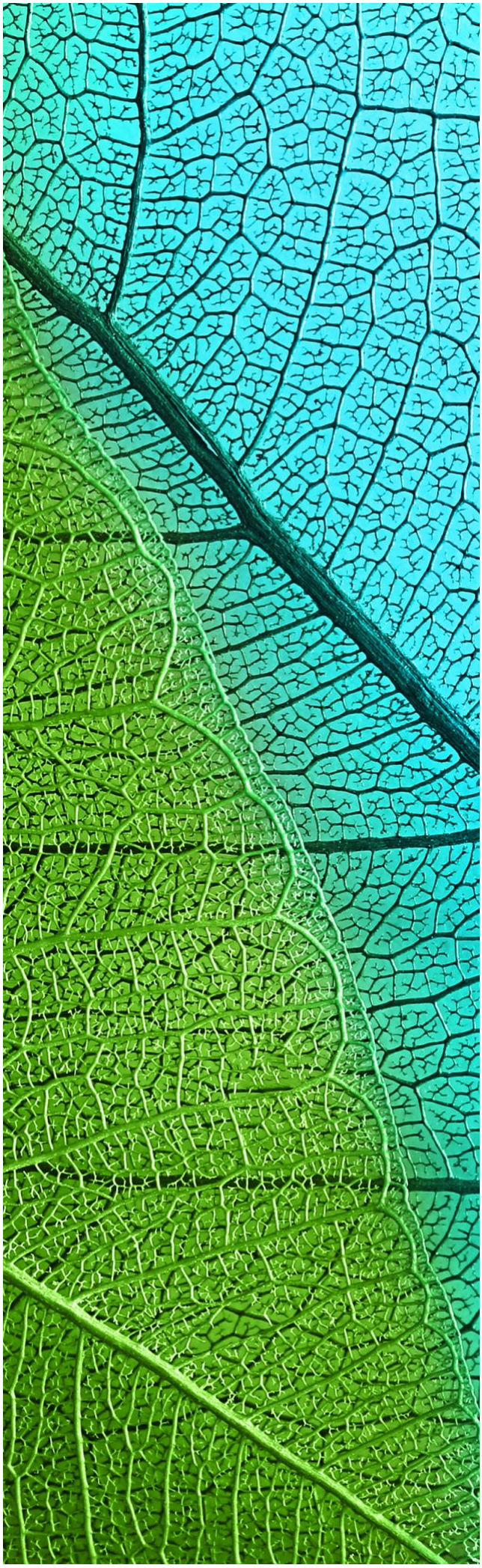
How to Read This Document

The following document is a Background Document that was prepared to inform the preparation of the draft Manuka Road Development Plan (the Plan). The document was prepared at a particular point in time prior to the community consultation and may include information that is not represented in the Plan or may conflict with the Plan. Noting this, the background documents have still been deemed suitable to be placed on consultation to support the Plan.

The Report shows general Plan details represented in Figure 1 that do not match the Plan put out for consultation. The figure should be considered as an early draft concept.

It is intended that all Background Documents are to be updated post community consultation and prior to Council Adoption of the Plan. These updated documents will be made available for public access once completed.

Rex Zhang
Senior Strategic Planner
Email: planningscheme@casey.vic.gov.au
Ph: 9705 5200



42-80 Manuka Road, Berwick

Flora and Fauna Assessment

Prepared for Parklea Pty Ltd

April 2022
Report No. 11179 (4.4)

Nature Advisory
(Formerly Brett Lane & Associates Pty Ltd)
5/61-63 Camberwell Road
Hawthorn East, VIC 3123
PO Box 337, Camberwell VIC 3124
(03) 9815 2111
www.natureadvisory.com.au

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1. Executive summary

Parklea Pty Ltd engaged Nature Advisory Pty. Ltd. to conduct a flora and fauna assessment of a 19-hectare area of land spanning properties 42-80 Manuka Road, Berwick, land proposed for rezoning and preceding residential subdivision. This investigation was commissioned to provide information on the extent and condition of native vegetation in the study area according to Victoria's new *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP 2017a), as well as any potential impacts on flora and fauna matters listed under the state *Flora and Fauna Guarantee Act 1988* and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Nature Advisory have conducted several surveys at the site since the project commenced in 2012. Prior to the current survey four patches (habitat zones A, B, C & D) of remnant woodland had been recorded in the study area, located immediately west of the urban floodway and a large dam. Three of the patches comprised an intact indigenous canopy of eucalypts and a patchy understorey of indigenous grasses, herbs and shrubs. One of the patches, located along an access road, consisted of a Manna Gum overstorey and supported few other indigenous life forms or features. These patches were found to contain a combined total of 34 large trees (Manna Gum) during the recent survey ranging in their trunk diameter at breast height (DBH) from 71cm to 200cm. Six scattered indigenous trees were recorded outside of these patches (DBH 25cm to 156cm)

During the survey in January 2017 an additional four patches (habitat zones E, F, G & H) of native vegetation were recorded in an extended study area, located immediately east of the original study area. These patches varied considerably in size and quality. Two of the patches comprised a canopy of eucalypts over an understorey supporting a diversity of indigenous species, particularly shrubs. These patches contained a combined total of 29 large trees (Manna Gum) ranging in their DBH from 71cm to 136cm. The other two patches were treeless and highly modified. One was dominated by Swamp Paperbark, while the other was dominated by Cumbungi and Common Reed.

The study area is subject to four overlays in the Casey Planning Scheme. Under SLO4 a permit is required to remove, destroy or lop any tree if the trunk circumference is greater than 0.5m at one metre above ground level. VPO2 covering the eastern part of the study area requires a permit to remove, destroy or lop any native vegetation. Under BMO a permit is required to subdivide land and to construct works. The eastern part of the sturdy area is also covered by a Land subject to Inundation overlay (LSIO).

A planning permit under Clause 52.17 of the Casey Planning Scheme is required for the removal of native vegetation in the study area.

The current proposal would trigger a referral to DELWP as it will likely meet the criteria specified in Section 3.2.3.

The current proposal footprint would result in the loss of a total extent of 0.346 hectares of native vegetation as represented in Figure 1 and documented in the DELWP removal report (Appendix 9).

This is comprised of:

- 0.074 ha of patch native vegetation;
- 6 scattered trees equating to 0.270 ha of native vegetation; and
- 6 large trees within patches of native vegetation.

Offsets required to compensate for the proposed removal of native vegetation from the study area are provided below.

- 0.072 *general habitat units* and must include the following offset attribute requirements:
    - Minimum strategic biodiversity value (SBV) of 0.387
    - Occur within the Port Phillip and Westernport CMA boundary or the Casey municipal district.
    - Include protection of at least 6 large trees.

Based on the relevant guidelines, the proposed development is unlikely to result in a significant impact on EPBC Act listed values presented below if mitigation measures are implanted to minimise impacts to water quality in the Grasmere Creek.

- Dwarf Galaxias

A Referral under the EPBC Act will be required for the above-listed value if its habitat is not protected by including management actions and mitigation measures in the design process. A wetland system aimed at treating storm water runoff before entering Grasmere Creek is recommended to maintain water quality.

No FFG Act values listed as threatened or protected are susceptible to impacts from the proposed development on public land for the proposed current design.

A Referral to the state Minister for Planning is unlikely to be required under the EE Act for the aspects covered by the current investigation.

2. Introduction

Parklea Pty Ltd engaged Nature Advisory Pty. Ltd. to conduct an updated flora and fauna assessment of a 19-hectare area of land spanning properties 42-80 Manuka Road, Berwick, land proposed for rezoning and preceding residential subdivision.

This report updates Nature Advisory Report 11179 (4.3) to bring the contained information in line with gazetted changes to Victoria's native vegetation removal regulations and investigate the quality of native vegetation directly east of the previous study area.

The current investigation was commissioned to provide information on the extent and condition of native vegetation in the study area according to Victoria's *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP 2017a), as well as any potential impacts on flora and fauna matters listed under the state *Flora and Fauna Guarantee Act 1988* (FFG Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). This report outlines any implications under relevant national, state and local legislation and policy frameworks.

Specifically, the scope of the investigation included:

- A review of the existing information on the flora, fauna and native vegetation, including:
    - Victorian Biodiversity Atlas administered by the Department of Environment and Primary Industries (DEPI);
    - The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Search Tool; and
    - DEPI Native Vegetation Information Management system (NVIM).
- A site survey was undertaken involving:
    - Characterisation and mapping of remnant native vegetation on the site;
    - Assessment of native vegetation in accordance with Victoria's *Biodiversity assessment guidelines* (the 'Guidelines') including habitat hectare assessment and/or scattered tree assessment;
    - Compilation of flora and fauna species lists for the site;
    - Assessment of the nature and quality of native fauna habitat; and
    - Assessment of the likelihood of occurrence of EPBC Act and FFG Act listed flora and fauna on the site.

This remainder of the report is divided into the following sections:

Section 3 describes the sources of information, including the methods used for the field survey.

Section 4 provides the legislative background including details of all relevant Commonwealth, State and local legislation and policies.

Section 5 presents the assessment results, including details of the native vegetation, flora and fauna of the study area.

Section 6 discusses the proposed impacts of the project and details the implications of the findings under the relevant legislation and policy.

This investigation was undertaken by a team from Nature Advisory, comprising Verity Fyfe (Botanist), Curtis Doughty (Zoologist), Rani Sherriff (Botanist), Davide Coppolino (Senior Ecologist) and Inga Kulik (Senior Ecologist & Project Manager).

3. Planning and legislative considerations

This investigation and report address the application on the site of relevant legislation and planning policies that protect biodiversity. Local, state and Commonwealth controls are summarised below.

3.1. Local planning provisions

The study area is located within the Casey local government area. It is currently zoned Farming Zone – Schedule 1 (FZ1) and Green Wedge Zone – Schedule 4 (GWZ4) in the Casey Planning Scheme.

The study area is located within a Bushfire-prone Area.

Local planning provisions apply under the Victorian *Planning and Environment Act 1987*.

3.1.1. Local planning policies

No local planning policies relevant to this investigation operate in the City of Casey.

3.1.2. Overlays

The study area is subject to three overlays in the Casey Planning Scheme, which are relevant to this assessment. It is partially covered by a Vegetation Protection Overlay (Schedule 2) and Land Subject to Inundation Overlay in the northeast, and is wholly covered by a Significant Landscape Overlay (Schedule 4) in the Casey Planning Scheme. A Bushfire Management Overlay applies to the properties to the east, but does apply to any land within the study area. A Heritage Overlay (HO50) covers most of the property at the address 62-70 Manuka Road, and a small portion of 54-60 Manuka Road.

The purpose of these overlays is discussed below.

Significant Landscape Overlay (SLO4)

The purpose of this overlay is to:

- Implement the State Planning Policy Framework and the Local Planning Policy Framework, including the Municipal Strategic Statement and local planning policies.
- Identify significant landscapes.
- Conserve and enhance the character of significant landscapes.

Statement of nature and key elements of landscape

The Berwick Township and environs possess "a special landscape character". The special landscape character of the Berwick Township and its environs is attributable to a predominance of tall, mature Australian and exotic trees on both private properties and the roadway. These trees are visually dominant in long distance views, streetscape views and views to private gardens. The boundary between private and public property is blurred in many areas due to the lack of front fences, with wide road verges blending with deep front setbacks and mature trees in front gardens and along the road reserves.

Landscape character objective to be achieved

- To ensure that the tree dominated landscape character of the Berwick Township and its environs is protected and enhanced.
- To ensure that new development is sited and designed to allow for the retention of existing trees that contribute to the character of the area and that provide wildlife habitat.
- To ensure that new buildings and works are designed to ensure they do not dominate the treed landscape character of the area.
- To ensure that new development is sympathetic to the natural characteristics of the area.

- To ensure that new development provides opportunities for additional tree and screen planting to enhance the treed character of the area.
- To ensure that the distinctive avenues of street trees are protected and retained.
- To ensure that front fences are sympathetic to the open, garden character of the area.

Permit requirements

A permit is required to:

- Remove, destroy or lop any tree if the trunk circumference is greater than 0.5m at one metre above ground level. This does not apply to the pruning of a tree for regeneration or ornamental shaping or the removal of dead trees or dead limbs or the partial removal of limbs and branches directly overhanging dwellings, garages and outbuildings.
- Construct a front fence.

A permit is not required for buildings or works which are not within 5 metres of the drip line of any tree with a trunk circumference that is greater than 0.5m at one metre above ground level.

Decision guidelines

Before deciding on an application, in addition to the decision guidelines in Clause 65, the responsible authority must consider, as appropriate:

- The State Planning Policy Framework and the Local Planning Policy Framework, including the Municipal Strategic Statement and local planning policies.
- The statement of the nature and key elements of the landscape and the landscape character objective contained in a schedule to this overlay.
- The conservation and enhancement of the landscape values of the area.
- The need to remove, destroy or lop vegetation to create a defendable space to reduce the risk of bushfire to life and property.
- The impact of the proposed buildings and works on the landscape due to height, bulk, colour, general appearance or the need to remove vegetation.
- The extent to which the buildings and works are designed to enhance or promote the landscape character objectives of the area.
- The impact of buildings and works on significant views.

<u>Vegetation Protection Overlay (VPO2)</u>

Statement of nature and significance of vegetation to be protected

A number of significant stands of remnant vegetation exist on the rear of the properties at 62-70 and 72-80 Manuka Road, Berwick. The valley slopes support remnants of Grassy Forest, while Swamp Riparian Woodland and Swamp Scrub are located along the tributary of Cardinia Creek and its associated floodplains. The highest quality examples of Swamp Riparian Woodland are upstream of the existing dam.

Swamp Riparian Woodland, Swamp Scrub and Grassy Forest are endangered ecological vegetation communities in the Gippsland Plains Bioregion (i.e. less than ten per cent of pre-European extent remains). In the case of Swamp Scrub, less than two per cent of pre- European extent remains.

The purpose of this overlay is to:

- To retain and protect remnant native vegetation so as to:
    - Provide habitat and movement corridors for native fauna.
    - Visually integrate the Cardinia Creek Parklands with the surrounding landscape and to screen and soften views of the site from the Parklands.

Permit requirements

A permit is required to remove, destroy or lop any native vegetation. This does not apply to the following environmental weed species:

- Sweet Pittosporum (*Pittosporum undulatum*);
- Sallow Wattle (*Acacia longifolia subsp. Longifolia*);
- Coast Wattle (*Acacia longifolia subsp. Sophorae*).

Decision Guidelines

Before deciding on an application, the responsible authority must consider:

- The significance of the vegetation.
- The habitat value of the vegetation.
- The advice of Parks Victoria.
- Alternative means of using the land or locating buildings and works so that the retention and protection of native vegetation is not compromised.

Bushfire Management Overlay

The purpose of this overlay is to:

- Implement the State Planning Policy Framework and the Local Planning Policy Framework, including the Municipal Strategic Statement and local planning policies.
- Ensure that the development of land prioritises the protection of human life and strengthens community resilience to bushfire.
- Identify areas where the bushfire hazard warrants bushfire protection measures to be implemented.
- Ensure development is only permitted where the risk to life and property from bushfire can be reduced to an acceptable level.

Permit requirements

A permit is required to subdivide land and for any construction works. This does not apply if a schedule to this overlay specifically states that a permit is not required.

Decision guidelines

Before deciding on an application, in addition to the decision guidelines in Clause 52.47 and Clause 65, the responsible authority must consider, as appropriate:

- The State Planning Policy Framework and the Local Planning Policy Framework, including the Municipal Strategic Statement and local planning policies.
- Any other matters specified in a schedule to this overlay.

3.2. State planning provisions

State planning provisions are established under the *Victorian Planning and Environment Act 1987*.

Clause 52.17 of all Victorian Planning Schemes states that:

A permit is required to remove, destroy or lop native vegetation, including dead native vegetation.

A permit is not required if:

- An exemption in Table 52.17-7 specifically states that a permit is not required.
- A native vegetation precinct plan corresponding to the land is incorporated into the planning scheme and listed in the schedule to Clause 52.16.
- The native vegetation is specified in a schedule to Clause 52.17.

3.2.1. Exemptions

Exemptions listed in Table 52.17-7 relevant to the study area include:

- *Site area:* Native vegetation that occurs on contiguous land in one ownership, which has an area of less than 0.4 hectares is exempt and does not require a planning permit. This exemption does not apply to native vegetation on a roadside or rail reservation.
- *Dead native vegetation:* Native vegetation that is dead is exempt and does not require a planning permit. This does not apply to a standing dead tree with a trunk diameter of 40 centimetres or more at a height of 1.3 metres above ground level.

3.2.2. Application requirements

Any application to remove, destroy or lop native vegetation must comply with the application requirements specified in *the Guidelines* (DELWP 2017a).

When assessing an application, Responsible Authorities are also obligated to refer to Clause 12.01-2 (Native vegetation management) in the Planning Scheme which in addition to *the* Guidelines, refers to the following:

- *Assessor's handbook – applications to remove, destroy or lop native vegetation* (Version 1.1) (DELWP 2018a).
- Statewide biodiversity information maintained by DELWP.

The application of *the Guidelines* (DELWP 2017a) are explained further in Appendix 1.

3.2.3. Referral to DELWP

Clause 66.02-2 of the planning scheme determines the role of DELWP in the assessment of native vegetation removal permit applications. If an application is referred, DELWP may make certain recommendations to the responsible authority in relation to the permit application.

Any application to remove, destroy or lop native vegetation must be referred to DELWP if:

- The impacts to native vegetation are in the Detailed Assessment Pathway;
- A property vegetation plan applies to the site; or
- The native vegetation is on Crown land which is occupied or managed by the responsible authority.

3.3. EPBC Act

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) protects a number of threatened species and ecological communities that are considered to be of national conservation significance. Any significant impacts on these species require 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).

Implications under the EPBC Act for the current proposal are discussed in Section 7.3.

3.4. FFG Act

The Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act) lists threatened and protected species and ecological communities (DELWP 2018b, DELWP 2017b). Any removal of protected flora, which includes threatened flora species and the plants that make up threatened communities, listed under the FFG Act from public land requires a Protected Flora Licence or Permit under the Act, obtained from DELWP.

The FFG Act only applies to private land where a license is required to remove grass trees, tree ferns and sphagnum moss for sale, or where an Interim Conservation Order has been made to protect critical habitat for a threatened species or community. As no such habitat has ever been declared, this mechanism under the FFG Act has never been implemented.

Implications under the FFG Act for the current proposal are discussed in Section 7.4.

3.5. EE Act

One or a combination of a number of criteria may trigger a requirement for a Referral to the Victorian Minister for Planning who will determine if an Environmental Effects Statement (EES) is required according to the *Ministerial Guidelines for Assessment of Environmental Effects under the* Environment Effects Act 1978 (DSE 2006).

The criteria related to flora, fauna and native vegetation which trigger a Referral are outlined below.

One or more of the following would trigger a Referral:

- Potential clearing of 10 hectares or more of native vegetation from an area that:
  - Is of an Ecological Vegetation Class identified as endangered by the Department of Sustainability and Environment (in accordance with Appendix 2 of Victoria's Native Vegetation Management Framework); or
  - Is, or is likely to be, of very high conservation significance (as defined in accordance with Appendix 3 of Victoria's Native Vegetation Management Framework); and
  - Is not authorised under an approved Forest Management Plan or Fire Protection Plan
- Potential long-term loss of a significant proportion (e.g. 1 to 5 percent depending on the conservation status of the species) of known remaining habitat or population of a threatened species within Victoria
- Potential long-term change to the ecological character of a wetland listed under the Ramsar Convention or in 'A Directory of Important Wetlands in Australia'
- Potential extensive or major effects on the health or biodiversity of aquatic, estuarine or marine ecosystems, over the long term

Two or more of the following would also trigger a Referral:

- Potential clearing of 10 hectares or more of native vegetation, unless authorised under an approved Forest Management Plan or Fire Protection Plan
- Matters listed under the Flora and Fauna Guarantee Act 1988:
  - Potential loss of a significant area of a listed ecological community; or
  - Potential loss of a genetically important population of an endangered or threatened species (listed or nominated for listing), including as a result of loss or fragmentation of habitats; or
  - Potential loss of critical habitat; or

Potential significant effects on habitat values of a wetland supporting migratory bird species.

Implications under the *Environment Effects Act 1978* (EE Act) for the current proposal are discussed in Section 7.5.

3.6. CaLP Act

The *Catchment and Land Protection Act 1994* (CaLP Act) requires that landowners (or a third party to whom responsibilities have been legally transferred) must eradicate regionally prohibited weeds and prevent the growth and spread of regionally controlled weeds.

Weed species listed on the CaLP Act that have been recorded in the study area are discussed in Section 7.6.

4. Existing information and methods

4.1. Existing information

Existing information used for this investigation is described below. Note that 'study area' refers to the properties at 42-80 Manuka Road, Berwick.

4.1.1. Existing reporting and documentation

The existing documentation below, relating to the study area was reviewed.

- Casey Planning Scheme
- BL&A 2012 & 2016 Manuka Road, Berwick Flora and Fauna Assessments

4.1.2. Native vegetation

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

- Relevant EVC benchmarks for the Gippsland Plain bioregion[1] (DSE 2004a);
- NatureKit (DELWP 2020a).

4.1.3. Listed matters

Existing flora and fauna species records and information about the potential occurrence of listed matters was obtained from an area termed the 'search region', defined here as an area with a radius of ten kilometres from the approximate centre point of the study area (coordinates: latitude 38˚ 01' 52" S and longitude 145˚ 22' 03" E).

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 (2017).

The online EPBC Act Protected Matters Search Tool (DAWE 2022a) was consulted to determine whether nationally listed species or communities potentially occurred in the search region based on habitat modelling.

4.2. Field methods

The initial field assessment was conducted on the 2nd December 2014, followed by a supplementary assessment which was conducted on 5th July 2016 that covered the Clover Cottage property at 54-60 Manuka Road.

The latest field assessment was conducted on the 29th and 30th of January 2018. During this assessment the existing study area was re-surveyed in order to detect large trees. Furthermore, an additional study area (located immediately east of the previous study area) was surveyed.

During these assessments, the study area was surveyed in detail on foot.

Sites in the study area found to support native vegetation or the potential to support listed matters were mapped. Mapping was undertaken through a combination of aerial photograph interpretation and ground-truthing using a hand-held GPS (accurate to approximately five metres).

[1] A bioregion is defined as "a geographic region that captures the patterns of ecological characteristics in the landscape, providing a natural framework for recognising and responding to biodiversity values". In general bioregions reflect underlying environmental features of the landscape (DNRE 1997).

4.2.1. Native vegetation

Native vegetation is currently defined in Clause 73.01 of all Victorian planning schemes as 'plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses'. The Guidelines (DELWP 2017a) further classify native vegetation as belonging to two categories:

- Patch; or
- Scattered tree.

The definitions of these categories are provided below, along with the prescribed DELWP methods to assess them. Further details on definitions of patches and scattered trees are provided in Appendix 1.

Patch

A patch of native vegetation is either:

- An area of vegetation where at least 25 per cent of the total perennial understorey plant cover is native; or
- Any area with three or more native canopy trees[2] where the drip line[3] of each tree touches the drip line of at least one other tree, forming a continuous canopy; or
- Any mapped wetland included in the *Current wetlands map*, available in DELWP systems and tools.

Patch condition is assessed using the habitat hectare method (Parkes *et al*. 2003; DSE 2004b) whereby components of the patch (e.g. tree canopy, understorey and ground cover) are assessed against an EVC benchmark. The score effectively measures the percentage resemblance of the vegetation to its original condition.

The Native Vegetation Information Management (NVIM) system (DELWP 2020c) provides modelled condition scores for native vegetation to be used in certain circumstances.

Scattered tree

A scattered tree is:

- A native canopy tree[2] that does not form part of a patch.

Scattered trees are counted and mapped, the species identified and their circumference at 1.3 m above the ground is recorded.

4.2.2. Flora species and habitats

Records of flora species were made in conjunction with sampling methods used to undertake habitat hectare assessments of native vegetation described above. Specimens requiring identification using laboratory techniques were collected.

Species protected under the FFG Act were determined by crosschecking against the FFG Act Protected Flora List (DELWP 2017b).

The potential for habitats to support listed flora species was assessed based on the criteria outlined below:

- The presence of suitable habitat for flora species such as soil type, floristic associations and landscape context; and

[2] A native canopy tree is a mature tree (i.e. it is able to flower) that is greater than 3 metres in height and is normally found in the upper layer of the relevant vegetation type.
[3] The drip line is the outermost boundary of a tree canopy (leaves and/or branches) where the water drips on to the ground.

- The level of disturbance of suitable habitats by anthropogenic disturbances and invasions by pest plants and animals.

Wherever appropriate, a precautionary approach was adopted in determining the likelihood of occurrence or flora listed under the EPBC Act and/or FFG Act. That is, where insufficient evidence was available on the potential occurrence of a listed species, it is assumed that it could be in an area of suitable habitat.

4.2.3. Fauna species and habitats

The techniques below were used to detect fauna species utilising the study area.

- Incidental searches for mammal scats, tracks and signs (e.g. diggings, signs of feeding and nests/burrows).
- Turning over logs/rocks and other ground debris for reptiles, frogs and mammals.
- Bird observation during the day.
- General searches for reptiles and frogs; including identification of frog calls in seasonally wet areas.
- General searches for bat habitat including waterbodies and potential roosting sites such as caves, dead trees with hollows and underneath bark of trees.

Fauna habitats are described using habitat components that include old-growth trees, fallen timber, leaf litter and surface rocks.

The study area's habitat connectivity (i.e. degree of isolation/fragmentation), including linkages to other habitats in the region, was determined using field observations, recent aerial photography and DELWP's NatureKit (DELWP 2020a).

Wherever appropriate, a precautionary approach was adopted in determining the likelihood of occurrence or fauna listed under the EPBC Act and FFG Act. That is, where insufficient evidence was available on the potential occurrence of a listed species, it is assumed that it could be in an area of suitable habitat.

4.2.4. Threatened ecological communities

The study area was assessed against published descriptions of relevant listed ecological communities modelled to potentially occur in the study area.

Reviewed ecological community descriptions comprised identification criteria and condition thresholds from listing advice for EPBC Act communities as well as FFG Act listed community descriptions (SAC 2015).

4.3. Limitations of field assessment

Whilst this assessment was not designed to provide an exhaustive inventory of flora and fauna species in the study area, all efforts were made to schedule the site assessment at a time of year when the majority of native vegetation life forms and habitat niches are likely to be present. Nevertheless, site assessments may fail to record all life-forms because of the seasonal absence of some species and sampling nature of surveys.

The initial and recent site assessments were carried out in summer, when many annual and/or seasonally-emergent plant species may have been absent or in the senescent or pre-flowering stage of their life-cycle. The supplementary survey was carried out in mid-winter, when few flora species were likely to have been absent or in the senescent or pre-flowering stage of their life-cycle. The timing of the surveys and condition of vegetation was otherwise considered suitable to ascertain the extent and condition of native vegetation and fauna habitats.

Some large trees could not be accessed and measured at the time of the 2018 assessment due to being surrounded by Hawthorn. Where this was the case the diameter at breast height was estimated.

Wherever appropriate, a precautionary approach was adopted in the discussion of implications for matters listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and Victorian *Flora and Fauna Guarantee Act 1988*. That is, where insufficient evidence was available on the potential occurrence of a listed species, it is assumed that it could be in an area of suitable habitat. The implications under legislation and policy are considered accordingly.

5. Assessment results

5.1. Site assessment

5.1.1. Site description

The study area for this investigation (Figure 1) was approximately 19 hectares of private land spanning properties 42-80 Manuka Road in Berwick, an outer south-east suburb of Melbourne. The study area was bordered by Manuka Road to the west, public land to the north, the Green Wedge Zone to the east and Allan Street to the south. The study area was located within the Urban Growth Boundary (UBG) which closely follows an easement containing a water pipeline from Cardinia Reservoir in the south of the study area; this boundary follows a floodway containing Grasmere Creek in the north – a tributary of Cardinia Creek.

The study area supported sedimentary soils on a gently undulating to flat landscape. The study area sloped from west to east down to the flood zone associated with Cardinia Creek.

The study area had been modified for the creation of pasture and ornamental gardens associated with the dwellings and outbuildings. The cleared paddocks were comprised of introduced pasture grasses such as Cocksfoot, Toowoomba Canary-grass, Sweet Vernal-grass and Couch; occasional indigenous flora species such as rushes and Weeping Grass were recorded at very low cover in these cleared paddocks. Most trees recorded on the edges of paddocks and in the garden areas were introduced ornamental and windbreak trees; the ground and shrub layers in the garden areas comprised turf grasses and introduced ornamental plants.

The initial study area contained four patches (habitat zones A, B, C & D) of remnant woodland, which were located immediately west of the urban floodway and a large dam. Three of the patches comprised an intact indigenous canopy of eucalypts and a patchy understorey of indigenous grasses, herbs and shrubs. One of the patches, located along an access road, consisted of a Manna Gum overstorey and supported few other indigenous life forms or features. Six scattered indigenous trees were recorded outside of these patches. These patches were found to contain a combined total of 34 large trees (Manna Gum) during the recent survey ranging in their trunk diameter at breast height (DBH) from 71cm to 200cm (see Appendix 4).

During an additional survey in January 2017 an additional four patches (habitat zones E, F, G & H) of native vegetation were recorded in an extended study area, located immediately east of the original study area. These patches varied considerably in size and quality. Two of the patches comprised a canopy of eucalypts over an understorey supporting a diversity of indigenous species, particularly shrubs. These patches contained a combined total of 29 large trees (Manna Gum) ranging in their DBH from 71cm to 136cm (see Appendix 4). The other two patches were treeless and highly modified. One was dominated by Swamp Paperbark, while the other was dominated by Cumbungi and Common Reed.

The remnant grassy woodland habitat in the study area is connected to the riparian habitat along Grasmere Creek. The Grasmere Creek is a tributary to the Cardinia Creek which is the larger tributary in the region. The Beaconsfield Flora and Fauna Reserve Biosite is included in the study area and extends beyond its boundary along the Cardinia Creek Reserve. The study area is located adjacent to the Akoonah Park Sanctuary for Flora and Fauna which includes the creeks and riparian habitat. A number of parks and reserves are located in the wider area and the creeks provide a wildlife corridor to these other areas of suitable habitat.

The majority of the study area is currently used for grazing cattle and horse agistment and indications are that this has been the dominant land use for at least two decades. To the east of Manuka Road and south of Allan Street lie substantial areas of residential development; land to the north is cleared and appears to have been cropped and used for pasture historically; the land to the east of the Urban Growth Boundary, which bisects the private property under investigation, is predominantly covered by remnant vegetation associated with Cardinia Creek and its floodway – the adjacent public land comprises the Cardinia Creek Nature Conservation Reserve (also known as the Beaconsfield Flora and Fauna Reserve).

The study area lies within the Gippsland Plain bioregion and falls within the Port Phillip and Westernport catchment.

5.1.2. Patches of native vegetation

Pre–European EVC mapping (DELWP 2020a) indicated that the study area and surrounds would have supported Swampy Woodland (EVC 937), and Swampy Riparian Woodland (EVC 83) prior to European settlement based on modelling of factors including rainfall, aspect, soils and remaining vegetation.

Evidence on site, including floristic composition and soil characteristics, suggested that Swampy Riparian Woodland (EVC 83) was present within the eastern portion of the study area (Figure 1). Descriptions of these EVCs are provided in Appendix 8.

Eight patches (referred to herein as habitat zones) comprising the abovementioned EVC were identified in the study area (Table 1).

Table 1: Description of habitat zones in the study area

Habitat Zone	EVC	Description
A	EVC 83: Swampy Riparian Woodland	Small patch along a drainage line. Canopy dominated by Manna gum, with some Messmate Stringybark and Narrow-leaf Peppermint. Understorey dominated by Bracken and Invasive species, some scattered indigenous grasses. Few logs, no recruitment observed. The understorey of this patch is quite disturbed, but it does contain 13 large trees.
B	EVC 83: Swampy Riparian Woodland	Small patch of Manna Gum lining an access road, with an understorey of small to tiny grazed grasses, some Wallaby Grass and Weeping grass, but exotic grasses dominant including high threat Sweet vernal-grass. All other life forms absent, logs and recruitment absent. Four large trees are present in this patch.
C	EVC 83: Swampy Riparian Woodland	Patch adjacent to the waterbody to the east of the study area. Contiguous with the swampy vegetation over the fence. Dominant canopy species Manna Gum, medium shrub component with Sweet Bursaria. Understorey dominated by invasive grasses, and woody weeds such as Blackberry and Hawthorn. Native herbs such as Yellow Rush-lily and Kidney Weed in the understorey. Recruitment absent, logs present. This patch contains 9 large trees, but the understorey is dominated by weeds.
D	EVC 83: Swampy Riparian Woodland	Patch adjacent to the waterbody to the east of the study area. Contiguous with the swampy vegetation over the fence. Manna Gum canopy over medium Sweet Bursaria shrubs. Invasive grasses and woody weeds dominant in the understorey. Some indigenous grasses; Kangaroo grass, Spear Grass and Weeping grass, and indigenous herbs; Kidney Weed and Yellow Rush-lily. Recruitment absent, some logs present. This patch contains 9 large trees and a higher biodiversity in the undergrowth than patch C.

Habitat Zone	EVC	Description
E	EVC 83: Swampy Riparian Woodland	Patch hugging the southern boundary of the large dam. Contiguous with habitat zones H and G. Represented a highly modified form of this EVC. Treeless. Co-dominated by Cumbungi and Common Reed, occasional small shrubs present. Moderate weed cover. Common weeds included Willow, Blackberry and introduced grasses. Recruitment observed. No logs present. This patch does not contain any large trees and is dominated by two species.
F	EVC 53_61: Swamp Scrub	Patch on an island in the middle of the large dam. Consisted of Swamp Paperbark and little else. Low weed cover. Weeds included Blackberry and Sweet Pittosporum. Recruitment observed. No logs present. No large trees were recorded in this patch.
G	EVC 83: Swampy Riparian Woodland	Largest patch located in the north-east corner of the study area. Dominant canopy species Manna Gum, occasional Narrow-leaved Peppermint present in the sub-canopy. Canopy was of good health, though not intact across the whole patch. Nineteen large trees present. Other trees present included Black Wattle and Blackwood. Much of the patch was dominated by Swamp Paperbark and this area was inundated at the time of the assessment. Good shrub, graminoid and herb diversity. Common species included Prickly Currant-bush, Tree Violet, Austral Bracken, Thatch Saw-sedge, Cumbungi and Common Reed. Weed cover was moderate-high. Common weeds included Blackberry, Hawthorn, Cocksfoot, Toowoomba Canary-grass, Bluebell Creeper, Scotch Thistle and Creeping Buttercup. Recruitment observed. Logs present. Overall this patch is of high to very high quality.
H	EVC 83: Swampy Riparian Woodland	This patch was located within a paddock and subject to grazing. It was contiguous with habitat zone A and adjacent to the dam. Dominant canopy species Manna Gum, occasional Narrow-leaved Peppermint present in the sub-canopy. Canopy was of good health and eleven large trees present. The understorey was lacking in diversity and weed cover was high. Indigenous understorey species included Cherry Ballart, Prickly Currant-bush, Swamp Paperbark, Black Wattle and Ground Fern. Common weeds included Cocksfoot, Brown Top-bent, Blackberry, Hawthorn and Spear Thistle. Recruitment observed. Logs present. Overall this patch is of high to very high quality.

The habitat hectare assessment results for these habitat zones are provided in Table 2 More detailed habitat scoring results are presented in Appendix 2.

Table 2: Summary of habitat hectare assessment results

Habitat Zone	EVC	Area (ha)	Condition score (out of 100)
A	EVC 83: Swampy Riparian Woodland	0.413	15
B	EVC 83: Swampy Riparian Woodland	0.131	9
C	EVC 83: Swampy Riparian Woodland	0.115	22
D	EVC 83: Swampy Riparian Woodland	0.282	32
E	EVC 83: Swampy Riparian Woodland	0.148	29
F	EVC 53_61: Swamp Scrub	0.152	26
G	EVC 83: Swampy Riparian Woodland	1.421	54
H	EVC 83: Swampy Riparian Woodland	0.410	54
Total		3.072	

Figure 1: Study area and native vegetation to be removed

Project: 42-72 Manuka Road, Berwick **Client:** Bosco Jonson Pty Ltd **Date:** 24/03/2022

- Study area
- Scattered tree
- Large tree in patch
- Swampy Riparian Woodland (EVC 83)
- Tree to be removed
- Native vegetation to be removed

N

Metres 0 40

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5.1.3. Scattered trees

Scattered trees recorded in the study area would have once comprised the canopy component of Swampy Riparian Woodland (EVC 83) and Swampy Woodland (EVC 937). Six scattered trees occurred in the study area (Figure 1), ranging in DBH (diameter at breast height) between 25 and 156 centimetres. Details of the scattered trees recorded are listed in Appendix 3.

5.1.4. Flora species

During the habitat hectare assessment 83 plant species were recorded. Of these, 23 (28%) were indigenous and 60 (72%) were introduced or non-indigenous native in origin (Appendix 5). This excluded all the planted ornamentals in the garden areas.

VBA records (VBA 2020d) and the EPBC Protected Matters Search Tool (DAWE 2020a) indicated that within the search region there were 55 records of, or there occurred potential suitable habitat for, seven species listed under the Commonwealth EPBC Act. No flora species listed under the EPBC Act were recorded during the field survey.

The likelihood of occurrence in the study area of species listed under the EPBC is addressed in Table 3. Species considered 'likely to occur' are those that have a very high chance of being in the study area based on numerous records in the search region and suitable habitat in the study area. Species considered to have the 'potential to occur' are those where suitable habitat exists, but recent records are scarce.

This analysis indicates that two FFG Act listed flora species have the potential to occur within the riparian habitat along Grasmere Creek:

- Austral Crane's-bill (FFG Act: Endangered)
- Floating Bladderwort (FFG Act; Endangered)

These species if present, will not impacted by the proposed development as the riparian habitat will be retained.

Table 3: Listed flora species and the likelihood of their occurrence in the study area

Common name	Scientific name	Conservation status			Habitat	Likelihood of occurrence
		EPBC	FFG	FFG-Prot		
Sticky Wattle	*Acacia howittii*		VU	P	Moist forest in eastern Victoria. Widely planted	No suitable habitat present – **Unlikely to occur**
Dandenong Wattle	*Acacia stictophylla*		EN	P	Dandenong Range and western foothills from Woori Yallock to Ringwood (Entwisle et al. 1996).	No suitable habitat present – **Unlikely to occur**
River Swamp Wallaby-grass	*Amphibromus fluitans*	VU			River Swamp Wallaby-grass grows mostly in permanent swamps and also lagoons, billabongs, dams and roadside ditches. The species requires moderately fertile soils with some bare ground; conditions that are caused by seasonally-fluctuating water levels (DAWE 2020).	No suitable habitat present – **Unlikely to occur**
Rough-barked Apple	*Angophora floribunda*		EN		In Victoria confined to far East Gippsland (east of c. Wingan Inlet) where found mainly in lowland, near-coastal forests on sandy soils (VicFlora).	No suitable habitat present – **Unlikely to occur**
White Star-bush	*Asterolasia asteriscophora subsp. albiflora*		CR	P	Damp forests with moist but well-drained, loamy soils (FIS)	No suitable habitat present – **Unlikely to occur**
Veined Spear-grass	*Austrostipa rudis subsp. australis*		EN		Mostly in cool areas of moderate altitude, in open forests on sandy or sandstone derived soils.	No suitable habitat present – **Unlikely to occur**
Velvet Apple-berry	*Billardiera scandens s.s.*		EN		Dry open forests and woodlands.	No suitable habitat present – **Unlikely to occur**
Wiry Bossiaea	*Bossiaea cordigera*		EN		Moist areas in heathlands, heathy woodland and open forest	No suitable habitat present – **Unlikely to occur**

Common name	Scientific name	Conservation status			Habitat	Likelihood of occurrence
		EPBC	FFG	FFG-Prot		
Angahook Pink-fingers	*Caladenia maritima*		CR	P	Currently known only from Upper Beaconsfield and stunted heathy open forest in the Anglesea area on well-drained sandy loam (VicFlora).	No suitable habitat present – **Unlikely to occur**
Wine-lipped Spider-orchid	*Caladenia oenochila*		CR	P	Foot hill forest and less commonly heathy forest (Jeanes and Backhouse 2006).	No suitable habitat present – **Unlikely to occur**
Eastern Spider-orchid	*Caladenia orientalis*	CR	EN	P	Heathland and Heathy Woodland in coastal areas between the Mornington Peninsula and Wilsons Promontory (Jeanes & Backhouse 2006).	No suitable habitat present – **Unlikely to occur**
Thick-lip Spider-orchid	*Caladenia tessellata*	VU		P	Coastal open woodlands, Lowland forest, heathy woodland (Entwisle 1994).	No suitable habitat present – **Unlikely to occur**
Bow-lip Spider-orchid	*Caladenia toxochila*		CR	P	Mallee-scrub or Callitris woodland on sandy soils or box-woodland on clay-loam (Entwisle 1994).	No suitable habitat present – **Unlikely to occur**
Slender Pink-fingers	*Caladenia vulgaris*		VU	P	Scattered across southern Victoria where sometimes locally common in heathland and coastal scrub on moisture-retentive sandy soils (VicFlora).	No suitable habitat present – **Unlikely to occur**
Forest Sedge	*Carex alsophila*		EN		Mountain gullies and swamps between Alexandra and Erica	No suitable habitat present – **Unlikely to occur**
Pale Swamp Everlasting	*Coronidium gunnianum*		CR	P	Mostly in grasslands and riverine River Red Gum woodland on soils that are prone to inundation (VicFlora).	No suitable habitat present – **Unlikely to occur**
Powelltown Correa	*Correa reflexa var. lobata*		EN	P	Moist often heathy forest east of Melbourne (Duretto 1999).	No suitable habitat present – **Unlikely to occur**

Common name	Scientific name	Conservation status			Habitat	Likelihood of occurrence
		EPBC	FFG	FFG-Prot		
Spurred Helmet-orchid	*Corybas aconitiflorus*		EN	P	Dry-wet sclerophyll forest, Coastal open woodlands, Lowland forest, heathy woodland (Entwisle 1994).	No suitable habitat present – **Unlikely to occur**
Spotted Gum	*Corymbia maculata*		VU		Coastal Plains and hills. Endemic to the Tara range in East Gippsland (Walsh & Entwistle).	No suitable habitat present – **Unlikely to occur**
Grey Billy-buttons	*Craspedia canens*		CR	P	Lowland grasslands, often on swamp fringes. Current records occur between Cranbourne and Traralgon (Everett 1999).	No suitable habitat present – **Unlikely to occur**
Matted Flax-lily	*Dianella amoena*	EN	CR	P	Lowland grassland and grassy woodlands on well-drained to seasonally waterlogged fertile sandy loams to heavy cracking soils derived from sedimentary or volcanic Geology. It is widely distributed from eastern to south-western Victoria (DAWE 2020).	No suitable habitat present – **unlikely to occur**
Glaucous Flax-lily	*Dianella longifolia var. grandis s.l.*		CR		Occurs in lowland plains grassland and grassy woodlands (e.g. Volcanic Plain and Riverina) as well as around rocky outcrops at higher altitudes (VicFlora).	No suitable habitat present – **unlikely to occur**
Purple Diuris	*Diuris punctata*		EN	P	Principally in lowland native grasslands, grassy woodlands, heathy woodlands and open heathlands, usually on fertile, loamy soils and including periodically inundated areas (Earl & Barlow 2004).	No suitable habitat present – **unlikely to occur**
Green Scentbark	*Eucalyptus fulgens*		EN		Forest and woodlands between Healesville and Woori Yallock to the Latrobe Valley (Brooker & Slee 1996).	No suitable habitat present – **unlikely to occur**

Common name	Scientific name	Conservation status			Habitat	Likelihood of occurrence
		EPBC	FFG	FFG-Prot		
Large-fruit Yellow-gum	*Eucalyptus leucoxylon subsp. megalocarpa*		CR		Undulating low hills of thin loam over limestone in coastal shrubland. Naturally restricted to far south-western Victoria, near the Glenelg River estuary south of Nelson, and south-eastern South Australia. Other occurences comprise planted individuals (Nicolle 2006).	No suitable habitat present – **unlikely to occur**
Mugga	*Eucalyptus sideroxylon subsp. sideroxylon*		EN		In Victoria confined to the Chiltern area, northern Warby Range and south of Winton (VicFlora).	No suitable habitat present – **unlikely to occur**
Strzelecki Gum	*Eucalyptus strzeleckii*	VU	CR	P	Apparently endemic, confined to across the western section of the Strzelecki Range, from Neerim South in the north, south to Foster. Favours ridges, slopes and streambanks and deep fertile soils (Brooker & Slee 1996).	No suitable habitat present – **unlikely to occur**
Studley Park Gum	*Eucalyptus X studleyensis*		CR		A morphologically variable hybrid between E. camaldulensis subsp. camaldulensis and E. ovata subsp. ovata from the lower Yarra River north-east of Melbourne (Kew, Viewbank, Watsonia) (VicFlora).	No suitable habitat present – **unlikely to occur**
Tailed Eyebright	*Euphrasia caudata*		EN		In Victoria confined to Sphagnum swamps, streams or other damp situations in subalpine woodlands and grasslands east of Omeo with an old outlying record from near Mt Wellington (VicFlora).	No suitable habitat present – **unlikely to occur**
Austral Crane's-bill	*Geranium solanderi var. solanderi s.s.*		EN		Damp to dryish usually sheltered sites in grassy woodlands, often along drainage lines (Smith 1999).	Some records in the same EVC and other EVCs with similar habitat characteristic - **Potential to occur.**

Common name	Scientific name	Conservation status			Habitat	Likelihood of occurrence
		EPBC	FFG	FFG-Prot		
Clover Glycine	*Glycine latrobeana*	VU	VU	P	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 (DAWE 2020).	No suitable habitat present – **Unlikely to occur.**
Tufted Club-sedge	*Isolepis wakefieldiana*		EN		Scattered in cooler parts of Victoria (e.g. Halls Gap, Cape Otway, Healesville, Gelantipy, Marlo, Cann River and Genoa areas) (VicFlora).	No suitable habitat present – **Unlikely to occur.**
Purple Blown-grass	*Lachnagrostis punicea subsp. filifolia*		EN	P	Seasonally wet, heavy clay soils (Walsh 1994).	No suitable habitat present – **Unlikely to occur.**
Spiny Peppercress	*Lepidium aschersonii*	VU	EN	P	The Spiny Peppercress occurs in periodically wet sites such as gilgai depressions and the margins of freshwater and saline marshes and shallow lakes, usually on heavy clay soil. Almost all sites receive some degree of soil waterlogging or seasonal flooding.	No suitable habitat present – **Unlikely to occur.**
Giant Honey-myrtle	*Melaleuca armillaris subsp. armillaris*		EN		Near coastal sandy heaths. Widely planted	Records outside E Gippsland correspond to naturalised plants from landscaping - **Unlikely to occur.**
Rough Daisy-bush	*Olearia asterotricha*		EN	P	Moist forest and swampy heathland in a few disjunct areas of southern Victoria (e.g. Portland area, Grampians, Emerald, Gembrook and Tonimbuk) but generally uncommon (Walsh & Lander 1999).	No suitable habitat present – **Unlikely to occur.**

Common name	Scientific name	Conservation status			Habitat	Likelihood of occurrence
		EPBC	FFG	FFG-Prot		
Famine Flat-pea	*Platylobium infecundum*		CR		Only known from a few locations in ranges east of Melbourne, growing in heathy forest and woodland (VicFlora).	No suitable habitat present – **Unlikely to occur.**
Round-leaf Pomaderris	*Pomaderris vacciniifolia*	CR	CR	P	Occurs in damp forest and herb-rich foothill forest north-east of Melbourne in the upper catchments of the Yarra, Plenty and Yea rivers (DAWE 2020).	No suitable habitat present – **unlikely to occur**
Maroon Leek-orchid	*Prasophyllum frenchii*	EN	EN	P	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 (DAWE 2020).	No recent records and habitat substantially degraded – **unlikely to occur.**
Green Leek-orchid	*Prasophyllum lindleyanum*		EN	P	Woodland or scrubby heath on fertile soils (Bates 1994).	No suitable habitat present – **Unlikely to occur.**
Dense Leek-orchid	*Prasophyllum spicatum*	VU	CR	P	Occurs in coastal and near-coastal heathland and heathy woodland. Soils are generally sandy, with some sites seasonally waterlogged (Duncan 2010).	No suitable habitat present – **Unlikely to occur.**
Green-striped Greenhood	*Pterostylis chlorogramma*	VU	EN	P	Occurs in mixed Box-Stringybark forest with a shrubby understorey, often with Pteridium esculentum as a major component on sandy or clay loam soils (Duncan et al. 2009).	No suitable habitat present – **Unlikely to occur.**
Red-tip Greenhood	*Pterostylis clivosa*		EN	P	Southern Vic in foothill forests (Jones 1994).	No suitable habitat present – **Unlikely to occur.**

Common name	Scientific name	Conservation status			Habitat	Likelihood of occurrence
		EPBC	FFG	FFG-Prot		
Leafy Greenhood	*Pterostylis cucullata*	VU		P	Tea-tree scrubs on tall sandy and calcareous dunes, in moist, open or even deep shaded locations (Jones 1994).	No suitable habitat present – **Unlikely to occur.**
Cobra Greenhood	*Pterostylis grandiflora*		EN	P	Moist shady gullies in tall wet forest (Jones 1994).	No suitable habitat present – **Unlikely to occur.**
Floodplain Fireweed	*Senecio campylocarpus*		EN	P	In Victoria mostly throughout central Victoria and in the north-east in loam to clay soils in forest and woodland, usually in seasonally inundated areas VicFlora).	No suitable habitat present – **Unlikely to occur.**
Swamp Fireweed	*Senecio psilocarpus*	VU		P	Herb-rich winter-wet swamps on volcanic clays or peaty soils (Walsh 1999). Known from approximately 10 sites between Wallan, about 45 km north of Melbourne, and Honans Scrub in south-eastern South Australia (TSSC 2008).	No suitable habitat present – **Unlikely to occur.**
Magenta Cherry	*Syzygium paniculatum*	VU			This species is found in rainforest on sandy soils or stabilised Quaternary sand dunes at low altitudes in coastal areas (Floyd 1989; Hyland 1983; Payne 1991). Rainforests are often remnant stands of littoral or gallery rainforest. (DAWE 2020).	No suitable habitat present – **Unlikely to occur.**
Metallic Sun-orchid	*Thelymitra epipactoides*	EN	EN	P	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 (DAWE 2020).	No suitable habitat present – **unlikely to occur**

Common name	Scientific name	Conservation status			Habitat	Likelihood of occurrence
		EPBC	FFG	FFG-Prot		
Winter Sun-orchid	*Thelymitra hiemalis*		CR	P	Swamps and heaths on sandy soils near coast to low woodlands on skeletal soils inland, mostly in moist and poorly drained areas (Weber & Entwisle 1994). South-west Victoria near Portland and immediately east of Melbourne at Blackburn on Glenelg Plain and Gippsland Plain (DSEWPC 2011)	No suitable habitat present – **unlikely to occur**
Crimson Sun-orchid	*Thelymitra X macmillanii*		VU	P	Heathy woodlands and grasslands (Weber & Entwisle 1994).	No suitable habitat present – **unlikely to occur**
Grampians Thryptomene	*Thryptomene calycina*		EN	P	Confined to the Grampians where occurring in heathlands and heathy woodlands mostly on sandy soils. Naturalised at Black Rock (south-east suburb of Melbourne), VicFlora.	No suitable habitat present – **unlikely to occur**
Floating Bladderwort	*Utricularia gibba*		EN		A common weed of aquaria and botanic gardens throughout the world. Occurs in fresh-water swamps and wetlands at low elevations. At least some collections from Victoria such as the single collection from East Gippsland are consistent with the continuous distribution of this species across northern and eastern Australia, suggesting that these plants may be native in Victoria. However, collections from urban areas around Melbourne are believed to be introduced. (VicFlora)	Suitable habitat occurs in Grassmere Creek Billabong and adjacent flooded areas. Recent record 2.8 kilometres downstream - **Potential to occur.**
Southern Xanthosia	*Xanthosia tasmanica*		EN		Occurring mainly in coastal areas in heath on sand (Duretto 1999).	No suitable habitat present – **unlikely to occur**

Common name	Scientific name	Conservation status			Habitat	Likelihood of occurrence
		EPBC	FFG	FFG-Prot		
Swamp Everlasting	*Xerochrysum palustre*	VU	CR	P	Grows in wetlands including sedge-swamps and shallow freshwater marshes, often on heavy black clay soils. Commonly associated genera include *Amphibromus, Baumea, Carex, Chorizandra, Craspedia, Eleocharis, Isolepis, Lachnagrostis, Lepidosperma, Myriophyllum, Phragmites australis, Themea triandra* and *Villarsia* (DAWE 2020).	No suitable habitat present – **unlikely to occur**

Notes: EPBC = threatened species status under EPBC Act (EX = presumed extinct in the wild; CR = critically endangered; EN = endangered; VU = vulnerable); **FFG** = threatened species status under the FFG Act (EX = presumed extinct in the wild; CR = critically endangered; EN = endangered; VU = vulnerable; P = protected under the FFG Act).

5.1.5. Fauna habitats

The study area supported the four fauna habitat types.

- Grassy Woodland;
- Planted trees;
- Grazing paddocks; and
- Aquatic habitat.

Grassy Woodland: This vegetation type was dominated by Manna Gum and also had Narrow-leaf Peppermint and Messmate. Little to no shrub layer and exotic pasture grasses dominated the understorey. The size of this habitat was small in the study area though it was connected to the other woodland habitats along the creek reserve to the north. There were some old trees though not a lot of hollows were observed. There was some fallen logs and leaf litter, rocks were absent. This habitat type was used for grazing cattle at the time of the survey.

This habitat type was considered to be moderate quality for native fauna.

Planted Trees and Gardens: This habitat type consisted of the majority of the treed area in the study area. Ornamental trees and other ornamental plants have been planted in gardens around the existing dwellings and pine and other trees planted as wind breaks along fencelines and tracks. Many fauna habitat elements have been lost in these areas, including hollows, logs and rocks. This habitat type is connected to other garden habitats in the broader region.

This habitat type is considered to be low quality for native fauna.

Grazing Paddocks: This habitat type was dominated by introduced pasture grasses. The paddock in the south was used for hay making and the other paddocks were used for grazing horses and cattle. Common occurring fauna were observed using these areas.

This habitat type was considered to be low quality for native fauna.

Aquatic Vegetation: There was a large dam on the property in the north that had some aquatic vegetation in it. This provided habitat for water birds and frogs. This habitat type was considered to be moderate habitat quality for native fauna.

In addition to the dam, a riparian corridor adjoins the study area to the east. This habitat was in good condition and had a lot of natural habitat elements remaining. It provided good habitat for waterbirds and frogs. This habitat type is considered to be high quality for native fauna.

5.1.6. Fauna species

The review of existing information indicated that 56 fauna species listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the state *Flora and Fauna Guarantee Act 1988* (FFG Act) have previously been recorded within the search region or for which potential habitat occurs according to the EPBC Act Protected Matters Search Tool. The likelihood of occurrence of these species in the study area was assessed and the results are presented in Table 4.

Species considered 'likely to occur' are those that have a very high chance of being in the study area given the existence of numerous records in the search region and suitable habitat in the study area. Using the precautionary approach, species considered to have the 'potential to occur' are those where suitable habitat exists, but recent records are scarce.

During the field assessments 54 fauna species were recorded. This included 44 bird (six introduced), five mammal (three introduced), two reptile and three frog species (Appendix 6).

Table 4: Listed fauna species and the likelihood of their occurrence in the study area

Common Name	Scientific Name	Conservation Status			Habitat	Number of Records	Date of Last Record	Likelihood of Occurrence
		EPBC-T	EPBC-M	FFG				
Birds								
Australasian Bittern	*Botaurus poiciloptilus*	EN		CR	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 (Marchant & Higgins 1990).	15	28/06/2018	Records in a range of natural and artifical wetlands in the vicinity. May visit Grassmere Creek Billabong in study area - **Potential to occur.**
Australasian Shoveler	*Spatula rhynchotis*			VU	Large and deep permanent bodies of water and aquatic flora abundant. Also occurs on billabongs, watercourses and flood waters on alluvial plains, freshwater meadows, shallow swamps, reed swamps, wooded lakes, sewage farms and farm dams (Marchant & Higgins 1990).	64	19/12/2019	Records in a range of natural and artifical wetlands in the vicinity. May visit Grassmere Creek Billabong in study area - **Potential to occur.**
Australian Little Bittern	*Ixobrychus dubius*			EN	Inhabits terrestrial wetlands, mainly in dense emergent vegetation in freshwater swamps, lakes and watercourses (Marchant & Higgins 1990).	3	26/09/2006	Species scarce in region. Very few records and habitat of moderate suitability - **Unlikely to occur.**
Australian Painted-snipe	*Rostratula australis*	EN		CR	Generally inhabits shallow terrestrial freshwater wetlands, including temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains. Typical sites include those with rank emergent tussocks of grass, sedges, rushes or reeds, or samphire; often with scattered clumps of Lignum muehlenbeckia or canegrass or sometimes tea-tree (Melaleuca). Sometimes utilises areas that are lined with trees, or that have some scattered fallen or washed-up timber (DAWE 2020).	None	N/A	Species scarce in region. Very few records and habitat of moderate suitability - **Unlikely to occur.**
Barking Owl	*Ninox connivens*			CR	Eucalyptus dominated forests and woodlands, commonly near water-bodies, such as streams and rivers, and requires hollow trees for nesting and trees with dense foliage for roosting (Higgins 1999).	5	20/12/2014	No suitable habitat - **unlikely to occur**.
Black-faced Monarch	*Monarcha melanopsis*		M (Bonn A2H)		Rainforests, eucalypt woodlands, coastal scrub and damp gullies (Higgins et al. 2006)	None	N/A	No suitable habitat - **unlikely to occur**.
Blue-billed Duck	*Oxyura australis*			VU	Terrestrial wetlands and prefers deep permanent, well vegetated water bodies. V (Marchant & Higgins 1990).	25	4/10/2018	Several records but no suitable habitat due to billabong too heavily vegetated - **unlikely to occur**.
Fork-tailed Swift	*Apus pacificus*		M (CAMBA, ROKAMBA , JAMBA)		The species can occur in wet sclerophyll forest but mainly prefers open forest or plains. It is almost exclusively aerial and feeds up to hundreds on metres above the ground, but can feed among open forest canopy. The species breeds internationally and seldom roosts in trees (Higgins 1999).	6	14/10/2010	No suitable habitat - **unlikely to occur**.

Common Name	Scientific Name	Conservation Status			Habitat	Number of Records	Date of Last Record	Likelihood of Occurrence
		EPBC-T	EPBC-M	FFG				
Freckled Duck	*Stictonetta naevosa*			EN	Terrestrial wetlands; prefer fresh, densely vegetated waters, particularly floodwater swamps and creeks vegetated with lignum or cane grass. During dry seasons or droughts, move off ephemeral breeding swamps and occupy large permanent waters (Marchant & Higgins 1990).	6	24/11/2019	No suitable habitat - **unlikely to occur**.
Gang-gang Cockatoo	*Callocephalon fimbriatum*	EN			In summer generally in tall mountain forests and woodlands, particularly in heavily timbered, mature wet sclerophyll forests and woodlands. Prefer Eucalyptus dominated assemblages. Also occurs in subalpine snow gum woodlands and occasionally in temperate rainforests and regenerating forests. In winter occur at lower altitudes in drier, more open Eucalyptus woodland (Higgins 1999).	71	20/04/2019	Recent records in parklands and woodlands in immediate vicinity. Habitat present on site - **Likely to occur.**
Glossy Ibis	*Plegadis falcinellus*		M (Bonn A2S)		Prefer freshwater inland wetlands, in particular, permanent or ephemeral water bodies and swamps with abundant vegetation (Marchant & Higgins 1990).	1	15/07/2017	No suitable habitat - **unlikely to occur**.
Grey Falcon	*Falco hypoleucos*	VU		VU	Inhabits arid and semi-arid zones; mainly on sandy and stony plains of inland drainage systems, lightly timbered with acacia. Hunt far into open areas, over spinifex, tussock grasslands and low shrublands. In Victoria, few records mostly in north and northwestern regions (Marchant & Higgins 1993).	None	N/A	No suitable habitat. Species extremely rare outside arid regions - **unlikely to occur**.
Grey Goshawk	*Accipiter novaehollandiae*			EN	Inhabit rainforests, open forests, swamp forests, woodlands and plantations; most abundant where forest or woodland provide cover for hunting from perches. in Vic., most common in Otway ranges (Marchant & Higgins 1993).	5	27/07/2019	Recent records in parklands and woodlands in immediate vicinity. Habitat present on site - **Likely to occur.**
Grey-crowned Babbler	*Pomatostomus temporalis*			VU	Inhabits dry woodlands and forests with a shrub layer and a groundcover of leaf litter and fallen timber. In Victoria it is found in woodlands and forests with box-ironbark eucalypt associations and River Red Gums, including narrow remnants along roadsides and streams. Formerly widespread over much of Victoria, but populations has declined and range has contracted markedly, mostly from the south and west since the 1970s. Gregarious, usually found in family group of 3–6 birds (Higgins & Peter 2002; Tzaros 2005).	3	1/01/1988	No suitable habitat - **unlikely to occur**.
Gull-billed Tern	*Gelochelidon nilotica macrotarsa*			EN	Shallow freshwater and saline wetlands; intertidal mudflats, also in sheltered inshore marine waters where they roost on sandbars and beaches (Higgins & Davies 1996).	1	28/09/2017	No suitable habitat - **unlikely to occur**.
Hardhead	*Aythya australis*			VU	Inhabits large, deep waters where vegetation is abundant; particularly deep swamps and lakes, pools and creeks. Also occur on freshwater meadows, seasonal swamps with abundant aquatic flora, reed swamps, wooded lakes and swamps, rice fields, and sewage ponds (Marchant & Higgins 1990).	102	19/12/2019	Records in a range of natural and artifical wetlands in the vicinity. May visit Grassmere Creek Billabong in study area - **Potential to occur.**

Common Name	Scientific Name	Conservation Status			Habitat	Number of Records	Date of Last Record	Likelihood of Occurrence
		EPBC-T	EPBC-M	FFG				
Helmeted Honeyeater	*Lichenostomus melanops cassidix*	CR		CR	Inhabits narrow patches of tall remnant eucalypt forest and woodlands along streams, or in surrounding swampland dominated by Mountain Swamp Gum with thickets of Scented Paperbark (Higgins et al. 2001). Currently only three populations exist in the wild, situated in riparian forest east of Melbourne (Zoos Victoria 2019).	7	1/01/1983	Suitable habitat present though outside of its natural range - **unlikely to occur**.
Latham's Snipe	*Gallinago hardwickii*		M (Bonn A2H, ROKAMBA, JAMBA, CAMBA)		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. The species is wide spread in southeast Australia and most of its population occurs in Victoria, except in the northwest of the state (Naarding 1983; Higgins & Davies 1996).	132	20/02/2020	Records in a range of natural and artifical wetlands in the vicinity. May visit Grassmere Creek Billabong in study area - **Potential to occur.**
Lewin's Rail	*Lewinia pectoralis*			VU	Occurs in a variety of densely vegetated wetland habitats, fresh or saline, and usually with areas of standing water. Requires shallow water areas for foraging (Marchant & Higgins 1993).	4	27/01/2019	No suitable habitat - **unlikely to occur**.
Little Eagle	*Hieraaetus morphnoides*			VU	Over wooded and forested lands and open country of Aust. Range extending into arid zone. Most abundant in open forest and woodland (Marchant & Higgins 1993).	7	20/06/2021	May occur incidentally while foraging or dispersing. Records in similar habitat in region. **Potential to occur.**
Little Egret	*Egretta garzetta*			EN	It occurs in a range of coastal and terrestrial wetlands, including freshwater wetlands with vegetation such as bulrush and requires trees for roosting and nesting (Marchant & Higgins 1990).	13	12/02/2019	Scarce in region, favours larger, open wetlands - **unlikely to occur**.
Musk Duck	*Biziura lobata*			VU	It inhabits terrestrial wetlands, estuarine habitats and sheltered inland waters. Almost entirely aquatic; preferring deep water of large swamps, lakes and estuaries, where conditions are stable and aquatic flora abundant (Marchant & Higgins 1990).	34	3/10/2021	Abundant records however Grassmere Creek Billabong may be too shallow and small to provide habitat - **Unlikely to occur.**
Osprey	*Pandion cristatus*		M (Bonn A2S)		Rare vagrant to Victoria (Marchant & Higgins 1993). Littoral and coastal habitats and terrestrial wetlands. They are mostly found in coastal areas but occasionally travel inland along major rivers (Johnstone & Storr 1998; Marchant & Higgins 1993; Olsen 1995). They require extensive areas of open fresh, brackish or saline water for foraging (Marchant & Higgins 1993).	None	N/A	No suitable habitat - **unlikely to occur**.
Painted Honeyeater	*Grantiella picta*	VU		VU	Inhabits box-ironbark forests and woodlands and mainly feeds on the fruits of mistletoe. Strongly associated with mistletoe around the margins of open forests and woodlands. Can also be found in farmland containing remnant treed vegetation. Occurs at few localities. Uncommon breeding migrant from further north, arriving in October and leaving in February (Higgins et al. 2001; Tzaros 2005).	None	N/A	No suitable habitat - **unlikely to occur**.
Pilotbird	*Pycnoptilus floccosus*	VU				23	16/07/2010	No suitable habitat - **unlikely to occur**.

Common Name	Scientific Name	Conservation Status			Habitat	Number of Records	Date of Last Record	Likelihood of Occurrence
		EPBC-T	EPBC-M	FFG				
Plumed Egret	*Ardea plumifera*			CR	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 bulrush (Marchant & Higgins 1990).	3	11/01/2019	Scarce in region, favours larger wetlands - **unlikely to occur**.
Powerful Owl	*Ninox strenua*			VU	Found in open and tall wet sclerophyll forests with sheltered gullies and old growth forest with dense understorey. They are also found in dry forests with box and ironbark eucalypts and River Red Gum. Large old trees with hollows are required by this species for nesting. In Victoria, the Powerful Owl is widespread, having been recorded from most of the state. However, throughout its range it is uncommon and occurs in low densities (Higgins 1999). Also occurs in highly urbanised areas, such as metropolitan Melbourne, where they are heavily reliant upon various forms of movement corridors (riparian strips, roadside vegetation and recreational reserves) to both hunt within and navigate throughout the landscape (Carter et al. 2019).	31	18/06/2020	Several recent records in Beaconsfield F&F Reserve. Suitable foraging habitat on site. **Likely to occur.**
Regent Honeyeater	*Anthochaera phrygia*	CR		CR	Inhabits dry box-ironbark eucalypt forests near rivers and creeks on inland slopes of the Great Dividing Range. Can also occur in small remnant patches or in mature trees in farmland or partly cleared agricultural land (Higgins et al. 2001).	None	N/A	No suitable habitat - **unlikely to occur**.
Rufous Fantail	*Rhipidura rufifrons*		M (Bonn A2H)		In east and south-east Australia, mainly inhabits tall wet sclerophyll forests, often in gullies. When on passage in warmer months, they are sometimes recorded in drier sclerophyll forests and woodlands, as well as parks and gardens (Higgins et al. 2006). Virtually absent from south-eastern Australia during winter (Higgins et al. 2006).	56	3/01/2019	Several recent records in Beaconsfield F&F Reserve. Suitable passage habitat. Species may occur during migration in paperbark swamp and riparian shrubby vegetation - **Likely to occur.**
Satin Flycatcher	*Myiagra cyanoleuca*		M (Bonn A2H)		Mostly found in eucalypt forest, particularly tall wet forests and woodland within gullies (Higgins et al. 2006). Also inhabits eucalypt woodland comprising an open understorey and a grassy ground layer (Higgins et al. 2006). Generally absent from rainforest (Higgins et al. 2006).	31	28/12/2020	Suitable passage habitat. Species may occur during migration in taller riparian shrubby vegetation - **Potential to occur.**
Sooty Owl	*Tyto tenebricosa*			EN	Inhabits old growth montane forests and wet or dry tall open sclerophyll forests (Higgins 1999).	2	30/11/2018	No suitable habitat - **unlikely to occur**.

Common Name	Scientific Name	Conservation Status			Habitat	Number of Records	Date of Last Record	Likelihood of Occurrence
		EPBC-T	EPBC-M	FFG				
Superb Parrot	*Polytelis swainsonii*	VU		EN	Occurs in eucalypt dominated forests and woodlands, namely comprised of River Red-gum, Yellow Box and Grey Box, with seasonal occurrences in box-pine and Boree woodland (Baker-Gabb 2011). The species range extends along major riverine systems and the inland slopes of the Great Divide, stretching from central Victoria to north of Tamworth in NSW. Breeds in hollow branch or trunk of tall eucalypts within 9 km of feeding areas. Mostly feeds in box woodlands and wooded farmlands; less often in riparian forests (Higgins 1999).	None	N/A	No suitable habitat - **unlikely to occur**.
Swift Parrot	*Lathamus discolor*	CR		CR	Prefers a select range of eucalypts in Victoria, including Yellow Gum, Grey Box, White Box, Red Ironbark and Yellow Box, as well as River Red-gum when this species supports abundant 'lerp' (Saunders & Tzaros 2011). The species is also known to forage within planted stands of Spotted Gum and Sugar Gum (Nature Advisory; unpublished data). Breeds in Tasmania and migrates to the mainland of Australia for the autumn, winter and early spring months. It lives mostly north of the Great Dividing Range, passing through two areas of Victoria on migration: the Port Phillip district and Gippsland (Emison et al. 1987; Higgins 1999; Kennedy & Tzaros 2005). Though it is also not uncommonly sighted in urban areas (Nature Advisory; unpublished data). Occurrence of this species on the mainland can substantially change from year to year depending on food availability, giving potential for this species to occur almost anywhere throughout its range (Emison et al. 1987).	17	21/03/2022	Species recorded in 2021 and recently in March 2022 in Beaconsfield F&F Reserve. Similar habitat occurs on site around Grassmere Creek Billabong - **Likely to occur.**
White-bellied Sea-Eagle	*Haliaeetus leucogaster*			EN	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. The eagles usually breed on coast and offshore islands and inland beside large lakes or rivers, usually in tall trees in or near water, also in cliffs, rock pinnacles and escarpments (Marchant & Higgins 1993).	9	29/09/2021	Species highly mobile. May fly over the site - **Potential to occur.**
White-throated Needletail	*Hirundapus caudacutus*	VU	M (CAMBA, ROKAMBA, JAMBA)	VU	Aerial, over all habitats, but probably more over wooded areas, including open forest and rainforest. Often over heathland and less often above treeless areas such as grassland and swamps or farmland (Higgins 1999).	29	28/02/2020	May fly over the study area during the summer months - **potential to occur.**
Yellow Wagtail	*Motacilla flava*		M (CAMBA, JAMBA, ROKAMBA)		Regular non-breeding visitor in northern Australia mainly spring-summer, vagrant to the south. Occupies a wide range of habitats, usually open areas with low vegetation such as crop, grassland and even parkland. Often recorded near water (Higgins, Peter & Cowling 1999)	None	N/A	Species vagrant to southern australia - **Unlikely to occur.**

Common Name	Scientific Name	Conservation Status			Habitat	Number of Records	Date of Last Record	Likelihood of Occurrence
		EPBC-T	EPBC-M	FFG				
Mammals								
Broad-toothed Rat	*Mastacomys fuscus mordicus*	VU		VU	Specialist herbivore which occurs in high rainfall areas in eastern highlands, south gippsland highland and Otway ranges. Habitats include alpine herbfield, heath, woodland, sedgeland and coastal tussock grassland (Menkhorst 1995). This species has also been known to inhabit dense, heathy vegetation within disturbed areas such as powerline easements and alpine ski slopes (Clarke & White 2008; Whisson et al. 2015).	1	15/05/1993	No suitable habitat - **unlikely to occur**.
Eastern Quoll	*Dasyurus viverrinus*	EN		EX	Probably extinct in mainland Australia. Inhabits a range of of open forest, scrubland and heath (Menkhorst 1995).	None	N/A	Extinct in the region.
Grey-headed Flying-fox	*Pteropus poliocephalus*	VU		VU	Brisbane, Newcastle, Sydney and Melbourne are occupied continuously. Elsewhere, during spring, they are uncommon south of Nowra and widespread in other areas of their range. Roosts in aggregations of various sizes on exposed branches. Roost sites are typically located near water, such as lakes, rivers or the coast. Roost vegetation includes rainforest patches, stands of Melaleuca, mangroves and riparian vegetation, but colonies also use highly modified vegetation in urban and suburban areas (DAWE 2020).	3	18/02/2017	Suitable habitat in the study area - **potential to occur.**
Long-nosed Potoroo	*Potorous tridactylus trisulcatus*	VU		VU	In Victoria, the species occupies a wide variety of wet forest and wet scrub, usually occuring on sandy loam soils where rainfall exceeds 750mm annually (Menkhorst 1995); In Tasmania, moist forest with dense shrub layer; in the north edge of rainforest (Menkhorst 1995). Dense understorey vegetation is an essential component for the species persistence, which can consist of grass trees, sedges, ferns, heath, tea-tree or melaleucas (Menkhorst 1995).	None	N/A	No suitable habitat - **unlikely to occur**.
Platypus	*Ornithorhynchus anatinus*			VU	Inhabits freshwater streams, ranging from alpine creeks to tropical lowland rivers; also lakes, shallow reservoirs and farm dams (Menkhorst and knight 2001).	26	19/03/2013	No suitable habitat - **unlikely to occur**.
Smoky Mouse	*Pseudomys fumeus*	EN		EN	Smoky Mouse occurs in a wide variety of habitats, from heath to dry sclerophyll forest, especially along ridgetops with a heath understorey, and occasionally adjacent wetter habitats such as fern gullies (Menkhorst 1995). A characteristic of many localities, except those in wet gullies, is a floristically diverse shrub layer with members of the plant families Epacridaceae, Fabaceae and Mimosaceae well represented (DAWE 2020). Shrub seeds and berries are important food sources for the species, with fire frequency and intensity highly influential in the occurrence of such habitat, and ultimately the species (Menkhorst 1995).	None	N/A	No suitable habitat - **unlikely to occur**.

Common Name	Scientific Name	Conservation Status			Habitat	Number of Records	Date of Last Record	Likelihood of Occurrence
		EPBC-T	EPBC-M	FFG				
Southern Brown Bandicoot	*Isoodon obesulus obesulus*	EN		EN	Suitable habitat for Southern Brown Bandicoots (eastern) is defined to be any patches of native or exotic vegetation, within their distribution, which contains understorey vegetation structure with 50–80% average foliage density in the 0.2–1 m height range. In areas where native habitats have been degraded or diminished, exotic vegetation, such as Blackberry (Rubus spp.), can and often does, provide important habitat (DAWE 2020).	3	25/05/2010	Lack of recent nearby records. **Unlikely to occur.**
Southern Greater Glider	*Petauroides volans*	VU		VU	In Victoria, this species inhabits forest habitats dominated by peppermint, stringybark, ash and gum eucalypts (Menkhorst 1995). Restricted to the central highlands and eastern Victoria, and common in areas of high rainfall. Rare in dry stringybark-box and Snow Gum forest, and does not occur in the box-ironbark or River Red-gum dominated riverina regions (Menkhorst 1995).	5	30/11/2018	Lack of recent nearby records. **Unlikely to occur.**
Spot-tailed Quoll	*Dasyurus maculatus maculatus*	EN		EN	Rainforest, wet and dry forest, coastal heath and scrub and River Red-gum woodlands along inland rivers (Menkhorst 1995).	1	19/06/2003	No suitable habitat - **unlikely to occur**.
Swamp Antechinus	*Antechinus minimus maritimus*	VU		VU	Dense wet heath, tussock grassland, sedgeland heathy woodland and coastal heath and scrub (Menkhorst 1995). Requires mature, dense vegetation with thick ground cover (DAWE 2020). Shelters in short burrows or underneath dense leaf litter. Rarely occurs more than 200m above sea level. Though this species has also previously been detected at sites which had experienced some structural disturbance in the South Gippsland region (Nature Advisory; unpublished data).	None	N/A	No suitable habitat - **unlikely to occur**.
Reptiles								
Swamp Skink	Lissolepis coventryi			EN	Wetlands including swamp margins, lakes, rivers, creeks and even tidal salt marshes, often associated with tea-tree thickets (Wilson & Swan 2003).	1	2/02/1999	Suitable habitat on adjoining land to the north however due to lack of records close by to the site considered **unlikely to occur**.
Frogs								
Growling Grass Frog	Litoria raniformis	VU		VU	Permanent, still or slow flowing water with fringing and emergent vegetation in streams, swamps, lagoons and artificial wetlands such as farm dams and abandoned quarries (Clemann & Gillespie 2004).	73	15/12/2016	No records nearby and no connectivity to previous records - **unlikely to occur.**
Southern Toadlet	Pseudophryne semimarmorata			EN	Damp areas in forests and woodlands (Cogger 2000). In Victoria, the Southern Toadlet is mainly found on and south of the Great Dividing Range although there are records as far north as the Little Desert (SWIFFT 2020).	63	24/06/2014	No records nearby and no connectivity to previous records - **unlikely to occur.**

Common Name	Scientific Name	Conservation Status			Habitat	Number of Records	Date of Last Record	Likelihood of Occurrence
		EPBC-T	EPBC-M	FFG				
Fish								
Australian Grayling	*Prototroctes maraena*	VU		EN	Large and small coastal streams and rivers with cool, clear waters with a gravel substrate and altering pools and riffles (Cadwallader & Backhouse 1983).	4	5/12/1985	No suitable habitat - **unlikely to occur**.
Dwarf Galaxias	*Galaxiella pusilla*	VU		EN	Ranges from the far west of the state through to the Mitchell River basin in central Gippsland. Vegetated margins of still water, ditches, swamps and backwaters of creeks, both ephemeral and permanent (Allen et al. 2002). Some wetlands where it occurs may partially or completely dry up during summer, with such wetlands reliant on seasonal flooding plus linkages to other sites where the species occurs, for habitat and population replenishment (Saddlier, Jackson & Hammer 2010). Dwarf Galaxias is also often found in association with burrowing freshwater crayfish (*Engaeus spp.*), with the crayfish burrows reportedly providing refuge from predators and dry conditions for the species (Saddlier, Jackson & Hammer 2010).	138	18/04/2018	Potential habitat for this species in the riparian habitat adjacent to the study area. Records within Grassmere Creek in study area. **Likely to occur.**
Macquarie Perch	*Macquaria australasica*	EN		EN	Cool, clear water of rivers and lakes. Favours slower moving water (Allen et al. 2002).	None	N/A	No suitable habitat - **unlikely to occur**.
Murray Cod	*Maccullochella peelii*	VU		EN	Slow flowing turbid water of rivers and streams of low elevation; also fast flowing clear upland streams (Allen et al. 2002).	None	N/A	No suitable habitat - **unlikely to occur**.
Yarra Pygmy Perch	*Nannoperca obscura*	VU		VU	Streams and small lakes, prefers flowing water with abundant aquatic vegetation (Allen et al. 2002).	None	N/A	No suitable habitat - **unlikely to occur**.
Invertebrates								
Golden Sun Moth	*Synemon plana*	VU		VU	Areas that are, or have been native grasslands or grassy woodlands. It is known to inhabit degraded grasslands with introduced grasses being dominant, with a preference for the native wallaby grass being present (DEWHA 2009). Also known to be closely associated with exotic grass species, with populations found in grassland almost entirely composed of Chilean needlegrass (Richter et al. 2013).	None	N/A	No suitable habitat - **unlikely to occur**.

Notes: EPBC-T = threatened species status under EPBC Act (EX = presumed extinct in the wild; CR = critically endangered; EN = endangered; VU = vulnerable); **EPBC-M**: migratory status under the EPBC Act (M = listed migratory taxa; Bonn Convention (A2H) - Convention on the Conservation of Migratory Species of Wild Animals – listed as a member of a family; Bonn Convention (A2S) - Convention on the Conservation of Migratory Species of Wild Animals - species listed explicitly; CAMBA - China-Australia Migratory Birds Agreement; JAMBA - Japan-Australia Migratory Birds Agreement; ROKAMBA - Republic of Korea Australia Migratory Birds Agreement); **FFG** = threatened species status under the FFG Act (EX = presumed extinct in the wild; CR = critically endangered; EN = endangered; VU = vulnerable).

5.1.7. Susceptibility of listed fauna to impacts

The following analysis identifies the susceptibility to development of listed fauna species which may utilise the study area. This analysis includes consideration of the factors below.

- The mobility of the species
- The availability and extent of other suitable habitat in the region and the degree to which each species may rely on habitat in the study area

Targeted surveys will be required to determine the presence or absence of any listed fauna species considered to be susceptible to impacts from development.

Birds (non-migratory)

Nine listed non-migratory bird species are considered to have the potential to occur in the study area. The susceptibility of these species to possible impacts from any development in the study area is discussed below.

- **Australasian Bittern** (EPBC Act: Endangered; FFG Act: Critically Endangered)

  This species is unlikely to be impacted as the aquatic habitat is going to be retained.
- **Australasian Shoveler** (FFG Act: Vulnerable)

  This species is unlikely to be impacted as the aquatic habitat is going to be retained.
- **Gang-gang Cockatoo** (EPBC Act: Endangered)

  The woodland habitat is being retained and therefore is unlikely the species will be impacted.
- **Grey Goshawk** (FFG Act: Endangered)

  The woodland habitat is being retained and therefore is unlikely the species will be impacted.
- **Hardhead** (FFG Act: Vulnerable)

  This species is unlikely to be impacted as the aquatic habitat is going to be retained.
- **Little Eagle** (FFG Act: Vulnerable)

  The woodland habitat is being retained and therefore is unlikely the species will be impacted.
- **Powerful Owl** (FFG Act: Vulnerable)

  The woodland habitat is being retained and therefore is unlikely the species will be impacted.
- **Swift Parrot** (EPBC Act: Critically Endangered; FFG Act: Critically Endangered)

  The woodland habitat is being retained and therefore is unlikely the species will be impacted.
- **White-bellied Sea-Eagle** (FFG Act: Endangered)

  The species may occur, but it does not rely on the habitat in the study area and will most likely fly over. It is unlikely the species will be impacted from habitat removal.

Migratory Birds

Four listed migratory bird species (excluding oceanic species and shorebirds) have the potential to occur in the study area. The susceptibility of these species to possible impacts from any development in the study area is discussed below.

- **Latham's Snipe** (EPBC Act: M (Bonn A2H, ROKAMBA, JAMBA, CAMBA))
- **Rufous Fantail** (EPBC Act: M (Bonn A2H))
- **Satin Flycatcher** (EPBC Act (Bonn A2H))

- **White-throated Needletail** (EPBC Act: Vulnerable, M (CAMBA, ROKAMBA, JAMBA) ; FFG Act: Vulnerable)

  This species has the potential to fly over the study area during the summer moths foraging for insects. The proposed development is unlikely to cause a significant impact to this species.

Mammals

One listed mammal species are considered to have the potential to occur in the study area. The susceptibility of these species to possible impacts from any development in the study area is discussed below.

- **Grey-headed Flying-fox** (EPBC Act: Vulnerable; FFG Act: Vulnerable)

  This species roosts at Yarra Bend in Fairfield and travels up to 50 kilometres each night foraging for food. The flying-fox feeds on fruit and nectar from flowering trees. There is potential for the flying-fox to forage in fruit trees and flowering eucalypts in the study area. The proposed development may remove some potential foraging trees however there are many suitable trees for foraging in the surrounding region that the impacts form this are considered to be negligible.

Reptiles

No listed reptile species are considered to have the potential to occur in the study area. The proposed development is unlikely to cause a significant impact to any threatened reptile species.

Frogs

No listed frog species are considered to have the potential to occur in the study area. The proposed development is unlikely to cause a significant impact to any threatened frog species.

Fish

One listed fish species are considered to have the potential to occur in the study area. The susceptibility of these species to possible impacts from any development in the study area is discussed below.

- **Dwarf Galaxias** (EPBC Act: Vulnerable; FFG Act: Endangered)

  The Dwarf Galaxias has the potential to occur in the riparian habitat adjacent to the study area. Potential impacts to this species may arise from water quality alterations caused by excess run-off from the proposed development. Management strategies are to be implemented to reduce water quality impacts to the riparian habitat.

Invertebrates

No listed invertebrate species are considered to have the potential to occur in the study area. The proposed development is unlikely to cause a significant impact to any threatened invertebrate species.

5.1.8. Listed ecological communities

The following ecological communities listed under the EPBC Act was considered to potentially occur in the study area:

- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically endangered – EPBC Act).

This listed ecological community was not found to occur in the study area, based on the absence of the dominant overstorey species White Box, Yellow Box or Blakely's Red Gum.

6. Assessment of impacts

6.1. Proposed development

The proposed development will involve rezoning of the study area to allow for subdivision and residential development.

6.2. Design response to mitigate impacts on flora and fauna

The project was designed to meet the strategies outlined in the Guidelines through the adoption of the following specific design measures:

- Design considerations have been applied to mitigate any potential impacts to the riparian habitat along Grasmere Creek adjacent to the study area. Management considerations are required, such as storm water treatment before the water enters the creek system.

Further recommendations to mitigate impacts on flora and fauna are presented in Section6.3.6.

6.3. Residual impacts of proposed development

Residual impacts for the proposed development are detailed below.

6.3.1. Native vegetation

The current proposal footprint will result in the loss of a total extent of 0.346 hectares of native vegetation as represented in Figure 1 and documented in the DELWP removal report (Appendix 9).

This is comprised of:

- 0.074 ha of patch native vegetation;
- 6 scattered trees equating to 0.270 ha of native vegetation; and
- 6 large trees within patches of native vegetation.

It is understood that no native vegetation has been approved for removal on the property within the last five years.

6.3.2. Modelled species important habitat

The current proposal footprint will have no impact on modelled habitat above the specific offset threshold.

6.3.3. Listed flora species

The analysis of the likelihood of occurrence of listed flora species presented in Section 5.1.4. identified that no flora species could be impacted by any development in the study area.

6.3.4. Listed fauna species

Based on the relevant guidelines, the proposed development is unlikely to result in a significant impact on EPBC Act listed values presented below if mitigation measures are implanted to minimise impacts to water quality in the Grasmere Creek.

- Dwarf Galaxias

A Referral under the EPBC Act will be required for the above-listed value if its habitat is not protected by including management actions and mitigation measures in the design process. A wetland system aimed at treating storm water runoff before entering Grasmere Creek is recommended to maintain water quality.

6.3.5. Threatened ecological communities

The proposed development footprint will not result in the loss of any threatened ecological communities.

6.3.6. Further mitigation recommendations

The following recommendations for mitigation in the *design phase* would address the 'avoid and minimise' strategies outlined in the Guidelines.

Where feasible, development should be sited at least thirty metres away from creeks and significant drainage lines. The proposed development should be designed in a way that does not alter the site's hydrology in areas that support native vegetation or act as tributaries to rivers, creeks and significant drainage lines.

A wetland system that is designed to treat storm water runoff before entering the Grasmere Creek needs to be considered to reduce water quality impacts that could have flow on effects to the Dwarf Galaxias.

A significant impact is defined as one of the following actions (significant impact guidelines of the Department of the Environment, 2013):

- lead to a long-term decrease in the size of an important population of a species
- reduce the area of occupancy of an important population
- fragment an existing important population into two or more populations
- adversely affect habitat critical to the survival of a species
- disrupt the breeding cycle of an important population
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
- result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
- introduce disease that may cause the species to decline, or
- interfere substantially with the recovery of the species.

Key threats to the Dwarf Galaxias include (after Saddlier *et al.* 2010):

- Degradation and loss of habitat
    - Drainage of wetlands
    - Fragmentation by piped sections of drains/creeks in urban areas reducing potential for dispersal
    - Removal of streamside vegetation which results in shading of water from vegetation, increasing water temperature particularly in summer
    - Degradation of streamside vegetation
        - Stock access, construction activity or quarrying leading to sedimentation, erosion and direct loss of vegetation
        - Weed proliferation
        - Reduced organic input required by prey species;
- Alteration to flow regimes:
    - Water extraction
    - Dams
    - Nearby Eucalypt and Pine plantations may result in lower water tables
    - Increased pollution from agriculture, pesticide/herbicide ingress, etc.
- Climate change
    - Expected greater frequency of drought and reduced frequency of flooding;
- Introduced invasive species
    - Predation from introduced fish such as Redfin Perch *Perca fluviatilis*, and possibly Brown Trout *Salmo trutta* and Rainbow Trout *Onchorhynchus mykiss*;
    - Competition from introduced fish (e.g. Mosquitofish);
- Pollution of streams
    - herbicides, pesticides, excessive nutrients, etc.;
- Illegal collection of Dwarf Galaxias from the wild by aquarists.

7. Implications under legislation and policy

7.1. Summary of planning implications

The study area is subject to four overlays in the Casey Planning Scheme which are relevant to this assessment; Significant Landscape Overlay – Schedule 4 (SLO4), Vegetation Protection Overlay - Schedule 2 (VPO2), Land Subject to Inundation Overlay (LSIO) and Bushfire Management Overlay (BMO).

Under SLO4 a permit is required to remove, destroy or lop any tree if the trunk circumference is greater than 0.5m at one metre above ground level. A permit is not required for buildings or works which are not within 5 metres of the drip line of any tree with a trunk circumference that is greater than 0.5m at one metre above ground level.

VPO2 covering the eastern part of the study area requires a permit to remove, destroy or lop any native vegetation.

Under BMO a permit is required to subdivide land and for any construction works.

The native vegetation in the study area which has been planted is exempt from requiring a permit under the exemptions table to Clause 52.17. Under the exemptions table, no permit is required to remove native vegetation if it has been planted for aesthetic or amenity purposes, such as shelterbelts and gardens. This exemption includes the Southern Mahogany, Southern Blue-gum and Sugar Gum trees, which have been planted in shelterbelts across paddocks, and within garden areas. This does not include trees identified as remnant indigenous vegetation which have been retained as part of these plantings. Some planted trees are protected by a heritage overlay.

The current proposal would trigger a referral to DELWP as it meets the criteria specified in Section 3.2.3.

A planning permit under Clause 52.17 of the Casey Planning Scheme would be required for the removal of any native vegetation from within the study area.

7.2. Implications under the Guidelines

7.2.1. Assessment pathway

The assessment pathway is determined by the location category and the extent of native vegetation proposed for removal is detailed as follows:

- Location Category: Location 2
- Extent of native vegetation removal: A total of 0.346 ha of native vegetation. This comprised of:
    - 0.074 ha of patch native vegetation;
    - 6 scattered trees equating to 0.270 ha of native vegetation; and
    - 6 large trees within remnant patches of native vegetation.

Based on the details above *the Guidelines* stipulate that the proposal is to be assessed under the Detailed assessment pathway (See detail in Appendix 9).

Note, that subject to the lot size in the future design of the subdivision up to 18 of these large trees could be retained.

The current proposal would trigger a referral to DELWP as it meets the criteria specified in Section 3.2.3.

7.2.2. Offset requirements

Offsets required to compensate for the proposed removal of native vegetation from the study area are provided below.

- 0.072 *general habitat units* and must include the following offset attribute requirements:
    - Minimum strategic biodiversity value (SBV) of 0.387
    - Occur within the Port Phillip and Westernport CMA boundary or the Casey municipal district.

- Include protection of at least 6 large trees.

Under *the Guidelines* all offsets must be secured prior to the removal of native vegetation.

7.2.3. Offset statement

The offset target for the current proposal will be achieved a third party offset acquired through an offset site broker (see Appendix 10).

7.3. EPBC Act

The EPBC Act protects a number of threatened species and ecological communities that are considered to be of national conservation significance. Any significant impacts on these species require 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).

Based on the relevant guidelines, the proposed development is unlikely to result in a significant impact on any EPBC Act listed values if impacts on the adjacent creekline are avoided.

Therefore, there are no implications under the EPBC Act.

7.4. FFG Act

The Victorian FFG Act lists threatened and protected species and ecological communities The Victorian FFG Act lists threatened and protected species and ecological communities. Any removal of threatened flora species or communities (or protected flora) listed under the FFG Act from public land requires a Protected Flora Permit under the Act, obtained from DELWP.

The FFG Act only applies to private land in relation to the commercial collection of grasstrees, tree-ferns and sphagnum moss.

The land addressed in this assessment is private land; therefore, a Protected Flora Licence or Permit under the FFG Act would not be required for the current proposal.

7.5. EE Act

The "Ministerial Guidelines for Assessment of Environmental Effects under the *Environment Effects Act 1978"* (DSE 2006), identifies criteria which trigger a Referral to the State Minister for Planning. The criteria related to flora, fauna and native vegetation are outlined below.

<u>One or more</u> of the following would trigger a Referral:

- Potential clearing of 10 ha or more of native vegetation from an area that:
  - Is of an Ecological Vegetation Class identified as endangered by the Department of Sustainability and Environment (in accordance with Appendix 2 of Victoria's Native Vegetation Management Framework); or
  - Is, or is likely to be, of very high conservation significance (as defined in accordance with Appendix 3 of Victoria's Native Vegetation Management Framework); and
  - Is not authorised under an approved Forest Management Plan or Fire Protection Plan
- Potential long-term loss of a significant proportion (e.g. 1 to 5 percent depending on the conservation status of the species) of known remaining habitat or population of a threatened species within Victoria
- Potential long-term change to the ecological character of a wetland listed under the Ramsar Convention or in 'A Directory of Important Wetlands in Australia'
- Potential extensive or major effects on the health or biodiversity of aquatic, estuarine or marine ecosystems, over the long term

Two or more of the following would also trigger a Referral:

- Potential clearing of 10 ha or more of native vegetation, unless authorised under an approved Forest Management Plan or Fire Protection Plan
- Matters listed under the Flora and Fauna Guarantee Act 1988:
    - Potential loss of a significant area of a listed ecological community; or
    - Potential loss of a genetically important population of an endangered or threatened species (listed or nominated for listing), including as a result of loss or fragmentation of habitats; or
    - Potential loss of critical habitat; or
    - Potential significant effects on habitat values of a wetland supporting migratory bird species.

Based on these criteria, a Referral to the state Minister for Planning will not be required under the EE Act for the aspects covered by the current investigation.

7.6. CaLP Act

The *Catchment and Land Protection Act 1994* (CaLP Act) requires that land owners (or a third party to whom responsibilities have been legally transferred) must prevent the growth and spread of regionally controlled weeds.

In accordance with the *Catchment and Land Protection Act 1994*, the noxious weed species listed below, which were recorded in the study area, must be controlled.

- African Box-thorn
- Blackberry
- Hawthorn
- Ragwort
- Spear Thistle

Precision control methods that minimise off-target kills (e.g. spot spraying) should be used in environmentally sensitive areas (e.g. within or near native vegetation, waterways, etc.).

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Appendix 1: Details of the assessment process in accordance with the Guidelines for the removal, destruction or lopping of native vegetation (DELWP 2017a)

Purpose and objective

Policies and strategies relating to the protection and management of native vegetation in Victoria are defined in the State Planning Policy Framework (SPPF). The objective identified in Clause 12.01 of all Victorian Planning Schemes is 'To ensure that there is no net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation'.

This is to be achieved through the following three-step approach, as detailed in the Guidelines:

1. Avoid the removal, destruction or lopping of native vegetation.
2. Minimise impacts from the removal, destruction or lopping of native vegetation that cannot be avoided.
3. Provide an offset to compensate for the biodiversity impact from the removal, destruction or lopping of native vegetation.

Note: While a planning permit may still be required, if native vegetation does not meet the definition of either a patch or a scattered tree, an offset under the Guidelines is not required.

Assessment pathways

The first step in determining the type of assessment required for any site in Victoria is to determine the assessment pathway for the proposed native vegetation removal. The three possible assessment pathways for applications to remove native vegetation in Victoria are:

- Basic;
- Intermediate; or
- Detailed.

This assessment pathway is determined by two factors:

- **Location Category**, as determined using the states' Location Map. The location category indicates the potential risk to biodiversity from removing a small amount of native vegetation. The three location categories are defined as:

  Location 1 – shown in light blue-green on the Location Map; occurring over most of Victoria.

  Location 2 – shown in dark blue-green on the Location Map; includes areas mapped as endangered EVCs and/or sensitive wetlands and coastal areas.

  Location 3 – shown in brown on the Location Map; includes areas where the removal of less than 0.5 hectares of native vegetation could have a significant impact on habitat for rare and threatened species.

- **Extent of native vegetation** – The extent of any patches and scattered trees proposed to be removed (as well as the extent of any past native vegetation removal), with consideration as to whether the proposed removal includes any large trees. Extent of native vegetation is determined as follows:

  Patch – the area of the patch in hectares.

  Scattered Tree – the extent of a scattered tree is dependent on whether the scattered tree is small or large. A tree is considered to be a large tree if it is greater or equal to the large tree benchmark diameter at breast height (DBH) for the relevant bioregional EVC. Any scattered tree that is not a large tree is a small scattered tree. The extent of large and small scattered trees is determined as follows:

  - **Large scattered tree** – the area of a circle with a 15-metre radius, with the trunk of the tree at the centre.

- **Small scattered tree** – the area of a circle with a ten-metre radius, with the trunk of the tree at the centre.

The assessment pathway for assessing an application to remove native vegetation is then determined as detailed in the following matrix table:

Extent of native vegetation	Location Category		
	Location 1	Location 2	Location 3
< 0.5 hectares and not including any large trees	Basic	Intermediate	Detailed
< 0.5 hectares and including one or more large trees	Intermediate	Intermediate	Detailed
≥ 0.5 hectares	Detailed	Detailed	Detailed

Note: If the native vegetation to be removed includes more than one location category, the higher location category is used to determine the assessment pathway.

Landscape scale information – strategic biodiversity value

The strategic biodiversity value (SBV) is a measure of a location's importance to Victoria's biodiversity, relative to other locations across the state. It is represented as a score between 0 and 1 and determined from the Strategic biodiversity value map, available from *NVIM* (DELWP 2020c).

Landscape scale information – habitat for rare or threatened species

Habitat importance for rare or threatened species is a measure of the importance of a location in the landscape as habitat for a particular rare or threatened species, in relation to other habitat available for that species. It is represented as a score between 0 and 1 and is determined from the Habitat importance maps, administered by DELWP.

This includes two groups of habitat:

- **Highly localised habitats** – Limited in area and considered to be equally important, therefore having the same habitat importance score.
- **Dispersed habitats** – Less limited in are and based on habitat distribution models.

Habitat for rare or threatened species is used to determine the type of offset required in the detailed assessment pathway.

Biodiversity value

A combination of site-based and landscape scale information is used to calculate the biodiversity value of native vegetation to be removed. Biodiversity value is represented by a general or species habitat score, detailed as follows.

Firstly, the extent and condition of native vegetation to be removed are combined to determine the habitat hectares as follows:

Habitat hectares = extent of native vegetation x condition score

Secondly, the habitat hectare score is combined with a landscape factor to obtain an overall measure of biodiversity value. Two landscape factors exist as follows:

- **General landscape factor** – determined using an adjusted strategic biodiversity score, and relevant when no habitat importance scores are applicable;
- **Species landscape factor** – determined using an adjusted habitat importance score for each rare or threatened species habitat mapped at a site in the Habitat importance map.

These factors are then used as follows to determine the biodiversity value of a site:

General habitat score = habitat hectares x general landscape factor

Species habitat score = habitat hectares x species landscape factor

Offset requirements

A native vegetation offset is required for the approved removal of native vegetation. Offsets conform to one of two types and each type incorporates a multiplier to address the risk of offset:

- A **general offset** is required when the removal of native vegetation does not have a significant impact on any habitat for rare or threatened species (i.e. the proportional impact is below the species offset threshold). In this case a multiplier of 1.5 applies to determine the general offset amount.

General offset (amount of general habitat units) = general habitat score x 1.5

- A **species offset** is required when the removal of native vegetation has a significant impact on habitat for a rare or threatened species (i.e. the proportional impact is above the species offset threshold). In this case a multiplier of 2 applies to determine the species offset amount.

Species offset (amount of species habitat units) = Species habitat score x 2

Note: if native vegetation does not meet the definition of either a patch or scattered tree an offset is not required.

Offset attributes

Offsets must meet the following attribute requirements, as relevant:

- General offsets

  Offset amount – general offset = general habitat score x 1.5

  Strategic biodiversity value (SBV) – the offset has at least 80% of the SBV of the native vegetation removed

  Vicinity – the offset is in the same CMA boundary or municipal district as the native vegetation removed

  Habitat for rare and threatened species – N/A

  Large trees – the offset include the protection of at least one large tree for every large tree to be removed

- Species offsets

  Offset amount – species offset = species habitat score x 2

  Strategic biodiversity value (SBV): N/A

  Vicinity: N/A

  Habitat for rare and threatened species – the offset comprises mapped habitat according to the Habitat importance map for the relevant species

  Large trees – the offset include the protection of at least one large tree for every large tree to be removed

Appendix 2: Detailed habitat hectare assessment results

Habitat Zone			A	B	C	D	E	F	G	H
Bioregion			GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP
EVC Number			83	83	83	83	83	53_61	83	83
Total area of Habitat Zone (ha)			0.413	0.131	0.115	0.282	0.148	0.152	1.421	0.410
Site Condition	Large Old Trees	/10	0	0	4	3	0	0	7	9
	Tree Canopy Cover	/5	4	4	4	4	0	0	4	4
	Lack of Weeds	/15	0	0	0	2	4	7	4	4
	Understorey	/25	5	0	5	15	5	5	15	15
	Recruitment	/10	0	0	1	1	5	5	5	3
	Organic Matter	/5	4	3	4	4	3	0	5	5
	Logs	/5	0	0	4	2	0	0	2	2
	Site Condition subtotal		*13*	*7*	*22*	*31*	*17*	*21*	*42*	*42*
Landscape Context	Patch Size	/10	1	1	1	1	8	1	8	8
	Neighbourhood	/10	0	0	0	0	1	1	1	1
	Distance to Core	/5	1	1	1	1	3	3	3	3
Total Habitat Score		**/100**	**15**	**9**	**24**	**33**	**29**	**26**	**54**	**54**

* Modified approach to habitat scoring - refer to Table 14 of DEPI's Vegetation Quality Assessment Manual (DSE, 2004); # Habitat hectares = habitat score/100 X area [ha])

Appendix 3: Scattered trees in study area

Tree no.	Common Name	Scientific Name	DBH (cm)	Radius of TPZ (m)	Remove/ Retain	Notes
1	Narrow-leaf Peppermint	*Eucalyptus radiata subsp. radiata*	156	15.00	Removed	
2	Narrow-leaf Peppermint	*Eucalyptus radiata subsp. radiata*	25	3.00	Removed	
3	Narrow-leaf Peppermint	*Eucalyptus radiata subsp. radiata*	60	7.20	Removed	
4	Manna Gum	*Eucalyptus viminalis subsp. viminalis*	103	12.36	Removed	
5	Narrow-leaf Peppermint	*Eucalyptus radiata subsp. radiata*	30	3.60	Removed	
6	Messmate Stringybark	*Eucalyptus obliqua*	76	9.12	Removed	Near-dead

Notes: DBH = Diameter at breast height (130 cm from the ground); **TPZ =** Tree Protection Zone.

Appendix 4: Large trees within patches

Tree No.	Common name	Scientific Name	DBH (cm)	Radius of TPZ (m)	Remove/Retain	Notes	Habitat Zone
1	Manna Gum	*Eucalyptus viminalis*	110	13.2	retain		C
2	Manna Gum	*Eucalyptus viminalis*	125	15.0	retain		C
3	Manna Gum	*Eucalyptus viminalis*	90	10.8	retain		C
4	Manna Gum	*Eucalyptus viminalis*	84	10.1	retain		C
5	Manna Gum	*Eucalyptus viminalis*	84	10.1	retain	Dead	C
6	Manna Gum	*Eucalyptus viminalis*	90	10.8	retain	DBH estimated	C
7	Manna Gum	*Eucalyptus viminalis*	102	12.2	retain		C
8	Manna Gum	*Eucalyptus viminalis*	105	12.6	retain		C
9	Manna Gum	*Eucalyptus viminalis*	120	14.4	retain	DBH estimated	C
10	Manna Gum	*Eucalyptus viminalis*	120	14.4	retain	DBH estimated	D
11	Manna Gum	*Eucalyptus viminalis*	200	15.0	retain	DBH estimated	D
12	Manna Gum	*Eucalyptus viminalis*	120	14.4	retain	DBH estimated	D
13	Manna Gum	*Eucalyptus viminalis*	71	8.5	retain		D
14	Manna Gum	*Eucalyptus viminalis*	93	11.2	retain		D
15	Manna Gum	*Eucalyptus viminalis*	89	10.7	retain		D
16	Manna Gum	*Eucalyptus viminalis*	90	10.8	retain	DBH estimated	D
17	Manna Gum	*Eucalyptus viminalis*	100	12.0	retain		D
18	Manna Gum	*Eucalyptus viminalis*	77	9.2	retain		D
19	Manna Gum	*Eucalyptus viminalis*	108	13.0	retain		A
20	Manna Gum	*Eucalyptus viminalis*	121	14.5	retain		A
21	Manna Gum	*Eucalyptus viminalis*	75	9.0	retain		A
22	Manna Gum	*Eucalyptus viminalis*	118	14.2	retain		A
23	Manna Gum	*Eucalyptus viminalis*	102	12.2	retain		A
24	Manna Gum	*Eucalyptus viminalis*	81	9.7	retain		A
25	Manna Gum	*Eucalyptus viminalis*	83	10.0	retain		A
26	Manna Gum	*Eucalyptus viminalis*	105	12.6	retain		H
27	Manna Gum	*Eucalyptus viminalis*	75	9.0	retain		A
28	Manna Gum	*Eucalyptus viminalis*	120	14.4	retain	DBH estimated	A
29	Manna Gum	*Eucalyptus viminalis*	115	13.8	retain		A
30	Manna Gum	*Eucalyptus viminalis*	87	10.4	retain		A
31	Manna Gum	*Eucalyptus viminalis*	115	13.8	remove		A
32	Manna Gum	*Eucalyptus viminalis*	92	11.0	remove		A
33	Manna Gum	*Eucalyptus viminalis*	74	8.9	remove		A
34	Manna Gum	*Eucalyptus viminalis*	82	9.8	retain		H
35	Manna Gum	*Eucalyptus viminalis*	100	12.0	retain		H
36	Manna Gum	*Eucalyptus viminalis*	71	8.5	retain		H
37	Manna Gum	*Eucalyptus viminalis*	113	13.6	retain		H
38	Manna Gum	*Eucalyptus viminalis*	128	15.0	retain	Dead	H
39	Manna Gum	*Eucalyptus viminalis*	136	15.0	retain		H

Tree No.	Common name	Scientific Name	DBH (cm)	Radius of TPZ (m)	Remove/Retain	Notes	Habitat Zone
40	Manna Gum	*Eucalyptus viminalis*	84	10.1	retain		H
41	Manna Gum	*Eucalyptus viminalis*	93	11.2	retain		H
42	Manna Gum	*Eucalyptus viminalis*	85	10.2	retain	DBH estimated, dead	H
43	Narrow-leaved Peppermint	*Eucalyptus radiata*	75	9.0	retain		G
44	Manna Gum	*Eucalyptus viminalis*	76	9.1	retain		G
45	Manna Gum	*Eucalyptus viminalis*	90	10.8	retain		G
46	Manna Gum	*Eucalyptus viminalis*	122	14.6	retain		G
47	Manna Gum	*Eucalyptus viminalis*	128	15.0	retain		G
48	Manna Gum	*Eucalyptus viminalis*	100	12.0	retain		G
49	Manna Gum	*Eucalyptus viminalis*	106	12.7	retain		G
50	Manna Gum	*Eucalyptus viminalis*	85	10.2	retain		G
51	Manna Gum	*Eucalyptus viminalis*	93	11.2	retain		G
52	Manna Gum	*Eucalyptus viminalis*	124	14.9	retain	DBH estimated	G
53	Manna Gum	*Eucalyptus viminalis*	135	15.0	retain		G
54	Manna Gum	*Eucalyptus viminalis*	74	8.9	retain		G
55	Manna Gum	*Eucalyptus viminalis*	90	10.8	retain	DBH estimated	G
56	Manna Gum	*Eucalyptus viminalis*	90	10.8	retain	DBH estimated	G
57	Manna Gum	*Eucalyptus viminalis*	132	15.0	retain		G
58	Manna Gum	*Eucalyptus viminalis*	72	8.6	retain		G
59	Manna Gum	*Eucalyptus viminalis*	120	14.4	retain	DBH estimated	G
60	Manna Gum	*Eucalyptus viminalis*	88	10.6	retain		B
61	Manna Gum	*Eucalyptus viminalis*	77	9.2	retain		B
62	Manna Gum	*Eucalyptus viminalis*	77	9.2	retain		B
63	Manna Gum	*Eucalyptus viminalis*	84	10.1	retain		B

Appendix 5: Flora species recorded in the study area

Origin	Common name	Scientific name	Conservation status			Recorded
			EPBC	FFG	FFG Protected	
*	African Box-thorn	*Lycium ferocissimum*				X
*	Agapanthus	*Agapanthus praecox subsp. orientalis*				X
*	Annual Meadow-grass	*Poa annua*				X
	Austral Bracken	*Pteridium esculentum*				X
	Black Wattle	*Acacia mearnsii*			P	X
*	Blackberry	*Rubus fruticosus spp. agg.*				X
*	Bridal Creeper	*Asparagus asparagoides*				X
	Brome	*Bromus spp.*				X
*	Brown-top Bent	*Agrostis capillaris*				X
*	Buck's-horn Plantain	*Plantago coronopus*				X
*	Cape weed	*Arctotheca calendula*				X
	Cherry Ballart	*Exocarpos cupressiformis*				X
*	Cocksfoot	*Dactylis glomerata*				X
	Common Bog-sedge	*Schoenus apogon*				X
*	Common Mouse-ear Chickweed	*Cerastium glomeratum s.l.*				X
*	Common Sow-thistle	*Sonchus oleraceus*				X
*	Common Violet	*Viola odorata*				X
*	Couch	*Cynodon dactylon var. dactylon*				X
*	Creeping Buttercup	*Ranunculus repens*				X
*	Dock (naturalised)	*Rumex spp. (naturalised)*				X
*	Dove's Foot	*Geranium molle*				X
*	Drain Flat-sedge	*Cyperus eragrostis*				X
*	Elm	*Ulmus spp.*				X
*	English Ivy	*Hedera helix*				X
*	English Oak	*Quercus robur*				X
*	Fat Hen	*Chenopodium album*				X
*	Flatweed	*Hypochaeris radicata*				X
*	Garden Dandelion	*Taraxacum officinale spp. agg.*				X
*	Gazania	*Gazania spp.*				X
	Groundsel	*Senecio spp.*			P	X
*	Hawthorn	*Crataegus monogyna*				X
*	Indian Strawberry	*Potentilla indica*				X
	Kangaroo Apple	*Solanum aviculare*				X
	Kangaroo Grass	*Themeda triandra*				X

Origin	Common name	Scientific name	Conservation status			Recorded
			EPBC	FFG	FFG Protected	
	Kidney-weed	*Dichondra repens*				X
*	Kikuyu	*Cenchrus clandestinus*				X
*	Lesser Quaking-grass	*Briza minor*				X
*	Madeira Winter-cherry	*Solanum pseudocapsicum*				X
	Manna Gum	*Eucalyptus viminalis subsp. viminalis*				X
	Messmate Stringybark	*Eucalyptus obliqua*				X
*	Mirror Bush	*Coprosma repens*				X
*	Montpellier Broom	*Genista monspessulana*				X
	Narrow-leaf Peppermint	*Eucalyptus radiata subsp. radiata*				X
*	Oat	*Avena sativa*				X
*	Oat	*Avena spp.*				X
*	Onion Grass	*Romulea rosea*				X
*	Pale Wood-sorrel	*Oxalis incarnata*				X
*	Panic Veldt-grass	*Ehrharta erecta var. erecta*				X
*	Petty Spurge	*Euphorbia peplus*				X
*	Pimpernel	*Lysimachia arvensis*				X
	Prickly Currant-bush	*Coprosma quadrifida*				X
*	Radiata Pine	*Pinus radiata var. radiata*				X
*	Ragwort	*Jacobaea vulgaris*				X
	Rush	*Juncus spp.*				X
*	Rye Grass	*Lolium spp.*				X
*	Self-heal	*Prunella vulgaris*				X
*	Sharp Buttercup	*Ranunculus muricatus*				X
	Shining Pennywort	*Hydrocotyle sibthorpioides*				X
	Silver Wattle	*Acacia dealbata*				X
*	Slender Thistle	*Carduus pycnocephalus*				X
*	Small Nettle	*Urtica urens*				X
*	Soursob	*Oxalis pes-caprae*				X
#	Southern Blue-gum	*Eucalyptus globulus*				X
#	Southern Mahogany	*Eucalyptus botryoides*				X
	Spear Grass	*Austrostipa spp.*				X
*	Spear Thistle	*Cirsium vulgare*				X
	Spotted Gum	*Corymbia maculata*		VU		X
*	Squirrel-tail Fescue	*Vulpia bromoides*				X
*	Sugar Gum	*Eucalyptus cladocalyx*				X

Origin	Common name	Scientific name	Conservation status			Recorded
			EPBC	FFG	FFG Protected	
	Sweet Bursaria	*Bursaria spinosa subsp. spinosa*				X
#	Sweet Pittosporum	*Pittosporum undulatum*				X
*	Sweet Vernal-grass	*Anthoxanthum odoratum*				X
*	Toowoomba Canary-grass	*Phalaris aquatica*				X
*	Variegated Thistle	*Silybum marianum*				X
	Veined Spear-grass	*Austrostipa rudis*				X
	Wallaby Grass	*Rytidosperma spp.*				X
*	Wandering Jew	*Tradescantia fluminensis*				X
	Weeping Grass	*Microlaena stipoides var. stipoides*				X
*	Weeping Willow	*Salix X sepulcralis var. sepulcralis*				X
*	White Arum-lily	*Zantedeschia aethiopica*				X
*	White Clover	*Trifolium repens var. repens*				X
*	Wood Sorrel	*Oxalis spp. (naturalised)*				X
	Yellow Rush-lily	*Tricoryne elatior*				X

* introduced species; # native species occurring outside of natural range

Notes: EPBC = threatened species status under EPBC Act (EX = presumed extinct in the wild; CR = critically endangered; EN = endangered; VU = vulnerable); **FFG** = threatened species status under the FFG Act (EX = presumed extinct in the wild; CR = critically endangered; EN = endangered; VU = vulnerable; P = protected under the FFG Act).

Appendix 6: Vertebrate terrestrial fauna species that occurred in the study area

Common name	Scientific name	Conservation status		Recorded
		EPBC	FFG	
Birds				
Australasian Grebe	*Tachybaptus novaehollandiae*			X
Australian Magpie	*Gymnorhina tibicen*			X
Bell Miner	*Manorina melanophrys*			X
Brown Falcon	*Falco berigora*			X
Brown Thornbill	*Acanthiza pusilla*			X
Chestnut Teal	*Anas castanea*			X
Common Blackbird	*Turdus merula*			X
Common Myna	*Acridotheres tristis*			X
Common Starling	*Sturnus vulgaris*			X
Crested Pigeon	*Ocyphaps lophotes*			X
Crimson Rosella	*Platycercus elegans*			X
Eastern Rosella	*Platycercus eximius*			X
Eastern Whipbird	*Psophodes olivaceus*			X
Eurasian Coot	*Fulica atra*			X
European Goldfinch	*Carduelis carduelis*			X
Galah	*Eolophus roseicapilla*			X
Grey Butcherbird	*Cracticus torquatus*			X
Grey Fantail	*Rhipidura albiscarpa*			X
Grey Shrike-thrush	*Colluricincla harmonica*			X
Grey Teal	*Anas gracilis*			X
Laughing Kookaburra	*Dacelo novaeguineae*			X
Little Raven	*Corvus mellori*			X
Magpie-lark	*Grallina cyanoleuca*			X
Noisy Miner	*Manorina melanocephala*			X
Pacific Black Duck	*Anas superciliosa*			X
Peregrine Falcon	*Falco peregrinus*			X
Pied Currawong	*Strepera graculina*			X
Rainbow Lorikeet	*Trichoglossus haematodus*			X
Red Wattlebird	*Anthochaera carunculata*			X
Rock Dove	*Columba livia*			X
Rufous Whistler	*Pachycephala rufiventris*			X
Sacred Kingfisher	*Todiramphus sanctus*			X
Silvereye	*Zosterops lateralis*			X
Spotted Pardalote	*Pardalotus punctatus*			X
Spotted Turtle-Dove	*Streptopelia chinensis*			X
Striated Pardalote	*Pardalotus striatus*			X

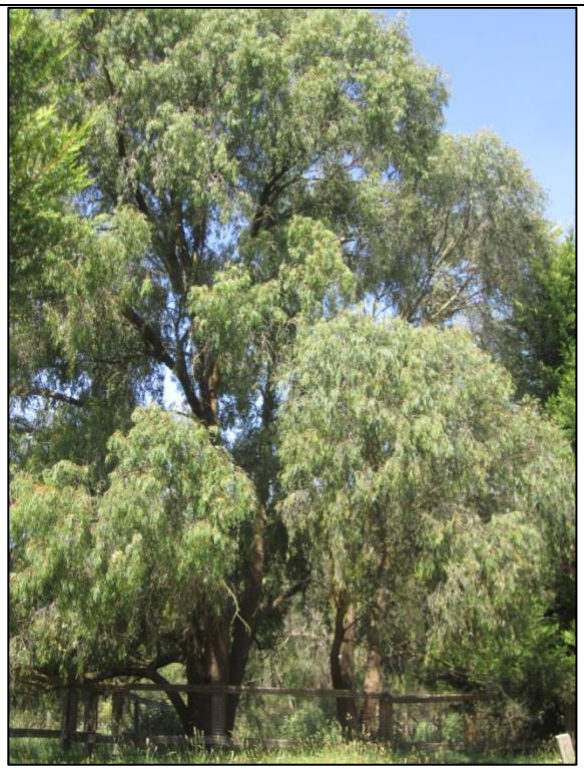
Common name	Scientific name	Conservation status		Recorded
		EPBC	FFG	
Sulphur-crested Cockatoo	*Cacatua galerita*			X
Tawny Frogmouth	*Podargus strigoides*			X
Welcome Swallow	*Hirundo neoxena*			X
White-browed Scrubwren	*Sericornis frontalis*			X
White-throated Treecreeper	*Cormobates leucophaeus*			X
Willie Wagtail	*Rhipidura leucophrys*			X
Yellow-faced Honeyeater	*Lichenostomus chrysops*			X
Yellow-tailed Black-Cockatoo	*Calyptorhynchus funereus*			X
Mammals				
Bush Rat	*Rattus fuscipes*			X
Common Wombat	*Vombatus ursinus*			X
European Hare	*Lepus europeaus*			X
European Rabbit	*Oryctolagus cuniculus*			X
Red Fox	*Vulpes vulpes*			X
Reptiles				
Blotched Blue-tongued Lizard	*Tiliqua nigrolutea*			X
Garden Skink	*Lampropholis guichenoti*			X
Frogs				
Common Froglet	*Crinia signifera*			X
Southern Brown Tree Frog	*Litoria ewingii*			X
Striped Marsh Frog	*Limnodynastes peronii*			X
Fish				
Invertebrates				

Notes: EPBC-T = threatened species status under EPBC Act (EX = presumed extinct in the wild; CR = critically endangered; EN = endangered; VU = vulnerable); **EPBC-M**: migratory status under the EPBC Act (M = listed migratory taxa; Bonn Convention (A2H) - Convention on the Conservation of Migratory Species of Wild Animals – listed as a member of a family; Bonn Convention (A2S) - Convention on the Conservation of Migratory Species of Wild Animals - species listed explicitly; CAMBA - China- Australia Migratory Birds Agreement; JAMBA - Japan-Australia Migratory Birds Agreement; ROKAMBA - Republic of Korea Australia Migratory Birds Agreement); **FFG** = threatened species status under the FFG Act (EX = presumed extinct in the wild; CR = critically endangered; EN = endangered; VU = vulnerable).

Appendix 7: Photographs of native vegetation proposed for removal

Native Vegetation - December 2 2014

Native Vegetation - December 2 2014



Native Vegetation - December 2 2014

Native Vegetation - December 2 2014

Native Vegetation - December 2 2014

Appendix 8: EVC benchmarks

Swampy Riparian Woodland (EVC 83) – Gippsland Plain bioregion

Department of Sustainability and Environment

EVC/Bioregion Benchmark for Vegetation Quality Assessment

Gippsland Plain bioregion

EVC 83: Swampy Riparian Woodland

Description:
Woodland to 15 m tall generally occupying low energy streams of the foothills and plains. The lower strata are variously locally dominated by a range of large and medium shrub species on the stream levees in combination with large tussock grasses and sedges in the ground layer.

Large trees:

Species	DBH(cm)	#/ha
Eucalyptus spp.	70 cm	15 / ha

Tree Canopy Cover:

%cover	Character Species	Common Name
20%	*Eucalyptus ovata*	Swamp Gum
	Eucalyptus radiata s.l.	Narrow-leaf Peppermint

Understorey:

Life form	#Spp	%Cover	LF code
Immature Canopy Tree		5%	IT
Understorey Tree or Large Shrub	4	30%	T
Medium Shrub	5	20%	MS
Small Shrub	1	1%	SS
Prostrate Shrub	1	1%	PS
Large Herb	3	5%	LH
Medium Herb	7	10%	MH
Small or Prostrate Herb	3	5%	SH
Large Tufted Graminoid	3	15%	LTG
Large Non-tufted Graminoid	1	5%	LNG
Medium to Small Tufted Graminoid	5	10%	MTG
Medium to Tiny Non-tufted Graminoid	2	10%	MNG
Ground Fern	2	10%	GF
Scrambler or Climber	2	5%	SC
Bryophytes/Lichens	na	10%	BL

LF Code	Species typical of at least part of EVC range	Common Name
T	*Acacia melanoxylon*	Blackwood
T	*Melaleuca ericifolia*	Swamp Paperbark
T	*Leptospermum lanigerum*	Woolly Tea-tree
MS	*Leptospermum continentale*	Prickly Tea-tree
MS	*Coprosma quadrifida*	Prickly Currant-bush
MS	*Bursaria spinosa*	Sweet Bursaria
LH	*Senecio minimus*	Shrubby Fireweed
MH	*Gonocarpus tetragynus*	Common Raspwort
MH	*Acaena novae-zelandiae*	Bidgee-widgee
MH	*Hydrocotyle hirta*	Hairy Pennywort
SH	*Dichondra repens*	Kidney-weed
LTG	*Carex appressa*	Tall Sedge
LTG	*Cyperus lucidus*	Leafy Flat-sedge
LTG	*Lepidosperma elatius*	Tall Sword-sedge
LTG	*Juncus procerus*	Tall Rush
LNG	*Phragmites australis*	Common Reed
MTG	*Themeda triandra*	Kangaroo Grass
MTG	*Lomandra filiformis*	Wattle Mat-rush
MNG	*Microlaena stipoides* var. *stipoides*	Weeping Grass
GF	*Pteridium esculentum*	Austral Bracken

Recruitment:
Continuous

Organic Litter:
20 % cover

Logs:
20 m/0.1 ha.

Weediness:

LF Code	Typical Weed Species	Common Name	Invasive	Impact
LH	*Cirsium vulgare*	Spear Thistle	high	high
LH	*Sonchus oleraceus*	Common Sow-thistle	high	low
MH	*Hypochoeris radicata*	Cat's Ear	high	low
MH	*Prunella vulgaris*	Self-heal	high	high
LNG	*Holcus lanatus*	Yorkshire Fog	high	high
MTG	*Anthoxanthum odoratum*	Sweet Vernal-grass	high	high
MTG	*Briza maxima*	Large Quaking-grass	high	low

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Appendix 9: Native Vegetation Removal (NVR) report

Native vegetation removal report

This report provides information to support an application to remove, destroy or lop native vegetation in accordance with the *Guidelines for the removal, destruction or lopping of native vegetation*. The report **is not an assessment by DELWP** of the proposed native vegetation removal. Native vegetation information and offset requirements have been determined using spatial data provided by the applicant or their consultant.

Date of issue: **19/03/2022**
Time of issue: **5:51 am**

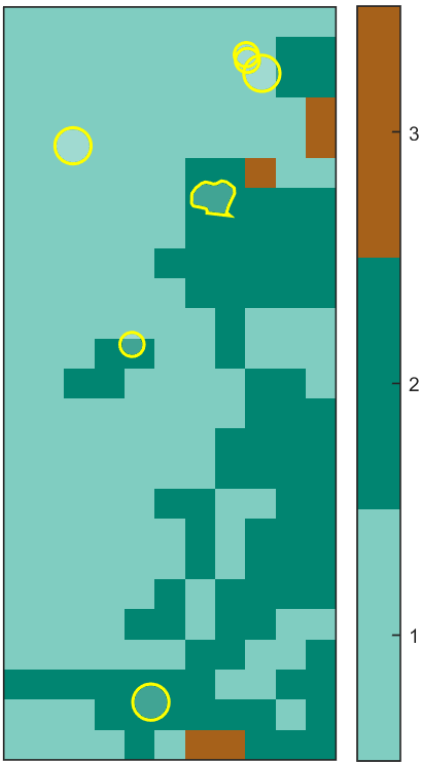
Report ID: NAA_2022_041

Project ID	G2017_11179_ManukaRd_220307

Assessment pathway

Assessment pathway	**Intermediate Assessment Pathway**
Extent including past and proposed	0.346 ha
Extent of past removal	0.000 ha
Extent of proposed removal	0.346 ha
No. Large trees proposed to be removed	6
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). 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



Offset requirements if a permit is granted

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

General offset amount[1]	0.072 general habitat units
Vicinity	Port Phillip and Westernport Catchment Management Authority (CMA) or Casey City Council
Minimum strategic biodiversity value score[2]	0.387
Large trees	6 large 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 general offset amount required is the sum of all general habitat units in Appendix 1.

2 Minimum strategic biodiversity score is 80 per cent of the weighted average score across habitat zones where a general offset is required

Next steps

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

If you wish to remove the mapped native vegetation you are required to apply for a permit from your local council. Council will refer your application to DELWP for assessment, as required. **This report is not a referral assessment by DELWP.**

This *Native vegetation removal report* must be submitted with your application for a permit to remove, destroy or lop native vegetation.

Refer to the *Guidelines for the removal, destruction or lopping of native* vegetation (the Guidelines) for a full list of application requirements This report provides information that meets the following application requirements:

- The assessment pathway and reason for the assessment pathway
- A description of the native vegetation to be removed (met unless you wish to include a site assessment)
- Maps showing the native vegetation and property
- The offset requirements determined in accordance with section 5 of the Guidelines that apply if approval is granted to remove native vegetation.

Additional application requirements must be met including:

- Topographical and land information
- Recent dated photographs
- Details of past native vegetation removal
- An avoid and minimise statement
- A copy of any Property Vegetation Plan that applies
- A defendable space statement as applicable
- A statement about the Native Vegetation Precinct Plan as applicable
- An offset statement that explains that an offset has been identified and how it will be secured.

Authorised by the Victorian Government, 8 Nicholson Street, East Melbourne.

For more information contact the DELWP Customer Service Centre 136 186

www.delwp.vic.gov.au

Appendix 1: Description of native vegetation to be removed

All zones require a general offset, the general habitat units each 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

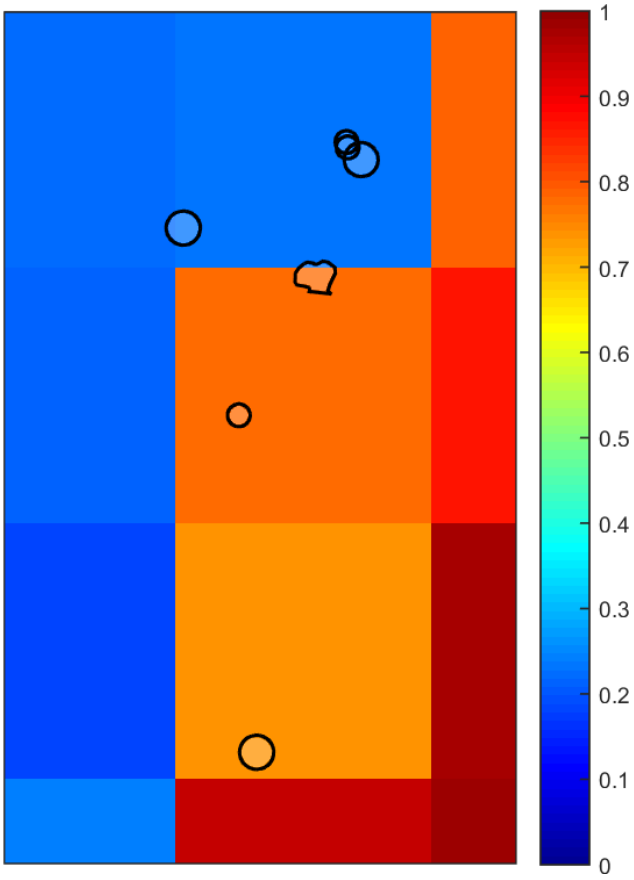
Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
1-1	Scattered Tree	gipp0083	Endangered	1	no	0.200	0.070	0.070	0.230		0.013	General
1-6	Scattered Tree	gipp0083	Endangered	1	no	0.200	0.070	0.070	0.740		0.018	General
1-A	Patch	gipp0083	Endangered	3	no	0.150	0.074	0.074	0.697		0.014	General
1-3	Scattered Tree	gipp0083	Endangered	0	no	0.200	0.031	0.009	0.230		0.002	General
1-2	Scattered Tree	gipp0083	Endangered	0	no	0.200	0.031	0.020	0.230		0.004	General
1-5	Scattered Tree	gipp0083	Endangered	0	no	0.200	0.031	0.031	0.780		0.008	General
1-4	Scattered Tree	gipp0083	Endangered	1	no	0.200	0.070	0.070	0.228		0.013	General

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

This is not applicable in the Intermediate Assessment Pathway.

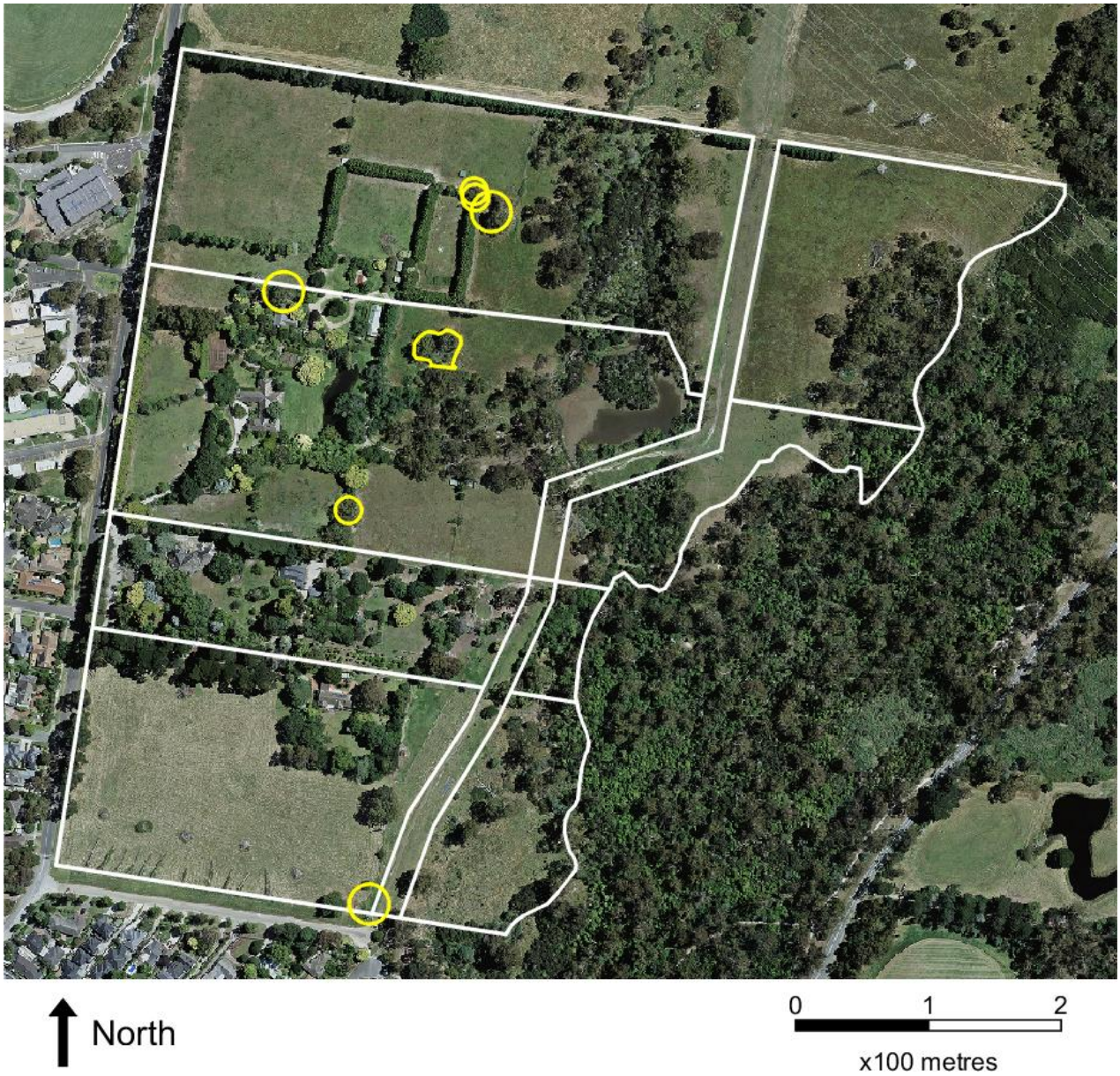
Appendix 3 – Images of mapped native vegetation

2. Strategic biodiversity values map



3. Aerial photograph showing mapped native vegetation

4. Map of the property in context



Yellow boundaries denote areas of proposed native vegetation removal.

Appendix 10: Availability of Offsets – GHU Search result

Report of available native vegetation credits

This report lists native vegetation credits available to purchase through the Native Vegetation Credit Register.

This report is **not evidence** that an offset has been secured. An offset is only secured when the units have been purchased and allocated to a permit or other approval and an allocated credit extract is provided by the Native Vegetation Credit Register.

Date and time: 11/04/2022 07:32 **Report ID: 13522**

What was searched for?

General offset

General habitat units	Strategic biodiversity value	Large trees	Vicinity (Catchment Management Authority or Municipal district)	
0.072	0.387	6	CMA	Port Phillip and Westernport
			or LGA	Casey City

Details of available native vegetation credits on 11 April 2022 07:32

These sites meet your requirements for general offsets.

Credit Site ID	GHU	LT	CMA	LGA	Land owner	Trader	Fixed price	Broker(s)
BBA-0277	7.222	462	Port Phillip and Westernport	Mornington Peninsula Shire	No	Yes	No	Abezco, Ethos, VegLink
BBA-0670	18.011	150	Port Phillip and Westernport	Cardinia Shire	No	Yes	No	Abezco, VegLink
BBA-0677	17.824	1527	Port Phillip and Westernport	Whittlesea City	No	Yes	No	Abezco, VegLink
BBA-0678	47.287	2629	Port Phillip and Westernport	Nillumbik Shire	No	Yes	No	VegLink
BBA-0678_2	0.388	59	Port Phillip and Westernport	Nillumbik Shire	No	Yes	No	VegLink
BBA-2789	1.317	14	Port Phillip and Westernport	Baw Baw Shire	Yes	Yes	No	Contact NVOR
BBA-2790	2.911	116	Port Phillip and Westernport	Baw Baw Shire	Yes	Yes	No	Contact NVOR
BBA-2870	2.544	431	Port Phillip and Westernport	Yarra Ranges Shire	Yes	Yes	No	VegLink
BBA-2871	16.335	1668	Port Phillip and Westernport	Yarra Ranges Shire	Yes	Yes	No	VegLink
TFN-C1636	1.416	130	Port Phillip and Westernport	Yarra Ranges Shire	Yes	Yes	Yes	Yarra Ranges SC
TFN-C1650	0.182	20	Port Phillip and Westernport	Yarra Ranges Shire	Yes	Yes	Yes	Yarra Ranges SC
TFN-C1663	0.109	27	Port Phillip and Westernport	Yarra Ranges Shire	Yes	Yes	Yes	Yarra Ranges SC
TFN-C1664	2.998	85	Port Phillip and Westernport	Yarra Ranges Shire	Yes	Yes	No	Yarra Ranges SC

TFN-C1750	0.321	8	Port Phillip and Westernport	Cardinia Shire	Yes	Yes	No	Bio Offsets
TFN-C1962	0.110	10	Goulburn Broken, Port Phillip and Westernport	Macedon Ranges Shire	No	Yes	No	Contact NVOR
VC_CFL-0838_01	0.213	712	Port Phillip And Westernport	Yarra Ranges Shire	Yes	Yes	No	VegLink
VC_CFL-3084_01	0.711	452	Port Phillip And Westernport	Cardinia Shire	Yes	Yes	No	VegLink
VC_CFL-3705_01	0.142	7	Port Phillip And Westernport	Melton City	Yes	Yes	No	VegLink
VC_CFL-3708_01	0.211	534	Port Phillip And Westernport	Yarra Ranges Shire	Yes	Yes	No	VegLink
VC_CFL-3709_01	0.139	395	Port Phillip And Westernport	Yarra Ranges Shire	Yes	Yes	No	VegLink
VC_CFL-3762_01	4.812	148	Port Phillip And Westernport	Moorabool Shire	Yes	Yes	No	VegLink

These sites meet your requirements using alternative arrangements for general offsets.

Credit Site ID	GHU	LT	CMA	LGA	Land owner	Trader	Fixed price	Broker(s)

There are no sites listed in the Native Vegetation Credit Register that meet your offset requirements when applying the alternative arrangements as listed in section 11.2 of the Guidelines for the removal, destruction or lopping of native vegetation.

These potential sites are not yet available, land owners may finalise them once a buyer is confirmed.

Credit Site ID	GHU	LT	CMA	LGA	Land owner	Trader	Fixed price	Broker(s)
VC_CFL-3710_01	7.606	322	Port Phillip And Westernport	Yarra Ranges Shire	Yes	Yes	No	VegLink
VC_CFL-3740_01	1.756	96	Port Phillip And Westernport	Cardinia Shire, Yarra Ranges Shire	Yes	Yes	No	Contact NVOR
VC_CFL-3740_01	0.425	25	Port Phillip And Westernport	Yarra Ranges Shire	Yes	Yes	No	Contact NVOR
VC_CFL-3744_01	3.717	384	Port Phillip And Westernport	Macedon Ranges Shire	Yes	Yes	No	VegLink
VC_CFL-3746_01	4.962	563	Port Phillip And Westernport	Macedon Ranges Shire	Yes	Yes	No	VegLink

LT - Large Trees *CMA - Catchment Management Authority* *LGA - Municipal District or Local Government Authority*

Next steps

If applying for approval to remove native vegetation
Attach this report to an application to remove native vegetation as evidence that your offset requirement is currently available.

If you have approval to remove native vegetation
Below are the contact details for all brokers. Contact the broker(s) listed for the credit site(s) that meet your offset requirements. These are shown in the above tables. If more than one broker or site is listed, you should get more than one quote before deciding which offset to secure.

Broker contact details

Broker Abbreviation	Broker Name	Phone	Email	Website
Abezco	Abzeco Pty. Ltd.	(03) 9431 5444	offsets@abzeco.com.au	www.abzeco.com.au
Baw Baw SC	Baw Baw Shire Council	(03) 5624 2411	bawbaw@bawbawshire.vic.gov.au	www.bawbawshire.vic.gov.au
Bio Offsets	Biodiversity Offsets Victoria	0452 161 013	info@offsetsvictoria.com.au	www.offsetsvictoria.com.au
Contact NVOR	Native Vegetation Offset Register	136 186	nativevegetation.offsetregister@delwp.vic.gov.au	www.environment.vic.gov.au/native-vegetation
Ecocentric	Ecocentric Environmental Consulting	0410 564 139	ecocentric@me.com	Not avaliable
Ethos	Ethos NRM Pty Ltd	(03) 5153 0037	offsets@ethosnrm.com.au	www.ethosnrm.com.au
Nillumbik SC	Nillumbik Shire Council	(03) 9433 3316	offsets@nillumbik.vic.gov.au	www.nillumbik.vic.gov.au
TFN	Trust for Nature	8631 5888	offsets@tfn.org.au	www.trustfornature.org.au
VegLink	Vegetation Link Pty Ltd	(03) 8578 4250 or 1300 834 546	offsets@vegetationlink.com.au	www.vegetationlink.com.au
Yarra Ranges SC	Yarra Ranges Shire Council	1300 368 333	biodiversityoffsets@yarraranges.vic.gov.au	www.yarraranges.vic.gov.au

For more information contact the DELWP Customer Service Centre 136 186 or the Native Vegetation Credit Register at nativevegetation.offsetregister@delwp.vic.gov.au