CITY OF GREATER GEELONG AMENDMENT C375

1920 BARWON HEADS ROAD, BARWON HEADS

EXPERT WITNESS STATEMENT OF BRETT LANE

Barwon Heads Lifestyle Pty Ltd

BL&A Brett Lane & Associates Pty. Ltd.
Ecological Research & Management
Suite 5 61–63 Camberwell Road, Hawthorn, VIC 3123
P.O. Box 337, Camberwell, VIC 3124
Ph. (03) 9815 2111
Fax. (03) 9815 2685

August 2018

Report No. 9131 (6.0)

CONTENTS

TABLES

FIGURES

APPENDICES

1. WITNESS INFORMATION

1.1. Expert witness information

Brett Alexander Lane
Brett Lane & Associates Pty Ltd
Suite 5, 61-63 Camberwell Road
Hawthorn East, Vic. 3123

Brett Lane has extensive expertise in terrestrial ecology and related legislation and policies. His qualifications and experience are summarised in Appendix 1.

1.2. Information of other significant contributors

The name, address and area of expertise of the other significant contributor to this work is presented in Table 1. Their details are provided in Appendix 1.

Table 1: Details of other significant contributors

Name of contributor	Address	Area of Relevant Expertise	Qualifications and expertise
Christopher Dunk	Brett Lane & Associates Pty Ltd Suite 5, 61-63 Camberwell Road, Hawthorn East, Vic. 3123	Botany	see Appendix 1

2. INTRODUCTION

Brett Lane & Associates Pty Ltd (BL&A) was commissioned to undertake an updated ecological assessment of the property at 1920 Barwon Heads Road, Barwon Heads. The assessment was undertaken to compare with the results of a similar assessment in 2009, presented in the following report:

- BL&A (2009) *Flora and Fauna Assessment, 1920 Barwon Heads Road, Barwon Heads – Expert Witness Statement of Brett Lane.* Consultant's Report for Macafee Investments Pty Ltd, Report 9131 (2.1).

This evidence was presented to the Planning Panel that considered the previous proposed amendment to the City of Greater Geelong Planning Scheme in the Barwon Heads area.

The current investigations were for Barwon Heads Lifestyle Pty Ltd, a company that proposes to develop a retirement village and associated facilities, as well as areas of residential development on the subject property. Specifically, this witness statement has been prepared for presentation at the forthcoming Planning Panel hearing for Amendment C375.

2.1. Scope of assessments

The scope of the latest assessment is described below.

- The subject land was inspected on 12th July 2018 to compare current ecological conditions with those documented in the 2009 report.
- Where differences were found, additional native vegetation assessment was undertaken.
- The nature of the interface between the land and the adjacent wetland reserves was inspected.
- A proposed development plan was considered and its impact on ecological values on and adjacent to the subject land was assessed.
- Information on stormwater runoff and the proposed stormwater management system (Venant Solutions 2018) was also reviewed.
- This evidence statement was prepared summarising the findings of this work and commenting on how impacts on ecological values can be avoided, minimised and offset.

2.2. Area covered by assessments

The study area for the above assessments was a 51-hectare parcel of land at 1900 and 1920 Barwon Heads Road, Barwon Heads (Figure 1). Located within the area covered by the *Barwon Heads Structure Plan 2017*, this property is situated adjacent to the western side of the current Barwon Heads settlement boundary and includes land within the Farming Zone and the Rural Conservation Zone (RCZ10). Directly west of the site lies a Public Conservation and Resource Zone, which covers nearby Murtnaghurt Lagoon, Lake Connewarre, and the overflow channel that connects them. This region is recognised as a Ramsar wetland, the boundary of which extends to the western edge of the site. A small portion of the north-western and south-western area of the property is also a DELWP-mapped wetland.

3. SOURCES OF INFORMATION

3.1. Existing Information

Existing information on flora and fauna accessed for this investigation is described below. Note that 'study area' refers to the 51-hectare parcel of land, located at 1920 Barwon Heads Road, Barwon Heads. Existing information has been obtained from a wider area, termed the 'search region' defined for this assessment as an area with radius 10 kilometres from the approximate centre point of the study area of coordinates: latitude 38˚ 16' 32" S and longitude 144˚28' 47" E.

3.1.1. Local Planning

This report addresses the potential impacts of the proposed development on the biodiversity value of the adjacent Ramsar wetland, in accordance with the requirements of Clause 12.01 (Biodiversity) of the Greater Geelong Planning Scheme.

Responses to the proposed development as discussed in *The Barwon Heads Structure Plan* (City of Greater Geelong 2017) were also considered.

3.1.2. Ecological Vegetation Classes

Pre-1750 (pre-European settlement) vegetation mapping was reviewed to determine the type of native vegetation likely to occur in the study area. Information on Ecological Vegetation Classes was obtained from published EVC benchmarks. These sources included:

- Relevant EVC benchmarks for the Otway Plain bioregion (DSE 2009); and
- NatureKit (DELWP 2018).

3.1.3. Listed matters

A list of the flora and fauna species recorded in the search region was obtained from the Victorian Biodiversity Atlas (VBA), a database administered by DELWP.

The online EPBC Act Protected Matters Search Tool (DEE 2018a) was consulted to determine whether nationally listed species or communities potentially occurred in the search region based on habitat modelling.

3.2. Methods

The site was examined on foot on 12th July, 2018. This work involved the following activities:

- Examination of recent aerial photographs and comparison with those taken prior to the previous study;
- Reassessment of the extent, condition and species composition of native vegetation in accordance with the habitat-hectare method described in DSE (2004);
- Reassessment of the likelihood of occurrence of threatened flora, fauna and ecological communities in the area;
- Preparation of an updated site map detailing the location of native vegetation and threatened species and/or communities recorded; and
- preparation of this statement including:

- A statement on the methods used and sources of information for the investigation including any limitations where applicable;
- The results of the survey and review of existing information;
- Determination of the offset target for the development footprint;
- Discussion of the implications of the findings for the proposed use of land, specifically addressing relevant legislative and policy requirements; and
- Recommendations for mitigation and management strategies, as well as any further investigation, if required.

3.3. Limitations of field assessment

Flora and fauna field surveys usually fail to record all species present for various reasons, including the seasonal absence of some species and short survey duration. Rare or cryptic species can be missed in short surveys.

The survey was conducted in winter – a time when annual and spring-emergent plant species may have been absent or lacking essential identification characteristics. However, because the current study was a re-assessment of the site, with the previous detailed survey conducted in spring (BL&A 2009), the timing of the survey and condition of vegetation was otherwise considered suitable to ascertain any changes to the extent and quality of native vegetation and presence of listed flora.

Some migratory shorebirds were unlikely to be present in the study area as the survey was undertaken outside the migration season.

Wherever appropriate, a precautionary approach has been adopted in the discussion of implications. That is, where insufficient evidence is available on the occurrence or likelihood of occurrence of a species, it is assumed that it could be in an area of habitat, if suitable, and the implications under legislation and policy are considered accordingly.

4. FINDINGS

4.1.1. Native vegetation

The current investigation of the site revealed no significant changes in the extent, composition or condition of the patches of native vegetation previously recorded from the site.

Minor differences in the condition of the patches of Coastal Saltmarsh (EVC 9) in the south-west corner of the site were observed, however these were primarily due to an increase in the amount of organic litter, which can be attributed to seasonal differences in the sampling period (i.e. winter versus spring).

All native species recorded in these patches during the initial assessment were present, and no additional species were found. Weed cover in these patches had not changed.

In the north-west corner of the site and mostly within the DELWP wetland boundary, a further patch of Coastal Saltmarsh was recorded (Habitat Zone D; see photograph in Appendix 3). The original flora assessment (BL&A 2009) found no evidence of this patch, and it is likely that this has developed as robust saltmarsh species have colonised what was a regularly mown lawn area. This area was of low diversity and dominated by low-growing saltmarsh species – primarily Beaded Glasswort, Rounded Noon-flower, Creeping Brookweed and Australian Salt-grass (for a full flora list, see Appendix 6). Creeping Brookweed was the only native species not recorded from the previous vegetation assessment. Weed cover was moderate (30%), comprising mainly species associated with lawns (Kikuyu, Couch and Burr Medic) and Galenia. A detailed habitat hectare assessment for Habitat Zone D is presented in Appendix 4.

Habitat Zone D is the only area of native vegetation affected by the current proposal; the other areas being preserved. It has been determined that Habitat Zone D is regrowth less than 10 years old, and is therefore exempt from the requirement of a permit for removal under Cl. 52.17 of the Greater Geelong Planning Scheme.

4.1.2. RAMSAR wetland

In 2015 the boundary of the Ramsar wetland was altered. It is now aligned with the full length of the western property boundary and no longer extends into it. The eastern section of Murtnaghurt Lagoon, which occupies the land directly south of the study area is not included in the Ramsar wetland. The Ramsar wetland adjacent to the property and most at risk of potential impacts from the proposed development now comprises only the channel draining northward from Murtnaghurt Lagoon towards Barwon River. This channel was found to support vegetation dominated by Chaffy Saw-sedge, with more diverse saltmarsh community, typically including Beaded Glasswort, Austral Sea-blite, Bower Spinach and Australian Salt-grass on the fringes. There was no evidence of changes in the extent or condition of the wetland plant community compared to the previous study.

Figure 1: Study area and native vegetation

Project: 1920 Barwon Heads Road, Barwon Heads
Client: Barwon Heads Lifestyle Pty Ltd
Date: 10/08/2018

Study area
RAMSAR Wetland
DELWP Wetland

Habitat zones

Coastal Saltmarsh (EVC 9)
Coastal Alkaline Scrub (EVC 858)

N

Metres
0 130

BL&A
Brett Lane & Associates Pty. Ltd.
Ecological Research & Management
PO Box 337, Camberwell, VIC 3124, Australia
www.ecologicalresearch.com.au
P: (03) 9815 2111 - F: (03) 9815 2685

160XXX - Created by: nmay / XXX - Z:\2009 jobs\9131 (1920 Barwon Heads Road, Barwon Heads Desktop F&F - AB)\9131.5 (Amendment C375 - Q - BL)\Mapping\GIS\9131 Wetland digitisation 180807.mxd

4.1.3. DELWP wetland

The mapped DELWP wetland boundary extends into the study area in the north-west corner (see Figure 2). Expansion of the existing artificial water body and construction of the playing-field carpark, vehicle access and the north-westernmost residential lot will therefore result in the deemed loss of 3.76 hectares of wetland (Figure 3). Being in Location 2 and of an area greater than 0.5 hectares, a permit is required for the removal of this area under the **detailed** assessment pathway, triggering a referral to DELWP.

4.1.4. Offset requirements

A native vegetation removal report for the removal of 3.76 hectares of DEWLP wetland has been included in Appendix 5.

If a permit is granted, a *Species offset amount* of 2.141 species units of habitat for Prickly Arrowgrass will be required.

Figure 2: Development Plan and Native Vegetation

Project: 1920 Barwon Heads Road, Barwon Heads
Client: Barwon Heads Lifestyle Pty Ltd
Date: 13/08/2018

- Study area
- DELWP Wetland
- RAMSAR Wetland

Habitat zones

- Coastal Saltmarsh (EVC 9)
- Coastal Alkaline Scrub (EVC 858)

N

Metres

0 130

BL&A
Brett Lane & Associates Pty. Ltd.
Ecological Research & Management
PO Box 337, Camberwell, VIC 3124, Australia
www.ecologicalresearch.com.au
P: (03) 9815 2111 - F: (03) 9815 2685

4.1.5. Threatened flora and fauna

No threatened flora or fauna species were recorded from the study area, and there were no changes to the likelihood of occurrence of threatened flora and fauna at the site. The conclusion in relation to the likelihood of occurrence of threatened flora and fauna species in Tables 1 and 4 of BL&A (2009) is therefore still current (these tables are included for completeness in Appendix 2).

Orange-bellied Parrot

As discussed in BL&A 2009 the EPBC Act and FFG Act-listed species, Orange-bellied Parrot, was considered to visit the wetlands adjacent to the study area regularly. Beaded Glasswort and Shrubby Glasswort were found within the patches of native vegetation in the south-west corner of the study area. These species can be indicative of suitable habitat (Higgins 1999), suggesting the possibility of visitation by Orange-bellied Parrot.

At the time of the initial assessment in 2009, there were no records of Orange-bellied Parrot from the Barwon Heads region and specifically, none from Murtnaghurt Lagoon nor the associated drainage channel immediately west of the study area. Since then, additional records of Orange-bellied Parrot within a 10-kilometre radius of the study area have been confined to Lake Connewarre and the northern section of the Barwon River were previous sightings occurred.

The population of the Orange-bellied Parrot has declined significantly since 2009 and it is now found regularly only at the Western treatment Plant on the north side of the Western Arm of Port Phillip Bay. It is now less likely to be found at Murtnaghurt Lagoon than 10 years ago. Should the population recover, it may start using the area more regularly. However, before the population declined to its current level there were no records of it there so this is considered a low probability.

Migratory birds

As with the previous study (BL&A 2009), the suitability of habitat in the study area for migratory bird species was examined through a review of existing information and site inspection. Due to the proximity of suitable habitat in Murtnaghurt Lagoon, the impact of the proposed development on this group of birds has been assessed in Section 5.1.

4.1.6. Threatened communities

The small area of Coastal Alkaline Scrub (EVC 858; Habitat Zone A, Figure 1), constituting 0.08 hectares of *Coastal Moonah (*Melaleuca lanceolata *subsp.* lanceolata*) Woodland Community*—listed as a threatened ecological community under the *Flora and Fauna Guarantee Act 1988*—was unaltered. This patch will be retained and protected as a landscape feature under the current proposal.

5. IMPACTS AND REGULATORY IMPLICATIONS

5.1. Proposed Development and Potential Impacts

The proposed development includes low and high-density housing incorporating areas of open space and a large water retention pond. The development footprint has been designed to incorporate the retention of:

- The small patch of Coastal Alkaline Scrub (Habitat Zone A);
- The areas of Saltmarsh in the south-west corner (Habitat Zones B and C);
- The eucalypt plantation in the north-east corner;
- A buffer zone of 50 metres between the Ramsar wetland and the water storage pond, with the exception of the area already occupied by the previous wetland construction where the existing buffer will be retained; and
- A total buffer zone of 100 metres between the Ramsar wetland and the development footprint.

The artificial wetland and surrounding vegetation in the north-west of the study area will be impacted by expansion of the water body as part of the stormwater treatment measures and nearby construction. Earthworks and landscaping have previously modified this area. The vegetation here was either planted indigenous flora or regrowth less than 10 years old, surrounded by regularly mown lawn areas of exotic grasses and herbaceous.

Given the current poor quality of this habitat, there is ample potential for the development proposal and associated revegetation works to greatly improve on the ecological value of this area adjacent to the Ramsar wetland.

The proposed development has the potential to impact fauna habitats, and in particular significant neighbouring wetlands, including saltmarsh. Direct impacts could arise both during construction and post-occupation.

Impacts from construction activities primarily involve disturbance to wildlife from increased levels of activity during construction, as well as possible indirect impacts arising from uncontrolled site access by personnel, vehicles and construction machinery, or the effects of sediment-laden runoff from construction areas. These impacts can effectively be prevented through the adoption of best practice construction environmental management measures. This is explored further in Section 6.2.

Saltmarsh habitats could be impacted by the increased human activity of the area, through increased disturbance, predator introduction and weed invasion. However, the presence of existing residential areas in close proximity to the proposed development suggests these impacts are already in existence and the addition of extra housing in the context of the proposed total buffer zone of 100 metres would not further impact this habitat. Importantly, the proposed water retention facility incorporated into the development plan will create a physical barrier to the dispersal potential of weeds and animal pests into the wetland, and will also prevent incursion by human activity. It is understood from the report from Venant Solution (2018) that this water body will also reduce urban runoff from the study area into the wetland, with the likely outcome being that the quality of water reaching the wetland will be improved from the current condition. Therefore, impacts are considered to be low.

Impacts on listed migratory species potentially include short-term disturbance from construction activities and long-term impacts from increased human activity in the area. It

is likely that small numbers of listed migratory species will occur occasionally on the artificial open-water wetland in small numbers. Any other waterbirds in the area would inhabit dense areas of sedgeland and saltmarsh. The small number of migratory waterbirds using the small wetland in the north west part of the site, combined with the natural screening of dense sedgeland for other waterbirds in the area, make it unlikely that disturbance during construction activities will significantly impact migratory bird species.

The maintenance of an extensive buffer zone around the proposed water retention structure and residential areas that separates them from sensitive wetland habitats will be a significant on-going impact mitigation feature of the proposed development. To maximise the mitigation effectiveness of this buffer, a management plan is being prepared to clearly direct the range of uses and revegetation activities that will be undertaken. Revegetation should include strategically placed screening plantings and wetland viewing opportunities to ensure human activities in the buffer area do not increase disturbance to waterbirds, including listed migratory species in the Murtnaghurt Lagoon.

Ecological effects to the wetland could potentially arise from changes to the frequency and duration of inundation events and consequential changes in water regime and lagoon salinity. Without mitigation, the amount of water that reaches the wetland will increase as runoff will be increased, and the slower arrival from seepage reduced. The primary aim of mitigation measures is therefore to intercept this excess runoff and facilitate the drainage via seepage. This can most efficiently be achieved by the creation of water retention ponds, which also enhance surface evaporation in keeping with post-rainfall surface evaporation from the current landscape (Venant Solutions 2018).

The location of the water retention facility in the development plan will provide an additional physical barrier protecting the wetlands; reducing the dispersal potential of introduced flora and fauna from the residential development and widespread access and disturbance to the wetland by human activity.

Changes in either the salinity of water or soil can affect the distribution and composition of saltmarsh plant communities. These communities are therefore prone to natural alteration and transition over time. The risk of significant changes to the salinity dynamics of the wetland from the proposed development arises from the potential for modification to the rate and amount of freshwater runoff. The design measures created to eliminate changes in runoff from the site will therefore effectively manage the risk posed by such potential changes in salinity.

The wetland community is also sensitive to impacts from increased sediment and nutrient inflow. Capturing the stormwater runoff from the study area in a retention pond will effectively capture sediment and nutrients as well, which will then settle within the pond. There is therefore likely to be a net decrease in sediment flow into the wetland from the development site post construction and occupation. The proposed stormwater management system will meet Best Practice Environmental Management standards for nutrient, sediment reduction and avoidance of an increase in pollutants (Venant Solutions 2018). Measures to manage the risk of sediment pollution during construction can be addressed via a construction environmental management plan (see Section 6.2).

5.2. Planning Controls

This sub-section briefly reviews the planning controls related to flora and fauna that would apply to any future development of the study area. These planning controls, combined with

the legislative controls detailed later in this section, provide for the consideration of potential impacts and the development and implementation of appropriate design, mitigation and offset measures to prevent significant impacts on remnant ecosystems and species on and adjacent to the study area.

5.2.1. Clause 52.17

Removal of native vegetation on allotments of 0.4 hectares or more requires a planning permit under Clause 52.17 of all Victorian Planning Schemes. Before issuing a planning permit, Responsible Authorities are obligated to refer to Clause 12.01 (Biodiversity) in the Planning Scheme. This refers in turn to the *Guidelines for the removal, destruction or lopping of native vegetation*.

A permit is required under Clause 52.17 of the Planning Scheme, and the provisions of the Guidelines apply to the proposed development given that part of a DELWP-mapped wetland would be removed in the north-western part of the site.

5.2.2. Overlays

Two separate overlays occur within various parts of the study area. These include:

- Land Subject to Inundation Overlay (LSIO) – The area of this overlay in the study area is limited to the artificial wetland in the north-west; and
- Environmental Significance Overlay – Schedule 2 (ESO2) – The area of this overlay in the study area is limited to the area of Saltmarsh (Habitat Zones B and C) in the south-west corner of the study area.

A permit is required for the proposed works, including the expansion of the artificial water body and construction of a bike path, within the area covered by the LSIO. No works are proposed for mapped saltmarsh areas.

5.3. EPBC Act

The EPBC Act contains a list of threatened species and ecological communities that are considered to be of national conservation significance. Any impacts on these species considered significant requires the approval of the Australian Minister for the Environment. If there is a possibility of a significant impact on nationally threatened species or communities or listed migratory species, a Referral under the EPBC Act should be considered. The Minister will decide after 20 business days whether the project will be a 'controlled action' under the EPBC Act, in which case it cannot be undertaken without the approval of the Minister. This approval depends on a further assessment and approval process (lasting between three and nine months, depending on the level of assessment).

The proposed development is situated approximately 100 metres from the channel connecting Murtnagurt Lagoon to lake Connewarre, which is part of the Port Philip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site. Taking into consideration the nature of the development and the proposed buffer between the development area and Ramsar wetlands and the provision of a stormwater management system designed to protect the current water and salinity regime of the wetland (see below), impacts on the ecological character of the Ramsar wetland are not considered to be significant.

Stormwater runoff has the potential to impact the lagoon and associated wetland ecosystems, through process such as alteration to nutrient levels, salinity and duration and extent of inundation events. Calculations provided by Venant Solutions (2018)

indicate that the proposed development plan is likely to increase runoff volume by 9% (from 659 megalitres per year to 722 megalitres per year) however, effective measures included in the development design ensure that there is no increase in runoff volume to the wetlands. These measures include on-site storage, infiltration to groundwater, re-use strategies, rainwater tanks, pumping off-site and Water Sensitive Urban Design (WSUD). The importance of the adjacent wetlands dictates that stormwater impacts are dealt with effectively.

No flora species listed as threatened under the EPBC Act were recorded during the current assessment and no listed flora species are considered likely to occur in the study area due to the absence of suitable habitat. Furthermore, no ecological communities considered a matter of national environmental significance under the Act were recorded in the study area.

One fauna species, the Orange-bellied Parrot, listed as threatened under the EPBC Act was considered unlikely to occur regularly in the study area despite the presence of suitable habitat. Some migratory bird species are also considered to occasionally visit the study area. The provision of the significant buffer zone between proposed development areas and wetlands, including saltmarsh habitats, will ensure that impacts are not significant. The management plan being developed for the buffer area will take into consideration potential impacts on wetlands and ensure these are appropriately mitigated.

Although the proposed development is considered not to have a significant impact on the Ramsar Wetland, Orange-bellied Parrot, other threatened flora and fauna, and/or migratory birds, a Referral under the EPBC Act is recommended to confirm the status of the proposed development under the EPBC Act. The project should be referred as 'Not a Controlled Action' (i.e. not requiring assessment and approval under the EPBC Act).

5.4. FFG Act

The Victorian *Flora and Fauna Guarantee Act 1988* lists threatened flora and fauna species to provide for their protection and management. The FFG Act has limited direct application to private land.

No flora species listed as threatened under the FFG Act were recorded during the current assessment and no listed flora species are considered likely to occur in the study area due to the absence of suitable habitat.

One ecological community listed as threatened under the FFG Act, *Coastal Moonah (*Melaleuca lanceolata *subs.* lanceolata*) Woodland Community* was recorded in the study area in the form of Coastal Alkaline Scrub (EVC 858). The current development proposal provides for retention of this small area (Habitat Zone A).

One fauna species, Orange-bellied Parrot, listed as threatened under the FFG Act is considered unlikely to occur regularly in the study area despite the presence of suitable habitat. The provision of the significant buffer zone between proposed development areas and wetlands will ensure that impacts are not significant. The management plan being developed for the buffer area will take into consideration potential impacts on wetlands and ensure these are appropriately mitigated.

5.5. EE Act

Under the *Environment Effects Act 1978*, proponents are required to prepare a Referral to the state minister for Planning, which will determine if an Environment Effects Statement (EES) is required for the project. Criteria related to flora and fauna are:

- Potential clearing of 10 hectares or more of native vegetation from an area with endangered EVC, or vegetation that is or is likely to be, of very high conservation significance according to Victoria's Native Vegetation Management Framework, except where authorised under an approved Forest Management Plan or Fire Protection Plan;
- Potential long-term loss of a significant proportion (1 to 5% depending upon conservation status of species concerned) of known remaining habitat or population of a threatened species in Victoria;
- Potential long-term change to a wetland's ecological character, where that wetland is Ramsar listed, or listed in 'A Directory of Important Wetlands in Australia';
- Potential major effects upon the biodiversity of aquatic ecosystems over the long term;
- Potential significant effects on matters listed under the *Flora and Fauna Guarantee Act 1988*.

One or a combination of these criteria may trigger a requirement for a Referral to the Victorian Minister for Planning who will determine if an EES is required.

The site is situated adjacent to a Ramsar wetland. The proposed total buffer of approximately 100 metres, combined with a range of effective stormwater management measures including the construction of a water retention facility that will create an additional barrier between the wetland and development, is considered suitable to prevent impacts to the integrity of this site. Therefore, an EES referral is not required.

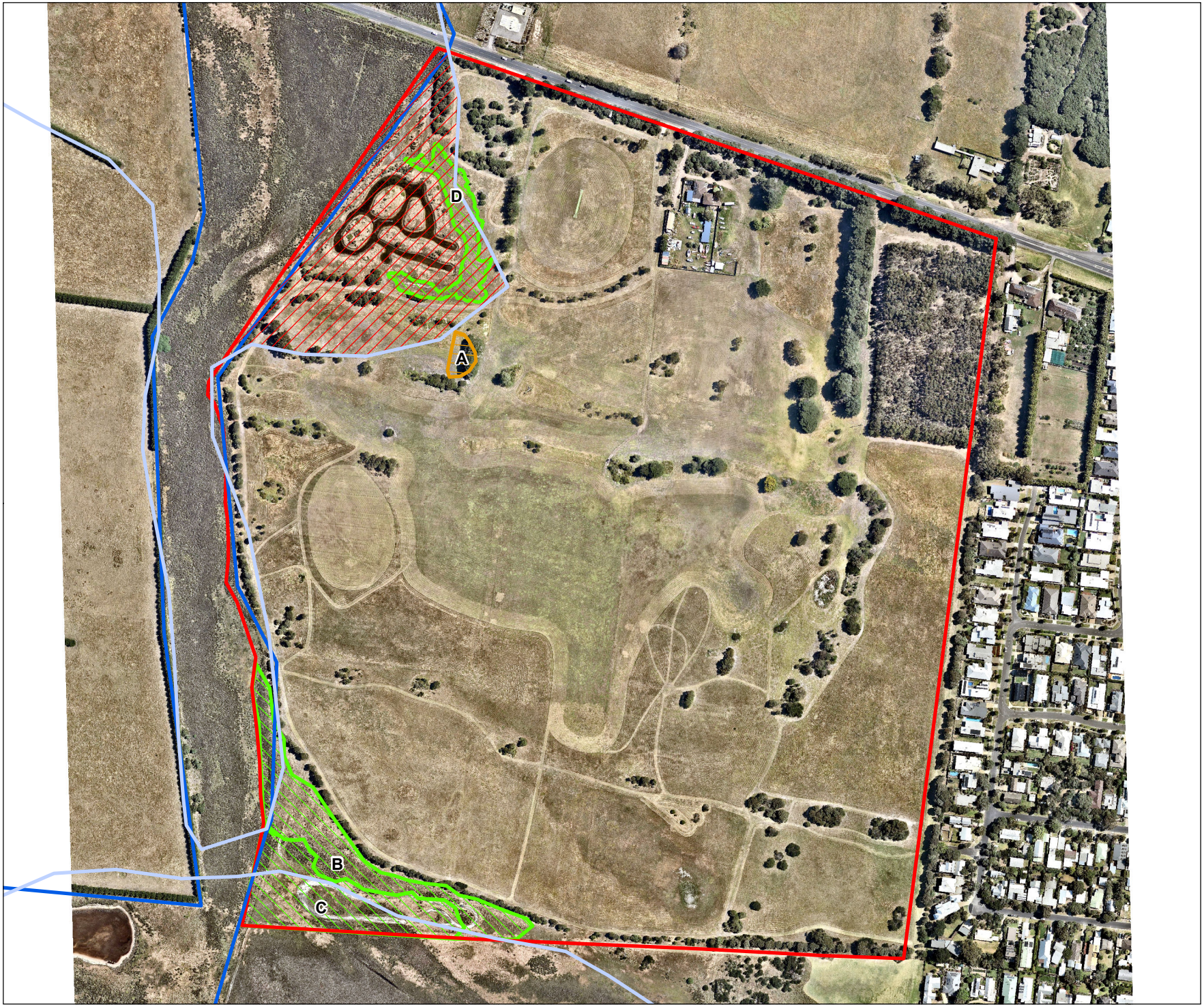


Figure 3: Native vegetation to be removed

Project: 1920 Barwon Heads Road, Barwon Heads
Client: Barwon Heads Lifestyle Pty Ltd
Date: 13/08/2018

- Study area
- DELWP Wetland
- RAMSAR Wetland
- Native vegetation to be removed

Habitat zones

- Coastal Saltmarsh (EVC 9)
- Coastal Alkaline Scrub (EVC 858)

N

Metres
0 120

BL&A
Brett Lane & Associates Pty. Ltd.
Ecological Research & Management
PO Box 337, Camberwell, VIC 3124, Australia
www.ecologicalresearch.com.au
P: (03) 9815 2111 - F: (03) 9815 2685

160XXX - Created by: nmay / XXX - Z:\2009 jobs\9131 (1920 Barwon Heads Road, Barwon Heads Desktop F&F - AB)\9131.5 (Amendment C375 - Q - BL)\Mapping\GIS\9131 FIG3 NV to be removed 180809.mxd

6. CONCLUSIONS AND RECOMMENDATIONS

The following section outlines recommendations and mitigations measures to address ecological constraints and issues identified on the site.

6.1. Conclusions

The implications below pertain to the current proposal.

A permit for the removal of 3.76 hectares of DELWP-mapped wetland is required under the planning scheme, and the provision of 2.141 species units of habitat for Prickly Arrowgrass will be required to offset this removal. As this action constitutes a **detailed** assessment pathway, a referral to DELWP will be required.

An EPBC Act referral is recommended. The adoption of key design and management measures, including a 50-metre buffer between the Ramsar wetland and the overall development footprint and effective stormwater management measures will ensure that impacts on matters of national environmental significance will not be significant. Therefore, potential impacts on the adjacent Ramsar site, the Orange-bellied Parrot and migratory bird species which have potential to occur in the study area will not be significant.

There are currently no implications under the EE Act, FFG Act or DSE Advisory list.

In view of the proposed development plan layout, the retention of the *Coastal Moonah (*Melaleuca lanceolata *subsp.* lanceolata*) Woodland Community*, and the scope this provides for the implementation of effective buffers and stormwater management measures, it is considered that the proposed development plan for the study area will not result in significant impacts on important flora and fauna attributes on and adjacent to the site.

6.2. Mitigation Recommendations

Consideration should be given to including the mitigation measures described below in a construction and operational environmental management plan for the project:

- Avoid removal of native planted trees where possible. Although a permit is not required for their removal, they were noted to support several native bird species and are recommended to be retained where possible;
- Protection of the patch of *Coastal Moonah (*Melaleuca lanceolata *subsp.* lanceolata*) Woodland Community* from accidental damage during the construction phase;
- Provide for effective stormwater retention and treatment measures to prevent any increase in runoff or nutrient input to adjacent wetlands;
- Any stockpiling of soil should occur outside areas of native vegetation, preferably on open areas of introduced pasture and ground cover weeds, to minimise disturbance;
- Weed control, by an experienced bush regenerator, should be carried out along disturbed areas after construction to control any weed outbreaks and prevent invasion by weeds into adjacent areas of native vegetation and wetlands;
- A significant buffer of open space should be retained between any development and the Ramsar wetland (Murtnagurt Lagoon drain);
- The existing buffer between the Ramsar wetland and the artificial water body in the north-west of the property will need to be retained;

- The buffer area should be revegetated with appropriate indigenous plants of local genetic provenance. This measure is aimed at minimising any potential long-term adverse impacts that the proposed development may have on the health and functionality of the Ramsar site.
- All machinery bought on site should be weed and pathogen free, and avoid areas of native vegetation and wetlands, which should be temporarily fenced to exclude inadvertent access;
- The use of local indigenous plant species, of local genetic provenance, should be considered in the landscaping of any development on the site; and
- Construction contractors should be inducted into an environmental management program for construction works and all environmental controls should be checked for compliance on a regular basis.

Provided these mitigation measures are adopted and effectively implemented then no significant impacts on flora and fauna values on or adjacent to the study area are anticipated. The proposed development design has the potential to promote the health and longevity of the wetlands by protecting and enhancing its ecological values.

7. DECLARATION

I have made all the inquiries that I believe are desirable and appropriate and no matters of significance which I regard as relevant have to my knowledge been withheld from the Panel.

Signed:

Brett Lane
Director
Brett Lane & Associates Pty Ltd
Suite 5, 61–63 Camberwell Road
Hawthorn East, VIC 3123

13th August 2018 2018

8. REFERENCES

BL&A 2009. *Flora and Fauna Assessment, 1920 Barwon Heads Road, Barwon Heads – Expert Witness Statement of Brett Lane.* Consultant's Report for Macafee Investments Pty Ltd, Report 9131 (2.1).

Carter, O. 2010. *National Recovery Plan for the Curly Sedge (*Carex tasmanica*)*, Department of Sustainability and Environment, East Melbourne.

City of Greater Geelong 2017. *Barwon Heads Structure Plan*, Greater Geelong City Council: Geelong.

Department of the Environment and Energy (DEE) 2018a. *EPBC Act Protected Matters Search Tool,* Department of the Environment, Canberra, viewed July 2018.

Department of the Environment and Energy (DEE) 2018b. *Species Profile and Threats Database*, Department of the Environment and Energy, Canberra, accessed July 2018.

Department of Environment, Land, Water and Planning (DELWP) 2018. *NatureKit*, Department of Environment, Land, Water and Planning, East Melbourne, Victoria, viewed July 2018.

Department of Sustainability and Environment (DSE) 2004. Vegetation Quality Assessment Manual–Guidelines for applying the habitat hectares scoring method. Version 1.3. Victorian Government Department of Sustainability and Environment, Melbourne.

Department of Sustainability and Environment (DSE) 2009. *Ecological Vegetation Class (EVC) Benchmarks by Bioregion*, Department of Environment, Land, Water and Planning, East Melbourne, Victoria.

Entwisle, T.J. 1996a. 'Brassicaceae' *in* Walsh, N.G.; Entwisle, T.J. (eds), *Flora of Victoria, Volume 3: Dicotyledons Winteraceae to Myrtaceae*, Inkata Press, Melbourne.

Entwisle, T.J. 1996b. 'Thymelaeaceae' *in* Walsh, N.G.; Entwisle, T.J. (eds), *Flora of Victoria, Volume 3, Dicotyledons Winteraceae to Myrtaceae*, Inkata Press, Melbourne.

Flann, C. 1999. 'Bracteantha' *in* Walsh, N.G.; Entwisle, T.J. (eds), *Flora of Victoria, Volume 4, Cornaceae to Asteraceae*, Inkata Press, Melbourne (as *Bracteantha palustris* Flann*).*

Jeanes, J.A. 1999. 'Euphorbiaceae' *in* Walsh, N.G.; Entwisle, T.J. (eds), *Flora of Victoria, Volume 4: Cornaceae to Asteraceae*, Inkata Press, Melbourne.

Jones, D.L. 1994, '*Pterostylis*' *in* NG Walsh & TJ Entwisle (eds), *Flora of Victoria, Volume 2: Ferns and Allied Plants, Conifers and Monocotyledons*, Inkata Prass, Melbourne, pp. 798–830.

Rule, K. (1998) 'A new, rare Victorian subspecies of *Eucalyptus leucoxylon* F. Muell.', *Muelleria* 11: 133–136.

Venant Solutions 2018. *City of Greater Geelong Planning Scheme Amendment C375, Expert Witness Statement, Flood and Stormwater*, 1900 Barwon Heads Road, Barwon Heads, Consultant's Report for Barwon Heads Lifestyles Pty Ltd, Report R.M00186.001.00, August 2018.

Appendix 1: Qualifications and experience of Brett Lane and other significant contributors

BL&A Brett Lane & Associates Pty. Ltd.
Ecological Research & Management

Brett Lane
Principal Consultant and Director

Profile

Brett has over 35 years' experience in ecological research and management. He has worked in a range of positions with environmental consultancies in Melbourne and Brisbane and with non-government environmental groups in Australia and East Asia. He has specialist knowledge in birds and wetlands, and extensive experience in ecological impact assessment, including in the infrastructure, renewable energy, property development and mining industries. Brett has undertaken and managed many hundreds of ecological assessments and prepared and reviewed documents that have accompanied development applications on behalf of private companies, government infrastructure agencies and private individuals. His extensive experience has given him an excellent knowledge of the regulatory environment relevant to native vegetation, flora and fauna and he can advise on the scope of scientific information needed to inform the development assessment and decision-making process. He has also defended his scientific work as an expert witness in courts and tribunals. Brett founded BL&A in 2001.

Biography

Working in industry since 1979

Qualifications

BA (Zoology & Physical Geography) *Monash University*

Certificates and Licenses

Management Authorisation – Salvage and Translocation
Victorian Animal Ethics Approval

Employment History

2001 – present
Director, *Brett Lane & Associates Pty Ltd, Melbourne*

1999 – 2000
Natural Resource Specialist, *PPK Environment & Infrastructure Pty Ltd, Melbourne*

1996 – 1998
Senior Ecologist, Ecology Australia Pty Ltd, *Melbourne*

1993 – 1996
Principal Terrestrial Ecologist, *WBM Oceanics Australia, Brisbane*

1991 – 1993
Assistant Director (East Asia), *Asian Wetland Bureau, Kuala Lumpur, Malaysia*

1987 – 1991
Director, *Brett A Lane Pty Ltd (Melbourne)*

1980 – 1986
Wader Studies Co-ordinator, *Royal Australasian Ornithologists' Union (now Birdlife Australia, Melbourne*

1979
Research Assistant, Kinhill Planners Pty Ltd., Melbourne

Key Skills

- Experienced advisor on state and federal biodiversity legislation and policy
- EPBC Act and EES Referrals
- Preparation of environmental assessment reports (preliminary documentation, public environmental report and environmental impact statement)
- Preparation of native vegetation planning permit applications
- Design of developments to comply with biodiversity legislation and policies
- Expert witness for VCAT, planning panels and courts
- Ecological risk assessment
- Native vegetation assessment
- Terrestrial fauna assessment and wetland ecology
- Ornithologist specialising in wetland and migratory shorebirds
- Wind energy development specialist and minimizing impacts on wildlife including collision risk modelling

Project Examples

Property Development

Eynesbury Township, Eynesbury, Victoria: Flora, Fauna and Habitat Hectare Assessment, Targeted Flora Surveys, Growling Grass Frog Survey, Plains-wanderer Survey and Development of an Offset Tracking Tool. Net Gain Analysis for Planning Permit Applications of subsequent stages and advice on offset management (2003 – present)

Taylors Rd, Sydenham, Victoria (Broadcast Australia): EPBC Act Referral, preparation of EPBC Act Public Environment Report (PER), Offset Site Search and Offset Management Plan, Spiny Rice-flower Propagation and Translocation Plans, Seed Collection (2006 – present)

Somerfield Estate, Keysborough, Victoria: Flora, Fauna and Growling Grass Frog Survey and Offset Plan Preparation, preparation of offset tracking reports for each stage of development (2008 – present)

Modena Estate, Burnside, Victoria: Flora and Fauna Assessment, targeted threatened species surveys, EPBC Act referrals and assessment approvals, development of offset and mitigation plans (2002 – present)

Renewable Energy

Dundonnell Wind Farm, Dundonnell, Victoria: Overview and Targeted Assessments including Brolga, bat, migratory bird, Striped Legless Lizard, Flora Surveys, assessment of powerline route and road access options, EPBC Act Referral, Input to EES Referral, preparation of EES technical appendix on flora and fauna, Brolga impact assessment, collision risk modelling (2009 – present)

Granville Wind Farm, Granville Harbour, Tasmania: Overview Assessment, targeted surveys including Orange-bellied Parrot and bat surveys, EPBC Act Referral and advice for regulator negotiations (2011 – present)

MacArthur Wind Farm, MacArthur, Victoria: Overview assessment, detailed flora and fauna surveys, impact assessment, input to EPBC Act Referral and state EES, assessment of powerline and road rout options, appearance at state Planning Panel hearings as expert witness, preparation of pre-construction and operational flora and fauna management plans, net gain analysis and identification of suitable offsets (2004 – 2012)

Cherry Tree Wind Farm, Victoria: Overview assessment, native vegetation and threatened flora surveys, targeted threatened fauna surveys, assessment of powerline and road route options, offset site sourcing and assessment, preparation of expert witness statement and appearance at VCAT (2010 - 2015)

Mt Gellibrand Wind Farm, Mt Gellibrand, Victoria: Overview assessment, detailed flora and fauna surveys, including targeted Brolga and migratory bird surveys, and Striped Legless Lizard tile grid surveys, input to state planning permit application, preparation of witness statement and appearance at state Planning Panel hearing, preparation and early implementation of pre-construction flora and fauna management plans, including bat and avifauna management plan, native vegetation mapping, offset mapping, development of Brolga monitoring and mitigation strategies (2004 – present).

Road and Rail Infrastructure

Avalon Airport Rail Link, Little River, Victoria: Flora and Fauna Mapping, Constraint Analysis and Net Gain Analysis (2011 – 2013)

Dingley Bypass, Keysborough, Victoria: Flora and Fauna Assessment, including targeted flora surveys, habitat hectare assessment and Net Gain analysis, expert witness at VCAT case (approved) (2008 – 2014)

Nagambie bypass, Nagambie Victoria: Flora and Fauna Assessment, including habitat hectare assessment and Net Gain analysis (2008)

Second Murray River Bridge Crossing at Echuca-Moama: Detailed Flora Assessment, Targeted Flora Survey (2008 – present)

Ecosystem Monitoring and Management

Scientific Review Panel, Kerang Lakes Bypass project (North Central Catchment Management Authority, Goulburn Murray Water): Scientific review of detailed technical reports to inform decisions of water savings plans and associated watering plans for five wetlands that form part of the Ramsar-listed Kerang Lakes wetlands system. (2013)

Northern Victoria Irrigation Renewal Program (NVIRP): Assessed the impact of a major federal water industry investment project on Matters of National Environmental Significance, including threatened flora, threatened fauna and listed migratory birds using wetlands located in the potential impact area. (2009-2011)

BL&A Brett Lane & Associates Pty. Ltd.
Ecological Research & Management

Christopher Dunk
Senior Ecologist

Profile

Chris has over 12 years in botany, study of fungi and more recently ecological assessment. Chris has worked on a range of projects throughout Victoria. In addition to general flora surveys, Chris has undertaken targeted survey for threatened plants and has attained accreditation for habitat hectare assessment.

Chris holds a Bachelor of Science (Hons), a Graduate Diploma (Professional Communication) and has extensive field experience in the research sector. Chris has also taught botany at various universities around Melbourne, and is a highly competent and recognised mycologist.

Biography

Working in industry since 2006

Qualifications

BSc (Hons)
Grad Dip (Professional Communication)

Certificates and Licenses

Construction Induction 'White Card'
Working With Children card
Vegetation Quality Assessment Competency

Employment History

2018- Present
Zoologist & Ecologist, *BL&A, Melbourne*.

2013-2018
Laboratory Demonstrator/Lecturer, Botany Department, Deakin University

2006–2013
Mycologist/Research Assistant, Royal Botanic Gardens Melbourne

2003–2017
Laboratory Demonstrator/Practical Co-ordinator, Department of Botany, La Trobe University

2006-2010
Laboratory Demonstrator/Specialist Consultant, School of Botany, Melbourne University

Key Skills

- Excellent plant identification skills
- Strong communication and writing skills
- Extensive field experience
- Excellent problem solving abilities
- Broad knowledge of taxonomy and ecology

Experience Knowledge Solutions
Suite 5, 61 - 63 Camberwell Road, Hawthorn East, VIC 3123
PO Box 337, Camberwell, VIC 3124
www.ecologicalresearch.com.au
Ph (03) 9815 2111
Fax (03) 9815 2685
enquiries@ecologicalresearch.com.au

Project Examples

Cooper Street, Epping – Initial assessment of commercial development impacts on EPBC Act-listed matters of national environmental significance and preparation of EPBC Act referral

Tooradin Hospitality Establishment – Assessment of native vegetation impacts of proposed resort-style development and preparation of report to accompany a planning permit application for native vegetation removal.

Alberton Wind Farm – Preparation and editing of Bilateral Assessment report under the Victoria – Commonwealth Assessment Agreement for a large wind farm project, including assessment of impacts on matters of national environmental significance.

Spavin Drive, Sunbury – Native vegetation assessment and preparation of report to accompany a planning permit application for native vegetation removal. Preparation of a Bushfire Risk Assessment.

Coleman's Road, Dandenong Industrial Development – Preparation of Construction Native Vegetation management Plan and Conservation Reserve Management Plan to protect retained native vegetation on an industrial estate, in response to strict planning permit conditions.

Tuck's Road, Main Ridge; Wedge Road, Skye; Eucalypt Court, Mickleham; Beauford Road, Red Hill South – Preparation of flora and native vegetation assessments for proposed subdivisions and preparation of reports to accompany a planning permit application for native vegetation removal.

Cressy and Campbellltown offset sites – targeted surveys for the threatened Spiny Rice-flower, an EPBC Act listed species

Appendix 2: Tables of listed flora and fauna

Table 2: FFG Act and EPBC Act listed flora species and likelihood of occurrence

Common Name	Scientific Name	Habitat	EPBC Act	FFG	Likelihood of occurrence
Bellarine Yellow-gum	*Eucalyptus leucoxylon* subsp. *bellarinensis*	Endemic to the Bellarine peninsula. Grows on heavy clay soils that are waterlogged in winter and affected by salty coastal winds (Rule 1998).		L	Not recorded during field survey – **does not occur.**
Clover Glycine	*Glycine latrobeana*	Found across south-eastern Australia in native grasslands, dry sclerophyll forests, woodlands and low open woodlands with a grassy ground layer. In Victoria, populations occur in lowland grasslands, grassy woodlands and sometimes in grassy heath (DEE 2018b).	V	L	No suitable habitat – **unlikely to occur.**
Curly Sedge	*Carex tasmanica*	Occurs in seasonally wet, fertile, heavy basalt clay soils, usually around the margins of slightly saline drainage lines or freshwater swamps. The dominant vegetation type varies, but is often grassy/sedgy and generally lacks trees (Carter 2010).	V	L	No suitable habitat – **unlikely to occur.**
Leafy Greenhood	*Pterostylis cucullata*	Tea-tree scrubs on tall sandy and calcareous dunes, in moist, open or even deep shaded locations (Jones 1994).	V	L	No suitable habitat – **unlikely to occur.**
Maroon Leek-orchid	*Prasophyllum frenchii*	Grows mainly in open sedge swampland or in wet grassland and wet heathland generally bordering swampy regions. Sites are generally low altitude, flat and moist. Soils are generally moderately rich damp sandy or black clay loams. Climate is mild, with an annual rainfall of 600–1100 mm, occurring predominantly in winter and spring (DEE 2018b).	E	L	No suitable habitat – **unlikely to occur.**

Common Name	Scientific Name	Habitat	EPBC Act	FFG	Likelihood of occurrence
Metallic Sun-orchid	*Thelymitra epipactoides*	Grows primarily in mesic coastal heathlands, grasslands and woodlands, but is also found in drier inland heathlands, open forests and woodlands. Substrates may be moist or dry sandy loams or loamy sands. Critical habitat has not been determined but the species is likely to require open conditions, which may be created by soil disturbance or fire, for recruitment (DEE 2018b).	E	L	No suitable habitat – **unlikely to occur.**
Rare Bitter-bush	*Adriana quadripartita s.s.* (glabrous form)	Coastal or near coastal areas west of Wilson's Promontory (Jeanes 1999).		L	Not recorded during field survey, no suitable habitat – **unlikely to occur.**
Spiny Peppercress	*Lepidium aschersonii*	Most recordings in heavy clay soil near salt lakes on volcanic plains (Entwisle 1996a).	V	L	No suitable habitat – **unlikely to occur.**
Spiny Rice-flower	*Pimelea spinescens* subsp. *spinescens*	Grasslands or open shrublands on basalt derived soils (Entwisle 1996b).	C	L	No suitable habitat – **unlikely to occur.**
Swamp Everlasting	*Xerochrysum palustre*	Lowland swamps, usually on cracking clays (Flann 1999).	V	L	No suitable habitat – **unlikely to occur.**

Key to abbreviations: Status under EPBC Act: **C** = Critically Endangered; **E** = Endangered; **V** = Vulnerable; **L** = Listed as threatened under FFG Act.

Table 3: Likelihood of Occurrence of Threatened Fauna within the Study Area

Common name	Scientific name	EPBC Act	FFG Act	Migratory*	Suitable habitat	Number and date of records	Likelihood of regular occurrence in the survey area
Birds							
Asian Dowitcher	*Limnodromus semipalmatus*			CAMBA, ROKAMBA, Bonn Convention (A2H)	Inhabits wide range of coastal or inland wetlands with varying levels of salinity; mainly muddy margins or rocky shores of wetlands.	None	Absence of historical records within search region suggests this species is **unlikely to occur** on the site.
Australasian Bittern	*Botaurus poiciloptilus*	E	L		Inhabits terrestrial wetlands, including a range of wetland types but prefers permanent water bodies with tall dense vegetation, particularly those dominated by sedges, rush, reeds or cutting grass.	17 records dating between 1994 and 2004.	Whilst there are recent historical records in the area, the study area and immediate surroundings do not support suitable habitat – **unlikely to occur**.
Australian Painted Snipe	*Rostratula australis*	E	L		Lowlands on shallow freshwater swamps with emergent vegetation and flooded saltmarshes.	None	Absence of historical records within search region suggests this species is **unlikely to occur** on the site.
Baillon's Crake	*Porzana pusilla*		L		Occur in a range of ephemeral and permanent wetlands such as swamps, creeks and lakes, with dense vegetation and	Seven records between 1997 and 2001.	Whilst there are recent historical records in the area, the study area and immediate

Common name	Scientific name	EPBC Act	FFG Act	Migratory*	Suitable habitat	Number and date of records	Likelihood of regular occurrence in the survey area
					abundant floating plants, but also in open waters with clumped vegetation		surroundings do not support suitable habitat – **unlikely to occur.**
Black-browed Albatross	*Thalassarche melanophris*	VU	L	Bonn Convention	Marine; in Antarctic, subantarctic and sub-tropical waters; breed on subantarctic and Antarctic islands.	Two records from 1988 and 2000.	Lack of suitable habitat and scarcity of records – **unlikely to occur.**
Black-tailed Godwit	*Limosa limosa*			JAMBA, CAMBA, ROKAMBA, Bonn Convention (A2H)	Mainly coastal species, usually in sheltered bays, estuaries and lagoons with large intertidal mudflats or sandflats.	Two records from 1998 and 2004.	Paucity of historical records – **unlikely to occur.**
Black-winged Stilt	*Himantopus himantopus*				Inhabits wide range of coastal or inland wetlands with varying levels of salinity; mainly muddy margins or rocky shores of wetlands.	None	Absence of historical records within search region – **unlikely to occur.**
Blue Petrel	*Halobaena caerulea*	VU		Bonn Convention	Marine; in Antarctic, subantarctic and sub-tropical waters; breed on subantarctic and Antarctic islands.	None	Absence of historical records within search region – **unlikely to occur.**

Common name	Scientific name	EPBC Act	FFG Act	Migratory*	Suitable habitat	Number and date of records	Likelihood of regular occurrence in the survey area
Blue-billed Duck	*Oxyura australis*		L		Terrestrial wetlands and prefers deep permanent, well vegetated water bodies.	Seven records between 1989 and 1995.	Scarce, old records and lack of suitable habitat – **unlikely to occur**.
Broad-billed Sandpiper	*Limicola falcinellus*			JAMBA, CAMBA, ROKAMBA, Bonn Convention (A2H)	Inhabits wide range of coastal or inland wetlands with varying levels of salinity; mainly muddy margins or rocky shores of wetlands.	None	Absence of historical records within search region – **unlikely to occur**.
Brolga	*Grus rubicunda*		L		Wetlands that include permanent open water and deep freshwater marsh.	Eight records between 1999 and 2006.	Lack of suitable habitat and paucity of historical records – **unlikely to occur**.
Buller's Albatross	*Thalassarche bulleri*	VU		Bonn Convention	Marine; in Antarctic, subantarctic and sub-tropical waters; breed on subantarctic and Antarctic islands.	None	Absence of historical records within search region suggests this species is **unlikely to occur**.
Campbell Albatross	*Thalassarche impavida*	VU		Bonn Convention	Marine; in Antarctic, subantarctic and sub-tropical waters; breed on subantarctic and Antarctic islands.	None	Absence of historical records within search region suggests this species is **unlikely to occur**.

Common name	Scientific name	EPBC Act	FFG Act	Migratory*	Suitable habitat	Number and date of records	Likelihood of regular occurrence in the survey area
Caspian Tern	*Hydroprogne caspia*		L	JAMBA, CAMBA	Sheltered coastal embayment, including harbours, lagoons, inlets, estuaries and river deltas, usually with sandy or muddy margins.	51 records dating between 1988 and 2006.	Whilst there are recent historical records in the area, the study area and immediate surroundings do not support suitable habitat – **unlikely to occur.**
Cattle Egret	*Ardea ibis*			JAMBA	Inhabits wide range of coastal or inland wetlands with varying levels of salinity; mainly muddy margins or rocky shores of wetlands.	None	Absence of historical records within search region – **unlikely to occur.**
Common Greenshank	*Tringa nebularia*			JAMBA, CAMBA, ROKAMBA, Bonn Convention (A2H)	Inhabits wide range of coastal or inland wetlands with varying levels of salinity; mainly muddy margins or rocky shores of wetlands.	None	Absence of historical records within search region – **unlikely to occur.**
Common Redshank	*Tringa totanus*			JAMBA, CAMBA, ROKAMBA, Bonn Convention (A2H)	Inhabits wide range of coastal or inland wetlands with varying levels of salinity; mainly muddy margins or rocky shores of wetlands.	None	Absence of historical records within search region – **unlikely to occur.**

Common name	Scientific name	EPBC Act	FFG Act	Migratory*	Suitable habitat	Number and date of records	Likelihood of regular occurrence in the survey area
Common Sandpiper	*Actitis hypoleucos*			JAMBA, CAMBA, ROKAMBA, Bonn Convention (A2H)	Inhabits wide range of coastal or inland wetlands with varying levels of salinity; mainly muddy margins or rocky shores of wetlands.	Seven records dating between 1988 and 2001.	Paucity of historical records – **unlikely to occur**.
Curlew Sandpiper	*Calidris ferruginea*	CE		JAMBA, CAMBA, ROKAMBA, Bonn Convention (A2H)	Inhabits wide range of coastal or inland wetlands with varying levels of salinity; mainly muddy margins or rocky shores of wetlands.	None	Absence of historical records within search region – **unlikely to occur**.
Diamond Dove	*Geopelia cuneata*		L		Inhabits mostly arid and semi-arid grassland savanna, often of Spinifex and in low open woodlands with grassy understorey; also often in open riparian woodlands.	Two records dating from 2000.	Paucity of historical records – **unlikely to occur**.
Double-banded Plover	*Charadrius bicinctus*			Bonn Convention (A2H)	Inhabits wide range of coastal or inland wetlands with varying levels of salinity; mainly muddy margins or rocky shores of wetlands.	None	Absence of historical records within search region – **unlikely to occur**.
Eastern Curlew	*Numenius madagascariensis*	CR	L	JAMBA, CAMBA,	Inhabits sheltered coasts, especially estuaries,	30 records dating	Whilst there are recent historical

Common name	Scientific name	EPBC Act	FFG Act	Migratory*	Suitable habitat	Number and date of records	Likelihood of regular occurrence in the survey area
				ROKAMBA, Bonn Convention (A2H)	embayment, harbours, inlets and coastal lagoons with large intertidal mudflats or sandflats, often with beds of sea grass.	between 1988 and 2006.	records in the area, the study area and immediate surroundings do not support suitable habitat. Therefore, this species is **unlikely to occur** on the site.
Eastern Great Egret	*Ardea modesta*		L	JAMBA, CAMBA	Permanent water bodies on flood plains; shallows of deep permanent lakes, either open or vegetated with shrubs or trees; semi-permanent swamps with tall emergent vegetation (e.g. Typha) and herb dominated seasonal swamps with abundant aquatic flora.	81 records dating between 1988 and 2006.	Whilst there are recent historical records in the area, the study area and immediate surroundings do not support suitable habitat. Therefore, this species is **unlikely to occur** on the site.
Fairy Prion	*Pachyptila turtur*	VU			Marine birds; in subtropical and subantarctic seas.	11 records dating between 1988 and 2001.	Paucity of historical records – **unlikely to occur**.
Fairy Tern	*Sternula nereis nereis*	VU	L		Sheltered coasts, on mainland and inshore and offshore islands. In embayment, such as harbours, inlets, bays,	14 records dating between	Paucity of historical records – **unlikely to occur**.

Common name	Scientific name	EPBC Act	FFG Act	Migratory*	Suitable habitat	Number and date of records	Likelihood of regular occurrence in the survey area
					estuaries and lagoons and on ocean beaches. Also on lakes and salt ponds.	1988 and 2001.	
Fork-tailed Swift	*Apus pacificus*			JAMBA, CAMBA, ROKAMBA	Aerial species roosting in trees.	None	Absence of historical records within search region – **unlikely to occur**.
Freckled Duck	*Stictonetta naevosa*		L		Terrestrial wetlands; prefer fresh, densely vegetated waters, particularly floodwater swamps and creeks vegetated with lignum or cane grass.	One record dating from 1993.	Paucity of historical records – **unlikely to occur**.
Glossy Ibis	*Plegadis falcinellus*			CAMBA, Bonn Convention (A2S)	Prefer freshwater inland wetlands, in particular, permanent or ephemeral water bodies and swamps with abundant vegetation.	12 records dating between 1997 and 2004.	Paucity of historical records – **unlikely to occur**.
Great Knot	*Calidris tenuirostris*	CR	L	JAMBA, CAMBA, ROKAMBA, Bonn Convention (A2H)	Inhabit sheltered coastal habitats with large intertidal mudflats or sandflats. Including inlets, bays, harbours, estuaries and lagoons; also ocean beaches.	Five records dating between 1988 and 2001.	Paucity of historical records – **unlikely to occur**.

Common name	Scientific name	EPBC Act	FFG Act	Migratory*	Suitable habitat	Number and date of records	Likelihood of regular occurrence in the survey area
Grey Goshawk	*Accipiter novaehollandiae novaehollandiae*		L		Inhabit rainforests, open forests, swamp forests, woodlands and plantations; most abundant where forest or woodland provide cover for hunting from perches.	Five records dating between 1991 and 2000.	Paucity of historical records – **unlikely to occur**.
Grey Plover	*Pluvialis squatarola*			JAMBA, CAMBA, ROKAMBA, Bonn (A2H)	Coastal, but occasionally inland. Mainly on marine shores, inlets, estuaries and lagoons where there are nearby large tidal mudflats for feeding and sandy beaches for roosting.	None	Absence of historical records within search region – **unlikely to occur**.
Grey-headed Albatross	*Thalassarche chrysostoma*	EN	L		Marine, in three major oceans. In summer in subantarctic and Antarctic seas; in winter most leave Antarctic zone and range extends to s. subtropics.	None	Absence of historical records within search region – **unlikely to occur**.
Grey-tailed Tattler	*Tringa brevipes*		L	JAMBA, CAMBA, ROKAMBA, Bonn Convention (A2H)	Usually found on sheltered coasts with reefs and rock platforms or with mudflats exposed at low tide and forage on wet mudflats and among rocks, and often roost on rocks.	One record dating from 1988.	Paucity of historical records– **unlikely to occur**.

Common name	Scientific name	EPBC Act	FFG Act	Migratory*	Suitable habitat	Number and date of records	Likelihood of regular occurrence in the survey area
Gull-billed Tern	*Gelochelidon nilotica macrotarsa*		L	CAMBA	Prefer shallow, often ephemeral, terrestrial wetlands, either fresh or saline, especially lakes, swamps and lagoons, particularly those with mudflats.	11 records dating between 1988 and 1999.	Paucity of historical records – **unlikely to occur**.
Hooded Plover	*Thinornis rubricollis rubricollis*	VU	L		Inhabits sandy ocean beaches, especially those that are broad and flat, with a wide wave-wash zone for feeding. Widespread in all coastal waters of Victoria.	64 records dating between 1988 and 2005.	Whilst there are recent historical records in the area, the study area and immediate surroundings do not support suitable habitat. Therefore, this species is **unlikely to occur** on the site.
Intermediate Egret	*Ardea intermedia*		L		It mainly inhabits terrestrial wetlands; only occasionally visit coastal wetlands and forages amongst aquatic vegetation in shallow water and requires trees for roosting and nesting. It often occurs in wetlands that contain vegetation, including Typha.	One record dating from 1997.	Paucity of historical records suggests – **unlikely to occur**.

Common name	Scientific name	EPBC Act	FFG Act	Migratory*	Suitable habitat	Number and date of records	Likelihood of regular occurrence in the survey area
Latham's Snipe	*Gallinago hardwickii*			JAMBA, CAMBA, ROKAMBA, Bonn Convention (A2H)	Occurs in wide variety of permanent and ephemeral wetlands; it prefers open freshwater wetlands with dense cover nearby, such as the edges of rivers and creeks, bogs, swamps, waterholes, etc.	26 records dating between 1988 and 2004.	Whilst there are recent historical records in the area, the study area and immediate surroundings do not support suitable habitat. Therefore, this species is **unlikely to occur** on the site.
Little Egret	*Egretta garzetta nigripes*		L		It occurs in a range of coastal and terrestrial wetlands, including freshwater wetlands with vegetation such as Typha and requires trees for roosting and nesting.	23 records dating from between 1988 and 2006.	Whilst there are recent historical records in the area, the study area and immediate surroundings do not support suitable habitat. Therefore, this species is **unlikely to occur** on the site.
Little Ringed Plover	*Charadrius dubius*			CAMBA, ROKAMBA	Inhabits sandy, muddy or rocky shores, usually coastal, rarely far inland. Often on beaches and mudflats, sandflats and occasionally rock shelves.	None	Absence of historical records within search region – **unlikely to occur.**

Common name	Scientific name	EPBC Act	FFG Act	Migratory*	Suitable habitat	Number and date of records	Likelihood of regular occurrence in the survey area
Little Tern	*Sternula albifrons sinensis*		L	JAMBA, CAMBA, ROKAMBA, Bonn Convention (A2S)	Sheltered coastal environments, including lagoons, estuaries, river mouths and deltas, lakes, bays, harbours and inlets, especially those with exposed sandbanks or sand spits.	Ten records dating from between 1989 and 2002.	
Magpie Goose	*Anseranas semipalmata*		L		Terrestrial and aquatic habitats, but activities cantered on wetlands, mainly those on floodplains of rivers.	14 records dating from between 1988 and 2005.	Whilst there are recent historical records in the area, the study area and immediate surroundings do not support suitable habitat. Therefore, this species is **unlikely to occur** on the site.
Marsh Sandpiper	*Tringa stagnatilis*			JAMBA, CAMBA, ROKAMBA, Bonn Convention (A2S)	Inhabits sandy, muddy or rocky shores, usually coastal, rarely far inland. Often on beaches and mudflats, sandflats and occasionally rock shelves.	None	Absence of historical records within search region – **unlikely to occur.**
Northern Giant-Petrel	*Macronectes halli*	VU	L		Marine, pelagic, regularly in subantarctic waters; range	One record from 1988.	Paucity of historical records – **unlikely to occur.**

Common name	Scientific name	EPBC Act	FFG Act	Migratory*	Suitable habitat	Number and date of records	Likelihood of regular occurrence in the survey area
					extends into subtropical waters in spring–winter.		
Northern Royal Albatross	*Diomedea sanfordii*	EN		Bonn Convention (A2S)	Marine, pelagic, regularly in subantarctic waters; range extends into subtropical waters in spring–winter.	None	Absence of historical records within search region – **unlikely to occur**.
Orange-bellied Parrot	*Neophema chrysogaster*	CE	L	JAMBA	Inhabits natural saltmarshes dominated by Beaded Glasswort *Sarcocornia quinqueflora* and Shrubby Glasswort *Sclerostegia arbuscula*, as well as associated grassy or weedy pastures.	71 records from between 1988 and 2018.	The presence of recent historical records and suitable habitat in the study area suggests this species has the **potential to occur** on the site.
Pacific Golden Plover	*Pluvialis fulva*			JAMBA, ROKAMBA, Bonn Convention (A2H)	Inhabits sandy, muddy or rocky shores, usually coastal, rarely far inland. Often on beaches and mudflats, sandflats and occasionally rock shelves.	Four records from between 1989 and 2001.	Paucity of historical records – **unlikely to occur**.
Pectoral Sandpiper	*Calidris melanotos*			JAMBA, ROKAMBA, Bonn Convention (A2H)	Inhabit shallow fresh to saline wetlands, usually coastal to near-coastal, but occasionally farther inland. Wetlands often have open fringing mudflats and low	Three records dating from between 1997 and 2001.	Paucity of historical records – **unlikely to occur**.

Common name	Scientific name	EPBC Act	FFG Act	Migratory*	Suitable habitat	Number and date of records	Likelihood of regular occurrence in the survey area
					emergent or fringing vegetation.		
Red Knot	*Calidris canutus*	EN		JAMBA, CAMBA, ROKAMBA, Bonn Convention (A2H)	Inhabits intertidal mudflats, sandflats, and sandy beaches of sheltered coasts, in estuaries, bays, inlets, and lagoons.	Eight records dating from between 1988 and 2001.	Paucity of historical records – **unlikely to occur**.
Red-necked Stint	*Calidris ruficollis*			JAMBA, CAMBA, ROKAMBA, Bonn Convention (A2H)	Inhabit shallow fresh to saline wetlands, usually coastal to near-coastal, but occasionally farther inland. Wetlands often have open fringing mudflats and low emergent or fringing vegetation.	None	Absence of historical records within search region – **unlikely to occur**.
Regent Honeyeater	*Anthochaera phrygia*	CR	L	JAMBA	Inhabits dry box-ironbark eucalypt forests near rivers and creeks on inland slopes of the Great Dividing Range. It could also occur in small remnant patches or in mature trees in farmland or partly cleared agricultural land.	None	Absence of historical records within search region – **unlikely to occur**.

Common name	Scientific name	EPBC Act	FFG Act	Migratory*	Suitable habitat	Number and date of records	Likelihood of regular occurrence in the survey area
Ruddy Turnstone	*Arenaria interpres*			JAMBA, CAMBA, ROKAMBA, Bonn Convention (A2H)	Inhabit shallow fresh to saline wetlands, usually coastal to near-coastal, but occasionally farther inland. Wetlands often have open fringing mudflats and low emergent or fringing vegetation.	None	Absence of historical records – **unlikely to occur**.
Ruff (Reeve)	*Philomachus pugnax*			JAMBA, CAMBA, ROKAMBA, Bonn Convention (A2H)	Inhabit shallow fresh to saline wetlands, usually coastal to near-coastal, but occasionally farther inland. Wetlands often have open fringing mudflats and low emergent or fringing vegetation.		Absence of historical records – **unlikely to occur**.
Rufous Fantail	*Rhipidura rufifrons*			Bonn Convention (A2H)	Rainforest, dense wet forest, swamp woodlands and mangroves.	None	Absence of historical records – **unlikely to occur**.
Salvin's Albatross	*Thalassarche salvini*	VU		Bonn Convention (A2H)	Marine, in subantarctic and subtropical waters, occasionally reaching tropic waters.	None	Absence of historical records – **unlikely to occur**.
Sanderling	*Calidris alba*			JAMBA, CAMBA, ROKAMBA,	Inhabits open sandy beaches exposed to sea-	Three records dating from between	Paucity of historical records – **unlikely to occur**.

Common name	Scientific name	EPBC Act	FFG Act	Migratory*	Suitable habitat	Number and date of records	Likelihood of regular occurrence in the survey area
				Bonn Convention (A2H)	swells; also on exposed sandbars and spits.	1988 and 1999.	
Satin Flycatcher	*Myiagra cyanoleuca*			Bonn Convention (A2H)	Tall forests, preferring wetter habitats.	None	Absence of historical records – **unlikely to occur.**
Sharp-tailed Sandpiper	*Calidris acuminata*			JAMBA, CAMBA, ROKAMBA, Bonn Convention (A2H)	Inhabit shallow fresh to saline wetlands, usually coastal to near-coastal, but occasionally farther inland. Wetlands often have open fringing mudflats and low emergent or fringing vegetation.	None	Absence of historical records within search region – **unlikely to occur.**
Shy Albatross	*Thalassarche cauta*	VU	L	Bonn Convention (A2H)	Marine, in subantarctic and subtropical waters, occasionally reaching tropic waters.	Five records dating from between 1988 and 2000.	Paucity of historical records – **unlikely to occur.**
Soft-plumaged Petrel	*Pterodroma mollis*	VU			Marine, in subantarctic and subtropical waters, occasionally reaching tropic waters.	None	Absence of historical records within search region – **unlikely to occur.**

Common name	Scientific name	EPBC Act	FFG Act	Migratory*	Suitable habitat	Number and date of records	Likelihood of regular occurrence in the survey area
Southern Giant-Petrel	*Macronectes giganteus*	EN	L	Bonn Convention (A2H)	Marine, Antarctic to subantarctic waters. Adults present near Antarctic breeding colonies all year.	One record dating from 1988.	Paucity of historical records – **unlikely to occur**.
Southern Royal Albatross	*Diomedea epomophora*	VU		Bonn Convention (A2H)	Marine, pelagic and aerial. In Australasian region, occur inshore, offshore and in pelagic waters.	None	Absence of historical records – **unlikely to occur**.
Swift Parrot	*Lathamus discolor*	CR	L		Prefers a narrow range of eucalypts in Victoria, including White Box (*Eucalyptus albens*), Red Ironbark (*E. sideroxylon*; , *E. tricarpa*) and Yellow Gum (*E. leucoxylon*), as well as River Red Gum (*E. camaldulensis*), when this species supports abundant 'lerp'.	Seven records dating from 1988 and 2005.	Paucity of historical records – **unlikely to occur**.
Terek Sandpiper	*Xenus cinereus*		L	JAMBA, CAMBA, ROKAMBA, Bonn Convention (A2H)	Inhabits saline intertidal mudflats in sheltered estuaries, harbours and lagoons; on islets, mudbanks, sandbanks or spits.	One record from 1998.	Paucity of historical records – **unlikely to occur**.

Common name	Scientific name	EPBC Act	FFG Act	Migratory*	Suitable habitat	Number and date of records	Likelihood of regular occurrence in the survey area
Tristan Albatross	*Diomedea dabbenena*	EN		Bonn Convention (A2H)	Marine, pelagic and aerial. In Australasian region, occur inshore, offshore and in pelagic waters.	None	Absence of historical records – **unlikely to occur.**
Wandering Albatross	*Diomedea exulans*	EN	L	Bonn Convention (A2H)	Marine, pelagic and aerial. In Australasian region, occur inshore, offshore and in pelagic waters.	None	Absence of historical records – **unlikely to occur.**
White-bellied Sea-Eagle	*Haliaeetus leucogaster*		L		This species is a bird of maritime habitats, terrestrial large wetlands and coastal lands of tropical and temperate Australia and offshore islands, ranging far inland only over large rivers and wetlands.	13 records dating from between 1993 and 2005.	Whilst there are recent historical records in the area, the study area and immediate surroundings do not support suitable habitat – **unlikely to occur.**
White-throated Needletail	*Hirundapus caudacutus*		L	JAMBA, CAMBA, ROKAMBA	Aerial species which roosts in trees.	None	Absence of historical records – **unlikely to occur.**
White-winged Black Tern	*Chlidonias leucopterus*			JAMBA, CAMBA, ROKAMBA	Inhabits coastal seas and exposed rocky coasts, and sandy beaches of sheltered coasts, especially those with banks, spits or flats of sand or shingle.	One record dating from 1992.	Paucity of historical records – **unlikely to occur.**

Common name	Scientific name	EPBC Act	FFG Act	Migratory*	Suitable habitat	Number and date of records	Likelihood of regular occurrence in the survey area
Wood Sandpiper	*Tringa glareola*			JAMBA, CAMBA, ROKAMBA, Bonn Convention (A2H)	Inhabits well vegetated, shallow, freshwater wetlands, such as swamps, lakes, pools, and waterholes; typically with emergent, aquatic plants or grass, and dominated by taller fringing vegetation, such as dense stands of rushes or reed.	Two records dating from 1997 and 1999.	Paucity of historical records – **unlikely to occur.**
Mammals							
Spot-tailed Quoll	*Dasyurus maculatus maculatus*	EN	L		Rainforest, wet and dry forest, coastal heath and scrub and River Red Gum woodlands along inland rivers.	None	Absence of historical records within search region – **unlikely to occur.**
Southern Bent-wing Bat	*Miniopterus schreibersii bassanii*	CR	L		Roosts in caves during the day, dispersing over a range of habitats at night. Its feeding areas tend to be associated with major drainage systems.	None	Absence of historical records within search region – **unlikely to occur.**
Long-nosed Potoroo	*Potorous tridactylus tridactylus*	VU	L		In Victoria coastal heathy woodland; In Tasmainia moist forest with dense	None	Absence of historical records – **unlikely to occur.**

Common name	Scientific name	EPBC Act	FFG Act	Migratory*	Suitable habitat	Number and date of records	Likelihood of regular occurrence in the survey area
					shrub layer; in the north edge of rainforest.		
Grey-headed Flying Fox	*Pteropus poliocephalus*	VU	L		Roosts in Riverine habitat in Melbourne and forages widely in flowereing eucalypts and fruit trees.	None	Absence of historical records – **unlikely to occur**.
Amphibians							
Growling Grass Frog	*Litoria raniformis*	VU	L		Permanent water with fringing and emergent vegetation in streams, swamps, lagoons and artificial wetlands such as farm dams and abandoned quarries.	Three records dating between 1991 and 1997.	Paucity of historical records – **unlikely to occur**.
Brown Toadlet	*Pseudophryne bibronii*		L		Wet and dry forest, grassy areas besides small creeks, alpine grasslands and mossy bogs.	One record from 2000.	Paucity of historical records – **unlikely to occur**.
Fish							
Yarra Pigmy Perch	*Nannoperca obscura*	VU	L		Streams and small lakes, prefers flowing water with abundant aquatic vegetation.	One record dating from 1990.	Paucity of historical records – **unlikely to occur**.

Common name	Scientific name	EPBC Act	FFG Act	Migratory*	Suitable habitat	Number and date of records	Likelihood of regular occurrence in the survey area
Eastern Dwarf Galaxias	*Galaxiella pusilla*	VU	L		Swamps, backwaters, pools, shallow lake margins and streams draining in to lakes.	None	Absence of historical records – **unlikely to occur**.
Australian Grayling	*Prototroctes maraena*	VU	L		Large and small coastal streams and rivers with cool, clear waters with a gravel substrate.	None	Absence of historical records – **unlikely to occur**.
Yellow Sedge-skipper	*Hesperilla flavescens flavescens*		L		Plains brackish sedge wetland dominated by Chaffy Saw-sedge.	Three records dating from 1988.	Paucity of historical records – **unlikely to occur**.

Key to abbreviations: Status under EPBC Act: **CR =** Critically Endangered; **EN** = Endangered; **VU** = Vulnerable; **L =** Listed as threatened under FFG Act. *Japan-Australia Migratory Bird Agreement (JAMBA), China-Australia Migratory Bird Agreement (CAMBA), Republic of Korea- Australia Migratory Bird Agreement (ROKAMBA), Bonn Convention.

Appendix 3: Photographs of native vegetation.

Coastal saltmarsh vegetation of Habitat Zone D, which lies within the DEWLP wetland boundary.

Vegetation between to the proposed development site and the eastern arm of Murtnaghurt Lagoon. Here the DELWP wetland is south of the property boundary and separated by mown grassland and disturbed coastal scrub vegetation associated with the adjacent golf course.

Typical vegetation of the channel forming the part of the Ramsar Wetland that lies adjacent to the western border of the proposed development site.

Appendix 4: Detailed Habitat Hectare assessment results

Habitat Zone			D
Bioregion			OtP
EVC Number			9
Total area of Habitat Zone (ha)			0.41
Site Condition	Large Old Trees	/10	N/A
	Tree Canopy Cover	/5	N/A
	Lack of Weeds	/15	4
	Understorey	/25	15
	Recruitment	/10	10
	Organic Matter	/5	5
	Logs	/5	N/A
	Site condition standardising multiplier*		1.36
	Site Condition subtotal		*46*
Landscape Context	Patch Size	/10	1
	Neighbourhood	/10	1
	Distance to Core	/5	4
Total Condition Score		**/100**	**52**

* Modified approach to habitat scoring – refer to Table 14 of DELWP's Vegetation Quality Assessment Manual (DSE, 2004).

Appendix 5: Native vegetation removal report

Scenario test – native vegetation removal

This report provides offset requirements for internal testing of different proposals to remove native vegetation. **This report DOES NOT support an application to remove, destroy or lop native vegetation under Clause 52.16 or 52.17 of planning schemes in Victoria.** A report must be obtained from the Department of Environment, Land, Water and Planning (DELWP).

Date of issue: **10/08/2018**
Time of issue: **11:03 am**

Report ID: Scenario Testing

Project ID	9131_1920_Barwon_Heads_Road_180810

Assessment pathway

Assessment pathway	**Detailed Assessment Pathway**
Extent including past and proposed	3.760 ha
Extent of past removal	0.000 ha
Extent of proposed removal	3.760 ha
No. Large trees proposed to be removed	0
Location category of proposed removal	Location 2 The native vegetation is in an area mapped as an endangered Ecological Vegetation Class (as per the statewide EVC map); and a wetland designated under the Convention on Wetlands of International Importance (the Ramsar Convention); and a wetland listed in the Directory of Important Wetlands of Australia; and an internationally important site for Migratory Shorebirds of the East Asian-Australasian Flyway. Removal of less than 0.5 hectares of native vegetation in this location will not have a significant impact on any habitat for a rare or threatened species.

1. Location map

Scenario test – native vegetation removal

Offset requirements if a permit is granted

Any approval granted will include a condition to obtain an offset that meets the following requirements:

Species offset amount[1]	2.141 species units of habitat for Prickly Arrowgrass, *Triglochin mucronata*
Large trees	0 trees

NB: values within tables in this document may not add to the totals shown above due to rounding

Appendix 1 includes information about the native vegetation to be removed

Appendix 2 includes information about the rare or threatened species mapped at the site.

Appendix 3 includes maps showing native vegetation to be removed and extracts of relevant species habitat importance maps

1 The species offset amount(s) required is the sum of all species habitat units in Appendix 1.

Scenario test – native vegetation removal

Next steps

Any proposal to remove native vegetation must meet the application requirements of the Detailed Assessment Pathway and it will be assessed under the Detailed Assessment Pathway.

This report DOES NOT support an application to remove, destroy or lop native vegetation under Clause 52.16 or 52.17 of planning schemes in Victoria.

If you wish to remove the mapped native vegetation you must submit the related shapefiles to the Department of Environment, Land, Water and Planning (DELWP) for processing, by email to ensymnvrtool.support@delwp.vic.gov.au. DELWP will provide a *Native vegetation removal report* that is required to meet the permit application requirements in accordance with *Guidelines for the removal, destruction or lopping of native vegetation* (Guidelines).

Appendix 1: Description of native vegetation to be removed

The species-general offset test was applied to your proposal. This test determines if the proposed removal of native vegetation has a proportional impact on any rare or threatened species habitats above the species offset threshold. The threshold is set at 0.005 per cent of the mapped habitat value for a species. When the proportional impact is above the species offset threshold a species offset is required. This test is done for all species mapped at the site. Multiple species offsets will be required if the species offset threshold is exceeded for multiple species.

Where a zone requires species offset(s), the species habitat units for each species in that zone is calculated by the following equation in accordance with the Guidelines:

Species habitat units = extent x condition x species landscape factor x 2, where the species landscape factor = 0.5 + (habitat importance score/2)

The species offset amount(s) required is the sum of all species habitat units per zone

Where a zone does not require a species offset, the general habitat units in that zone is calculated by the following equation in accordance with the Guidelines:

General habitat units = extent x condition x general landscape factor x 1.5, where the general landscape factor = 0.5 + (strategic biodiversity value score/2)

The general offset amount required is the sum of all general habitat units per zone.

Native vegetation to be removed

Information provided by or on behalf of the applicant in a GIS file						Information calculated by EnSym						
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Modelled Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
1-D	Patch	otp_0009	Endangered	0	no	0.406	3.760	3.760	0.799	0.404	2.141	503447 Prickly Arrowgrass *Triglochin mucronata*

Appendix 2: Information about impacts to rare or threatened species' habitats on site

This table lists all rare or threatened species' habitats mapped at the site.

Species common name	Species scientific name	Species number	Conservation status	Group	Habitat impacted	% habitat value affected
Prickly Arrowgrass	*Triglochin mucronata*	503447	Rare	Dispersed	Habitat importance map	0.0064
Orange-bellied Parrot	*Neophema chrysogaster*	10305	Critically endangered	Dispersed	Habitat importance map	0.0041
Fairy Tern	*Sterna nereis nereis*	10118	Endangered	Dispersed	Habitat importance map	0.0032
Coast Twin-leaf	*Zygophyllum billardierei*	503615	Rare	Dispersed	Habitat importance map	0.0028
Coast Wirilda	*Acacia uncifolia*	504210	Rare	Dispersed	Habitat importance map	0.0023
Coast Bitter-bush	*Adriana quadripartita*	504755	Vulnerable	Dispersed	Habitat importance map	0.0021
Little Tern	*Sterna albifrons sinensis*	10117	Vulnerable	Dispersed	Habitat importance map	0.0019
Marsh Saltbush	*Atriplex paludosa subsp. paludosa*	500326	Rare	Dispersed	Habitat importance map	0.0017
Whimbrel	*Numenius phaeopus*	10150	Vulnerable	Dispersed	Habitat importance map	0.0016
Creeping Rush	*Juncus revolutus*	501839	Rare	Dispersed	Habitat importance map	0.0014
Common Sandpiper	*Actitis hypoleucos*	10157	Vulnerable	Dispersed	Habitat importance map	0.0012
Grey Mangrove	*Avicennia marina subsp. australasica*	500345	Rare	Dispersed	Habitat importance map	0.0011
Gull-billed Tern	*Gelochelidon nilotica macrotarsa*	10111	Endangered	Dispersed	Habitat importance map	0.0008
Common Greenshank	*Tringa nebularia*	10158	Vulnerable	Dispersed	Habitat importance map	0.0007
Great Knot	*Calidris tenuirostris*	10165	Endangered	Dispersed	Habitat importance map	0.0007
Pacific Golden Plover	*Pluvialis fulva*	10137	Vulnerable	Dispersed	Habitat importance map	0.0007
Eastern Curlew	*Numenius madagascariensis*	10149	Vulnerable	Dispersed	Habitat importance map	0.0007
Curlew Sandpiper	*Calidris ferruginea*	10161	Endangered	Dispersed	Habitat importance map	0.0006
Red Knot	*Calidris canutus*	10164	Endangered	Dispersed	Habitat importance map	0.0006
Black-tailed Godwit	*Limosa limosa*	528553	Vulnerable	Dispersed	Habitat importance map	0.0006

Glossy Grass Skink	*Pseudemoia rawlinsoni*	12683	Vulnerable	Dispersed	Habitat importance map	0.0006
Marsh Sandpiper	*Tringa stagnatilis*	10159	Vulnerable	Dispersed	Habitat importance map	0.0006
Little Egret	*Egretta garzetta nigripes*	10185	Endangered	Dispersed	Habitat importance map	0.0005
Swamp Diuris	*Diuris palustris*	501082	Vulnerable	Dispersed	Habitat importance map	0.0005
Australasian Bittern	*Botaurus poiciloptilus*	10197	Endangered	Dispersed	Habitat importance map	0.0005
Salt Lawrencia	*Lawrencia spicata*	501888	Rare	Dispersed	Habitat importance map	0.0004
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	10226	Vulnerable	Dispersed	Habitat importance map	0.0004
Salt Blown-grass	*Lachnagrostis robusta*	504223	Rare	Dispersed	Habitat importance map	0.0004
Freckled Duck	*Stictonetta naevosa*	10214	Endangered	Dispersed	Habitat importance map	0.0003
Growling Grass Frog	*Litoria raniformis*	13207	Endangered	Dispersed	Habitat importance map	0.0003
Blue-billed Duck	*Oxyura australis*	10216	Endangered	Dispersed	Habitat importance map	0.0003
Eastern Great Egret	*Ardea modesta*	10187	Vulnerable	Dispersed	Habitat importance map	0.0003
Intermediate Egret	*Ardea intermedia*	10186	Endangered	Dispersed	Habitat importance map	0.0003
Brackish Plains Buttercup	*Ranunculus diminutus*	504314	Rare	Dispersed	Habitat importance map	0.0003
Musk Duck	*Biziura lobata*	10217	Vulnerable	Dispersed	Habitat importance map	0.0003
Baillon's Crake	*Porzana pusilla palustris*	10050	Vulnerable	Dispersed	Habitat importance map	0.0002
Australasian Shoveler	*Anas rhynchotis*	10212	Vulnerable	Dispersed	Habitat importance map	0.0002
Hardhead	*Aythya australis*	10215	Vulnerable	Dispersed	Habitat importance map	0.0002
Snowy Mint-bush	*Prostanthera nivea var. nivea*	502746	Rare	Dispersed	Habitat importance map	0.0002
Lewin's Rail	*Lewinia pectoralis pectoralis*	10045	Vulnerable	Dispersed	Habitat importance map	0.0002
Wavy Swamp Wallaby-grass	*Amphibromus sinuatus*	503625	Vulnerable	Dispersed	Habitat importance map	0.0002
Leafy Twig-sedge	*Cladium procerum*	500786	Rare	Dispersed	Habitat importance map	0.0002
Purple Blown-grass	*Lachnagrostis punicea subsp. punicea*	504206	Rare	Dispersed	Habitat importance map	0.0002

Australian Painted Snipe	*Rostratula australis*	10170	Critically endangered	Dispersed	Habitat importance map	0.0002
Pale Swamp Everlasting	*Coronidium gunnianum*	504655	Vulnerable	Dispersed	Habitat importance map	0.0001
Lesser Sand Plover	*Charadrius mongolus*	10139	Critically endangered	Dispersed	Habitat importance map	0.0001
Elegant Parrot	*Neophema elegans*	10307	Vulnerable	Dispersed	Habitat importance map	0.0001
Grey Goshawk	*Accipiter novaehollandiae novaehollandiae*	10220	Vulnerable	Dispersed	Habitat importance map	0.0001
Golden Cowslips	*Diuris behrii*	501061	Vulnerable	Dispersed	Habitat importance map	0.0001
Clover Glycine	*Glycine latrobeana*	501456	Vulnerable	Dispersed	Habitat importance map	0.0000
Black Falcon	*Falco subniger*	10238	Vulnerable	Dispersed	Habitat importance map	0.0000
Spiny Rice-flower	*Pimelea spinescens subsp. spinescens*	504823	Endangered	Dispersed	Habitat importance map	0.0000
White-throated Needletail	*Hirundapus caudacutus*	10334	Vulnerable	Dispersed	Habitat importance map	0.0000
Rye Beetle-grass	*Tripogon loliiformis*	503455	Rare	Dispersed	Habitat importance map	0.0000
Chestnut-rumped Heathwren	*Calamanthus pyrrhopygius*	10498	Vulnerable	Dispersed	Habitat importance map	0.0000

Habitat group

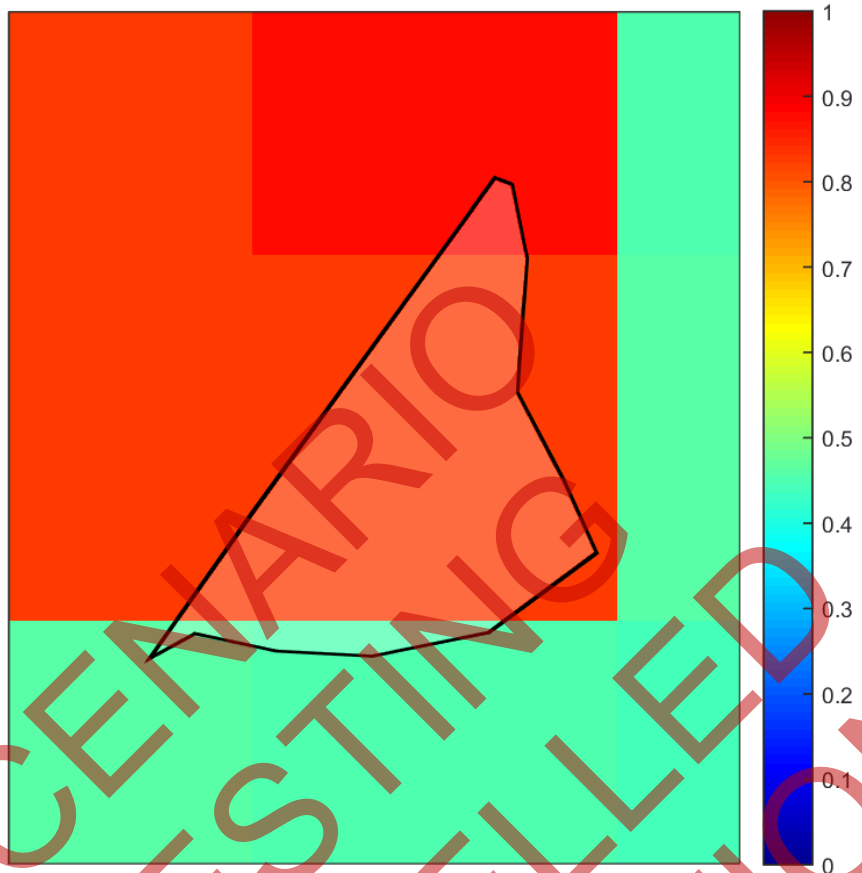
- Highly localised habitat means there is 2000 hectares or less mapped habitat for the species
- Dispersed habitat means there is more than 2000 hectares of mapped habitat for the species

Habitat impacted

- Habitat importance maps are the maps defined in the Guidelines that include all the mapped habitat for a rare or threatened species
- Top ranking maps are the maps defined in the Guidelines that depict the important areas of a dispersed species habitat, developed from the highest habitat importance scores in dispersed species habitat maps and selected VBA records
- Selected VBA record is an area in Victoria that represents a large population, roosting or breeding site etc.

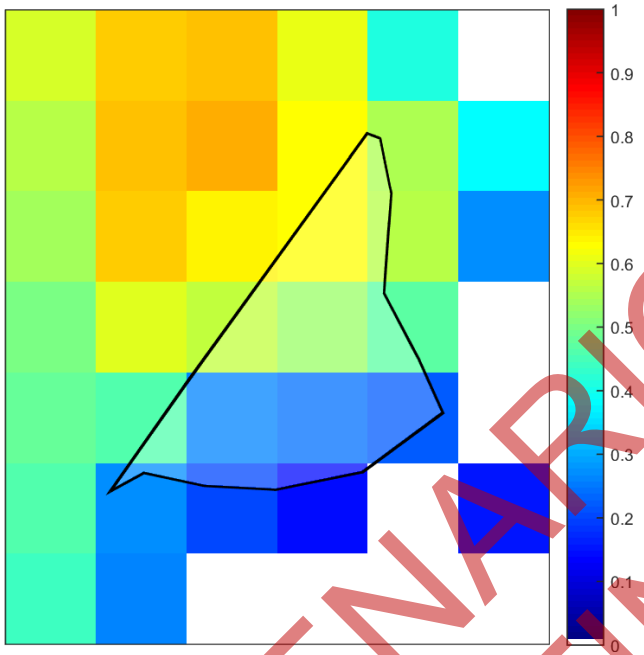
Appendix 3 – Images of mapped native vegetation

2. Strategic biodiversity values map



3. Habitat importance maps

Prickly Arrowgrass
Triglochin mucronata
503447



Appendix 6: Flora species recorded from Habitat Zone D

Origin	Common Name	Scientific Name	Conservation Status		Previously Recorded
			FFG	EPBC	
	Austral Seablite	*Suaeda australis*			X
	Australian Salt-grass	*Distichlis distichophylla*			X
	Beaded Glasswort	*Salicornia quinqueflora*			X
*	Burr Medic	*Medicago polymorpha*			
*	Buck's-horn Plantain	*Plantago coronopus* subsp. *coronopus*			X
	Chaffy Saw-sedge	*Gahnia filum*			X
	Creeping Brookweed	*Samolus repens*			X
*	Galenia	*Galenia pubescens* var. *pubescens*			X
*	Kikuyu	*Cenchrus clandestinus*			X
*	Ribwort	*Plantago lanceolata*			X
	Round-leaf Wilsonia	*Wilsonia rotundifolia*			
	Rounded Noon-flower	*Disphyma crassifolium* subsp. *clavellatum*			X
	Southern Sea-heath	*Frankenia pauciflora var. gunnii*			X

* = introduced species.