered)
- Painted Honeyeater (Vulnerable)
- Wallum Rocketfrog *Litoria freycineti* (Vulnerable)
- Wallum Sedgefrog (Vulnerable)

- Oxleyan Pygmy Perch (Vulnerable)
- Powerful Owl *Ninox strenua* (Vulnerable)
- Richmond Birdwing *Ornithoptera richmondia* (Vulnerable)
- Southern Greater Glider (Vulnerable)
- Ground Parrot (Eastern) *Pezoporus wallicus wallicus* (Vulnerable)
- Koala (Vulnerable)
- Plumed Frogmouth *Podargus ocellatus plumiferus* (Vulnerable)
- Australian Painted Snipe (Vulnerable)
- Southern Emu-wren *Stipiturus malachurus* (Vulnerable)
- Black-breasted Button-Quail (Vulnerable).

Platypus *Ornithorhynchus anatinus* and Short-beaked Echidna *Tachyglossus aculeatus* (both listed as Special Least Concern under the NC Act) are also known from the vicinity of the study area.

The field survey confirmed the presence of Black-breasted Button-Quail (Vulnerable) at Site K1 in the form of old platelets (foraging evidence), as shown on **Figure 3.1**. The results of the survey also indicate potential habitat for the following species occurs at one or more of the proposed accommodation sites, based on habitat type and condition:

- Glossy Black-Cockatoo (Vulnerable) – Sites L2, L4 and K2.
- Wallum Froglet (Vulnerable) – Site N1 and near Site L3.
- Wallum Sedgefrog (Vulnerable) – Site N1 and near Site L3 (**Photo 5**).
- Southern Emu-wren (Vulnerable) – Sites N2, N3 and L1.
- Black-breasted Button-Quail (Vulnerable) – Sites T1 and P1.



Photo 5: Significant frog habitat (background) near Site L3.

The field survey also indicates potential habitat for Cooloola Blind Snake *Ramphotyphlops silvia* (Near Threatened) at Site P1. Although Near Threatened species are not technically recognised as MSES, these species are recognised as important values under the QPWS Operational Policy and Procedural Guide for assessing the impact of QPWS actions on natural and cultural values.

3.2.2 Marine Parks

There are no marine parks recognised within the vicinity of the Cooloola Great Walk.

3.2.3 Fish Habitat Areas

Lake Cooroibah is a recognised fish habitat area, a portion of which occurs near the southern-most portion of the Cooloola Great Walk. None of the proposed accommodation sites are located within, or in close proximity to this fish habitat area.

3.2.4 Waterways Providing for Fish Passage

A number of waterways mapped by the State as providing for fish passage occur within the vicinity of the Cooloola Great Walk, from the vicinity of Freshwater Lake to the vicinity of Dutgee Walker's Camp. Lake Cooroibah is also recognised as an estuary providing for fish passage.






The field survey confirmed the presence of waterways in close proximity to the Noosa River Camps (Site N1 and N4), Dutgee Walkers' Camp (Sites N2 and N3) and Site L3. However, there will be no impacts upon fish passage from the establishment and operation of the proposed accommodation sites.





3.2.5 Marine Plants





State mapping of remnant vegetation and estuarine habitat indicates marine plants are likely to be restricted to Lake Cooroibah and its immediate surrounds.





The field survey confirmed no marine plants occur within close proximity to any of the proposed accommodation sites.

Table 3.1. Summary of ecological values and generally suitability of each proposed accommodation site

Site	GPS coordinates	Photos	Description of Ecological Values and General Suitability
TEEWAH			
Site T1 (H29, Q16)	-26.270841 153.065656		<p>This area consists of wattle regrowth, providing generally low quality habitat. Mapped as least concern RE 12.2.14.</p> <p>The site adjoins vegetation that provides a mosaic of coastal foredune scrub offering potential habitat for Black-breasted Button-Quail, although of generally low quality in the proposed location such that a significant impact would not result from the limited clearing required. Rufous Fantail may also occasion this area though no significant impact would result from the clearing required.</p> <p>Conclusion/recommendation: the site is a suitable pod location, although the area along the existing great walk contains listed invasive species, which should be controlled if another access track is developed off the existing great walk track.</p>
NOOSA RIVER / DUTGEE WALKERS' CAMP			
Site N1 (H5, Q2)	-26.15136 153.04485		<p>This area is a <i>Melaleuca</i> swamp full of sedges, reeds and a number of hollow bearing trees. Ground-truthed as least concern wetland RE 12.3.5, bordered to the east by least concern RE 12.2.6 and to the west by least concern RE 12.2.5.</p> <p>This site forms part of a wetland of high ecological significance and provides high quality habitat for threatened fauna species such as Wallum Sedgefrog and Grey-headed Flying Fox, as well as other, State-listed acid frogs and general habitat for Rufous Fantail. <i>Boronia rivularis</i> (NC Act = NT) is also common in the close vicinity.</p> <p>Conclusion/recommendation: Not a suitable location.</p> <p>An alternative location is proposed to the north-east (Appendix B). At this location the pods could be nestled in amongst the trees. This location is close to existing Great Walks track. The potential for Koalas at this location is low, despite suitable food trees.</p>
Site N2 (H10)	-26.139752 153.047209		<p>This area consists of dense ground and mid layer vegetation. Confirmed as least concern RE 12.2.5, with Of Concern and wetland RE 12.2.12 and least concern wetland REs 12.3.13 just to the south.</p> <p>This site forms part of a wetland of high ecological significance and provides potential habitat for Three-toed Snake-tooth Skink, Rufous Fantail and, to a lesser degree, Southern Emu-wren, although habitats values are not to the extent that a significant impact would result from the clearing required. However, <i>Boronia rivularis</i> is common throughout this site, including a large patch at the pod location, becoming infrequent south and west of this location.</p> <p>Conclusion/recommendation: This site would require considerable removal of ground and mid layer vegetation, which may include State listed flora. An alternative site would be preferable in terms of avoiding ecological impacts.</p>
Site N3	-26.13722222 153.0480555		<p>Confirmed as least concern RE 12.2.5 and least concern wetland RE 12.3.5. Surrounded by Of Concern wetland RE 12.2.12 and least concern wetland REs 12.3.5 and 12.3.13.</p> <p><i>Boronia rivularis</i> is common and abundant throughout this site, with large patches occurring at the entrance trail to the existing campsite. It becomes more restricted to some smaller patches within the existing campsite. This area is adjacent to a wetland of high ecological significance and provides potential habitat for Three-toed Snake-tooth Skink and Rufous Fantail, as well as some low potential for Southern Emu-wren, although not to the extent that a significant impact would result from the clearing required.</p> <p>Conclusion/recommendation: May impact on State listed flora. An alternative site that utilises existing, cleared areas would be preferable in terms of avoiding ecological impacts.</p>
Site N4 (H1, Q1)	-26.15267 153.05056		<p>This area consists of occasional, large hollow bearing trees surrounded by more dominant, smaller whipstick regrowth. Confirmed as least concern RE 12.2.6, with least concern wetland REs 12.3.5 just to the south.</p> <p>This site is adjacent to a wetland of high ecological significance and provides potential habitat for Three-toed Snake-tooth Skink, Black-faced Monarch, Rufous Fantail, and Grey-headed Flying-fox, although not to the extent that a significant impact would result from the clearing required. <i>Boronia rivularis</i> occurs within the area but not in the exact location of the pod or jetty/access track.</p> <p>Conclusion/recommendation: This is a suitable pod location, if the pods can be sensitively placed between larger trees. To reduce impact the pods should be located between these two points: -26.151982, 153.050658 and -26.153208, 153.050485.</p>

Site	GPS coordinates	Photos	Description of Ecological Values and General Suitability
			<p>It is suggested that the jetty be constructed just north-west of the pod locations (-26.152673, 153.050444). This location would provide low environmental impact and, potentially, a gentle approach for vessels and deep water for larger vessels.</p>
LITORIA WALKERS' CAMP			
Site L1 (H14, Q8)	-26.07381 153.07844		<p>Some large grass trees, habitat trees and logs occur within the area. RE confirmed as least concern 12.2.8.</p> <p>The vegetation provides potential habitat for Three-toed Snake-tooth Skink, Grey-headed Flying Fox, Southern Emu-wren and Rufous Fantail, although not to the extent that a significant impact would result from the clearing required.</p> <p>Conclusion/recommendation: This area provides a suitable location with minimal impact if the larger trees are retained. However, the slope presents some design constraints.</p>
Site L2 (H15, Q9)	-26.07243 153.07538 -26.07262 153.07577 Service pod/fire shelter -26.07297 153.07718		<p>This area adjoins the existing camp and contains some very large stag trees. RE confirmed as least concern 12.2.8.</p> <p><i>Macrozamia pauli-guilielmi</i> is common throughout the existing campsite grounds. The area provides potential habitat for Three-toed Snake-tooth Skink, Grey-headed Flying Fox, Glossy Black-Cockatoo and Rufous Fantail, although not to the extent that a significant impact would result from the clearing required.</p> <p>Conclusion/recommendation: This area could be a suitable pod location, provided the <i>Macrozamia pauli-guilielmi</i> are avoided. However, the large stags may present safety issues.</p>
Site L3 (H11, Q7)	-26.0705555 153.0819444		<p>The site contains large black butt trees with views of the lake. RE 12.2.8 was confirmed.</p> <p><i>Macrozamia pauli-guilielmi</i> is abundant throughout this site, and particularly dense in the current pod location. This site is also adjacent to a wetland of high ecological significance and provides potential habitat for Three-toed Snake-tooth Skink, Black-faced Monarch, Grey-headed Flying Fox and Rufous Fantail, although not to the extent that a significant impact would result from the clearing required.</p> <p>Conclusion/recommendation: Not a suitable location. The site also lacks the feeling of being tucked away as it is on the edge of the main track. It is not possible to move the location any closer to the lake as this area comprises habitat for significant frog species.</p> <p>Alternative site locations to the south of the main track are detailed in Appendix B. These alternative site locations had no EVNT plant species encountered.</p>
Site L4	-26.0727777 153.0772222	Refer to Sites L1 and L2	<p>Below current Litoria camping area on ridge. RE confirmed as least concern 12.2.8.</p> <p><i>Macrozamia pauli-guilielmi</i> is common throughout the existing campsite grounds. The area provides potential habitat for Three-toed Snake-tooth Skink, Grey-headed Flying Fox, Glossy Black-Cockatoo and Rufous Fantail, although not to the extent that a significant impact would result from the clearing required.</p> <p>Conclusion/recommendation: This area could be a suitable pod location, provided the <i>Macrozamia pauli-guilielmi</i> are avoided. Easy to service from vehicle track and trail. May be too close to existing camp.</p>

Site	GPS coordinates	Photos	Description of Ecological Values and General Suitability
KAURI WALKERS' CAMP			
Site K1 (H16, Q10)	-26.00386 153.12297 -26.00508 153.12327 -26.00512 153.12294 Service pod/fire shelter -26.00393 153.1232		<p>The site consists of rainforest habitat. Of concern RE 12.2.1 was confirmed on site with an ecotone occurring to the south of the site with Of concern RE 12.2.4.</p> <p>This site may contain a TEC, subject to whether the patch of RE 12.2.1 meets certain diagnostic/condition criteria (which can only be confirmed through additional sampling elsewhere in the patch). Furthermore, <i>Archidendron lovelliae</i> (NC Act = V and EPBC Act = V) and <i>Cryptocarya foetida</i> (NC Act = V and EPBC Act = V) are common as seedlings, sapling and mature trees within the vegetation surrounding the existing camp sites. Old Black-breasted Button Quail evidence was also present in the area, and the rainforest vegetation also provides high quality habitat for Three-toed Snake-tooth Skink, Black-faced Monarch, Rufous Fantail, Grey-headed Flying-fox and Spectacled Monarch.</p> <p>Conclusion/recommendation: Not an ideal location, although the existing cleared areas could be used. If the existing cleared campsite areas are used and EVNT listed flora and habitat are avoided, this may be a suitable site.</p>
Site K2 (H18, Q12)	-26.00333333 153.1241666		<p>This site is a Black butt dominated forest with <i>Casuarina torulosa</i> present throughout. RE confirmed as the least concern RE 12.2.8.</p> <p>The vegetation provides potential habitat for Three-toed Snake-tooth Skink, Rufous Fantail, Grey-headed Flying-fox and Glossy Black-Cockatoo, although not to the extent that a significant impact would result from the clearing required.</p> <p>Conclusion/recommendation: This site could be a suitable pod location, although tree removal may be required, and it is located in close proximity to an access road. It is also not located in 'rainforest', if this is a desired camp experience.</p> <p>An alternative location with very little clearing required is outlined in Appendix B.</p>
Site K3 (H17, Q11)	-26.00388888 153.1216666		<p>Of concern RE 12.2.1 was confirmed on site. It contains a very large stag tree.</p> <p>This site may contain a TEC, subject to whether the patch of RE 12.2.1 meets certain diagnostic/condition criteria (which can only be confirmed through additional sampling elsewhere in the patch). RE 12.2.1 also contains EVNT species in close proximity to the site. This area also provides potential habitat for Black-faced Monarch, Grey-headed Flying-fox, and Rufous Fantail, although not to the extent that a significant impact would result from the clearing required.</p> <p>Conclusion/recommendation: This site could be a suitable pod location, if sensitively positioned, although an alternative site would be preferable in terms of avoiding ecological impacts. The ground is also sloped, which would require levelling or design changes.</p> <p>An alternative location is outlined in Appendix B.</p>
POONA LAKE			
Site P1 (H19, Q13)	-25.966193 153.111098		<p>The area contains very intact high value bushland. Contains well-developed Of concern RE 12.2.1 and transitions into an ecotone with of concern REs 12.2.3/12.2.4.</p> <p>This site may contain a TEC, subject to whether the patches of RE 12.2.1 and/or 12.2.3 meet certain diagnostic/condition criteria (which can only be confirmed through additional sampling elsewhere in the patches). <i>Archidendron lovelliae</i> also occurs within the vicinity, and other EVNT plants likely occur. This area is also adjacent to a wetland of high ecological significance and provides high quality potential habitat for Three-toed Snake-tooth Skink, Black-breasted Button-Quail, Black-faced Monarch, Rufous Fantail, Spectacled Monarch, and some potential for Cooloola Blind Snake.</p> <p>Conclusion/recommendation: Not an optimal pod location. It is also on a slope which will require additional design considerations.</p>

Site	GPS coordinates	Photos	Description of Ecological Values and General Suitability
			
DOUBLE ISLAND POINT			
Site D1 (H23, Q14)	-25.93622 153.19076		Maintained grassland in a flat area on top of a hill. Nothing of ecological significance. Conclusion/recommendation: While the cleared site could be suitable as a pod location, it is surrounded by Of Concern RE 12.12.19 and is heavily used by day visitors. Recommend an alternative site.
Site D2 (H24, Q15)	-25.9318 153.19068		Small mown lawn next to a lighthouse. Nothing of ecological significance. Conclusion/recommendation: This site is very exposed, heavily used by day visitors and surrounded by Of Concern RE 12.12.19. Therefore, it is not suitable as a pod location. Alternative locations are provided in Appendix B .
Site D3 (H27)	-25.93222222 153.1894444		An existing disturbed area containing both garden species and native vegetation. Nothing of ecological significance. Conclusion/recommendation: This location is ideal for pod placement, provided they are sensitively positioned around existing native vegetation (surrounded by Of Concern RE 12.12.19). A suitable alternative/additional location is also provided in Appendix B .

4.0 IMPACT ASSESSMENT

4.1 IMPACT MECHANISMS

4.1.1 *Vegetation Removal*

It is expected some removal of vegetation will need to occur for the siting and construction of accommodation infrastructure and access tracks.

Removal of vegetation reduces the total amount of habitat and populations of flora and fauna, and has the potential to result in fragmentation of habitats and populations, changes to remaining vegetation that cause the loss of food, breeding and shelter resources for fauna, and exposure to introduced species that are either competitors or predators. The removal of vegetation can also result in direct loss of individual plants, including EVNT species, and large trees that may provide breeding and sheltering resources for fauna, and can result in the mortality of fauna present at the time of vegetation removal.

Secondary impacts can affect peripheral vegetation through:

- soil disturbance/exposure and altered water flow patterns, and subsequent erosion and sedimentation, which may expose tree roots, smother vegetation, and potentially alter the physical form, chemical processes and ecological health of downstream aquatic and riparian habitats; and
- increased desiccation, light penetration, wind-throw, herbivory, weed invasion, nest predation, and parasitism for adjacent flora and fauna. In particular, introduced weeds can change vegetation community composition and, in some cases, increase the intensity of fire, leading to further community degradation.

The removal of vegetation can also create barriers to fauna movement through habitat fragmentation, affecting reproductive cycles and facilitating the incursion of pest species and aggressive, native “edge” species deeper into woodlands and forests.

4.1.2 *Construction and Operation*

In addition to vegetation removal and the associated secondary (or indirect) impacts, the construction and operation of the accommodation sites (and the expected associated increase in use of the existing Cooloola Great Walk track) have the potential to result in on-going disturbance to surrounding habitats.

Artificial lighting may affect behaviour of both nocturnal and diurnal fauna, both vertebrate and invertebrate, including interfering with birds that migrate at night; altering reproductive behaviour of frogs; disrupting communication between individual mammals and birds; focusing the foraging activities of insectivores; and increasing the likelihood of predation for some species.

Similarly, noise, including background noise, generated by human activities can potentially affect behaviour and persistence of species and communities by, for example, masking of alarm and mating calls, location and motion of resources, obstructions or potential harms; in short, noise pollution affects the sending and reception of behavioural and social signals in faunal communities.

Construction/maintenance vehicles and accommodation guests have the potential to introduce and/or spread weed species and plant pathogens, and damage vegetation (including EVNT flora species and important habitat features) through unauthorised or inadvertent access to adjacent habitats. General waste and land disturbance also has the potential to attract highly competitive and/or predatory exotic fauna species.

Increased human presence has the potential to increase the frequency of accidental fires within vegetated areas, adversely affecting habitat structure and, therefore, habitat value for a range of significant species.

Degradation of adjacent and downstream habitats can also result from increased local nutrient loads (e.g. from insufficiently treated/contained wastewater), contamination (from insufficiently contained hazardous substances) and altered drainage.

4.2 IMPACT MANAGEMENT

The overarching principle of relevant State and Commonwealth environmental protection policies in terms of impact management is to avoid impacts as much as possible in the first instance, following which mitigation measures should be used in an attempt to reduce unavoidable impacts to acceptable/insignificant levels. Where impacts remain at unacceptable/significant levels post-mitigation, only then should compensatory measures (e.g. offsets) be employed as a last resort.

4.2.1 Impact Avoidance

The most effective means of avoiding direct impacts associated with the removal of vegetation and associated loss of habitat and flora species is through appropriate development footprint location and design. **Table 3.1** provides an appraisal of the proposed accommodation sites in terms of potential impacts to ecological values, with reference to suitable sites, or possible alternative sites in **Appendix B**, in the interests of avoiding the removal of significant flora/habitat and vegetation clearing in general. **Section 4.3** assesses the significance of likely residual (post-mitigation) impacts to MNES and MSES to further inform the selection of a preferred site for each general camp location, as outlined in **Section 4.4**.

It is also assumed that, once the preferred sites are selected, additional measures will be incorporated to avoid unnecessary impacts to ecological values. At the time of preparing this report, details regarding the design, construction, operation and maintenance of the proposed accommodation sites were not yet available. For the purposes of this preliminary assessment of impacts to inform site selection, it is assumed the sites will be of a similar design and function as those recently approved for the Scenic Rim Trail and Eco-accommodation Project, which were also proposed in response to the Queensland Government initiative to facilitate ecotourism on the state's national park estate. Assumed key measures in terms of impact avoidance include:

- Positioning of sites and associated infrastructure to include existing cleared areas and/or avoid the removal of large trees and other important habitat features, where feasible in terms of functionality and safety.
- Use of an appropriately qualified "flora spotter" during final site footprint selection and vegetation clearing to ensure direct impacts to EVNT species are avoided.

- Raised accommodation structures and storage that enable natural stormwater flows to continue unaffected.
- Fully contained septic/wastewater systems, with all waste products removed from site at appropriate intervals.
- Dedicated storage structures for flammable liquids and other hazardous substances, with chemicals for weed treatment managed by specialist contractors and not stored on site
- Limiting guests per night/tour to small numbers (up to 16), with all guests accompanied and supervised by highly trained guides and educated on the avoidance of environmental impact, particularly in relation to access restrictions to prevent unnecessary damage to vegetation and important habitat features, and containment of waste.
- Cancelling or postponing tours during periods of extreme bushfire risk and/or in response to high biosecurity risks.
- Preparation and implementation of Environmental Management Plans that commit to the ongoing maintenance of the sites and appropriate environmental standards over the life of the project, and the ongoing monitoring and management of avoidable impacts, particularly from unnecessary vegetation clearing, insufficiently contained/treated wastewater and hazardous substances, and unnecessary bushfire and biosecurity risks.

4.2.2 Impact Mitigation

Assumed key measures in terms of impact mitigation include:

- Limiting the total removal of a vegetation to small areas (< 0.3ha per site, restricted to ground-layer and shrubs where possible) to accommodate structures and associated tracks.
- Use of appropriately qualified fauna spotters during vegetation clearing to ensure any resident fauna and important habitat features are appropriately managed.
- Incorporating site designs that minimises impacts from artificial lighting.
- Limiting guests per night/tour to small numbers (up to 16), with all guests accompanied and supervised by highly trained guides and educated on the minimisation of environmental impact,

particularly in relation to the introduction and spread of weeds and plant pathogens, bushfire risk and noise.

- Preparation and implementation of Environmental Management Plans that commit to the ongoing maintenance of the sites and appropriate environmental standards over the life of the project, and the ongoing monitoring and mitigation of impacts. For example:
 - Ensuring construction equipment and vehicles are cleaned and certified “weed free” before entering the National Park.
 - ensuring all personnel and guests have clean clothing and footwear before entering the National Park.
 - providing chemical footbaths at the commencement of the Great Walk trail and at each accommodation site.
 - training tour guides in the identification of weeds and other indicators of ecological impact (such as evidence of pest animal species), such that they can provide regular feedback as part of a broader monitoring regime.
 - training tour guides in the identification of animal breeding places, such that they can provide feedback on potential impacts to animal breeding activity (e.g. if a big nest or flying-fox roost is established within or within close proximity to one of the sites) as part of a broader monitoring and impact mitigation regime.

4.3 SIGNIFICANCE OF RESIDUAL IMPACTS UPON MATTERS OF ENVIRONMENTAL SIGNIFICANCE

The following sections assess the likelihood of significant impacts to MNES and MSES after the assumed key avoidance and mitigation measures outlined above have been implemented. In particular, these assessments assume the relevance of any “net”, residual impacts (i.e. beyond those that would or could occur as a result of the current and ongoing use of the Cooloola Great Walk and existing camps in the absence of any additional accommodation sites) will be restricted to MNES and MSES confirmed as occurring or potentially occurring within or within close proximity to the proposed accommodation sites. This key assumption is particularly reliant on measures that would ensure an increase in visitor numbers does not result in a proportional increase in impacts to MNES and MSES in the vicinity of the Great Walk track or throughout the National Park in general, such as the use of guides to supervise and educate guests on the avoidance and mitigation of environmental impacts.

4.3.1 Commonwealth Self Assessment

The field survey has confirmed that the project may result in residual impacts upon the following MNES:

- **Critically Endangered TECs**, including either the Lowland Rainforest of Subtropical Australia, or the Littoral Rainforests and Coastal Vine Thickets of Eastern Australia.
- **Endangered Flora Species**, including *Acronychia littoralis* and *Macrozamia pauli-guilielmi*.
- **Vulnerable Flora Species**, including *Archidendron lovelliae* and *Cryptocarya foetida*.
- **Vulnerable Fauna Species**, including Wallum Sedgefrog, Three-toed Snake-tooth Skink, Black-breasted Button-Quail and Grey-headed Flying-fox.
- **Migratory Fauna Species**, including , Rufous Fantail, Black-faced Monarch and Spectacled Monarch.

Tables 4.1 to 4.5 summarise an assessment of the significance of residual impacts upon these MNES, based on the criteria specified in the *Matters of National Environmental Significance: Significant Impact Guidelines 1.1* (DotE 2013).

Table 4.1: Assessment against significance impact criteria for Critically Endangered TECs	
<i>An action is likely to have a significant impact on an Endangered TEC if there is a real chance or possibility that it will:</i>	The results of the field survey indicate patches of vegetation mapped as RE 12.2.1 and 12.2.3 in the vicinity Kauri walkers' camp (Sites K1 and K3) and Poona Lake (Site P1) are likely to represent either the Lowland Rainforest of Subtropical Australia TEC, or the Littoral Rainforests and Coastal Vine Thickets of Eastern Australia TEC. Further sampling effort across each patch (including areas beyond that assessed as part of this study) would be required to confirm their TEC status; in the meantime, it should be assumed one of these TECs is present.
<i>Reduce the extent of an ecological community</i>	The establishment of accommodation infrastructure at Sites K1 or K3, and P1, could result in a reduction in extent of either the Lowland Rainforest of Subtropical Australia TEC, or the Littoral Rainforests and Coastal Vine Thickets of Eastern Australia TEC. However, the relatively small size of the maximum total reduction in extent likely to occur (<0.5ha) in comparison to the combined, overall patch sizes of the TECs at these locations (9.5ha), and the expectation that canopy trees and pockets of understorey vegetation will be retained within the camp site design wherever feasible, suggest this would not represent a significant impact.
<i>Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines</i>	The proposed positioning, and likely configuration and area of clearing required at each location (<0.3ha), would not fragment the TEC patch at these locations.
<i>Adversely affect habitat critical to the survival of an ecological community</i>	At each site, it is assumed appropriate measures will be implemented to: <ul style="list-style-type: none"> - enable natural stormwater flows to continue unaffected; - prevent wastewater and hazardous substances from entering the environment; - prevent unnecessary access and damage to surrounding vegetation; - minimise bushfire and biosecurity risks; and - minimise the introduction and spread of weeds and plant pathogens. If so, the likelihood of the establishment and operation of the proposed sites adversely affecting habitat critical to the survival of an ecological community is considered low.
<i>Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns</i>	At each site, it is assumed appropriate measures will be implemented to: <ul style="list-style-type: none"> - enable natural stormwater flows to continue unaffected; and - prevent wastewater and hazardous substances from entering the environment. If so, the likelihood of the establishment and operation of the proposed sites modifying or destroying abiotic (non-living) factors necessary for an ecological community's survival is considered low.
<i>Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting</i>	At each site, it is assumed appropriate measures will be implemented to: <ul style="list-style-type: none"> - enable natural stormwater flows to continue unaffected; - prevent wastewater and hazardous substances from entering the environment; - prevent unnecessary access and damage to surrounding vegetation; - minimise bushfire and biosecurity risks; and - minimise the introduction and spread of weeds and plant pathogens. If so, the likelihood of the establishment and operation of the proposed sites causing a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, is considered low.

Table 4.1: Assessment against significance impact criteria for Critically Endangered TECs	
<p>Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:</p> <ul style="list-style-type: none"> - assisting invasive species, that are harmful to the listed ecological community, to become established, or - causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community 	<p>At each site, it is assumed appropriate measures will be implemented to:</p> <ul style="list-style-type: none"> - enable natural stormwater flows to continue unaffected; - prevent wastewater and hazardous substances from entering the environment; - prevent unnecessary access and damage to surrounding vegetation; - minimise bushfire and biosecurity risks; and - minimise the introduction and spread of weeds and plant pathogens. <p>If so, the likelihood of the establishment and operation of the proposed sites causing a substantial reduction in the quality or integrity of an occurrence of an ecological community is considered low.</p>
<p>Interfere with the recovery of an ecological community.</p>	<p>The TEC patches within which the proposed sites would be located form part of a mosaic of intact, remnant vegetation communities within a large protected area. The establishment and operation of the proposed sites are unlikely to adversely affect these patches, and are unlikely to interfere with the recovery of the subject TECs.</p>

Table 4.2: Assessment against significance impact criteria for Endangered flora species	
<p>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</p>	<p>The field survey confirmed the presence of <i>Macrozamia pauli-guilielmi</i> throughout the existing Litoria Walkers' camp, and as particularly abundant at Site L3 and near Sites L2 and L4.</p> <p><i>Acronychia littoralis</i> is also considered likely to occur in the vicinity of the exiting Kauri Walkers' camp (Sites K1 and K3) and Poona Lake (Site P1).</p>
<p>Lead to a long-term decrease in the size of a population</p>	<p>The establishment and operation of accommodation infrastructure at Site L3 is likely to result in direct impacts to <i>Macrozamia pauli-guilielmi</i>, which is likely to lead to a long-term decrease in the size of the local population at this location.</p> <p>Sites L2 and L4 are positioned adjacent to the existing Litoria Walkers camp', within which a number of <i>Macrozamia pauli-guilielmi</i> occur and already face the threat of direct impacts through inadvertent damage by camping visitors. The proposed camp infrastructure is expected to be able to be positioned to avoid direct impacts during camp establishment, although the risk of direct impacts will increase with an expected increase in visitor numbers and frequency during camp operation. This may lead to a long-term decrease in the size of the local population at this location.</p> <p>No <i>Acronychia littoralis</i> were recorded within the proposed site locations at K1, K3 or P1, such that direct impacts and an associated long-term decrease in the size of the local population would not be expected, provided appropriate measures are implemented to:</p> <ul style="list-style-type: none"> - enable natural stormwater flows to continue unaffected; - prevent wastewater and hazardous substances from entering the environment; - prevent unnecessary access and damage to surrounding vegetation; - minimise bushfire and biosecurity risks; and - minimise the introduction and spread of weeds and plant pathogens.
<p>Reduce the area of occupancy of the species</p>	<p>Given the small size of the proposed impact areas in relation to the available habitat for these species in the surrounding landscape, any reduction in the area of occupancy will be negligible and is not considered to represent a significant impact.</p>
<p>Fragment an existing population into two or more populations</p>	<p>The size and configuration of each proposed accommodation site is such that fragmentation of existing populations of these species into two or more populations is unlikely.</p>
<p>Adversely affect habitat critical to the survival of a species</p>	<p>At each site, it is assumed appropriate measures will be implemented to:</p> <ul style="list-style-type: none"> - enable natural stormwater flows to continue unaffected; - prevent wastewater and hazardous substances from entering the environment; - prevent unnecessary access and damage to surrounding vegetation; - minimise bushfire and biosecurity risks; and - minimise the introduction and spread of weeds and plant pathogens.

Table 4.2: Assessment against significance impact criteria for Endangered flora species	
	If so, the likelihood of the establishment and operation of the proposed sites adversely affecting habitat critical to the survival of these species is considered low.
<i>Disrupt the breeding cycle of a population</i>	<p>Disruptions to the breeding cycle of <i>Macrozamia pauli-guilelmi</i> may occur during site establishment and/or operation at Sites L3, L2 and L4, in association with the expected or potential direct impacts at these locations. Otherwise, disruptions to breeding cycles would not be expected, provided appropriate measures are implemented to:</p> <ul style="list-style-type: none"> - enable natural stormwater flows to continue unaffected; - prevent wastewater and hazardous substances from entering the environment; - prevent unnecessary access and damage to surrounding vegetation; - minimise bushfire and biosecurity risks; and - minimise the introduction and spread of weeds and plant pathogens.
<i>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</i>	<p>At each site, it is assumed appropriate measures will be implemented to:</p> <ul style="list-style-type: none"> - enable natural stormwater flows to continue unaffected; - prevent wastewater and hazardous substances from entering the environment; - prevent unnecessary access and damage to surrounding vegetation; - minimise bushfire and biosecurity risks; and - minimise the introduction and spread of weeds and plant pathogens. <p>If so, the likelihood of the establishment and operation of the proposed sites modifying, destroying, removing, isolating or decreasing the availability or quality of habitat to these extent that these species are likely to decline is considered low.</p>
<i>Result in invasive species that are harmful to the species becoming established in the species' habitat</i>	<p>At each site, it is assumed appropriate measures will be implemented to minimise the introduction and spread of weeds, including</p> <ul style="list-style-type: none"> - ensuring construction equipment and vehicles are cleaned and certified "weed free" before entering the National Park. - ensuring all personnel and guests have clean clothing and footwear before entering the National Park. - providing chemical footbaths at the commencement of the Great Walk trail and at each accommodation site. - training tour guides in the identification of weeds and other indicators of ecological impact, such that they can provide regular feedback as part of a broader monitoring regime. <p>If so, the likelihood of the establishment and operation of the proposed sites resulting in invasive species that are harmful to these species becoming established in the species' habitat is considered low.</p>
<i>Introduce disease that may cause the species to decline</i>	<p>At each site, it is assumed appropriate measures will be implemented to minimise the introduction and spread of plant pathogens, including</p> <ul style="list-style-type: none"> - ensuring all personnel and guests have clean clothing and footwear before entering the National Park. - providing chemical footbaths at the commencement of the Great Walk trail and at each accommodation site. - training tour guides in the identification of plant disease and other indicators of ecological impact, such that they can provide regular feedback as part of a broader monitoring regime. <p>If so, the likelihood of the establishment and operation of the proposed sites introducing disease that may cause these species to decline is considered low.</p>
<i>Interfere with the recovery of the species.</i>	The habitats within which the proposed sites would be located form part of a mosaic of intact, remnant vegetation communities within a large protected area. The establishment and operation of the proposed sites are unlikely to adversely affect these habitats other than at a very small and localised scale, and are unlikely to interfere with the recovery of the subject species.

Table 4.3: Assessment against significance impact criteria for Vulnerable flora species	
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>	<p>The field survey confirmed the presence of <i>Archidendron lovelliae</i> and <i>Cryptocarya foetida</i> throughout the vegetation surrounding the existing Kauri Walkers' camp (Sites K1 and K3), and recorded <i>Archidendron lovelliae</i> in the vicinity of Poona Lake.</p> <p>The occurrence of these species within relatively intact habitat within a protected area suggests they are part of important populations from a conservation perspective.</p>
<i>Lead to a long-term decrease in the size of an important population</i>	<p>Sites K1 is positioned adjacent to the existing Kauri Walkers camp', within which a number of <i>Archidendron lovelliae</i> and <i>Cryptocarya foetida</i> seedlings and saplings occur and already face the threat of direct impacts through inadvertent damage by camping visitors. The proposed camp infrastructure is expected to be able to be positioned to avoid direct impacts during camp establishment, although the risk of direct impacts will increase with an expected increase in visitor numbers and frequency during camp operation. This may lead to a long-term decrease in the size of the local population at this location.</p> <p>No <i>Archidendron lovelliae</i> were recorded within the proposed site location at K3 or P1, such that direct impacts and an associated long-term decrease in the size of the local population would not be expected, provided appropriate measures are implemented to:</p> <ul style="list-style-type: none"> - enable natural stormwater flows to continue unaffected; - prevent wastewater and hazardous substances from entering the environment; - prevent unnecessary access and damage to surrounding vegetation; - minimise bushfire and biosecurity risks; and - minimise the introduction and spread of weeds and plant pathogens.
<i>Reduce the area of occupancy of an important population</i>	<p>Given the small size of the proposed impact areas in relation to the available habitat for these species in the surrounding, protected landscape, any reduction in the area of occupancy will be negligible and is not considered to represent a significant impact.</p>
<i>Fragment an important population into two or more populations</i>	<p>The size and configuration of each proposed accommodation site is such that fragmentation of existing populations of these species into two or more populations is unlikely.</p>
<i>Adversely affect habitat critical to the survival of a species</i>	<p>At each site, it is assumed appropriate measures will be implemented to:</p> <ul style="list-style-type: none"> - enable natural stormwater flows to continue unaffected; - prevent wastewater and hazardous substances from entering the environment; - prevent unnecessary access and damage to surrounding vegetation; - minimise bushfire and biosecurity risks; and - minimise the introduction and spread of weeds and plant pathogens. <p>If so, the likelihood of the establishment and operation of the proposed sites adversely affecting habitat critical to the survival of these species is considered low.</p>
<i>Disrupt the breeding cycle of an important population</i>	<p>Disruptions to the breeding cycle of <i>Archidendron lovelliae</i> and <i>Cryptocarya foetida</i> may occur during site establishment and/or operation at Site K1, in association with the potential direct impact at this locations. Otherwise, disruptions to breeding cycles would not be expected, provided appropriate measures are implemented to:</p> <ul style="list-style-type: none"> - enable natural stormwater flows to continue unaffected; - prevent wastewater and hazardous substances from entering the environment; - prevent unnecessary access and damage to surrounding vegetation; - minimise bushfire and biosecurity risks; and - minimise the introduction and spread of weeds and plant pathogens.
<i>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</i>	<p>At each site, it is assumed appropriate measures will be implemented to:</p> <ul style="list-style-type: none"> - enable natural stormwater flows to continue unaffected; - prevent wastewater and hazardous substances from entering the environment; - prevent unnecessary access and damage to surrounding vegetation; - minimise bushfire and biosecurity risks; and - minimise the introduction and spread of weeds and plant pathogens. <p>If so, the likelihood of the establishment and operation of the proposed sites modifying, destroying, removing, isolating or decreasing the availability or quality of habitat to these extent that these species are likely to decline is considered low.</p>
<i>Result in invasive species that are harmful to a vulnerable species becoming established in</i>	<p>At each site, it is assumed appropriate measures will be implemented to minimise the introduction and spread of weeds, including</p>

Table 4.3: Assessment against significance impact criteria for Vulnerable flora species	
<i>the vulnerable species' habitat</i>	<ul style="list-style-type: none"> - ensuring construction equipment and vehicles are cleaned and certified "weed free" before entering the National Park. - ensuring all personnel and guests have clean clothing and footwear before entering the National Park. - providing chemical footbaths at the commencement of the Great Walk trail and at each accommodation site. - training tour guides in the identification of weeds and other indicators of ecological impact, such that they can provide regular feedback as part of a broader monitoring regime. <p>If so, the likelihood of the establishment and operation of the proposed sites resulting in invasive species that are harmful to these species becoming established in the species' habitat is considered low.</p>
<i>Introduce disease that may cause the species to decline</i>	<p>At each site, it is assumed appropriate measures will be implemented to minimise the introduction and spread of plant pathogens, including</p> <ul style="list-style-type: none"> - ensuring all personnel and guests have clean clothing and footwear before entering the National Park. - providing chemical footbaths at the commencement of the Great Walk trail and at each accommodation site. - training tour guides in the identification of plant disease and other indicators of ecological impact, such that they can provide regular feedback as part of a broader monitoring regime. <p>If so, the likelihood of the establishment and operation of the proposed sites introducing disease that may cause these species to decline is considered low.</p>
<i>Interfere with the recovery of the species.</i>	<p>The habitats within which the proposed sites would be located form part of a mosaic of intact, remnant vegetation communities within a large protected area. The establishment and operation of the proposed sites are unlikely to adversely affect these habitats other than at a very small and localised scale, and are unlikely to interfere with the recovery of the subject species.</p>

Table 4.4: Assessment against significance impact criteria for Vulnerable fauna species	
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>	<p>The field survey confirmed the presence of Black-breasted Button-Quail at Site K1 in the form of old platelets (foraging evidence).</p> <p>The results of the survey also indicate potential habitat for the following species occurs at some of the proposed accommodation sites, based on habitat type and condition:</p> <ul style="list-style-type: none"> - Three-toed Snake-tooth Skink – Sites N2, N3, N4, L1, L2, L3, L4, K1, K2, P1. - Wallum Sedgefrog – Site N1 and near Site L3. - Grey-headed Flying-fox – Sites N1, N4, L1, L2, L3, L4, K1, K2 and K3. - Black-breasted Button-Quail – Sites T1 and P1. <p>The <i>National recovery plan for the wallum sedgefrog and other wallum-dependent frog species</i> (Meyer et al, 2006) indicates the Great Sandy National Park comprises an important population for Wallum Sedgefrog. The occurrence of the other species within relatively intact habitat within a protected area suggests they are also part of important populations from a conservation perspective.</p>
<i>Lead to a long-term decrease in the size of an important population of a species</i>	<p>Three-toed Snake-tooth Skink – The establishment of accommodation infrastructure could result in a reduction of up to approximately 1 hectare of habitat for this species. However, the design and configuration of each site is expected to incorporate patches of suitable microhabitat and important habitat features for this species within and immediately surrounding the camping areas (e.g. leaf litter, rotting logs), such that a long-term decrease in the size of the local population is considered unlikely.</p> <p>Wallum Sedgefrog – Site N1 is a <i>Melaleuca</i> swamp full of sedges and reeds, offering high quality habitat for this species. Establishment of a site at this location could lead to a long-term decrease in the size of the local population.</p> <p>The establishment of Site L3 is not expected to result in any direct impacts to habitat for Wallum Sedgefrog, such that a long-term decrease in the size of the local population is considered unlikely.</p> <p>Grey-headed Flying-fox - The positioning of sites and associated infrastructure is expected to avoid the removal of canopy trees (which represent the primary foraging and</p>

Table 4.4: Assessment against significance impact criteria for Vulnerable fauna species	
	<p>breeding habitat for this species), where feasible in terms of functionality and safety. There are also no current flying-fox camps in the vicinity of the proposed sites.</p> <p>Given the small amount of habitat removal expected compared to the large amount of suitable habitat available throughout the National Park, long-term decrease in the size of any local population is expected, provided no camps are directly disturbed during site establishment.</p> <p>Black-breasted Button-Quail - The establishment of accommodation infrastructure could result in a reduction of up to approximately 0.5 hectares of habitat for this species. However, the design and configuration of each site is expected to incorporate patches of suitable microhabitat and important habitat features for this species within and immediately surrounding the camping areas (e.g. leaf litter, understorey vegetation), such that a long-term decrease in the size of the local population is considered unlikely.</p>
<i>Reduce the area of occupancy of an important population</i>	Given the small size of the proposed impact areas in relation to the available habitat for these species in the surrounding, protected landscape, any reduction in the area of occupancy will be negligible and is not considered to represent a significant impact.
<i>Fragment an existing important population into two or more populations</i>	The size and configuration of each proposed accommodation site is such that fragmentation of existing populations of these species into two or more populations is unlikely.
<i>Adversely affect habitat critical to the survival of a species</i>	<p>The establishment of Site N1 could adversely affect habitat critical to the survival of Wallum Sedgefrog through direct disturbance and alterations to natural hydrological conditions.</p> <p>At all other sites, it is assumed appropriate measures will be implemented to:</p> <ul style="list-style-type: none"> - enable natural stormwater flows to continue unaffected; - prevent wastewater and hazardous substances from entering the environment; - prevent unnecessary access and damage to surrounding vegetation; - minimise bushfire and biosecurity risks; and - minimise the introduction and spread of weeds and plant pathogens. <p>If so, the likelihood of the establishment and operation of the proposed sites adversely affecting habitat critical to the survival of Three-toed Snake-tooth Skink, Grey-headed Flying-fox and Black-breasted Button-Quail is considered low.</p>
<i>Disrupt the breeding cycle of an important population</i>	<p>The establishment of Site N1 could disrupt the breeding cycle of a local population of Wallum Sedgefrog through direct disturbance and alterations to natural hydrological conditions.</p> <p>At all other sites, it is assumed appropriate measures will be implemented to:</p> <ul style="list-style-type: none"> - prevent unnecessary access and damage to surrounding vegetation; - minimise bushfire risks; and - minimise impacts from excess light and noise. <p>It is also expected tour guides would be trained in the identification of animal breeding places, such that they can provide feedback on potential impacts to animal breeding activity (e.g. if a big nest or flying-fox roost is established within or within close proximity to one of the sites) as part of a broader monitoring and impact mitigation regime.</p> <p>If so, the likelihood of the establishment and operation of the proposed sites disrupting the breeding cycle of Three-toed Snake-tooth Skink, Grey-headed Flying-fox and Black-breasted Button-Quail is considered low.</p>
<i>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</i>	Given the small size of the proposed impact areas in relation to the available habitat for these species in the surrounding, protected landscape, any modification or removal of habitat is not expected to cause the species to decline.
<i>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</i>	<p>At each site, it is assumed appropriate measures will be implemented to minimise the introduction and spread of weeds, including</p> <ul style="list-style-type: none"> - ensuring construction equipment and vehicles are cleaned and certified "weed free" before entering the National Park. - ensuring all personnel and guests have clean clothing and footwear before entering the National Park. - providing chemical footbaths at the commencement of the Great Walk trail and at each accommodation site.

Table 4.4: Assessment against significance impact criteria for Vulnerable fauna species	
	<ul style="list-style-type: none"> - training tour guides in the identification of weeds and other indicators of ecological impact, such that they can provide regular feedback as part of a broader monitoring regime. <p>If so, the likelihood of the establishment and operation of the proposed sites resulting in invasive species that are harmful to these species becoming established in the species' habitat is considered low.</p>
<i>Introduce disease that may cause the species to decline</i>	<p>At each site, it is assumed appropriate measures will be implemented to minimise the introduction and spread of plant pathogens, including</p> <ul style="list-style-type: none"> - ensuring all personnel and guests have clean clothing and footwear before entering the National Park. - providing chemical footbaths at the commencement of the Great Walk trail and at each accommodation site. - training tour guides in the identification of plant disease and other indicators of ecological impact, such that they can provide regular feedback as part of a broader monitoring regime. <p>If so, the likelihood of the establishment and operation of the proposed sites introducing disease that may cause these species to decline is considered low.</p>
<i>Interfere with the recovery of the species</i>	<p>The habitats within which the proposed sites would be located form part of a mosaic of intact, remnant vegetation communities within a large protected area. The establishment and operation of the proposed sites are unlikely to adversely affect these habitats other than at a very small and localised scale, and are unlikely to interfere with the recovery of the subject species.</p>

Table 4.5: Assessment against significance impact criteria for Migratory fauna species	
<i>An action is likely to have a significant impact on a Migratory species if there is a real chance or possibility that it will:</i>	<p>The results of the survey indicate potential habitat for the following species occurs at some of the proposed accommodation sites, based on habitat type and condition:</p> <ul style="list-style-type: none"> - Black-faced Monarch – Site N4, L3, K1, K3 and P1. - Rufous Fantail – Sites T1, N1, N2, N3, N4, L1, L2, L3, L4, K1, K2, K3 and P1. - Spectacled Monarch – Site K1 and P1.
<i>Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species</i>	<p>The size and configuration of each proposed accommodation site is such that fragmentation or isolation of habitat for these species is unlikely.</p> <p>At the majority of sites, it is also assumed appropriate measures will be implemented to:</p> <ul style="list-style-type: none"> - enable natural stormwater flows to continue unaffected; - prevent wastewater and hazardous substances from entering the environment; - prevent unnecessary access and damage to surrounding vegetation; - minimise bushfire and biosecurity risks; and - minimise the introduction and spread of weeds and plant pathogens. <p>If so, the likelihood of the establishment and operation of the proposed sites substantially modifying important habitat for these species is considered low.</p>
<i>Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species</i>	<p>At each site, it is assumed appropriate measures will be implemented to minimise the introduction and spread of weeds, including</p> <ul style="list-style-type: none"> - ensuring construction equipment and vehicles are cleaned and certified “weed free” before entering the National Park. - ensuring all personnel and guests have clean clothing and footwear before entering the National Park. - providing chemical footbaths at the commencement of the Great Walk trail and at each accommodation site. - training tour guides in the identification of weeds and other indicators of ecological impact, such that they can provide regular feedback as part of a broader monitoring regime. <p>If so, the likelihood of the establishment and operation of the proposed sites resulting in invasive species that are harmful to these species becoming established in the species' habitat is considered low.</p>
<i>Seriously disrupt the lifecycle (breeding,</i>	<p>The establishment of accommodation infrastructure could result in a reduction of up to approximately 1 hectare of habitat for Black-faced Monarch and Rufous Fantail, and 0.5</p>

Table 4.5: Assessment against significance impact criteria for Migratory fauna species

<p><i>feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species</i></p>	<p>hectares of habitat for Spectacled Monarch. However, the positioning of sites and associated infrastructure is expected to avoid the removal of canopy trees and incorporate patches of suitable understorey habitat within and immediately surrounding the camping areas.</p> <p>It is also expected tour guides would be trained in the identification of animal breeding places, such that they can provide feedback on potential impacts to animal breeding activity (e.g. if a big nest is established within or within close proximity to one of the sites) as part of a broader monitoring and impact mitigation regime.</p> <p>If so, serious disruptions to the lifecycle of these species are considered unlikely.</p>
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4.3.2 State Matters

The field survey has confirmed the project may result in residual impacts upon the following MSES:

- **Regulated Vegetation**, including:
 - Of Concern REs, including REs 12.2.1, 12.2.3, 12.2.4, 12.2.12 and 12.12.19;
 - remnant vegetation intersecting with a wetland, including REs 12.2.12, 12.3.5 and 12.3.13;
 - remnant vegetation within the defined distance of a watercourse; and
 - essential habitat.
- **Wetlands of High Ecological Significance.**
- **Protected Wildlife Habitat for Endangered or Vulnerable Flora Species**, including *Archidendron lovelliae*, *Cryptocarya foetida*, *Macrozamia pauli-guilielmi*, *Acronychia littoralis* and *Blandfordia grandiflora*.
- **Protected Wildlife Habitat for Endangered or Vulnerable Fauna Species**, including Glossy Black-Cockatoo, Wallum Froglet, Wallum Sedgefrog, Southern Emu-wren and Black-breasted Button-Quail.

The field survey also confirmed the project may result in residual impacts upon populations of *Boronia rivularis*, *Glycine argyrea* and *Tecomanthe hillii*, and Cooloola Blind Snake, all of which are listed as Near Threatened under the NC Act. Although not technically recognised as MSES, Near Threatened flora species are recognised under the State’s protected plant framework in accordance with the NC Act, and measures should be taken to ensure no net loss of these plants in the wild. Near Threatened flora species and fauna species are also recognised as important values under the QPWS Operational Policy and Procedural Guide for assessing the impact of QPWS actions on natural and cultural values.

The QPWS Operational Policy and Procedural Guide for assessing the impact of QPWS actions on natural and cultural values defines the following five impact classes:

- Class 1 – Routine works and upgrades or replacement entirely within an existing footprint and with no or very low potential for impact on natural and cultural values.
- Class 2 – Minor to major works (capital or non-capital) creating a new, or enlarging an existing, footprint, and/or altering the fabric of a cultural heritage place where:
 - a) None of the Value Groups listed on the Impact Assessment Checklist are present or they are highly unlikely to be present.
 - b) A value is known, or is likely, to be present but it has been determined that the action: will not have a significant impact on the value; or will not have a significant impact on the value if specified prevention/mitigation strategies are applied.
 - c) The values in the area are poorly known but the nature of the action is such that the likelihood of a significant impact is very low (the precautionary principle must be rigorously applied).
- Class 3 – Minor to major works (capital or non-capital) creating a new, or enlarging an existing, footprint, and/or altering the fabric of a cultural heritage place where:
 - The action will have, or is likely to have, significant impacts on values other than matters of national or state environmental significance and/or Aboriginal and Torres Strait Islander cultural heritage and/or historic/shared cultural heritage.
- Class 4 – Medium to major works (capital or non-capital) creating a new, or enlarging an

- existing, footprint, and/or altering the fabric of a cultural heritage place where:
 - Values in the area are poorly known and the works to be undertaken are of a kind likely to cause significant irreversible, or potentially irreversible, impacts.
- Class 5 – Minor to major works (capital or non-capital) creating a new, or enlarging an existing, footprint, and/or altering the fabric of a cultural heritage place where:
 - The action will have, or is likely to have, a significant impact on a matter of national or state environmental significance and/or Aboriginal and Torres Strait Islander cultural heritage and/or historic/shared cultural heritage. Class 5 includes actions that will impact marine plants or a declared Fish Habitat Area and do not comply with all of the requirements for accepted development.

In terms of ecological values, the “Impact Assessment Checklist” includes MNES and MSES, as well as values of regional or local significance.

The criteria used to assess the significance of impacts to MSES and other important values are largely based on those specified in the *Matters of National Environmental Significance: Significant Impact Guidelines 1.1* (DotE 2013), i.e.:

- Criteria for Of Concern REs are the same as those for TECs listed as Endangered under the EPBC Act (refer **Table 4.1**);
- Criteria for species listed as Endangered under the NC Act are the same as those for species listed as Endangered under the EPBC Act (refer **Table 4.2**); and
- Criteria for species listed as Vulnerable or Near Threatened under the NC Act are the same as those for species listed as Vulnerable under the EPBC Act (refer **Tables 4.3/4.4**).

Based on these criteria, no significant impacts would be expected on any Of Concern REs, provided the assumed key avoidance and mitigation measures outlined in **Section 4.2** have been implemented. Significant impacts to Endangered, Vulnerable and Near Threatened species listed under the NC Act are also considered unlikely, other than:

- Potential impacts to *Macrozamia pauli-guillielmi* at Site L3 and (to a lesser extent) Sites L2 and L4.

- Potential impacts to *Archidendron lovelliae* and *Cryptocarya foetida* at Site K1.
- Potential impacts to *Boronia rivularis* at Sites N2 and N3.
- Potential impacts to Wallum Sedgefrog and Wallum Froglet at Site N1 and (to a lesser extent) L3.

QPWS Operational Policy and Procedural Guide for assessing the impact of QPWS actions on natural and cultural values state that an action is likely to have a significant impact on the ecological character of a wetland if there is a real chance or possibility that it will result in:

- areas of the wetland being destroyed or substantially modified;
- a substantial and measurable change in the hydrological regime of the wetland, for example, a substantial change to the volume, timing, duration and frequency of ground and surface water flows to and within the wetland;
- the habitat or lifecycle of native species, including invertebrate fauna and fish species, dependent upon the wetland being seriously affected;
- a substantial and measurable change in the water quality of the wetland – for example, a substantial change in the level of salinity, pollutants, or nutrients in the wetland, or water temperature which may adversely impact on biodiversity, ecological integrity, social amenity or human health; or
- an invasive species that is harmful to the ecological character of the wetland being established (or an existing invasive species being spread) in the wetland.

Site N1 is within a Melaleuca swamp and the establishment of accommodation infrastructure at this location is likely to lead to the destruction or substantial modification of an area of wetland, and may also seriously affect the habitat or lifecycle of native species dependent upon the wetland.

At all other sites, it is assumed appropriate measures will be implemented to:

- enable natural stormwater flows to continue unaffected;
- prevent wastewater and hazardous substances from entering the environment;
- prevent unnecessary access and damage to surrounding vegetation;

- minimise bushfire and biosecurity risks;
- minimise the introduction and spread of weeds and plant pathogens; and
- minimise impacts from excess light and noise.

It is also expected tour guides would be trained in the identification of animal breeding places, such that they can provide feedback on potential impacts to animal breeding activity (e.g. mass frog breeding after rainfall) as part of a broader monitoring and impact mitigation regime.

If so, the likelihood of the establishment and operation of the proposed sites (other than Site N1) resulting in significant impacts to wetland is considered low.

4.4 SUMMARY OF IMPACT SIGNIFICANCE AND PREFERRED SITE RECOMMENDATIONS

Table 4.6 summarises the significance of impacts for each proposed accommodation site. Overall, this suggests the majority of proposed sites are unlikely to result in significant impacts upon MNES, MSES or other important ecological values provided the assumed key avoidance and mitigation measures outlined in **Section 4.2** have been implemented.

The main exceptions are Sites N1 and L3, the establishment and operation of which is likely to lead to significant impacts upon MNES and/or MSES, such that they would meet the definition of a “Class 5 Impact” under the QPWS Operational Policy and Procedural Guide for assessing the impact of QPWS actions on natural and cultural values. The establishment and operation of Site

K1 and Site L2 or L4 could also lead to significant impacts upon MNES and/or MSES, and these should also be considered potential “Class 5 Impacts”.

The establishment and operation of Sites N2 and N3 is likely to lead to significant impacts upon the Near Threatened species *Boronia rivularis*, and would meet the definition of a “Class 3 Impact”.

For all other sites, the proposed works would meet the definition of “Class 2 Impact” under the QPWS Operational Policy and Procedural Guide for assessing the impact of QPWS actions on natural and cultural values.

Even so, where no significant impacts are expected, consideration should also be given to the overarching principle of relevant State and Commonwealth government environmental protection policies relating to impact management, in that impacts should be avoided as much as possible in the first instance. In this respect, the recommended preferred sites (from an ecological perspective) for each general location are as follows, as indicated on **Figure 4.1**:

- near Teewah Village – Site T1.
- near the Noosa River and existing Dutgee walkers’ camp - Site N4 or NA1.
- near the existing Litoria walkers’ camp - Site LA3b.
- near the existing Kauri walkers’ camp - Site KA2 or KA3.
- Double Island Point – Site DA2a, DA2b or DA3.

Table 4.6. Summary of impact significance for each proposed accommodation site

Site	Impact Significance*
TEEWAH	
Site T1	
NOOSA RIVER / DUTGEE WALKERS' CAMP	
Site N1	
Site NA1 (alternative to N1)	
Site N2	
Site N3	
Site N4	
LITORIA WALKERS' CAMP	
Site L1	
Site L2	
Site L3	
Site LA3a (alternative to L3)	
Site L3b (alternative to L3)	
Site L4	
KAURI WALKERS' CAMP	
Site K1	
Site K2	
Site KA2 (alternative to K2)	
Site K3	
Site KA3 (alternative to K3)	
POONA LAKE	
Site P1	
DOUBLE ISLAND POINT	
Site D1	
Site D2	
Site DA2a (alternative to D2)	
Site DA2b (alternative to D2)	
Site D3	
Site DA3 (alternative to D3)	

***Note:**

Red = significant impact on MNES or MSES likely.

Orange = significant impact on MNES or MSES possible, or significant impact on other important values likely.

Yellow = significant impact unlikely, although some notable ecological impact expected.

Green = no notable ecological impact expected.

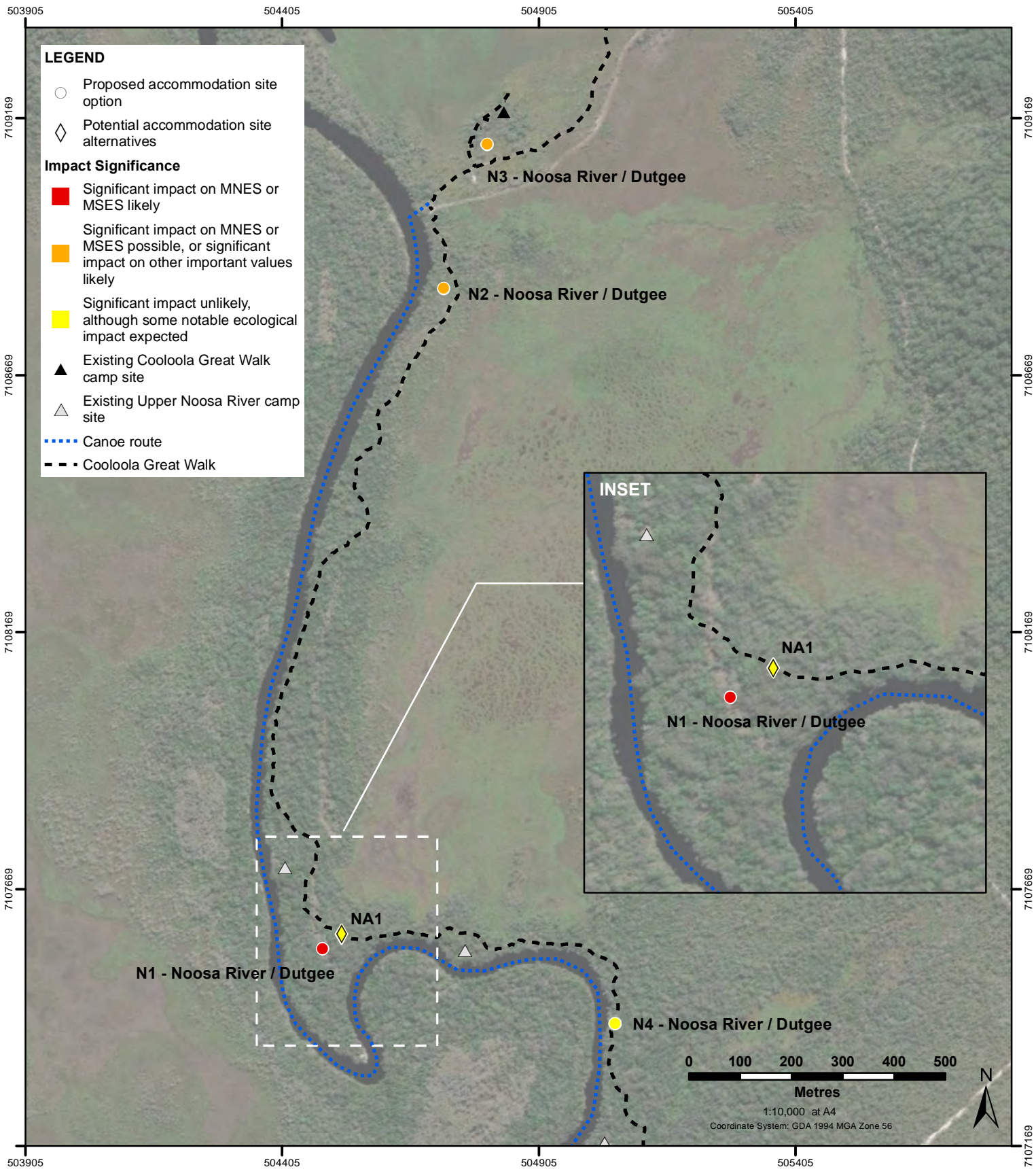


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Drawn By: KM Reviewed by: JA Date: 29/03/2020

Figure: 4.1a
Title: Preferred Accommodation Site Locations - Teewah
Project: Premium Ecotourism Products – Cooloola Great Walk
Client: Department of Environment and Science

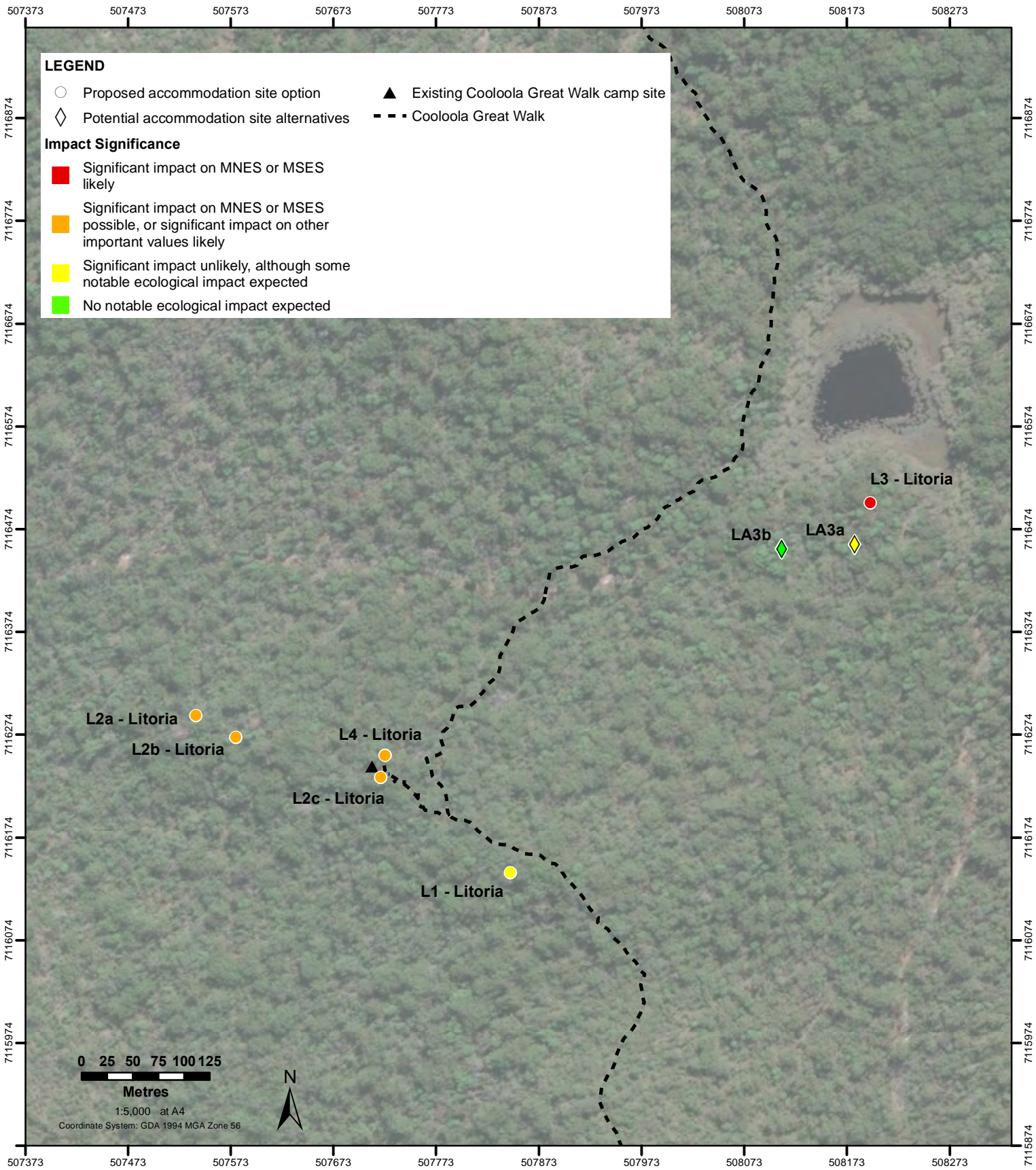




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 Drawn By: KM Reviewed by: JA Date: 29/03/2020

Figure: 4.1b
Title: Preferred Accommodation Site Locations - Dutgee
Project: Premium Ecotourism Products – Cooloola Great Walk
Client: Department of Environment and Science



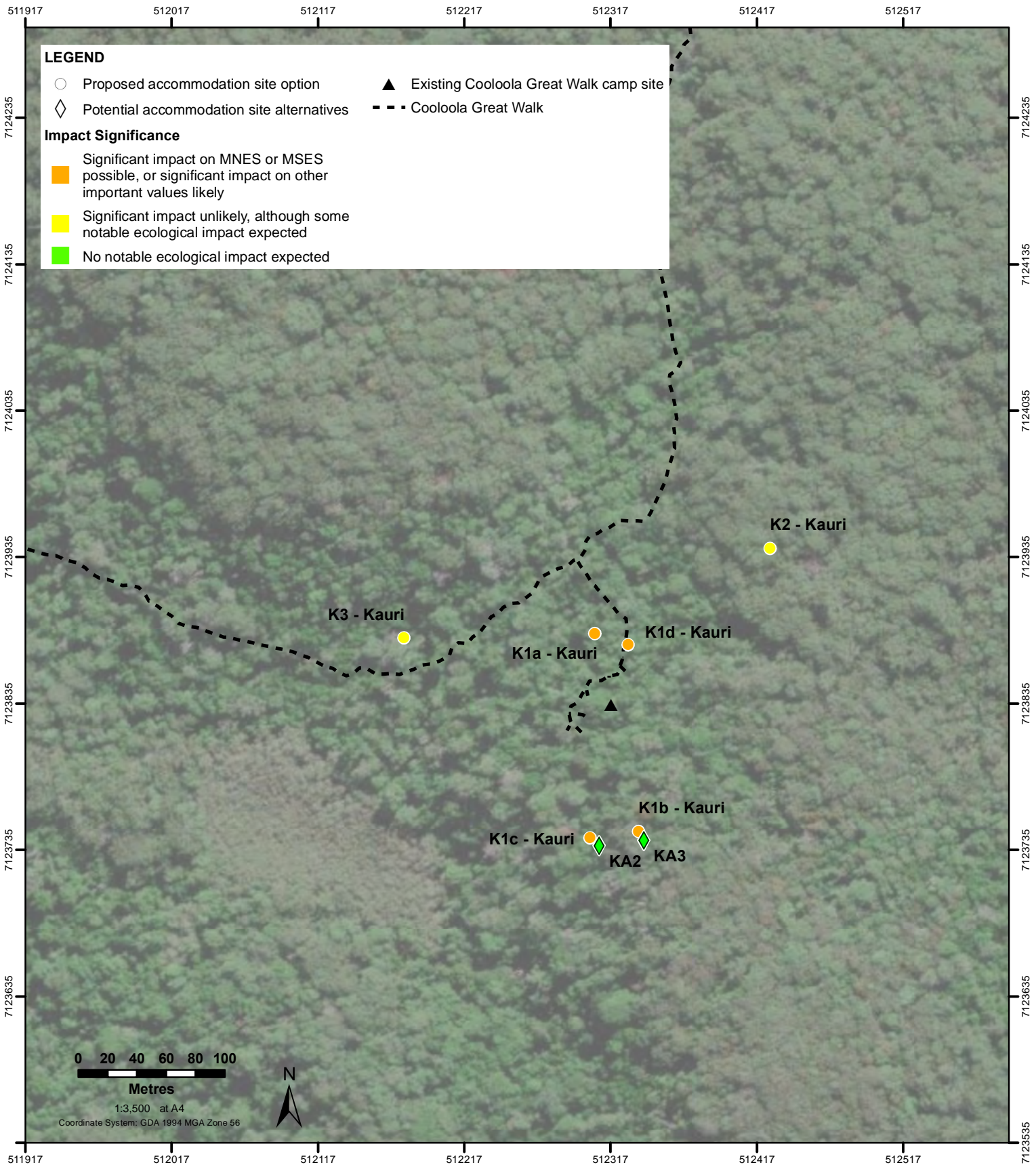


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Figure: 4.1c
Title: Preferred Accommodation Site Locations - Litoria
Project: Premium Ecotourism Products – Cooloola Great Walk
Client: Department of Environment and Science



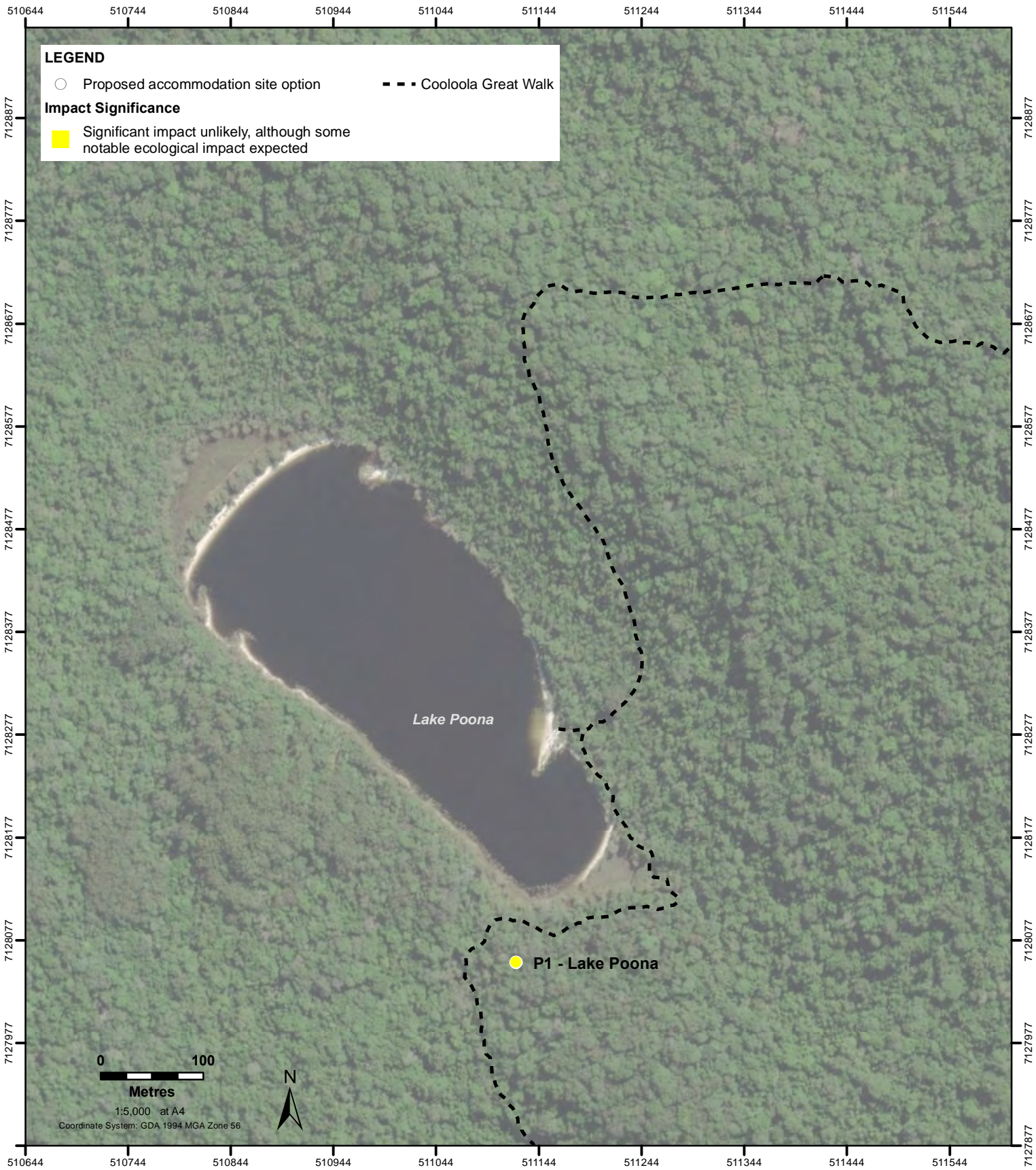


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Drawn By: KM Reviewed by: JA Date: 29/03/2020

Figure: 4.1d
Title: Preferred Accommodation Site Locations - Kauri
Project: Premium Ecotourism Products – Cooloola Great Walk
Client: Department of Environment and Science





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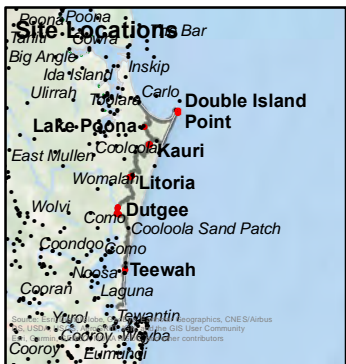
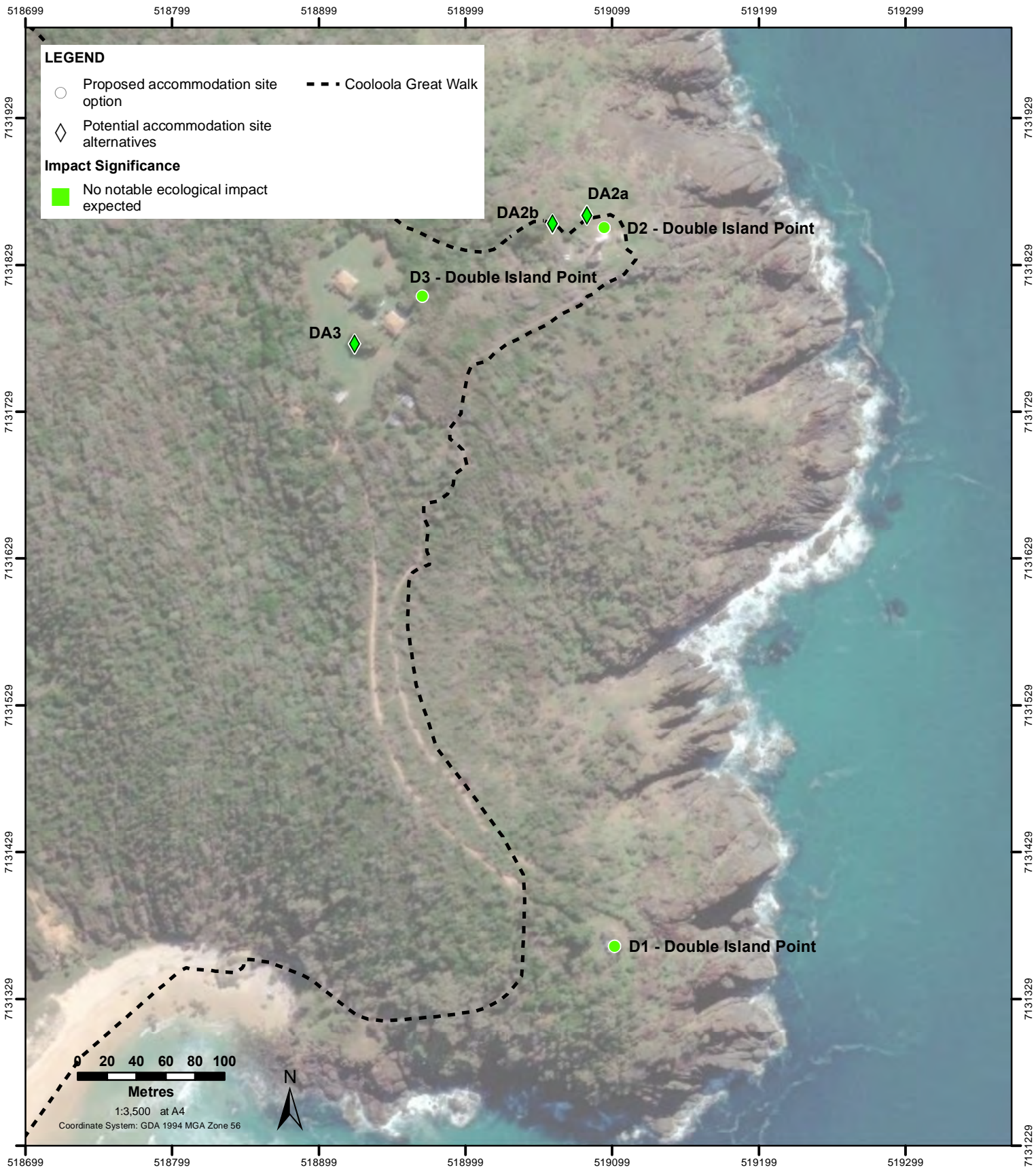
Figure: 4.1e

Title: Preferred Accommodation Site Locations - Lake Poona

Project: Premium Ecotourism Products – Cooloola Great Walk

Client: Department of Environment and Science





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Drawn By: KM Reviewed by: JA Date: 29/03/2020

Figure: 4.1f

Title: Preferred Accommodation Site Locations - Double Island Point

Project: Premium Ecotourism Products – Cooloola Great Walk

Client: Department of Environment and Science



5.0 REFERENCES

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APPENDIX A

Quaternary Site Data

Table A.1. Site Reference Table

Quaternary Site Number Noted on Vegetation Assessment Forms in Appendix A	Corresponding Site Number in Table 3.1 of Main Report
1	N4
2	N1
3	N3
4	N3
5	N3
7	L3
8	L1
9	L2
10	K1
11	K3
12	K2
13	P1
14	D1
15	D2
16	T1

1

Created	2019-07-30 10:48:34 AEST by Adrian Caneris
Updated	2019-07-30 11:21:46 AEST by Adrian Caneris
Location	-26.1526763333333, 153.050626833333

Site Photos





Recorders	Jarrah
Date	2019-07-30
Site number	1

T1 Stratum

Median height	13
Height interval	8-19
Estimated cover density	Sparse

T2 Stratum

Median height	6
Height interval	2-8
Estimated cover density	Dense

S1 Stratum

Median height	1.5
Height interval	1-2
Estimated cover density	Dense

Ground Stratum

Median height	0.5
Height interval	0-1
Estimated cover density	Sparse

Species dominance

T1

Stratum	T1
Relative dominance	Dominant
Species	<i>Eucalyptus racemosa</i> subsp. <i>racemosascribbly</i> gum

T1

Stratum	T1
Relative dominance	Associated
Species	<i>Melaleuca quinquenervias</i> wamp paperbark

T2

Stratum	T2
Relative dominance	Codominant
Species	<i>Banksia aemulawallum</i> banksia, <i>Acacia disparrima</i> subsp. <i>disparrima</i> , <i>Persoonia virgatas</i> small-leaved geebung

T2

Stratum	T2
Relative dominance	Associated
Species	<i>Corymbia intermedia</i> pink bloodwood, <i>Callitris columellaris</i>

G

Stratum	G
Relative dominance	Codominant
Species	<i>Austromyrtus dulcis</i> midgen berry, <i>Xanthorrhoea johnsonii</i> , <i>Leucopogon pimeleoides</i> , <i>Baloskion tetraphyllum</i>

2

Created	2019-07-30 01:54:04 UTC by Adrian Caneris
Updated	2019-08-20 22:45:31 UTC by Lizzy Buckby
Location	-26.1513381666667, 153.044820166667

Site Photos





Recorders	Jarrah
Date	2019-07-30
Site number	2

T1 Stratum

Median height	18
Height interval	12-21
Estimated cover density	Mid-Dense
Additional information	No go

Species dominance

T1

Stratum	T1
Relative dominance	Dominant
Species	Melaleuca quinquenerviaswamp paperbark

G

Stratum	G
Relative dominance	Subdominant
Species	Baloskion pallens, Schoenus brevifolius, Baumea teretifolia, Baumea articulata, Persicaria strigosa, Blechnum indicum

3

Created	2019-07-30 03:35:19 UTC by Adrian Caneris
Updated	2019-08-20 22:48:07 UTC by Lizzy Buckby
Location	-26.1378393333333, 153.047386

Site Photos



Recorders

Jarrah

Date

2019-07-30

Site number	3
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T1 Stratum

Median height	16
Height interval	10-20
Estimated cover density	Sparse

S1 Stratum

Median height	1.5
Height interval	1-2
Estimated cover density	Dense

Ground Stratum

Median height	0.5
Height interval	0-1
Estimated cover density	Dense

Species dominance

T1

Stratum	T1
Relative dominance	Dominant
Species	Melaleuca quinquenerviaswamp paperbark

S1

Stratum	S1
Relative dominance	Dominant
Species	Phyllota phyllicoidesyellow peabush, Gahnia sieberiana

S1

Stratum	S1
Relative dominance	Associated
Species	Boronia rivularisWide Bay boronia, Boronia rosmarinifoliaforest boronia

4

Created	2019-07-30 03:47:45 UTC by Adrian Caneris
Updated	2019-08-20 22:50:07 UTC by Lizzy Buckby
Location	-26.1371455, 153.0479935

Site Photos



Recorders

Jarrah

Date

2019-07-30

Site number	4
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T1 Stratum

Median height	13
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Height interval	8-17
-----------------	------

Estimated cover density	Sparse
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T2 Stratum

Median height	6
---------------	---

Height interval	2-8
-----------------	-----

Estimated cover density	Mid-Dense
-------------------------	-----------

S1 Stratum

Median height	1.5
---------------	-----

Height interval	1-2
-----------------	-----

Estimated cover density	Dense
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Ground Stratum

Median height	0.5
---------------	-----

Height interval	0-1
-----------------	-----

Estimated cover density	Mid-Dense
-------------------------	-----------

Species dominance

T1

Stratum	T1
---------	----

Relative dominance	Dominant
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Species	Melaleuca quinquenerviaswamp paperbark
---------	--

T2

Stratum	T2
---------	----

Relative dominance	Dominant
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Species	Allocasuarina littoralis
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G

Stratum	G
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Relative dominance	Dominant
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Species	Phyllota phyllicoidesyellow peabush
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G

Stratum	G
---------	---

Relative dominance	Associated
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Species	Personia virgatasmall-leaved geebung, Leptospermum semibaccatumwallum tea-tree, Boronia rivularisWide Bay boronia
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S1

Stratum	S1
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Relative dominance	Codominant
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Species

Hakea acūtes

5

Created	2019-07-30 04:07:18 UTC by Adrian Caneris
Updated	2019-08-20 22:53:04 UTC by Lizzy Buckby
Location	-26.1364365, 153.048396833333

Site Photos



Recorders

Jarrah

Date

2019-07-30

Site number	5
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T1 Stratum

Median height	14
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Height interval	9-19
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Estimated cover density	Sparse
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T2 Stratum

Median height	7
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Height interval	2-9
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Estimated cover density	Sparse
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S1 Stratum

Median height	1.5
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Height interval	1-2
-----------------	-----

Estimated cover density	Dense
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Ground Stratum

Median height	0.5
---------------	-----

Height interval	0-1
-----------------	-----

Estimated cover density	Dense
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Additional information	Same as before
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Species dominance

T1

Stratum	T1
---------	----

Relative dominance	Codominant
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Species	Melaleuca quinquenerviaswamp paperbark, Corymbia intermediapink bloodwood
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S1

Stratum	S1
---------	----

Relative dominance	Codominant
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Species	Phyllota phylloidesyellow peabush, Persoonia virgatasmall-headed geebung
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7

Created	2019-07-31 09:03:21 AEST by Adrian Caneris
Updated	2019-08-22 10:06:45 AEST by Adrian Caneris
Location	-26.0705376667, 153.081901667

Site Photos







Recorders	Jarrah
Date	2019-07-31
Site number	7

T1 Stratum

Median height	21
Height interval	16-23
Estimated cover density	Mid-Dense

T2 Stratum

Median height	12
Height interval	5-16
Estimated cover density	Sparse

S1 Stratum

Median height	1.5
Height interval	1-2
Estimated cover density	Mid-Dense

Ground Stratum

Median height	0.5
Height interval	0-1
Estimated cover density	Mid-Dense
Additional information	Rare and threatens through out

Species dominance

T1

Stratum	T1
Relative dominance	Dominant
Species	Eucalyptus pilularisblackbutt

T1

Stratum	T1
Relative dominance	Associated
Species	Lophostemon confertusbrush box, Corymbia intermediapink bloodwood, Corymbia gummiferared bloodwood

T2

Stratum	T2
Relative dominance	Dominant
Species	Lophostemon confertusbrush box

S1

Stratum	S1
Relative dominance	Codominant
Species	Dodonaea triquetralarge-leaved hop bush, Dodonaea viscosa subsp. burmanniana, Hovea acutifolia, Alphitonia excelsasoap tree, Banksia aemulawallum banksia

G

Stratum	G
Relative dominance	Codominant
Species	Imperata cylindricablady grass, Pteridium esculentumcommon bracken, Macrozamia pauli-guilielmi, Hibbertia scandens, Dianella longifolia var. longifolia, Cymbopogon refractusbarbed-wire grass, Petalostigma pubescensquinine tree

8

Created	2019-07-31 10:21:43 AEST by Adrian Caneris
Updated	2019-08-22 10:09:06 AEST by Adrian Caneris
Location	-26.073768, 153.078519833

Site Photos





Recorders	Jarrah
Date	2019-07-31
Site number	8

T1 Stratum

Median height	23
Height interval	16-25
Estimated cover density	Sparse

T2 Stratum

Median height	12
Height interval	8-16
Estimated cover density	Mid-Dense

T3 Stratum

Median height	4
Height interval	2-8
Estimated cover density	Mid-Dense

S1 Stratum

Median height	1.5
Height interval	1-2
Estimated cover density	Mid-Dense

Ground Stratum

Median height	.5
Height interval	0-1
Estimated cover density	Mid-Dense

Species dominance

T1

Stratum	T1
Relative dominance	Dominant
Species	<i>Eucalyptus pilularis</i> blackbutt

T1

Stratum	T1
Relative dominance	Associated
Species	<i>Angophora woodsiana</i> mudgee

T2

Stratum	T2
Relative dominance	Codominant
Species	<i>Leptospermum juniperinum</i> prickly tea-tree, <i>Acacia leiocalyx</i> , <i>Acacia concurrens</i> , <i>Acacia disparima</i> subsp. <i>disparima</i> , <i>Allocasuarina torulosa</i>

T3

Stratum	T3
Relative dominance	Codominant
Species	<i>Acacia concurrens</i> , <i>Acacia leiocalyx</i>

S1

Stratum	S1
Relative dominance	Dominant
Species	Pteridium esculentumcommon bracken, Leptospermum juniperinumprickly tea-tree, Acacia penninervis

G

Stratum	G
Relative dominance	Codominant
Species	Xanthorrhoea johnsonii, Pteridium esculentumcommon bracken, Dianella longifolia

9

Created	2019-07-31 11:03:47 AEST by Adrian Caneris
Updated	2019-08-22 10:09:20 AEST by Adrian Caneris
Location	-26.0724285, 153.075397167

Site Photos



Recorders

Jarrah

Date

2019-07-31

Site number	9
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T1 Stratum

Median height	22
Height interval	17-24
Estimated cover density	Sparse

T2 Stratum

Median height	14
Height interval	9-17
Estimated cover density	Sparse

T3 Stratum

Median height	5
Height interval	2-9
Estimated cover density	Mid-Dense

S1 Stratum

Median height	1-2
Height interval	1.5
Estimated cover density	Mid-Dense

Ground Stratum

Median height	0.5
Height interval	0-1
Estimated cover density	Mid-Dense

Species dominance

T1

Stratum	T1
Relative dominance	Dominant
Species	Eucalyptus pilularisblackbutt

T2

Stratum	T2
Relative dominance	Dominant
Species	Angophora woodsianasmudgee

T3

Stratum	T3
Relative dominance	Dominant
Species	Banksia serrata red honeysuckle

S1

Stratum	S1
Relative dominance	Dominant
Species	Leptospermum juniperinumprickly tea-tree

G

Stratum	G
Relative dominance	Associated
Species	Pteridium esculentumcommon bracken, Boronia rosmarinifoliaforest boronia

10

Created	2019-07-31 13:40:20 AEST by Adrian Caneris
Updated	2019-08-22 10:09:37 AEST by Adrian Caneris
Location	-26.004193, 153.122865167

Site Photos



Recorders	Jarrah
Date	2019-07-31
Site number	10

Emergent Stratum

Median height	27
Height interval	25-30
Estimated cover density	Very Sparse

T1 Stratum

Median height	22
Height interval	17-25
Estimated cover density	Mid-Dense

T2 Stratum

Median height	14
Height interval	8-17
Estimated cover density	Mid-Dense

T3 Stratum

Median height	7
Height interval	2-8
Estimated cover density	Mid-Dense

S1 Stratum

Median height	1.5
Height interval	1-2
Estimated cover density	Sparse

Ground Stratum

Median height	0.5
Height interval	0-1
Estimated cover density	Sparse

Species dominance

E

Stratum	E
Relative dominance	Dominant
Species	Agathis robusta

T1

Stratum	T1
Relative dominance	Codominant
Species	Beilschmiedia obtusifoliahard bolly gum, Agathis robusta, Archontophoenix cunninghamiana, Elaeocarpus eumundiEumundi quandong, Litsea australisbrown bolly gum, Cryptocarya glaucescens, Cryptocarya macdonaldiiMcDonald's laurel, Rhodamnia acuminatacooloola ironwood, Archidendron lovelliaebacon wood

T2

Stratum	T2
Relative dominance	Subdominant

Species	Syzygium luehmannii, Syzygium oleosum blue cherry, Syzygium johnsonii Johnson's satinash, Halfordia kendacksaffron heart, Psydrax lamprophylla, Rhodamnia acuminata cooloola ironwood
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G

Stratum	G
---------	---

Relative dominance	Codominant
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Species	Litsea australis brown bolly gum, Archidendron lovelliae bacon wood, Cryptocarya macdonaldii McDonald's laurel, Cryptocarya glaucescens, Cryptocarya foetida stinking cryptocarya, Cordyline rubra red-fruited palm lily, Rhodamnia acuminata cooloola ironwood
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11

Created	2019-07-31 15:20:37 AEST by Adrian Caneris
Updated	2019-08-22 10:09:49 AEST by Adrian Caneris
Location	-26.003921, 153.121644833

Site Photos







Recorders	Jarah
Date	2019-07-31
Site number	11

Emergent Stratum

Median height	27
Height interval	22-30
Estimated cover density	Sparse

T1 Stratum

Median height	20
Height interval	15-22
Estimated cover density	Mid-Dense

T2 Stratum

Median height	10
Height interval	6-15
Estimated cover density	Mid-Dense

T3 Stratum

Median height	4
Height interval	2-6
Estimated cover density	Mid-Dense

S1 Stratum

Median height	1.5
Height interval	1-2
Estimated cover density	Mid-Dense

Ground Stratum

Median height	0.5
Height interval	0-1
Estimated cover density	Mid-Dense
Additional information	Possible ecotone area

Species dominance

E

Stratum	E
Relative dominance	Dominant
Species	Lophostemon confertus brush box, Ficus watkinsiana green-leaved Moreton Bay fig

T1

Stratum	T1
Relative dominance	Codominant
Species	Backhousia myrtifolia carrol, Syzygium luehmannii, Syzygium johnsonii Johnson's satinash, Archontophoenix cunninghamiana

S1

Stratum	S1
Relative dominance	Subdominant
Species	Decaspermum humile silky myrtle, Backhousia myrtifolia carrol, Alyxia ruscifolia, Pittosporum revolutum yellow pittosporum

G

Stratum	G
Relative dominance	Codominant
Species	Alyxia ruscifolia, Geodorum densiflorum pink nodding orchid, Cordyline rubra red-fruited palm lily, Psydrax lamprophylla

12

Created	2019-07-31 15:41:03 AEST by Adrian Caneris
Updated	2019-08-22 10:10:03 AEST by Adrian Caneris
Location	-26.0033423333, 153.1241555

Site Photos





Recorders	Jarrah
Date	2019-07-31
Site number	12

T1 Stratum

Median height	23
Height interval	18-25
Estimated cover density	Sparse

T2 Stratum

Median height	14
Height interval	10-18
Estimated cover density	Mid-Dense

S1 Stratum

Median height	1.5
Height interval	1-2
Estimated cover density	Sparse

Ground Stratum

Median height	0.5
Height interval	0-1
Estimated cover density	Mid-Dense
Additional information	Lots of fuel and litter

Species dominance

T1

Stratum	T1
Relative dominance	Dominant
Species	<i>Eucalyptus pilularis</i> blackbutt

T2

Stratum	T2
Relative dominance	Codominant
Species	<i>Glochidion ferdinandi</i> , <i>Leptospermum trinervium</i> woolly tea-tree

S1

Stratum	S1
Relative dominance	Codominant
Species	<i>Hibbertia scandens</i> , <i>Clerodendrum floribundum</i> , <i>Glochidion ferdinandi</i>

G

Stratum	G
Relative dominance	Codominant
Species	<i>Hibbertia scandens</i> , <i>Schizaea bifida</i> forked comb fern, <i>Smilax australis</i> barbed-wire vine, <i>Blechnum indicum</i>

13

Created	2019-08-01 09:22:47 AEST by Adrian Caneris
Updated	2019-08-22 10:10:14 AEST by Adrian Caneris
Location	-25.9661175, 153.111075333

Site Photos





Recorders	Jarrah
Date	2019-08-01
Site number	13

Emergent Stratum

Median height	25
Height interval	23-27
Estimated cover density	Sparse

T1 Stratum

Median height	23
Height interval	18-23
Estimated cover density	Sparse

T2 Stratum

Median height	15
Height interval	11-18
Estimated cover density	Mid-Dense

T3 Stratum

Median height	5
Height interval	2-11
Estimated cover density	Mid-Dense

S1 Stratum

Median height	1.5
Height interval	1-2
Estimated cover density	Sparse

Ground Stratum

Median height	0.5
Height interval	0-1
Estimated cover density	Sparse

Species dominance

E

Stratum	E
Relative dominance	Codominant
Species	Agathis robusta, Lophostemon confertusbrush box

T1

Stratum	T1
Relative dominance	Codominant
Species	Lophostemon confertusbrush box, Agathis robusta, Allocasuarina torulosa, Endiandra sieberhard corkwood, Ficus watkinsianagreen-leaved Moreton Bay fig, Sarcopteryx stipatasteelwood

T2

Stratum	T2
Relative dominance	Codominant

Species	Backhousia myrtifolia, Litsea australis, brown bolly gum, Acronychia littoralis, scented acronychia
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T3

Stratum	T3
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Relative dominance	Codominant
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Species	Backhousia myrtifolia, Allocasuarina torulosa
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S1

Stratum	S1
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Relative dominance	Codominant
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Species	Alyxia ruscifolia, Litsea australis, brown bolly gum, Sarcopteryx stipata, steelwood, Macrozamia douglasii
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G

Stratum	G
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Relative dominance	Codominant
--------------------	------------

Species	Smilax australis, barbed-wire vine, Macrozamia douglasii, Litsea australis, brown bolly gum, Alyxia ruscifolia, Clematicissus opaca, Pittosporum revolutum, yellow pittosporum
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14

Created	2019-08-01 02:33:25 UTC by Adrian Caneris
Updated	2019-08-20 23:47:47 UTC by Lizzy Buckby
Location	-25.9360803333333, 153.190699

Site Photos





Recorders	Jarrah
Date	2019-08-01
Site number	14

Emergent Stratum

Median height	20
Height interval	15-21
Estimated cover density	Very Sparse

T1 Stratum

Median height	10
Height interval	6-12
Estimated cover density	Mid-Dense

T2 Stratum

Median height	4
Height interval	2-6
Estimated cover density	Mid-Dense

S1 Stratum

Median height	1.5
Height interval	1-2
Estimated cover density	Mid-Dense

Ground Stratum

Median height	0.5
Height interval	0-1
Estimated cover density	Mid-Dense

Species dominance

E

Stratum	E
Relative dominance	Codominant
Species	<i>Araucaria cunninghamii</i> , Coconut

T1

Stratum	T1
Relative dominance	Codominant
Species	<i>Pandanus tectorius</i> , <i>Banksia integrifolia</i> , <i>Cyclophyllum coprosmoides</i>

G

Stratum	G
Relative dominance	Codominant
Species	<i>Imperata cylindrica</i> lady grass, <i>Hibbertia scandens</i>

15

Created	2019-08-01 02:58:44 UTC by Adrian Caneris
Updated	2019-08-20 23:49:10 UTC by Lizzy Buckby
Location	-25.931788, 153.1906905

Site Photos



Recorders

Jarrah

Date

2019-08-01

Site number 15

S1 Stratum

Median height 1.5

Height interval 1-2

Estimated cover density Dense

Ground Stratum

Median height 0.5

Height interval 0-1

Estimated cover density Dense

Additional information Next to light house, some invasive species present in the general area

Species dominance

S1

Stratum S1

Relative dominance Dominant

Species Pandanus tectorius

G

Stratum G

Relative dominance Dominant

Species Imperata cylindrica, blady grass, Tinospora smilacina, snakevine

16

Created	2019-08-01 05:15:34 UTC by Adrian Caneris
Updated	2019-08-20 23:53:20 UTC by Lizzy Buckby
Location	-26.2707793333333, 153.065691333333

Site Photos







Recorders	Jarah
Date	2019-08-01
Site number	16

T1 Stratum

Median height	6
Height interval	4-11
Estimated cover density	Mid-Dense

T2 Stratum

Median height	3
Height interval	2-4
Estimated cover density	Mid-Dense

S1 Stratum

Median height	1.5
Height interval	1-2
Estimated cover density	Mid-Dense

Ground Stratum

Median height	0.5
Height interval	0-1
Estimated cover density	Mid-Dense

Species dominance

T1

Stratum	T1
Relative dominance	Codominant
Species	Myrsine variabilis, Acronychia imperforata beach acronychia, Acacia disparrima subsp. disparrima, Acacia leiocalyx, Corymbia tessellaris Moreton Bay ash, Alphitonia excelsa soap tree, Cyclophyllum coprosmoides

S1

Stratum	S1
Relative dominance	Codominant
Species	Cyclophyllum coprosmoides, Myrsine variabilis





G






Stratum	G
Relative dominance	Codominant
Species	Austromyrtus dulcis midgen berry, Sporobolus laxus, Myrsine variabilis

APPENDIX B

Recommended Alternative Site Locations

Table B.1. Alternative Site Locations and Descriptions

Site	GPS coordinates	Photos	Description
NOOSA RIVER / DUTGEE WALKERS' CAMP			
Site NA1 (alternative to Site N1)	-26.151106, 153.045229		To the north-east of Site N1. At this location, the pods could be nestled in amongst the trees. This location is also close to the existing Great Walks track. The potential for Koalas at this location is low, despite suitable food trees. No significant impacts on ecological values would result.
LITORIA WALKERS' CAMP			
Site LA3a (alternative to Site L3) (H12)	-26.070922, 153.081794		This area contains the same RE and vegetation as Site L3. However, it is set further back from the lake, providing a greater buffer. It is more secluded and contains no <i>Macrozamia pauli-guilielmi</i> . The dense vegetation provides potential habitat for Black-breasted Button Quail, Three-toed Snake-tooth Skink, Black-faced Monarch, Rufous Fantail, Grey-headed Flying-fox and Spectacled Monarch, although not to the extent that a significant impact would result from the clearing required. Site LA3b (below) would be preferable in terms of avoiding ecological impacts.
Site LA3b (alternative to Site L3) (H13)	-26.070961, 153.081080		This area contains the same RE and vegetation as Site L3. However, it is set further back from the lake, providing a greater buffer. It is more secluded and contains no <i>Macrozamia pauli-guilielmi</i> . The area has been previously disturbed and does not contain any important ecological values. Hence, it would be preferable to select this site instead of site LA3a in terms of avoiding ecological impacts.
KAURI WALKERS' CAMP			
Site KA2 (alternative to Site K2) (H18.1)	-26.005170, 153.123003		This is an existing, cleared area that would require little additional disturbance.

			
Site KA3 (alternative to Site K3) (H17.1)	-26.005137, 153.123308		This area contains cleared pockets in amongst wet eucalypt forest. It is a suitable alternative site as the need for any further clearing is reduced.
DOUBLE ISLAND POINT			
Site DA2a (alternative to Site D2) (H25)	-25.931722, 153.190564		This site is located directly on the Great Walks track and comprises a flat, rocky outcrop with views of the National Park.
Site DA2b (alternative to Site D2) (H26)	-25.931776, 153.190329		This area is a flat, grassed, rocky outcrop with views of the ocean. The site would be exposed in high winds and during peak summer periods, hence Site DA2a may be preferable.
Site DA3 (alternative to Site D3) (H28)	-25.932517, 153.188983		This area wouldn't require any tree clearing or positioning pod locations around existing native vegetation.