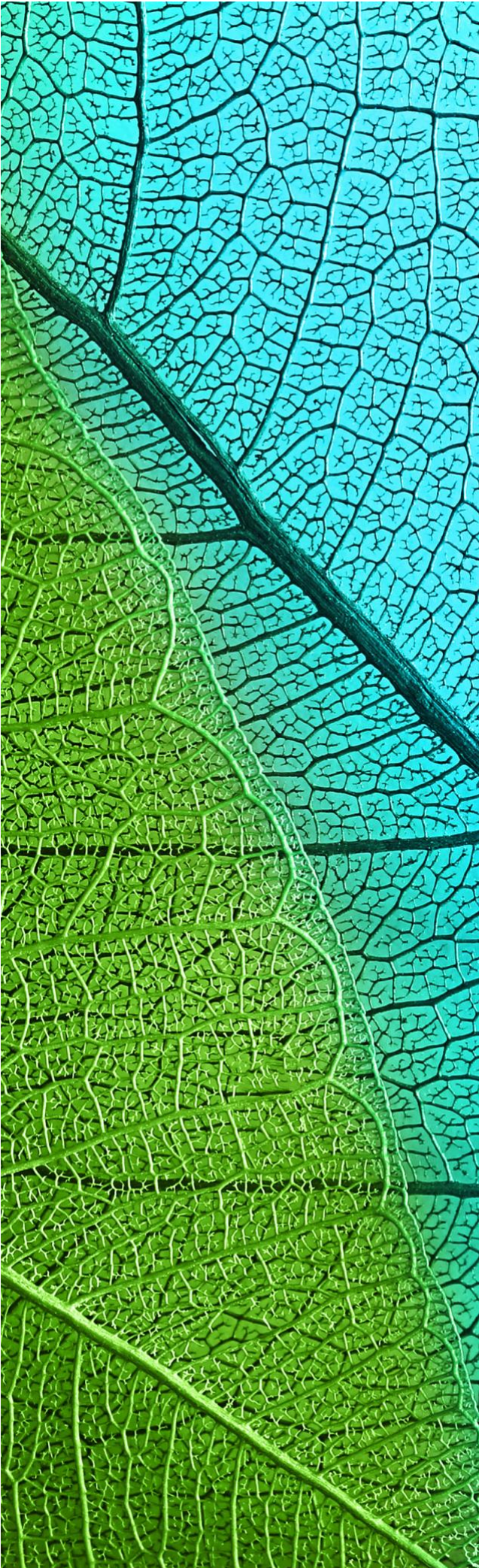




Wonthaggi North East Precinct Structure Plan

Flora and Fauna Assessment

Bass Coast Shire Council

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Report No. 16188 (1.6)



**Nature
Advisory**

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1. Executive Summary

Nature Advisory undertook a flora and fauna assessment of a 675-hectare area of land in Wonthaggi, namely the area defined as the Wonthaggi North East Precinct Structure Plan (PSP). The site predominantly comprised large agricultural lots which supported introduced pasture, and/or were being used for the production of hay or cattle grazing. Native vegetation recorded throughout the PSP area predominantly comprised Swamp Scrub (EVC 53) though also consisted of vegetation from the following Ecological Vegetation Classes (EVCs):

- Damp Sands Herb-rich Woodland (EVC 3);
- Lowland Forest (EVC 16);
- Grassy Woodland (EVC 175);
- Tall Marsh (EVC 821); and
- Swampy Woodland (EVC 937).

Swamp Scrub was common throughout the site, primarily along roadsides, and was distinguishable by a dense canopy and mid layer of Swamp Paperbark. Woodland vegetation was present in both the northern and southern sections of the site, primarily in linear remnants, and was distinguished by a canopy of Swamp Gum (in areas of Grassy Woodland, which was mostly recorded in the north) and Coast Manna-gum (in areas of Damp Sands Herb-rich Woodland, in the south). Patches of Swampy Woodland, Lowland Forest and Tall Marsh were recorded either side of Bass Highway, near the intersection of Carneys Road. A total of 61 remnant patches of native vegetation comprising the above listed EVCs were recorded in the PSP area. A total of 14 large trees were recorded within patches. In addition, 122 scattered indigenous canopy trees occurred throughout the site, of which 24 were large and 98 small scattered trees.

Fauna habitat included agricultural, treed and aquatic habitats. Roadside vegetation provided the main habitat corridors throughout the site, connecting with other adjoining treed habitats. Aquatic habitats were largely limited to farm dams, however, one large wetland existed amidst the scrub north west of the intersection of Bass Hwy and Carneys Road. This wetland comprised a large area of water and was heavily vegetated in part with Narrow-leaf Cumbungi.

No listed threatened ecological communities occur within the study area. No listed threatened flora species were recorded and none are considered likely to occur due to a lack of suitable habitat.

One listed migratory bird species, Latham's Snipe, was recorded from a vegetated dam south of Bass Highway in the southern section of the study area. Additional listed fauna species that have the potential to occur in the study area include:

- Eastern Great Egret (FFG listed)
- Fork-tailed Swift (EPBC Act listed Migratory)
- Growling Grass Frog (EPBC Act listed vulnerable)
- White-throated Needletail (EPBC Act listed Migratory)

Impacts to the above listed bird species from development are considered unlikely to be significant due to their mobility to move away from disturbance to nearby suitable habitats. One area of aquatic habitat (north west of the proposed roundabout at Carneys Road) has the potential to support Growling Grass Frog. Based on the current design for the roundabout, it is understood that this wetland will not be impacted. As such, there will be no impacts to Growling Grass Frog from

the current development. Any future works that may impact on this area of wetland should consider potential impacts on Growling Grass Frog.

The current proposal involves the future development of the study area for the purpose of the North East Wonthaggi Precinct Structure Plan (PSP). As part of the initial assessment undertaken by Nature Advisory, several recommendations were provided to Bass Coast Shire Council to inform the preparation of the Native Vegetation Precinct Plan (NVPP) for the area. Following submission of the initial assessment and discussions with Bass Coast Shire Council and the Victorian Planning Authority (VPA), these recommendations have been largely incorporated into an updated development plan for the site.

The Native Vegetation Removal (NVR) report prepared by DELWP documents a total extent loss of 7.540 hectares of native vegetation for the North East Wonthaggi PSP. It is important to note that the extent loss (7.540ha) includes the loss of 71 scattered trees (10 large and 61 small) which have been converted to an area as per DELWP's required data standards. Overall 14 large trees are proposed to be removed including 10 large scattered trees and 4 large trees in patches of native vegetation.

Such removal of native vegetation would be assessed under the Detailed assessment pathway, trigger a referral to DELWP and result in the following offset requirement:

- **1.744 general habitat units**, with a minimum strategic biodiversity value score (SBV) of 0.338 and be located within the West Gippsland Catchment Management Authority (CMA) area or the Bass Coast Shire Council.
- **The protection of 14 large trees.**

Based on the current development plan, no threatened ecological communities, flora or fauna species are likely to be impacted. As such, there are no implications for threatened values under the *Environment Protection and Biodiversity Conservation Act 1999* or Victorian *Flora and Fauna Guarantee Act 1988*.

The following FFG Act values listed as threatened or protected may be susceptible to impacts from the proposed development within areas of public land:

- Flora genera (protected):
 - Acacia
 - Senecio
 - Xanthorrhoea

A Protected Flora Permit would be required from DELWP to remove any of the plant taxa comprising the abovementioned protected values from public land (and Xanthorrhoea from private land).

As the proposed removal of native vegetation is less than 10 hectares, a Referral to the state Minister for Planning would not be required under the *Environment Effects Act 1978*.

2. Introduction

Bass Coast Shire Council engaged Nature Advisory to conduct a biodiversity assessment of an approximately 675-hectare area of land in Wonthaggi. The specific area investigated, referred to herein as the ‘study area’, was the area of land defined as the Wonthaggi North East Precinct Structure Plan (PSP) area. The information presented in the investigation will provide input into the Native Vegetation Precinct Plan (NVPP) for the area.

This investigation was commissioned to provide information 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), herein referred to as ‘the Guidelines’, 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:

- Review of existing information on the flora, fauna and native vegetation of the study area and surrounds, including:
 - Victorian Biodiversity Atlas (VBA) administered by the Department of Environment, Land, Water and Planning (DELWP);
 - Victorian Flora Information System (FIS);
 - The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Search Tool; and
 - DELWP Native Vegetation Information Management system (NVIM).
- A site survey which was undertaken in February 2016 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 EVC mapping, habitat hectare assessment (Vegetation Quality Assessment) and/or scattered tree assessment;
 - Mapping and documentation of any rare or threatened flora and fauna species found within the project area;
 - Mapping and documentation of locations of noxious weeds within the project area;
 - Compilation of flora and fauna species lists for the site;
 - Assessment of the nature and quality of native fauna habitat; and
 - Assessment of the potential and likelihood of occurrence of EPBC Act and *Flora and Fauna Guarantee Act 1988* (FFG Act) listed flora, fauna and communities on the site.
- Additional site surveys in September 2018 to:
 - Assess additional impacts to native vegetation from the development of roundabout at the intersection of Bass Hwy and Carneys Road; and
 - Map and assess large trees within patches to complete the dataset needed to update the impact assessment to reflect the 2017 Guidelines.

This report is divided into the following sections:

Section 3 provides the legislative background including details of all relevant Commonwealth, State and local legislation and policies.

Section 4 describes the sources of information, including the methods used for the field survey.

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 draft PSP design.

Section 7 details the implications of the findings as per the draft PSP design under the relevant legislation and policy.

This investigation was undertaken by a team from Nature Advisory, comprising Justin Sullivan (Senior Ecologist), Teisha Lay (Zoologist) and Inga Kulik (Senior Ecologist & Project Manager).

3. Planning and Legislative Considerations

This investigation and report address 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 Bass Coast local government area. It currently covers various zoning boundaries, namely Farming Zone (FZ), General Residential Zone – Schedule 1 (GRZ1), Commercial 2 Zone (C2Z), Industrial 1 Zone (IN1Z), Public Use Zone – Service and Utility (PUZ1) and Public Park and Recreation Zone (PPRZ) in the Bass Coast Planning Scheme. Local planning provisions currently apply under the Victorian *Planning and Environment Act 1987*.

3.1.1. Overlays

Three overlays apply to particular sections of the study area, namely the Development Plan Overlay – Schedule 21 (DPO21), Environmental Significance Overlay – Schedule 4 (ESO4) and Bushfire Management Overlay (BMO). The purpose of ESO4, which is relevant to the current investigation, is discussed below.

Environmental Significance Overlay – Schedule 4 (ESO4)

Requirement for a permit: A permit is required under ESO4 to remove, destroy or lop any vegetation, including dead vegetation.

3.2. State planning provisions

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

Under Clause 52.17 of all Victorian Planning Schemes a planning permit is required for the destruction, lopping or removal of native vegetation on land which has an area of 0.4 hectares or more (together with all contiguous land in single ownership). This includes the removal of dead trees with a DBH (diameter at breast height or 1.3 metres) of 40 centimetres or more and any individual scattered native plants.

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 (DELWP 2017b).
- Statewide biodiversity information maintained by DELWP.

The application of the Guidelines (DELWP 2017a) are explained further in

Appendix 1.

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 is 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* 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.

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 2015a, DELWP 2015b). Any removal of threatened flora species or communities (or protected flora) listed under the FFG Act from public land requires a Protected Flora Licence or Permit under the Act, obtained from DELWP.

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 EES is required according to the “Ministerial Guidelines for Assessment of Environmental Effects under the *Environment Effects Act 1978*” (DSE 2006).

Implications under the EE Act for the current proposal are discussed in Section 7.5.

4. Existing Information & Methods

4.1. Existing information

Existing information used for this investigation is described below.

4.1.1. Existing reporting and documentation

The reports, planning schemes and/or development plans below, relating to the study area were reviewed.

- Bass Coast Planning Scheme
- Fuller Road and Haywood Street, Wonthaggi – Vegetation Report (Beveridge Williams 2011)
- Wonthaggi North East Precinct Structure Plan: Plan 2 – Future Urban Structure – Draft (VPA 2016)

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 bioregion¹ (DELWP 2015c); and
- Biodiversity Interactive Maps (DELWP 2017b).

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° 36’ 00” S and longitude 145° 36’ 55” 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 (2017c).

The ‘Vegetation/ Modelled FFG Act Communities’ layer in DELWP’s Biodiversity Interactive Map (DELWP 2017a) was consulted to determine which ecological communities listed as threatened under the FFG Act were modelled to potentially occur in or near the study area.

The online *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Search Tool (Department of the Environment and Energy 2017a) was consulted to determine whether nationally listed species or communities potentially occurred in the search region based on habitat modelling.

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. Field methods

Initial field assessment

The field assessment was conducted from the 1st to the 3rd February 2016. During this assessment, the study area was surveyed initially by vehicle and areas supporting remnant native vegetation and/or fauna habitat were inspected in more detail on foot.

Sites in the study area found to support native vegetation or with potential to support listed matters were mapped. Mapping was undertaken through a combination of aerial photograph interpretation use of a hand-held GPS (accurate to approximately five metres). Species and ecological communities listed as threatened under the EPBC Act or FFG Act (where they occurred on public land) were also mapped using the same method.

Additional field assessments

An additional field inspection was conducted on 11th September 2018 to assess additional impacts to native vegetation and/or fauna habitat either side of the intersection of Bass Hwy and Carneys Road. This intersection is proposed for the development of a new roundabout.

A further assessment was undertaken on 17th September 2018 to complete the collection of data required to assess the native vegetation impacts under the 2017 Guidelines. (This namely included the mapping and assessment of all large trees in patches in the study area),

4.2.1. Native vegetation

Native vegetation is currently defined in the Victoria Planning Provisions 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 trees² where the drip lines³ 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 2018b) provides modelled condition scores for native vegetation to be used in certain circumstances.

Scattered tree

A scattered tree is:

- A native canopy tree² 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 2015a).

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
- 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 of 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.

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.

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 rock.

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 Biodiversity Interactive Maps (DELWP 2017b).

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 2017).

4.3. Limitations of field assessment

The original site assessment was carried out in late summer. The short duration and seasonal timing of field assessments can result in some species not being detected when they may occur at other times. Additionally, some flora species and life-forms may be undetectable at the time of the survey or unidentifiable due to a lack of flowers or fruit.

The timing of the survey and condition of vegetation was otherwise considered suitable to ascertain the extent and condition of native vegetation and fauna habitats.

These limitations were not considered to compromise the validity of the current investigation.

Identification of EVCs considers vegetation types which would have naturally occupied the landscape prior to European impacts. Significant past alteration of the study area's land form and hydrology as well as past vegetation clearance has resulted in the emergence of some areas of the site that exhibit artificial elements and the reestablishment of vegetation that is likely to be notably different to what would have naturally occupied the study area. Identification of EVCs in altered areas was therefore based upon consideration of:

- Modelled EVC mapping (DELWP 2017b);
- Observations of adjacent landforms that had not been significantly altered;

- Observations of nearby natural vegetation remnants; and
- Relevant published EVC benchmark descriptions.

5. Assessment Results

5.1. Site description

The study area for this investigation (Figures 1 to 3) was approximately 675 hectares of land located immediately to the north east of the existing Wonthaggi township. The study area was bounded by Heslop Road in the north and Fullers Road, Benetti Road and Carneys Road to the west (extending west where a new roundabout is proposed at the intersection of Bass Hwy and Carneys Road).

Large agricultural lots adjoined the property in all directions and existing small residential lots occurred to the south west. Two main roads dissect the study area, namely the Bass Highway (B460) which dissects the southern part of the study area and runs east-west connecting Wonthaggi and Inverloch, and Korumburra-Wonthaggi Road (C437), which dissects the site in the north running north east from Wonthaggi. Three minor roads also dissect the study area, namely Wentworth Road and Oates Road in the north and McGibbony's Road which dissects the study area diagonally, to the north of the Bass Highway.

The study area is mostly comprised of several large agricultural lots, that are either used for crop (predominantly Rye Grass), the production of hay or grazing by cattle. South of the Bass Highway, the study area comprises a large number of smaller residential and industrial lots.

The study area largely supported fertile soils, with lighter coloured, sandy soils occurring south of the Bass Highway.

Vegetation in the study area consisted largely of introduced pasture, which was present throughout the large agricultural lots within the study area. These paddocks were generally dominated by Rye Grass, with several properties having been recently harvested for hay at the time of surveying. Native scrub vegetation, distinguished by a dense canopy and mid layer of Swamp Paperbark occurred commonly along roadsides throughout the study area. Scrub vegetation was generally low in native species diversity and comprised a high cover of introduced flora including several high threat species, namely Blackberry, Montpellier Broom and Sweet Pittosporum. Native scrub was also found within properties, along fences or in drainage lines. The largest areas of scrub occurred along Korumburra-Wonthaggi Road, McGibbony's Road, north of the intersection of Bass Hwy and Carneys Road and within a triangular patch south east of Sharrock Road.

Native woodland was located in linear patches along roadsides or property boundaries. South of the Bass Highway, several small patches of woodland were mapped within larger grassy paddocks. One area of Lowland forest, dominated by Messmate Stringybark was also recorded south west of the intersection of Bass Hwy and Carneys Road.

Scattered native canopy trees were also recorded throughout the study area and included Swamp Paperbark and Swamp Gum, which were mostly found north of McGibbony's Road and Coast Manna-gum, which was recorded mostly to the south, and included several large old trees.

Various vegetation was planted throughout the study area in the form of windbreaks, garden, roadside and nursery plantings. Vegetation between Wentworth Road and Oates Road comprises largely garden plantings associated with the larger residential lots that exist in this area. Giant Honey Myrtle, not considered to be indigenous to the area, occurred commonly in gardens in the study area. Tree species commonly recorded along planted tree lines included Southern Mahogany, Southern Bluegum, Spotted Gum and Sugar Gum, all of which are not indigenous to the area.

Fauna habitat within the study area included agricultural, treed and aquatic habitats. The roadside vegetation areas (namely Korumburra-Wonthaggi Road and McGibbony's Road), although generally low in native flora species diversity and high in weed cover, provide the main habitat corridors throughout the study area, connecting with other woody habitats beyond the study area boundary. Aquatic habitats within the study area were largely limited to farm dams, which were mostly void of any fringing vegetation. The small number of dams/waterbodies that did have fringing vegetation were considered to support habitat for common aquatic fauna, namely frogs and waterbirds. A number of narrow drainage lines also exist within the study area, and generally supported introduced flora and/or low covers of Common Reed and Rush. One large wetland existed amidst the large area of scrub north west of the intersection of Bass Hwy and Carneys Road. This wetland comprised a large area of water and was heavily vegetated in part with Narrow-leaf Cumbungi.

The study area lies within the Gippsland Plain bioregion and falls within the West Gippsland catchment.

5.2. Remnant patches

Pre-European EVC mapping (DELWP 2017b) indicated that the study area and surrounds would have supported Damp Sands herb-rich Woodland (EVC 3), Swamp Scrub (EVC 53), Grassy Woodland/ Swamp Scrub Mosaic (EVC 924) and Damp Sands herb-rich Woodland/Swamp Scrub Mosaic (EVC 925) 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 the following EVCs occurred in the study area:

- **Damp Sands herb-rich Woodland (EVC 3)** which occurred in the southern section of the study area, largely in association with sandy soils and the occurrence of Coast Manna-gum (*Eucalyptus viminalis* subsp. *pyroriana*). (NOTE: Coast Manna-gum which was planted in a garden setting (nursery) west of Oates Road and in tree rows south of Bass Highway were not considered as native vegetation).
- **Lowland Forest (EVC 16)** which existed in one section of the study area only, to the south west of the intersection of Bass Hwy and Carneys Road. Distinguished by a healthy canopy of Messmate Stringybark.
- **Swamp Scrub (EVC 53)** which occurred commonly along roadsides throughout the study area and was generally dominated by a dense cover of Swamp Paperbark (*Melaleuca ericifolia*).
- **Grassy Woodland (EVC 175)** which occurred in the northern sections of the study area, and was mainly distinguished by the presence of Swamp Gum (*Eucalyptus ovata*) and/or Narrow-leaf Peppermint (*Eucalyptus radiata*).
- **Tall Marsh (EVC 821)** which existed in one area and comprised a large area of water with a high cover of Narrow-leaf Cumbungi.
- **Swampy Woodland (EVC 937)** which existed in one section of the study area only, north of Bass Hwy. Distinguished by a canopy of Swamp Gum.

Descriptions of these EVCs are provided within the EVC benchmarks in Appendix 6.

61 remnant patches (referred to herein as habitat zones) comprising the abovementioned EVCs were identified in the study area (

Table 1). Remnant patches in the study area are shown in Figures 1 to 3. A total of 14 large trees were recorded in patches. Large trees in patches are noted in Tables 1 and 2, with detail provided in Appendix 3.

Table 1: Description of habitat zones in the study area

Habitat Zone	EVC	Description
AA, AD, AI, AO, AS, AT, AY, AZ, BA, BB, BI, BK, BL, BM, BN, BP, BQ, BR, BS, BT, BU, BW, BY	Swamp Scrub (EVC 53)	Swamp Scrub patches composed exclusively of Swamp Paperbark. High recruitment of Swamp Paperbark and high weed cover.
AB, AE, AF, AG, AJ, AK, AL, AM, AN, AP, AQ, AR, AU, BD, BE, BF, BG, BH, BJ, BX	Swamp Scrub (EVC 53)	Swamp Scrub patches dominated by Swamp Paperbark and also comprising other native shrub species namely Tree Violet and Blackwood. High recruitment of Swamp Paperbark and high weed cover.
AC, AH	Grassy Woodland (EVC 175)	Woodland patches dominated by Swamp Gum. Other species recorded include Narrow Leaf Peppermint and Swamp Paperbark.
AX	Grassy Woodland (EVC 175)	Linear patch of woodland along Korumburra-Wonthaggi Road. Dominated by Swamp Gum over a dense ground layer of native Kangaroo Grass.
AW	Swamp Scrub (EVC 53)	Wide linear patch of Swamp Scrub in the northern section of Korumburra-Wonthaggi Road. Dominated by Swamp Paperbark. Other native flora species recorded include Prickly Currant-bush, Tree Violet and Spiny-headed Mat-rush. Weed cover very high, namely Blackberry which is impenetrable in sections.
AV	Swamp Scrub (EVC 53)	Previously cleared area in paddock, which would have previously supported Swamp Scrub. Now exclusively comprises a dense area of native Rush species in a low-lying wetter corner of the paddock. Weeds include pasture grasses and Wild Sage.
BV	Damp Sands Herb-rich Woodland (EVC 3)	Linear patches of woodland with a mixture of remnant Coast Manna-gum, planted trees and indigenous scrubby understorey. Understorey consists of Swamp Paperbark, various wattles and Common Reed. Weed cover is high. One large tree exists in HZ BV3.
BZ, CB	Damp Sands Herb-rich Woodland (EVC 3)	Linear patches of woodland dominated by Coast Manna-gum. Understorey is made of a sparse shrub layer including Blackwood, and few graminoids including Small Grass-tree. Four large trees are in HZ BZ. Four large trees are in HZ CB.
CA	Swamp Scrub (EVC 53)	Swamp Scrub dominated by Swamp Paperbark and also comprising other native shrub species namely Blackwood. Includes Spike Sedge and Sword Sedge in wetter section. High recruitment of Swamp Paperbark and high weed cover

Habitat Zone	EVC	Description
BO	Swamp Scrub (EVC 53)	Large triangular shaped patch of scrub dominated by Swamp Paperbark. Native flora diversity high, including species such as Prickly Currant-bush, Tasman Flax-lily and Weeping Grass. Weed cover very high, including mainly high threat species such as Blackberry and Sweet Pittosporum.
BC, CC, CD, CE	Damp Sands Herb-rich Woodland (EVC 3)	Patches of woodland distinguished by the presence of Coast Manna-gum. Understorey comprises a high cover of introduced grasses. HZ CC comprises three large trees.
CF	Lowland Forest (EVC 16)	Remnant patch of Lowland Forest distinguished by a healthy canopy of Messmate Stringybark over a mixed understorey of native shrubs (including Coast Tea-tree and Sallow Wattle), graminoids (Spiny-headed Mat-rush) and ground fern (Austral Bracken). Weed cover is high with Sweet Pittosporum the dominant weed species. Two large trees exist in the area surveyed.
CG	Swamp Scrub (EVC 53)	Large patch of Swamp Scrub, dominated by a continuous canopy of Swamp Paperbark. Low diversity of native species in the understorey. High cover of introduced flora, namely Blackberry and Sweet Pittosporum.
CH	Swampy Woodland (EVC 937)	Remnant patch of woodland near roadside distinguished by a canopy Swamp Gums, some dead. Understorey comprises native shrubs and graminoids, as well as woody weeds including Sweet Pittosporum and Cape Broom.
CI	Tall Marsh (EVC 821)	Dense cover of Narrow-leaf Cumbungi in vegetated section of wetland (totally surrounded by Swamp Scrub).

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 no.	Area (ha)	Condition score (out of 100)	Number of Large Trees in Habitat Zone
AA	53	0.047	25	
AB	53	0.789	23	
AC	175	0.081	24	
AD	53	0.053	24	
AE	53	0.230	24	
AF	53	0.458	25	
AG	53	0.393	25	
AH	175	0.033	16	
AI	53	0.032	25	
AJ	53	1.015	22	
AK	53	0.021	24	

Habitat Zone	EVC no.	Area (ha)	Condition score (out of 100)	Number of Large Trees in Habitat Zone
AL	53	0.484	24	
AM	53	0.170	23	
AN	53	0.221	23	
AO	53	0.019	17	
AP	53	0.042	25	
AQ	53	0.025	25	
AR	53	0.018	25	
AS	53	0.018	25	
AT	53	0.168	25	
AU	53	1.223	25	
AV	53	0.595	16	
AW	53	1.378	19	
AX	175	0.128	23	
AY	53	0.233	24	
AZ	53	0.810	25	
BA	53	0.021	25	
BB	53	0.014	23	
BC	3	0.009	13	
BD	53	2.119	20	
BE	53	0.022	16	
BF	53	1.279	25	
BG	53	0.594	25	
BH	53	0.108	25	
BI	53	0.023	25	
BJ	53	0.179	16	
BK	53	0.188	25	
BL	53	0.001	25	
BM	53	0.036	25	
BN	53	0.379	25	
BO	53	0.883	39	
BP	53	0.210	25	
BQ	53	0.026	25	
BR	53	0.111	25	
BS	53	0.377	25	
BT	53	0.111	25	
BU	53	0.064	25	
BV	3	0.697	18	1
BW	53	0.021	25	
BX	53	0.391	20	
BY	53	0.115	25	

Habitat Zone	EVC no.	Area (ha)	Condition score (out of 100)	Number of Large Trees in Habitat Zone
BZ	3	0.480	36	4
CA	53	0.297	23	
CB	3	0.420	19	4
CC	3	0.098	24	3
CD	3	0.015	10	
CE	3	0.054	10	
CF	16	0.507	28	2
CG	53	1.636	33	
CH	937	0.106	29	
CI	821	0.189	40	
Total		20.464		14

Figure 1: Study area and native vegetation

Project: North East Wonthaggi PSP
Client: Bass Coast Shire Council
Date: 08/05/2020

 Study area

Native vegetation

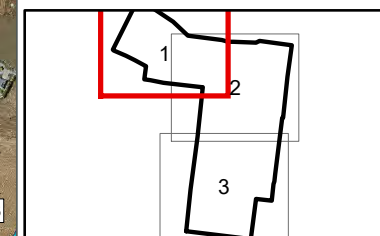
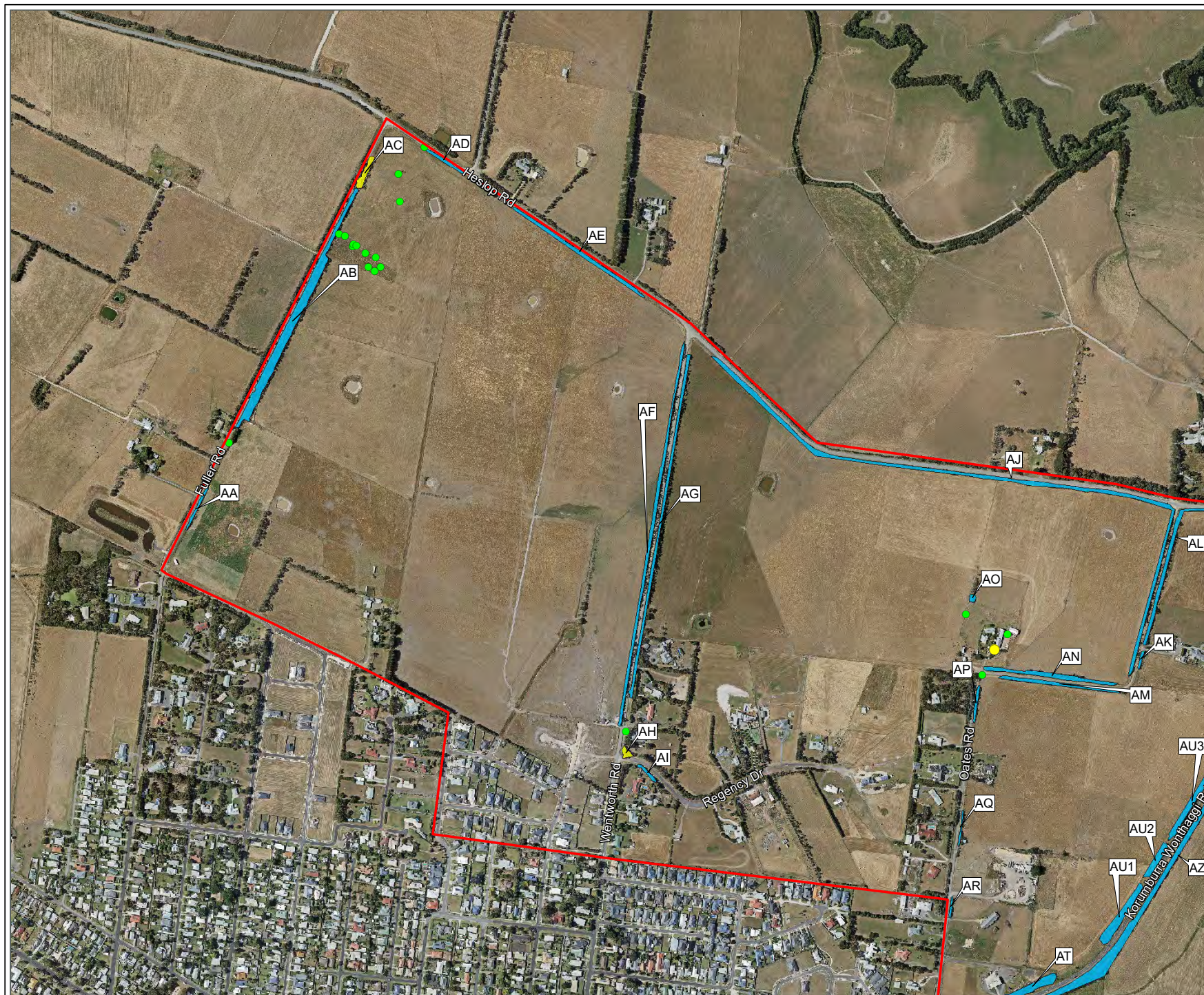
 Grassy Woodland (EVC 175)

 Swamp Scrub (EVC 53)

Native trees

 Large scattered tree

 Small scattered tree



Metres
 0 170



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Figure 2: Study area and native vegetation

Project: North East Wonthaggi PSP
Client: Bass Coast Shire Council
Date: 08/05/2020

Study area

Native vegetation

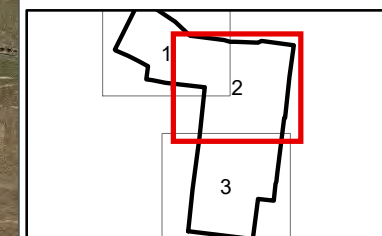
Grassy Woodland (EVC 175)

Swamp Scrub (EVC 53)

Native trees

Large scattered tree

Small scattered tree



Metres
 0 170



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Figure 3: Study area and native vegetation

Project: North East Wonthaggi PSP
Client: Bass Coast Shire Council
Date: 08/05/2020

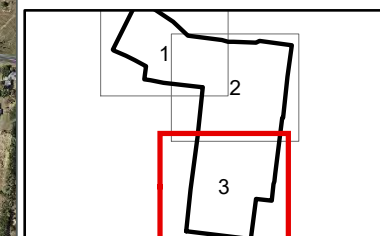
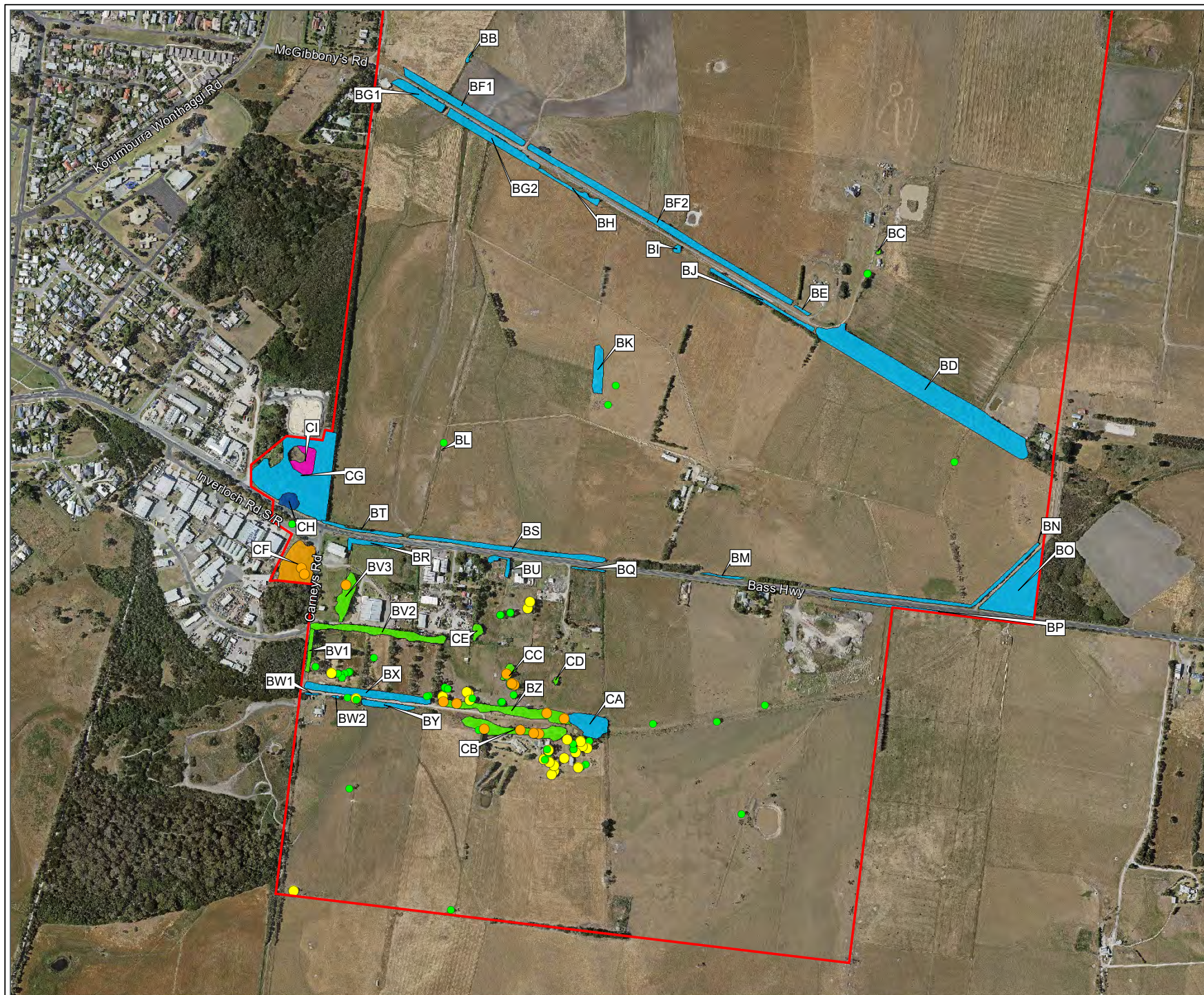
 Study area

Native vegetation

-  Lowland Forest (EVC 16)
-  Damp Sands Herb-rich Woodland (EVC 3)
-  Swamp Scrub (EVC 53)
-  Tall Marsh (EVC 821)
-  Swampy Woodland (EVC 937)

Native trees

-  Large scattered tree
-  Small scattered tree
-  Large Tree in HZ



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5.3. Scattered trees

Scattered trees were recorded throughout the study area. In the northern section of the study area (north of McGibbony's Road) scattered trees would have mostly once comprised the canopy component of Swamp Scrub (EVC 53) and Grassy Woodland (EVC 175), and hence were mostly Swamp Paperbark and Swamp Gums, respectively.

In the southern section of the study area (south of McGibbony's Road), scattered trees would have mostly once comprised the canopy component of Damp Sands Herb-rich Woodland (EVC 3) and hence were mostly Coast Manna-gums.

A total of 122 scattered trees occurred in the study area (see Figures 1 to 3). Of these 24 were large scattered trees and 98 were small.

Details of all scattered trees recorded are listed in Appendix 3.

5.4. Flora species

5.4.1. Species recorded

During the habitat hectare assessment 94 plant species were recorded. Of these, 37 (39%) were indigenous and 57 (61%) were introduced or non-indigenous native in origin (Appendix 4).

5.4.2. Listed species

VBA records (VBA 2013) and the EPBC Protected Matters Search Tool (Department of the Environment and Energy 2017a) indicated that within the search region there were records of, or there occurred potential suitable habitat for, seven flora species listed under the Commonwealth EPBC Act and six listed under the state *Flora and Fauna Guarantee Act 1988* (FFG Act), including five listed under both Acts. No flora species listed as threatened under the EPBC Act or FFG Act were recorded during the field survey.

The likelihood of occurrence in the study area of species listed under the EPBC Act and FFG Act 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 no listed flora species are likely to occur or have the potential to occur generally due to a lack of suitable habitat in the study area.

Table 3: FFG Act and EPBC Act listed flora species and likelihood of occurrence

Common Name	Scientific name	EPBC	FFG	DELWP	Habitat	Number of records	Date of last record	Likelihood of occurrence
Clover Glycine	<i>Glycine latrobeana</i>	VU	L	v	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 (DoEE 2017d).	None	N/A	Native grassland habitat not present within the study area. Areas of grassy woodland recorded in the study area had highly disturbed understoreys and not considered suitable habitat - unlikely to occur
Strzelecki Gum	<i>Eucalyptus strzeleckii</i>	VU	L	v	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.	2	9/03/2012	Not recorded within the study area during the detailed survey - unlikely to occur
Leafy Greenhood	<i>Pterostylis cucullata</i> subsp. <i>cucullata</i>	VU	L	e	Coast Tea-tree (<i>Leptospermum laevigatum</i>) or Moonah (<i>Melaleuca lanceolata</i>) coastal scrubs on stabilized sand dunes, with an open understorey and grassy and herbaceous groundcover on seasonally damp but well drained humus rich sandy loams. Mt Eccles population occurs in Brown Stringybark (<i>Eucalyptus baxteri</i>) and Manna Gum (<i>E. viminalis</i>) forest with a grassy groundcover (Duncan 2010).	3	28/09/1934	Suitable habitat not present within the study area - unlikely to occur
Dense Leek-orchid	<i>Prasophyllum spicatum</i>	VU		e	Well drained sandy loams in coastal heath and near-coastal heathy forest (Jones 2006).	2	6/11/2006	Suitable habitat not present within the study area - unlikely to occur
River Swamp Wallaby-grass	<i>Amphibromus fluitans</i>	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 (DoEE 2017c).	2	25/05/2011	Suitable habitat not present within the study area. Dams within the study area were mostly disturbed and lacked any fringing vegetation - unlikely to occur
Maroon Leek-orchid	<i>Prasophyllum frenchii</i>	EN	L	e	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 ((DoEE 2017e).	None	N/A	Suitable habitat not present within the study area - unlikely to occur
Eastern Spider-orchid	<i>Caladenia orientalis</i>	EN	L	e	Heathland and Heathy Woodland in coastal areas between the Mornington Peninsula and Wilsons Promontory (Jeanes & Backhouse 2006).	1	16/09/2008	Suitable habitat not present within the study area - unlikely to occur
Merran's Sun-orchid	<i>Thelymitra X merraniae</i>		L	e	Heath/woodlands, open forest and moist swampy areas with sand and clay loams (Weber & Entwisle 1994).	1	5/11/1934	Suitable habitat not present within the study area - unlikely to occur

Notes: EPBC = threatened species status under EPBC Act: CR = critically endangered; EN = endangered; VU = vulnerable; FFG = threatened species status under the FFG Act: L = listed as threatened under the FFG Act; DELWP = status under DELWP's Advisory List (DEPI 2014); e = endangered; v = vulnerable

5.5. Fauna habitats

The study area supported the following three fauna habitat types:

- Agricultural land;
- Treed vegetation; and
- Aquatic habitats.

Agricultural land

Introduced pasture covers the majority of the study area and primarily comprised introduced grass species including Rye Grass, Sweet Vernal-grass and Yorkshire Fog. Blackberry was also common in this habitat. This habitat is largely devoid of native vegetation due to historic clearing for agriculture and the introduction of grasses for cattle farming and for hay production.

Habitat components for ground dwelling fauna, such as leaf litter, rocks and woody debris, were absent with the exception of vegetation along fencelines and roadsides. The habitat is only likely to support fauna species that are common to rural areas, including Eastern Grey Kangaroos, of which 19 individuals were observed on one occasion between McGibbony's Road and the Bass Highway.

Treed Vegetation

This habitat is comprised of predominantly indigenous and native trees and shrubs with a modified ground layer consisting of grasses, rushes and bracken. Dominant overstorey and mid storey species were Swamp Paperbark, Swamp Gum, Blackwood, and Coast Manna-gum. The trees had not attained the maturity to develop hollows; nevertheless these provided habitat for common bush birds and mammals such as kangaroos and possums.

Some of these linear patches comprised indigenous ground-layer species such as Rush and Mat-rush as well as recruiting Swamp Paperbark. Large stands of Blackberry occurred commonly throughout these roadside corridors. Wombat burrows were present in sandy soils in the study area south of the Bass Highway. Some linear patches of treed vegetation had been planted in the study area and consisted of Cypress Pine as well as Coast Manna-gum. This habitat provided foraging opportunities for a number of common and generalist fauna species.

Importantly, connectivity to similar habitats within the landscape, provided by linear strips of vegetated habitat, increased the value of habitats to fauna. The broader study area was connected to roadside vegetation such as Bass Highway, Korumburra-Wonthaggi Road and McGibbony's Road. Roadside vegetation covered a small proportion of the study area, but is partly connected to other swamp scrub areas around Wonthaggi, such as the numerous Wonthaggi Bushland Reserves on the outskirts of the township and to the east of the study area. These few larger sized blocks of vegetation are mostly isolated and surrounded by cleared agricultural land or townships. Connecting habitats formed a network of wider, regional value that provides dispersal routes, as well as foraging habitat for species that may move between large blocks of vegetation.

Aquatic habitats

Aquatic habitats scattered across the broader study area consisted of farm dams as well as ephemeral depressions, drainage lines and channels (Figure 4).

The majority of farm dams were accessible to stock and supported little to no native vegetation. These were often in poor condition and dominated by native and weed species such as Common Reed and Bulrush. Common duck species were observed during the current field survey from farm

dams. South of Bass Highway, a single Latham's Snipe was observed at a vegetated wetland, and a flock of Wood Ducks were observed at a large dam north of the highway.

Along the northern end of Korumburra-Wonthaggi Road, a large ephemeral depression area dominated by Rush is connected to a vegetated dam and drainage line. All but the dam were dry during the field survey. The ephemeral depression is dominated by Rush. Drainage channels were common throughout the eastern section of study area. Some parts of the drainage lines were wet and comprised Rush and Bulrush. Two Eastern Grey Kangaroos were flushed from long grass beside a drainage channel north of McGibbony's Road.

One large wetland existed amidst the large area of scrub north west of the intersection of Bass Hwy and Carneys Road. This wetland comprised a large area of water and was heavily vegetated in part with Narrow-leaf Cumbungi.



Figure 4: Aquatic habitats throughout the study area

Although most of these aquatic habitats lacked significant native aquatic vegetation, they provided habitat for frog and waterbird species.

5.6. Fauna species

5.6.1. Species recorded

During the field assessment 36 fauna species were recorded. This included 34 birds (six introduced) and two mammals (one introduced) (Appendix 5).

5.6.2. Listed species

The review of existing information indicated that 37 fauna species listed under the state *Flora and Fauna Guarantee Act 1988* (FFG Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) have previously been recorded within the search region since 1900 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.

This analysis of potential occurrence of listed fauna species excludes:

- Marine fauna given that the study area is inland
- Migratory oceanic bird species (such as albatrosses and petrels) and migratory shorebirds given that the study area is inland.

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 that where suitable habitat exists, but recent records are scarce. This analysis indicates that five listed fauna species are likely to occur or have the potential to occur. These species are:

- Latham’s Snipe (EPBC Act listed Migratory)
- Eastern Great Egret (FFG listed)
- Fork-tailed Swift (EPBC Act listed Migratory)
- White-throated Needletail (EPBC Act listed Migratory)
- Growling Grass Frog (EPBC Act listed vulnerable)

The susceptibility of these species to impacts from development is discussed in Section 5.6.3.

Table 4: Listed fauna species from the search region and likelihood of occurrence in the study area

Common Name	Scientific name	EPBC-T	EPBC-M	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
Birds								
Australasian Bittern	<i>Botaurus poiciloptilus</i>	EN		L	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 and Higgins 1990).	5	16/10/2006	No suitable habitat. Unlikely to occur.
Australian Painted Snipe	<i>Rostratula australis</i>	EN		L	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.	None	N/A	Habitat present (aquatic) but limited in extent. No historical records in region. Unlikely to occur.
Baillon's Crake	<i>Porzana pusilla palustris</i>			L	Occurs in a range of ephemeral and permanent wetlands such as swamps, creeks and lakes, with dense vegetation and abundant floating plants, but also in open waters with clumped vegetation (Marchant and Higgins 1993).	7	29/01/2008	Habitat present (aquatic) but limited in extent. Unlikely to occur.
Black-faced Monarch	<i>Monarcha melanopsis</i>		M (Bonn Convention (A2H))		Rainforests, eucalypt woodlands, coastal scrub and damp gullies (Higgins et al. 2006)	None	N/A	No suitable habitat and lack of historical records. Unlikely to occur.
Blue-billed Duck	<i>Oxyura australis</i>			L	Terrestrial wetlands and prefers deep permanent, well vegetated water bodies. V (Marchant and Higgins 1990).	53	2/01/2009	No suitable habitat. Unlikely to occur.
Chestnut-rumped Heathwren	<i>Calamanthus pyrrhopygius</i>			L	Dense heathland and dense understorey or ground-layer in sclerophyll forests and woodlands; also in Box-ironbark forests. Widespread but sparsely distributed. (Higgins and Peter 2002; Tzaros 2005).	1	3/11/1999	No suitable habitat (heathy woodland). Unlikely to occur.
Eastern Great Egret	<i>Ardea modesta</i>			L	Occurs in a variety of wetlands including: permanent water bodies on flood plains; shallows of deep permanent lakes, either open or vegetated with shrubs or trees; semi-permanent swamps with tall emergent vegetation (e.g. bulrush) and herb dominated seasonal swamps with abundant aquatic flora (Marchant and Higgins 1990).	182	6/10/2010	Suitable aquatic habitat exists and recent records in the search region. Potential to occur.
Fork-tailed Swift	<i>Apus pacificus</i>		M (JAMBA,CAMBA, ROKAMBA)		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 of metres above the ground, but can feed among open forest canopy. The species breeds internationally and seldom roosts in trees and is unlikely to be impacted by the development (Higgins et al 2006b).	6	18/03/2000	May occasionally pass through/fly over the study area. Potential to occur

Common Name	Scientific name	EPBC-T	EPBC-M	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
Glossy Ibis	<i>Plegadis falcinellus</i>		M (CAMBA, Bonn (A2S))		Prefer freshwater inland wetlands, in particular, permanent or ephemeral water bodies and swamps with abundant vegetation (Marchant and Higgins 1990).	2	6/11/2007	No suitable habitat. Unlikely to occur.
Grey Goshawk	<i>Accipiter novaehollandiae novaehollandiae</i>			L	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 and Higgins 1993).	1	3/11/1999	Habitat suboptimal and few records. Unlikely to occur.
Hooded Robin	<i>Melanodryas cucullata cucullata</i>			L	Occur mostly in open Grey Box, White Box, Yellow Box, Yellow Gum and Ironbark woodlands with pockets of saplings or taller shrubs, an open shrubby understorey, sparse grasses and patches of bare ground and leaf-litter, with scattered fallen timber. The population has declined throughout range, especially since the early 1980s. This species typically occurs north of the great divide in shrubland or woodland dominated by acacias. (Higgins and Peter 2002; Tzaros 2005).	1	23/01/2000	Habitat exists but paucity of records suggests that it is unlikely to occur regularly.
Intermediate Egret	<i>Ardea intermedia</i>			L	It mainly inhabits terrestrial wetlands; only occasionally visit coastal wetlands and forages amongst aquatic vegetation in shallow water and requires trees for roosting and nesting. It often occurs in wetlands that contain vegetation, including bulrush (Marchant and Higgins 1990).	7	31/07/2008	Habitat present but limited in extent. Unlikely to occur.
Latham's Snipe	<i>Gallinago hardwickii</i>		M (JAMBA, CAMBA, ROKAMBA, Bonn A2H)		Occurs in wide variety of permanent and ephemeral wetlands; it prefers open freshwater wetlands with dense cover nearby, such as the edges of rivers and creeks, bogs, swamps, waterholes. The species is wide spread in southeast Australia and most of its population occurs in Vic. Except in the northwest of the state (Naarding 1983; Higgins and Davies 1996).	272	23/11/2011	One individual recorded in vegetated dam in the southern section of the study area. Recorded in same location in both the initial Feb 2016 survey as well as the September 2018 survey. Recorded
Lewin's Rail	<i>Lewinia pectoralis pectoralis</i>			L	Occurs in a variety of densely vegetated wetland habitats, fresh or saline and usually with areas of standing water; requires shallow water areas to forage in (Marchant and Higgins 1993).	1	29/04/2003	Habitat present (aquatic) but limited in extent and paucity of records in region. Unlikely to occur.
Little Egret	<i>Egretta garzetta nigripes</i>			L	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 and Higgins 1990).	2	8/03/1993	Habitat present (aquatic) but limited in extent and paucity of records in region. Unlikely to occur.

Common Name	Scientific name	EPBC-T	EPBC-M	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
Magpie Goose	<i>Anseranas semipalmata</i>			L	Terrestrial and aquatic habitats, but activities cantered on wetlands, mainly those on floodplains of rivers (Marchant and Higgins 1990).	37	29/03/2008	Although there was some potential habitat in the broader study area this species is an uncommon visitor to the region and is considered unlikely to occur
Orange-bellied Parrot	<i>Neophema chrysogaster</i>	CE	M (JAMBA)	L	The Orange-bellied Parrot is endemic to south-eastern Australia. Its current non-breeding mainland distribution is from the mouth of the Murray River in South Australia, along the coast, to the east of Jack Smith Lake in South Gippsland, Victoria, covering approximately 1000 km of coastline. The most used sites in Victoria are around Port Phillip Bay and Bellarine Peninsula. In Victoria, they mostly occur in sheltered coastal habitats, such as bays, lagoons and estuaries, or, rarely, saltworks. They are also found in low samphire herbland dominated by Beaded Glasswort (<i>Sarcocornia quinqueflora</i>), Sea Heath (<i>Frankenia pauciflora</i>) or Sea-blite (<i>Suaeda australis</i>), and in taller shrubland dominated by Shrubby Glasswort (<i>Sclerostegia arbuscula</i>). Breeds at Melaleuca in Tas during spring/summer months (DoEE 2017b).	4	16/04/2013	No suitable habitat. Unlikely to occur.
Regent Honeyeater	<i>Anthochaera phrygia</i>	CR	M (JAMBA)	L	Inhabits dry box-ironbark eucalypt forests near rivers and creeks on inland slopes of the Great Dividing Range. It could also occur in small remnant patches or in mature trees in farmland or partly cleared agricultural land (Higgins et al. 2001).	None	N/A	No suitable habitat and lack of historical records. Unlikely to occur.
Rufous Fantail	<i>Rhipidura rufifrons</i>		M (Bonn Convention (A2H))		Primarily found in dense, moist habitats. Less often present in dry sclerophyll forests and woodlands (Higgins et al. 2006).	4	1/01/2006	No suitable habitat. Unlikely to occur.
Satin Flycatcher	<i>Myiagra cyanoleuca</i>		M (Bonn Convention (A2H))		Tall forests and woodlands in wetter habitats but not in rainforest (Higgins et al. 2006)	8	1/01/2006	No suitable habitat. Unlikely to occur.
Swift Parrot	<i>Lathamus discolor</i>	CR		L	Prefers a narrow range of eucalypts in Victoria, including White Box, Red Ironbark and Yellow Gum as well as River Red Gum when this species supports abundant 'lerp'. 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 and Tzaros 2005).	2	16/10/1997	No suitable habitat. Unlikely to occur.

Common Name	Scientific name	EPBC-T	EPBC-M	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>			L	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 and Higgins 1993).	6	3/05/2008	Habitat present but limited in extent (aquatic, prefers coastal inshore waters). Unlikely to occur
White-throated Needletail	<i>Hirundapus caudacutus</i>		M (JAMBA, CAMBA, ROKAMBA)		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).	27	4/02/2007	May occasionally pass through/fly over the study area. Potential to occur
Yellow Wagtail	<i>Motacilla flava</i>		M (JAMBA, CAMBA, ROKAMBA)		Extremely uncommon migrant. Few sightings in Victoria. Mostly occurs in well-watered open grasslands on the fringes of wetlands. Roosts in mangroves and other dense vegetation (DotE 2015).	None	N/A	No suitable habitat and lack of historical records. Unlikely to occur.
Mammals								
Broad-toothed Rat	<i>Mastacomys fuscus mordicus</i>	VU		L	Alpine sedges and heaths, wet sedge and grass patches in forest in eastern highlands, south gippsland highland and Otways (Menkhorst 1995).	None	N/A	No suitable habitat and lack of historical records. Unlikely to occur.
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	VU		L	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.	None	N/A	Little suitable habitat (flowering trees) and too distant from known roost areas (inner Melbourne) to expect regular commuting. Unlikely to occur.
Smoky Mouse	<i>Pseudomys fumeus</i>	EN		L	The Konoom 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. 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	None	N/A	No suitable habitat and lack of historical records. Unlikely to occur.
Southern Brown Bandicoot	<i>Isoodon obesulus obesulus</i>	EN		L	Species experts define suitable habitat for Southern Brown Bandicoots (eastern) 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 (<i>Rubus</i> spp.), can and often does, provide important habitat	20	19/04/2010	Habitat superficially suitable, but lacks sufficient dense, well drained cover needed by the species. Unlikely to occur.

Common Name	Scientific name	EPBC-T	EPBC-M	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
Swamp Antechinus	<i>Antechinus minimus maritimus</i>	VU		L	Dense wet heath, tussock grassland, sedgeland heathy woodland and coastal heath and scrub (Menkhorst 1995).	42	5/10/2015	Habitat superficially suitable, but ground cover too disturbed/modified from the usual habitat of the species. Unlikely to occur.
White-footed Dunnart	<i>Sminthopsis leucopus</i>			L	Coastal tussock grassland and sedgeland, wet heath, and forest or woodland with a dense heathy understorey or mid-storey vegetation (Menkhorst 1995).	34	5/10/2015	Habitat suboptimal - prefers vegetated dunes and less disturbed areas. Unlikely to occur.
Reptiles								
Leathery Turtle	<i>Dermochelys coriacea</i>	EN		L	Found in all coastal waters though less frequently in southern Australia (Cogger 2000).	2	14/01/2006	No suitable habitat. Unlikely to occur.
Swamp Skink	<i>Lissolepis coventryi</i>			L	Wetlands including swamp margins, lakes, rivers, creeks and even tidal salt marshes, often associated with tea-tree thickets (Wilson and Swan 2003).	10	5/06/2009	Habitat superficially suitable, but nearby records all from less disturbed habitats. Unlikely to occur.
Frogs								
Growling Grass Frog	<i>Litoria raniformis</i>	VU		L	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 and Gillespie 2004).	12	1/02/1991	Potential to occur in aquatic habitat in Habitat Zone Cl. Most recent record in the search region from 1991. Potential to occur
Invertebrates								
Giant Gippsland Earthworm	<i>Megascolides australis</i>	VU		L	It is generally found in the deep blue-grey clay-like soils over cretaceous rocks in the western Strzelecki Ranges and in the alluvial soils in depositional zones to the north and south-west (Smith & Peterson 1982, Yen & Van Praagh 1993).	2	1/01/1980	No suitable habitat (moist soils near drainage lines close to base of hills). Unlikely to occur.
Golden Sun Moth	<i>Synemon plana</i>	CR		L	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).	None	N/A	No suitable habitat. Unlikely to occur.
Fish								
Australian Grayling	<i>Prototroctes maraena</i>	VU		L	Large and small coastal streams and rivers with cool, clear waters with a gravel substrate and altering pools and riffles (Cadwallader and Backhouse 1983).	None	N/A	No suitable habitat. Unlikely to occur.
Dwarf Galaxias	<i>Galaxiella pusilla</i>	VU		L	Barwon River to Mitchell River. Vegetated margins of still water, ditches, swamps and backwaters of creeks, both ephemeral and permanent (Allen et al. 2002).	None	N/A	No suitable habitat. Unlikely to occur.

Notes: EPBC-T = threatened species status under EPBC Act; EX = presumed extinct in the wild; CE = 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; L = listed as threatened under the FFG Act.

5.6.3. 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

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

- **Eastern Great Egret**

(FFG Act-listed)

There are numerous records of the Eastern Great Egret from the region where it usually occurs on the more extensive wetlands and intertidal zones of the coast. It may occur from time to time at the sedge wetland, and could occur regularly in the more open waters of Wonthaggi Wetlands.

This wetland species has the potential to occur infrequently on the vegetated farm dams within the study area. Although not key breeding habitat, the dams in the study area provide foraging habitat. Given the widespread distribution of this species, there are unlikely to be any impacts on its population overall, arising from this development.

Migratory Birds

Three 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: migratory)

Latham's Snipe is a migratory species that visits south-eastern Australia from August to February. The species is a very agile and inconspicuous and generally feeds in low light. The species is highly mobile and abundant suitable habitat was present at a vegetated dam in the southern section of the study area (south of Bass Highway) where the species was recorded. Given that most of the habitats in the study area are unsuitable to support the species, it would possibly suffer a very small loss of suitable habitat in the study area. This mobile species will probably not be affected significantly by the development proposal, particularly if mitigation is implemented.

- **Fork-tailed Swift, White-throated Needletail**

(EPBC Act: Migratory (JAMBA, CAMBA, ROKAMBA))

These two species occur in Victoria usually in summer or early autumn and may be expected to forage over the study area for several days each year. It is likely to occur occasionally over the Wonthaggi study area, but due to its extensive range across Australia in the non-breeding season and minimal loss of flying insect prey, they are unlikely to be significantly affected by this proposed development.

Frogs

One listed frog has the potential to occur in the study area, discussed below.

- **Growling Grass Frog** (EPBC Act: vulnerable)

Recent records of Growling Grass Frog are scarce in the search region. Habitat in the study area was largely limited to suboptimal habitat. One area of aquatic habitat (Habitat Zone CI) has the potential to support Growling Grass Frog – several other common frog species (Eastern Banjo Frog, Common Froglet, Striped Marsh Frog) were heard calling from this wetland area during the September 2018 survey. Based on the current design for the roundabout and PSP development area, it is understood that this wetland will not be impacted. As such, there will be no impacts to Growling Grass Frog from the current development.

Any future works that may impact on this area of wetland should consider potential impacts on the Growling Grass Frog.

Other fauna

No listed mammal, reptile, fish or invertebrate species are considered to have the potential to occur in the study area.

It is therefore unlikely that any listed species would experience impacts from the proposed development.

5.7. Listed ecological communities

According to the EPBC Act Protected Matters Search Tool report dated 24th January 2017, one EPBC Act listed ecological community, the *Natural Damp Grasslands of the Victorian Coastal Plains* was noted as having the potential to occur in the study area. Based on the current detailed assessment of native vegetation in the study area, it was noted that no EPBC Act listed ecological communities occur in the study area.

6. Impacts of Proposed Development

6.1. Proposed development

The current proposal involves the future development of the study area for the purpose of the North East Wonthaggi Precinct Structure Plan (PSP). Development within this area will include residential, business and industrial use.

Based on additional detail provided in September 2018, it is understood that a roundabout is proposed as part of the PSP development, namely at the intersection of Bass Hwy and Carneys Road. Impacts from the development have now also been considered.

6.2. Impacts of proposed development

Impacts are presented in this section based on feedback received from Bass Coast Shire Council in late March 2017 in regards to which areas of native vegetation are to be retained or removed (Figures 5 to 35).

Impacts to native vegetation from the proposed roundabout at the intersection of Bass Highway and Carneys Road was determined based on plans provided by Bass Coast Shire Council which outlined the limit of works.

Impacts on ecological values are outlined below.

6.2.1. Native vegetation

Impacts to native vegetation are detailed in the Native Vegetation Removal (NVR) report provided from DELWP (Appendix 8). This determined the development of the Wonthaggi North East PSP would result in a total 'extent' loss of 7.540 hectares of native vegetation including 14 large trees (10 of which were scattered trees and four from within patches of native vegetation). It is important to note that the extent loss (7.540 ha) includes the loss of 71 scattered trees (10 large and 61 small) which have been converted to an area as per DELWP's required data standards.

It is understood that no native vegetation has been approved for removal on the properties relevant to the PSP area within the last five years.

6.2.2. Modelled species important habitat

The current proposal will not have a proportional impact on modelled habitat above the specific offset threshold for any rare or threatened species listed on DELWP's advisory lists (See Appendix 8).

6.2.3. Listed flora species

The analysis of the likelihood of occurrence of listed flora species presented in Section 5.4.2 identified that no listed flora species are likely to occur in the study area. Therefore, none would be impacted by any development in the study area.

6.2.4. Fauna habitat

Main fauna habitat linkages are to be retained under the current proposal. Residual fauna habitats likely to be affected are low quality linear patches of scrub along roadsides.

Vegetated dams and drainage lines that support waterbirds may be impacted. The aquatic bird species would have the advantage of being able to move away from a habitat whose quality has deteriorated.

6.2.5. Listed fauna species

The analysis of susceptibility of listed fauna species to impacts presented in Section 5.6.3 identified that no fauna species will be significantly impacted by the development.

6.2.6. Threatened ecological communities

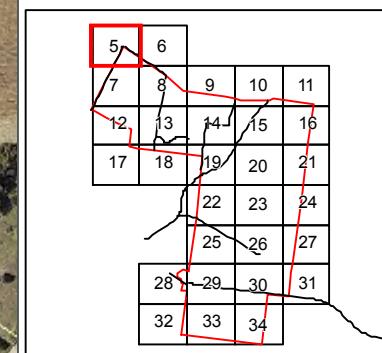
No threatened ecological communities occur in the study area, therefore none will be impacted.

Figure 5-34: Vegetation proposed to be retained and removed

Figure 5: Study area and native vegetation

Project: North East Wonthaggi PSP
Client: Bass Coast Shire Council
Date: 14/01/2020

- Study area
- Remnant Patches of Native Vegetation to be Removed (3)
- Remnant Patches of Native Vegetation to be Retained (3)
- Native trees**
- Small ST (11)
- ⊗ Native trees to be Removed (11)



Metres
 0 40



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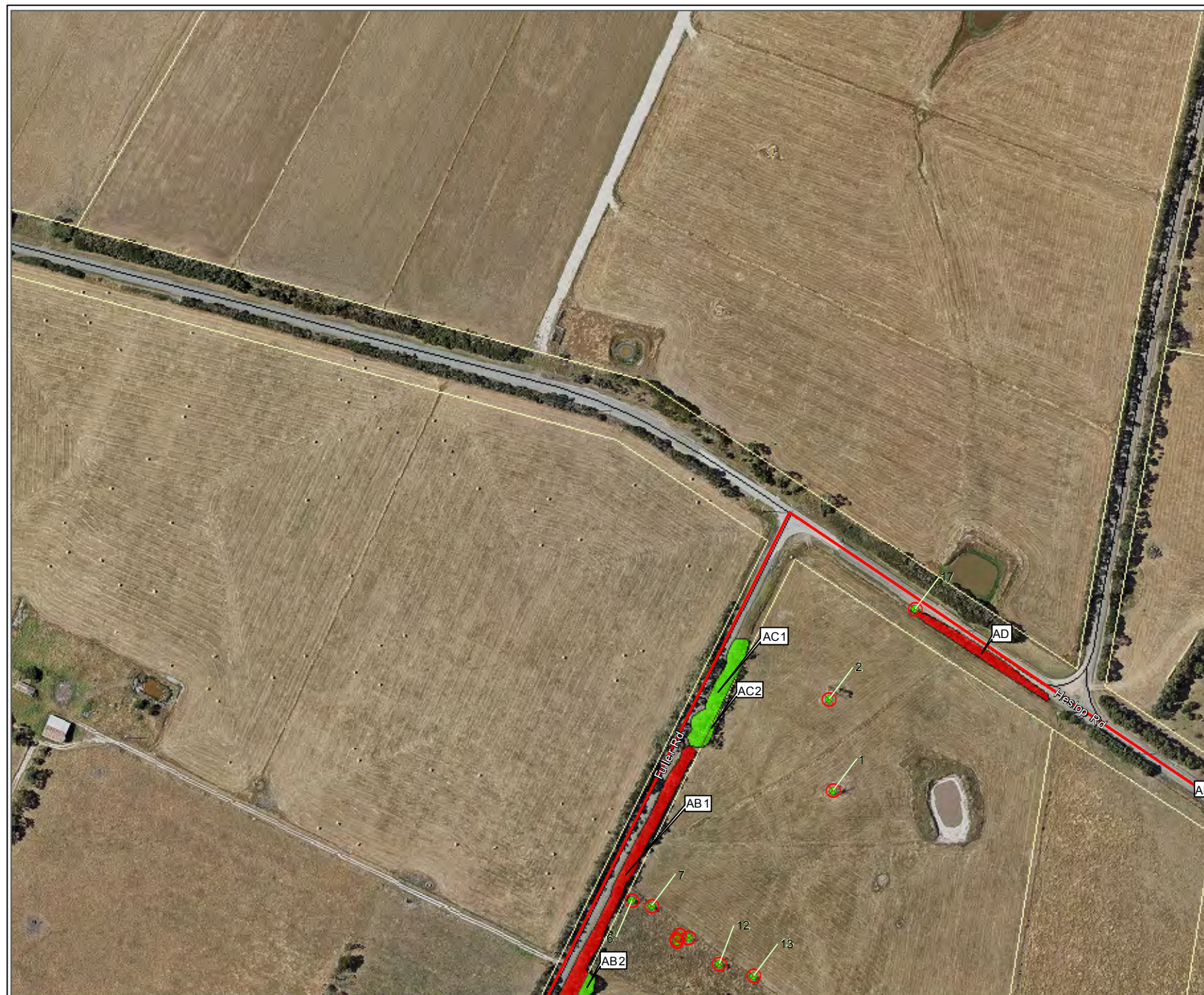
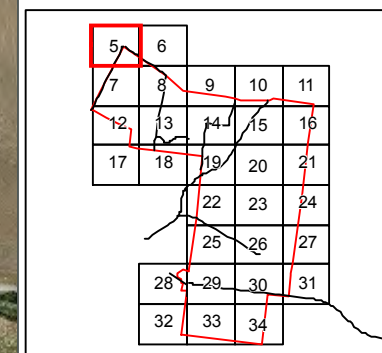


Figure 6: Study area and native vegetation

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Client: Bass Coast Shire Council
Date: 14/01/2020

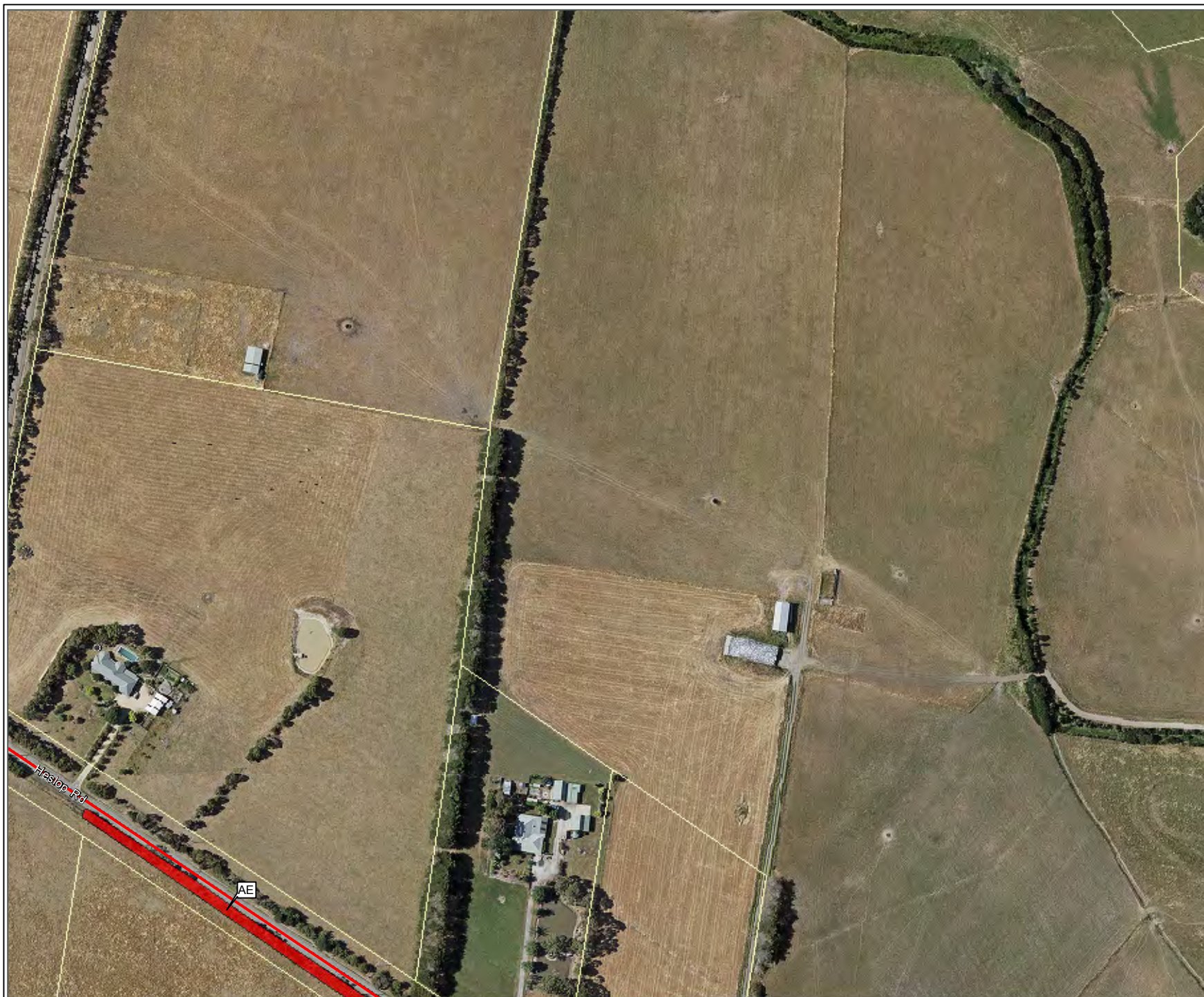
- Study area
- Remnant Patches of Native Vegetation to be Removed (1)



Metres
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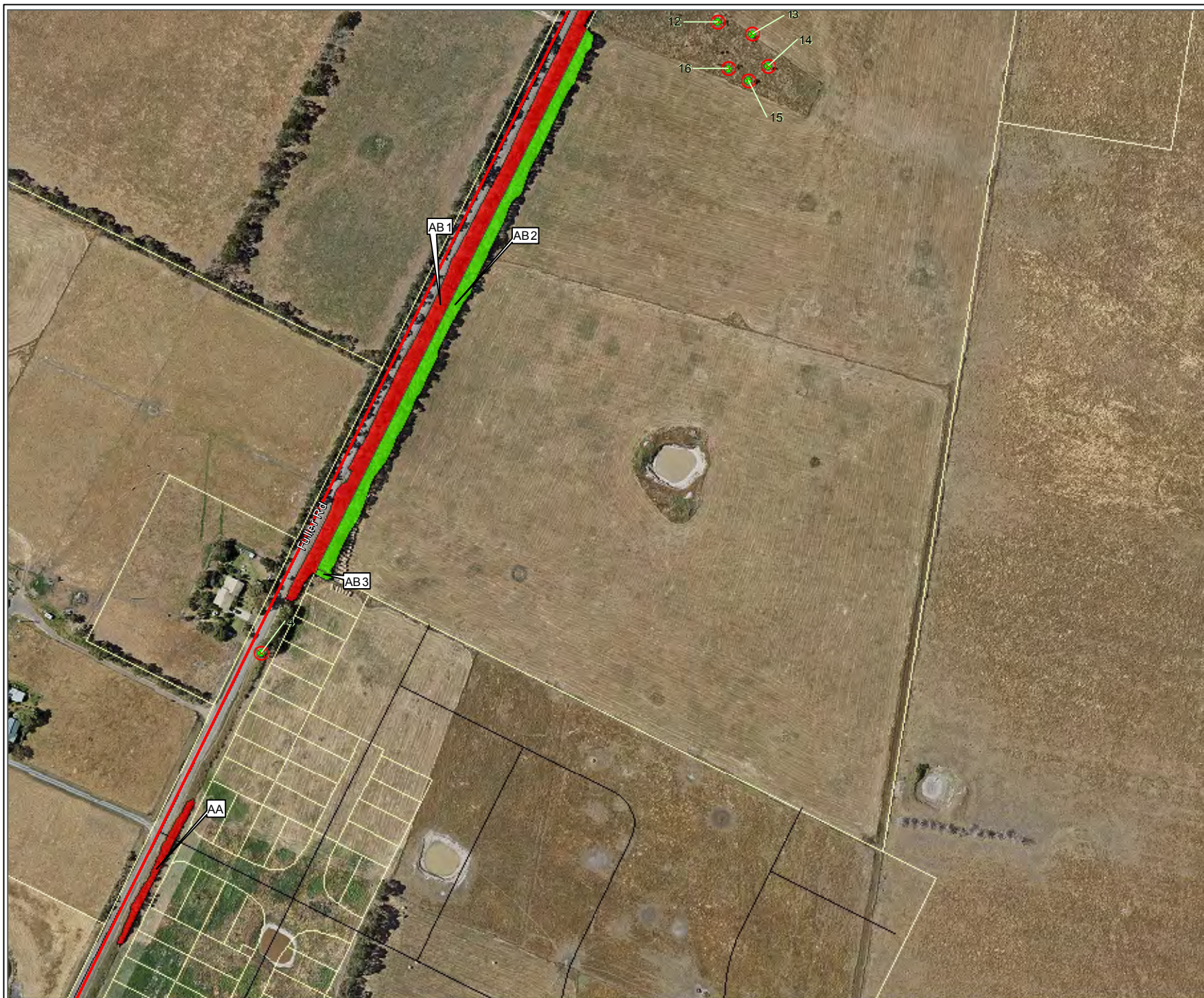
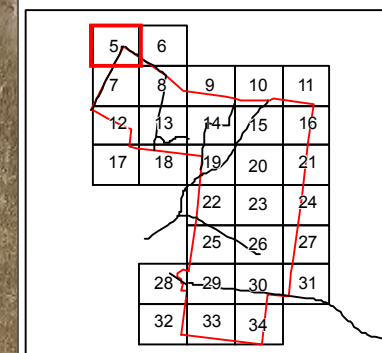


Figure 7: Study area and native vegetation

Project: North East Wonthaggi PSP
Client: Bass Coast Shire Council
Date: 14/01/2020

- Study area
- Remnant Patches of Native Vegetation to be Removed (2)
- Remnant Patches of Native Vegetation to be Retained (2)
- Native trees**
 - Small ST (6)
 - ⊗ Native trees to be Removed (6)



Metres
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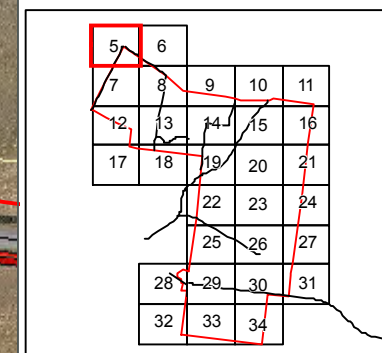
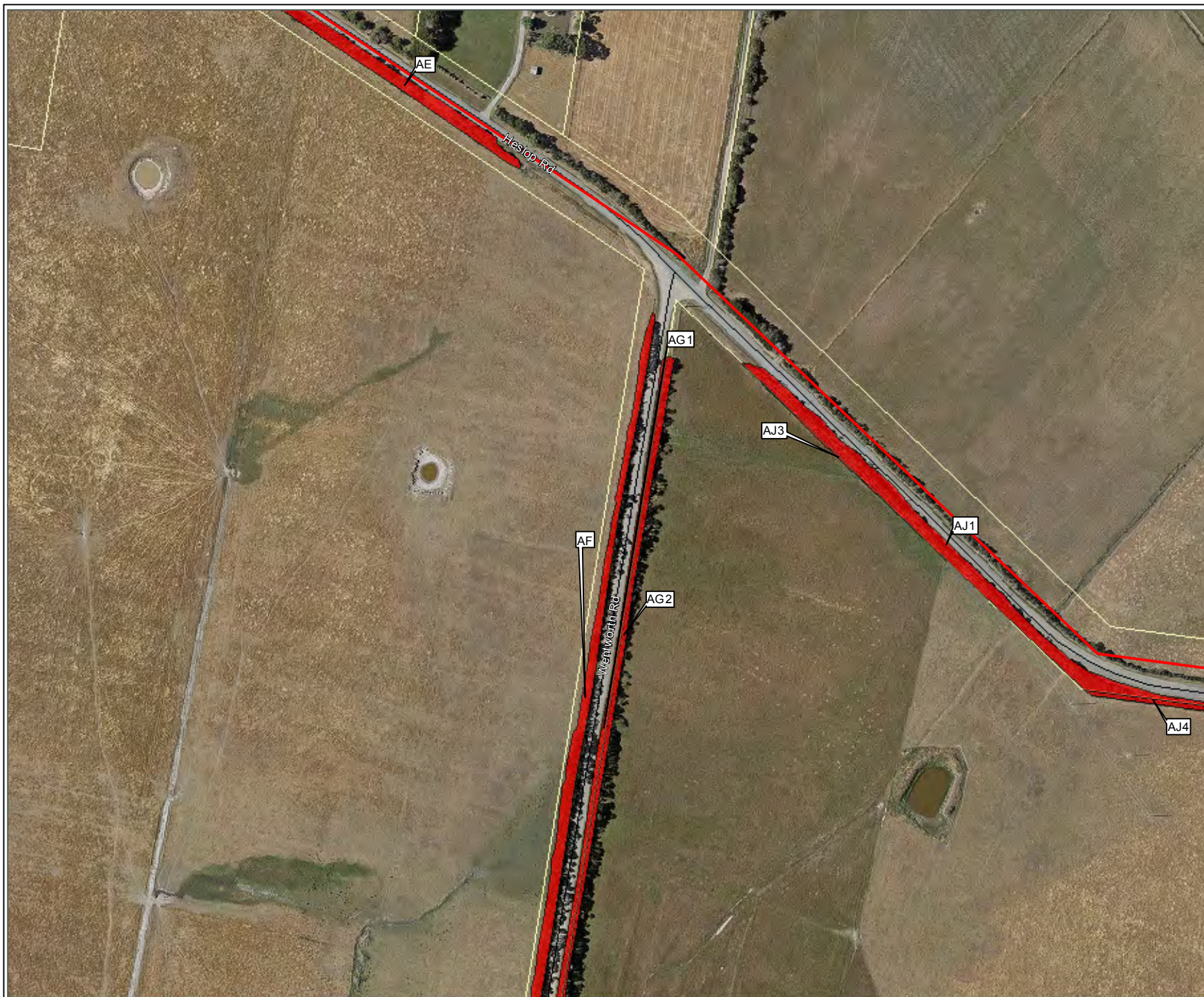


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Figure 8: Study area and native vegetation

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Client: Bass Coast Shire Council
Date: 14/01/2020

- Study area
- Remnant Patches of Native Vegetation to be Removed (7)



Metres
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Figure 9: Study area and native vegetation

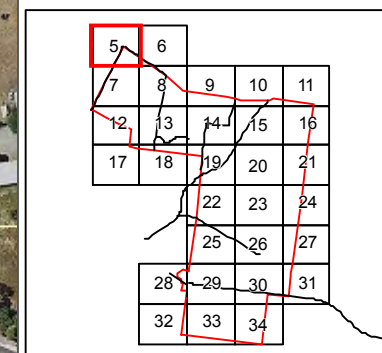
Project: North East Wonthaggi PSP

Client: Bass Coast Shire Council

Date: 14/01/2020

 Study area

Remnant Patches of Native
 Vegetation to be Removed
 (7)



Metres



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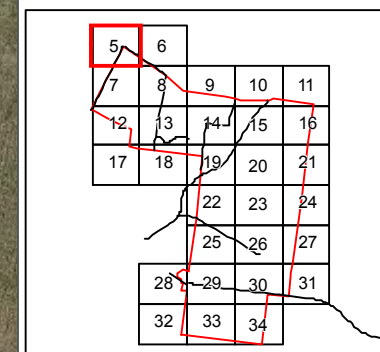
Figure 11: Study area and native vegetation

Project: North East Wonthaggi PSP

Client: Bass Coast Shire Council

Date: 14/01/2020

 Study area



Metres
0 40



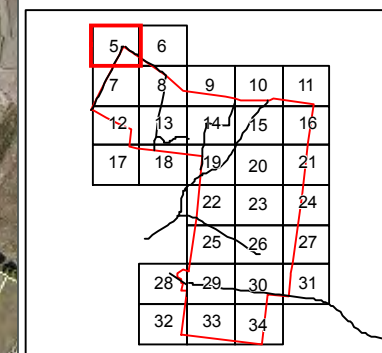
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Figure 12: Study area and native vegetation

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Client: Bass Coast Shire Council
Date: 14/01/2020

 Study area



Metres
 0 40

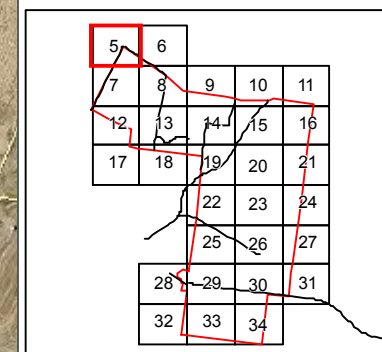


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Figure 13: Study area and native vegetation

Project: North East Wonthaggi PSP
Client: Bass Coast Shire Council
Date: 14/01/2020

- Study area
- Remnant Patches of Native Vegetation to be Removed (3)
- Remnant Patches of Native Vegetation to be Retained (4)
- Native trees**
 - Small ST (1)
 - ⊗ Native trees to be Removed (1)



Metres
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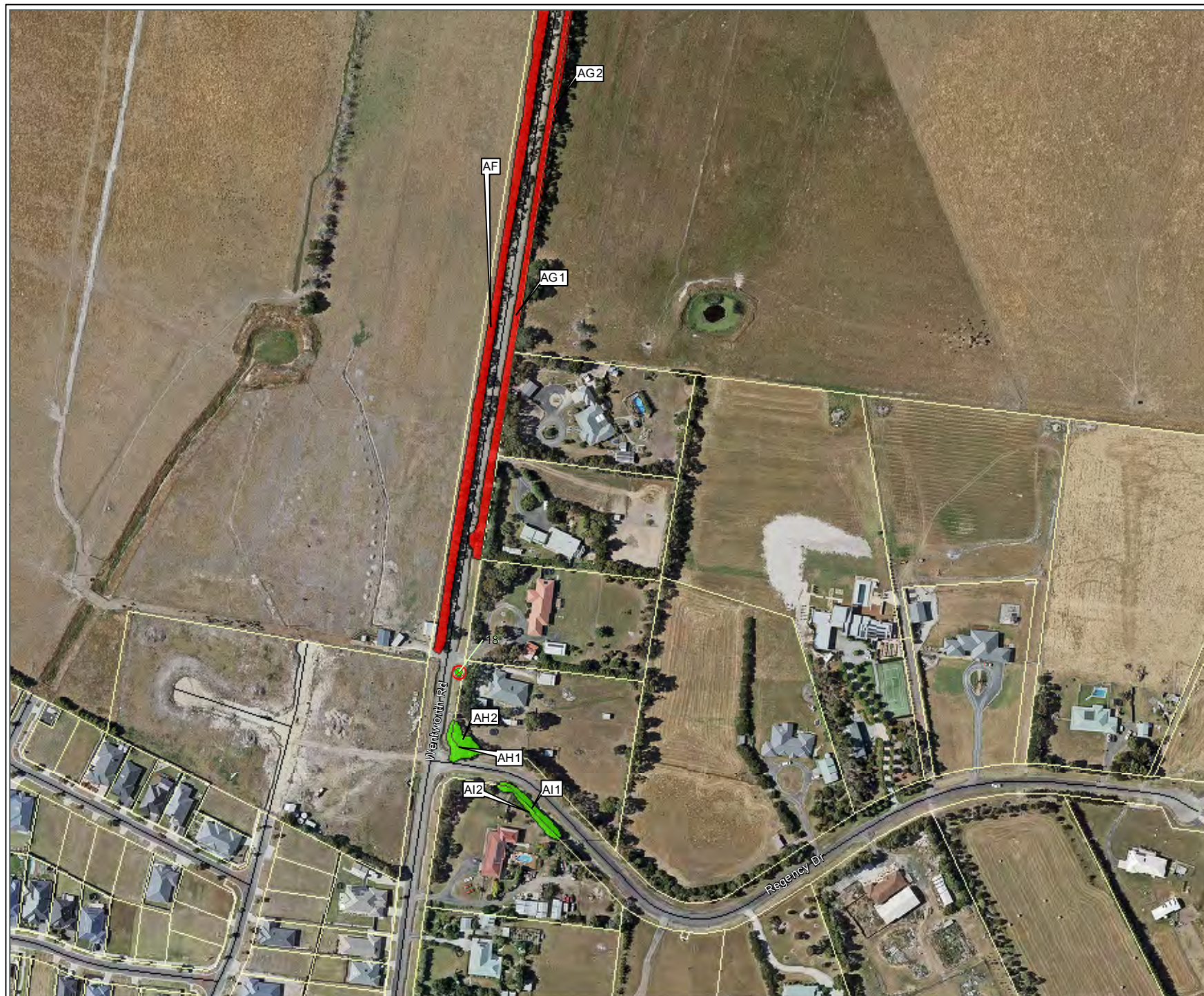
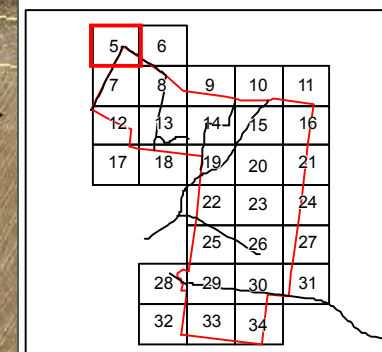
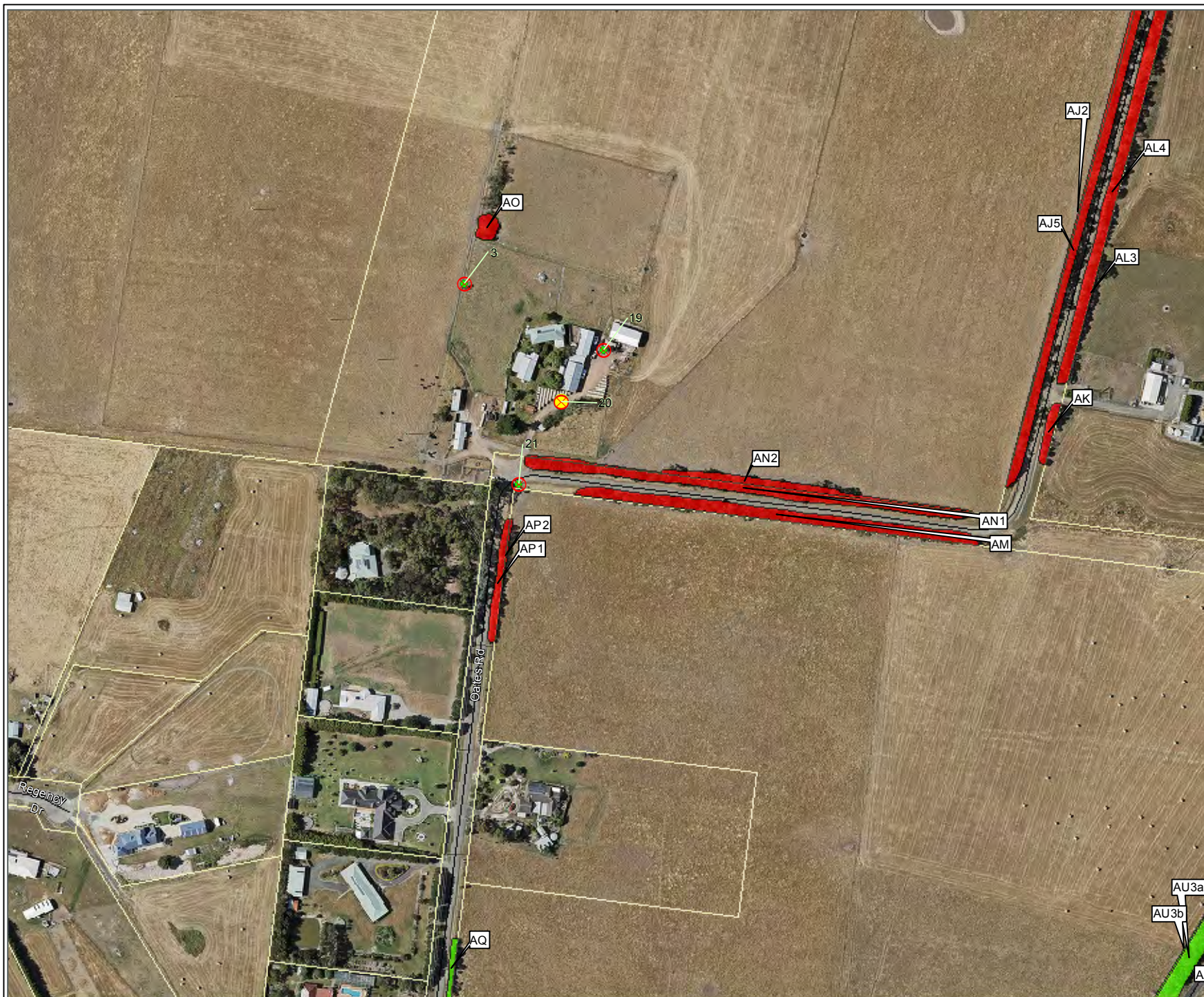


Figure 14: Study area and native vegetation

Project: North East Wonthaggi PSP
Client: Bass Coast Shire Council
Date: 14/01/2020

- Study area
- Remnant Patches of Native Vegetation to be Removed (11)
- Remnant Patches of Native Vegetation to be Retained (4)
- Native trees**
 - Large scattered tree (1)
 - Small ST (3)
 - Native trees to be Removed (4)



Metres
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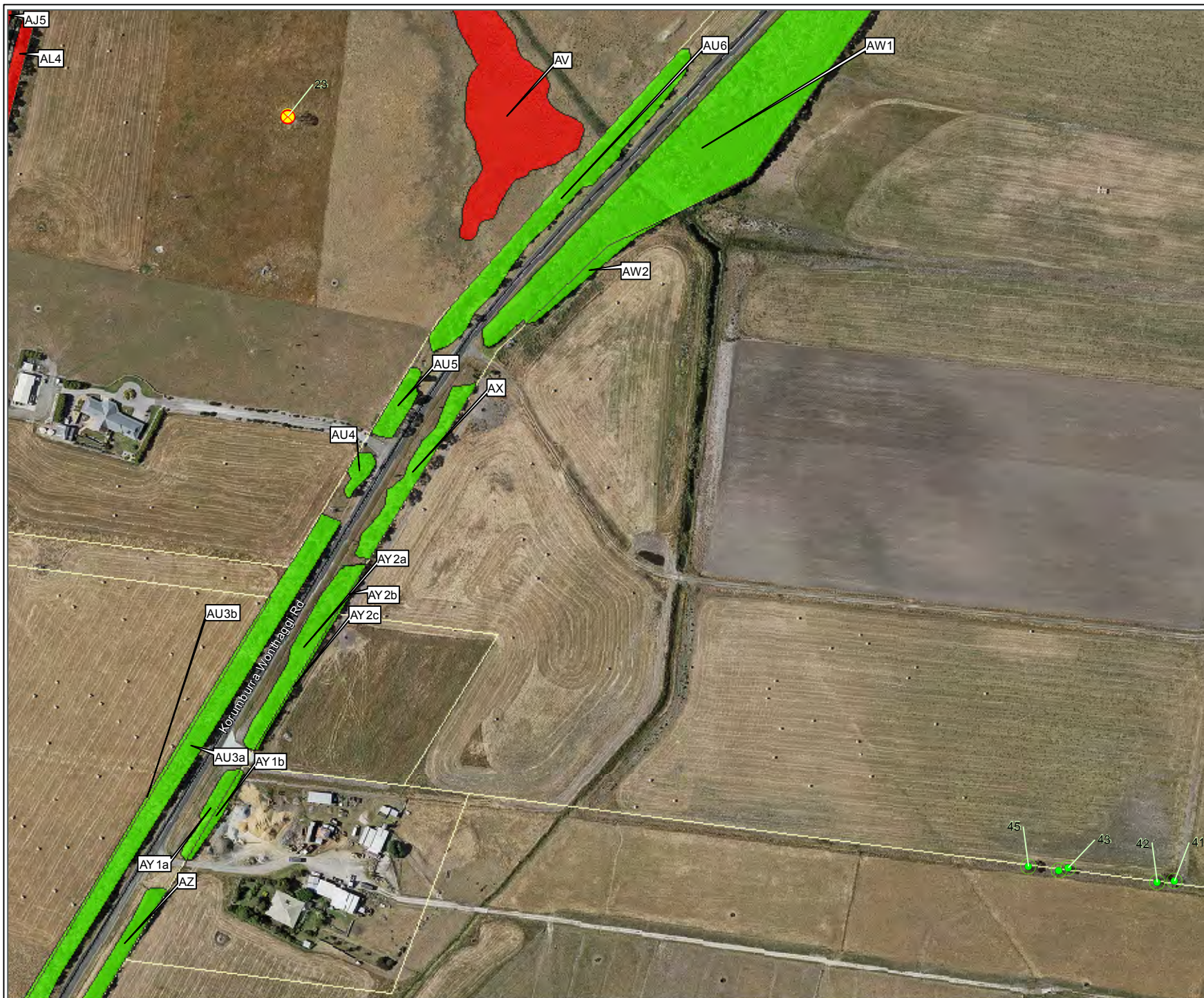
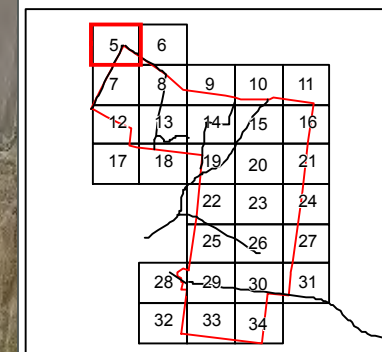


Figure 15: Study area and native vegetation

Project: North East Wonthaggi PSP
Client: Bass Coast Shire Council
Date: 14/01/2020

- Study area
- Remnant Patches of Native Vegetation to be Removed (3)
- Remnant Patches of Native Vegetation to be Retained (14)
- Native trees**
- Large scattered tree (1)
- Small ST (5)
- ⊗ Native trees to be Removed (1)
- Native trees to be Retained (5)



Metres
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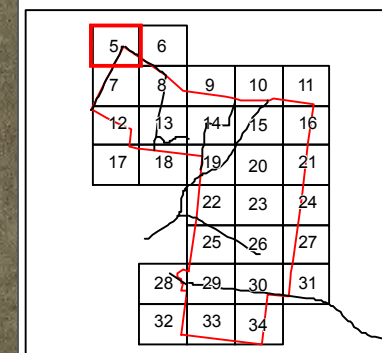
Figure 16: Study area and native vegetation

Project: North East Wonthaggi PSP
Client: Bass Coast Shire Council
Date: 14/01/2020

 Study area

Native trees

-  Small ST (19)
-  Native trees to be Retained (19)



Metres
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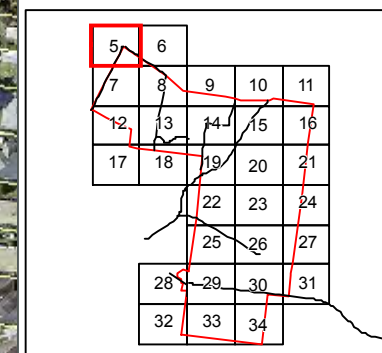
Figure 17: Study area and native vegetation

Project: North East Wonthaggi PSP

Client: Bass Coast Shire Council

Date: 14/01/2020

 Study area



Metres
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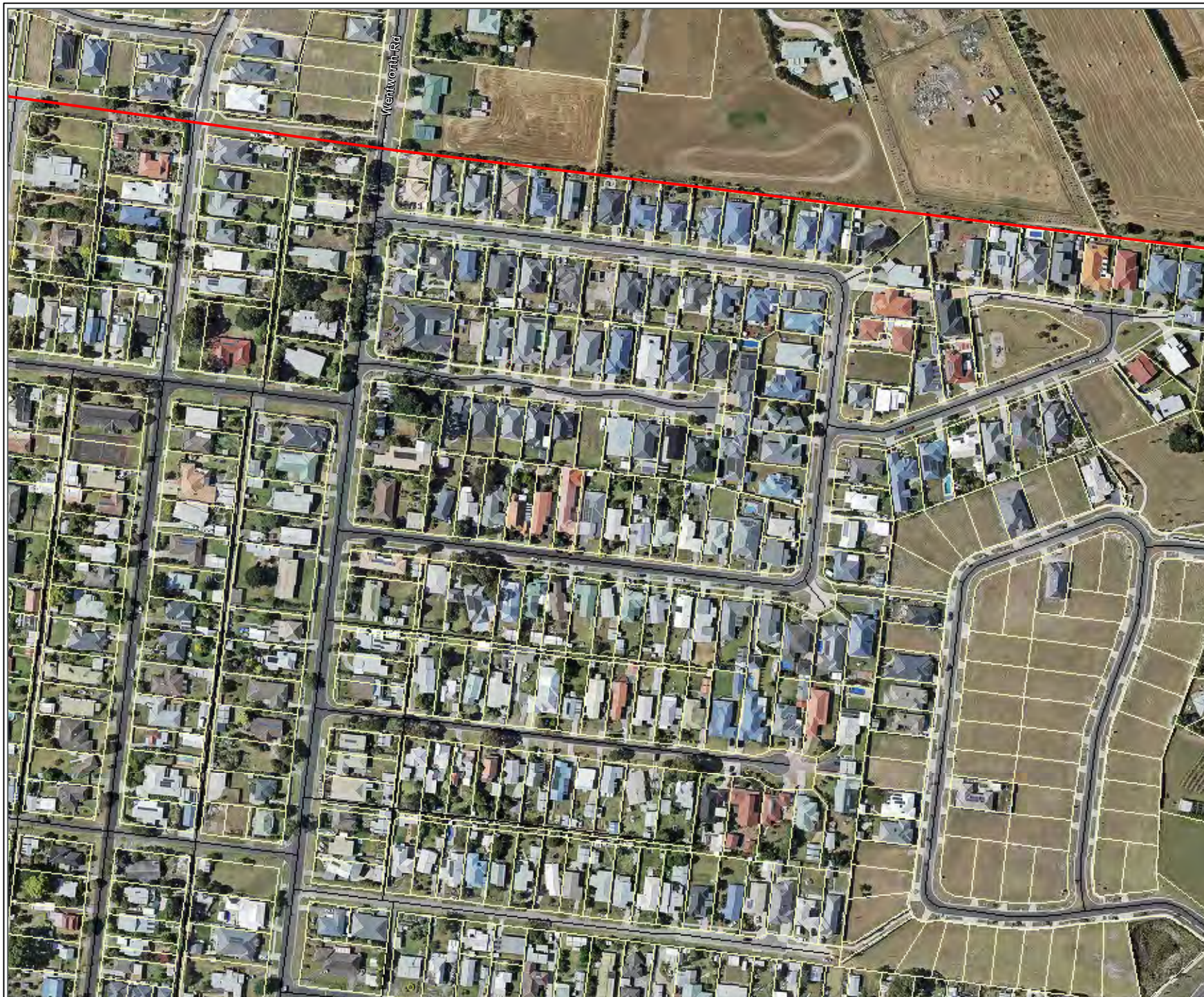
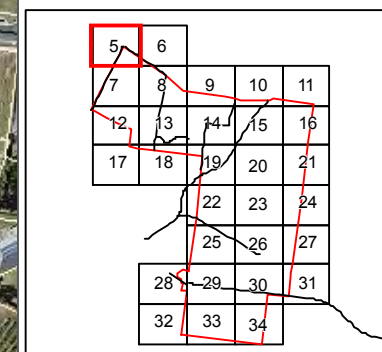


Figure 18: Study area and native vegetation

Project: North East Wonthaggi PSP
Client: Bass Coast Shire Council
Date: 14/01/2020

 Study area



Metres
 0 40



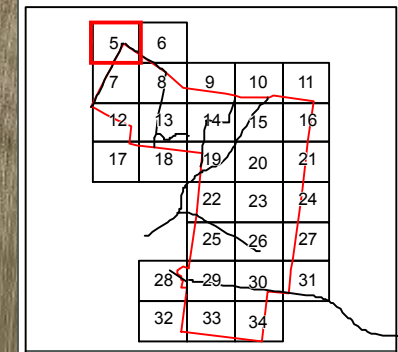
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Figure 19: Study area and native vegetation

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Client: Bass Coast Shire Council
Date: 14/01/2020

Study area
 Remnant Patches of Native Vegetation to be Retained (16)



N

Metres
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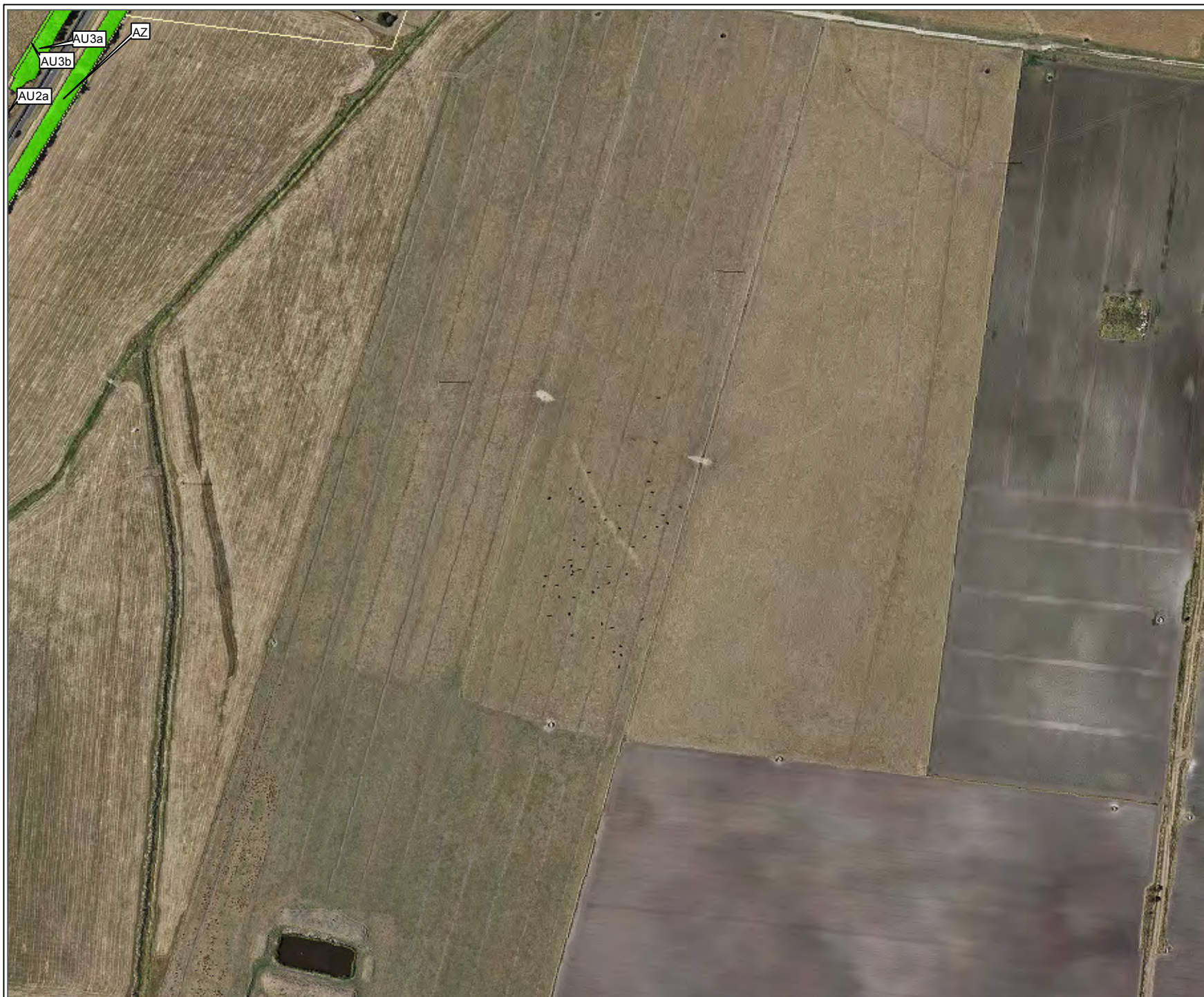
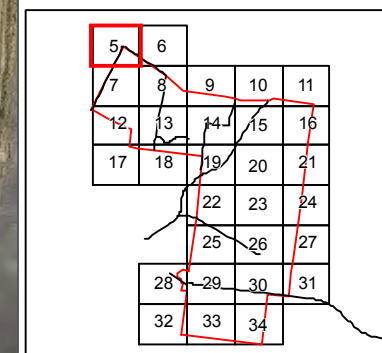


Figure 20: Study area and native vegetation

Project: North East Wonthaggi PSP
Client: Bass Coast Shire Council
Date: 14/01/2020

- Study area
- Remnant Patches of Native Vegetation to be Retained (4)



Metres
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Figure 21: Study area and native vegetation

Project: North East Wonthaggi PSP

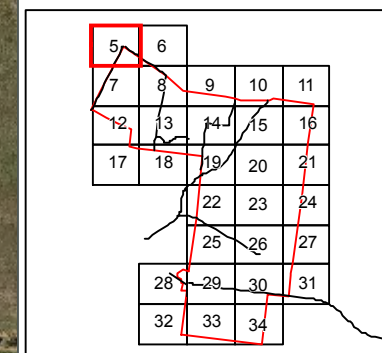
Client: Bass Coast Shire Council

Date: 14/01/2020

Study area

Native trees

- Small ST (3)
- Native trees to be Removed (2)
- Native trees to be Retained (1)



Metres
0 40



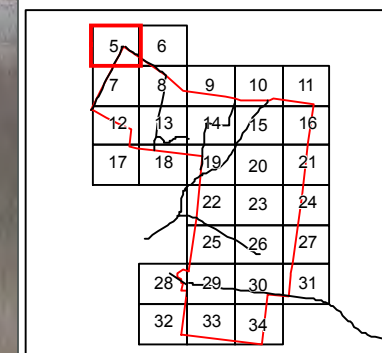
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Figure 22: Study area and native vegetation

Project: North East Wonthaggi PSP
Client: Bass Coast Shire Council
Date: 14/01/2020

- Study area
- Remnant Patches of Native Vegetation to be Retained (5)



Metres
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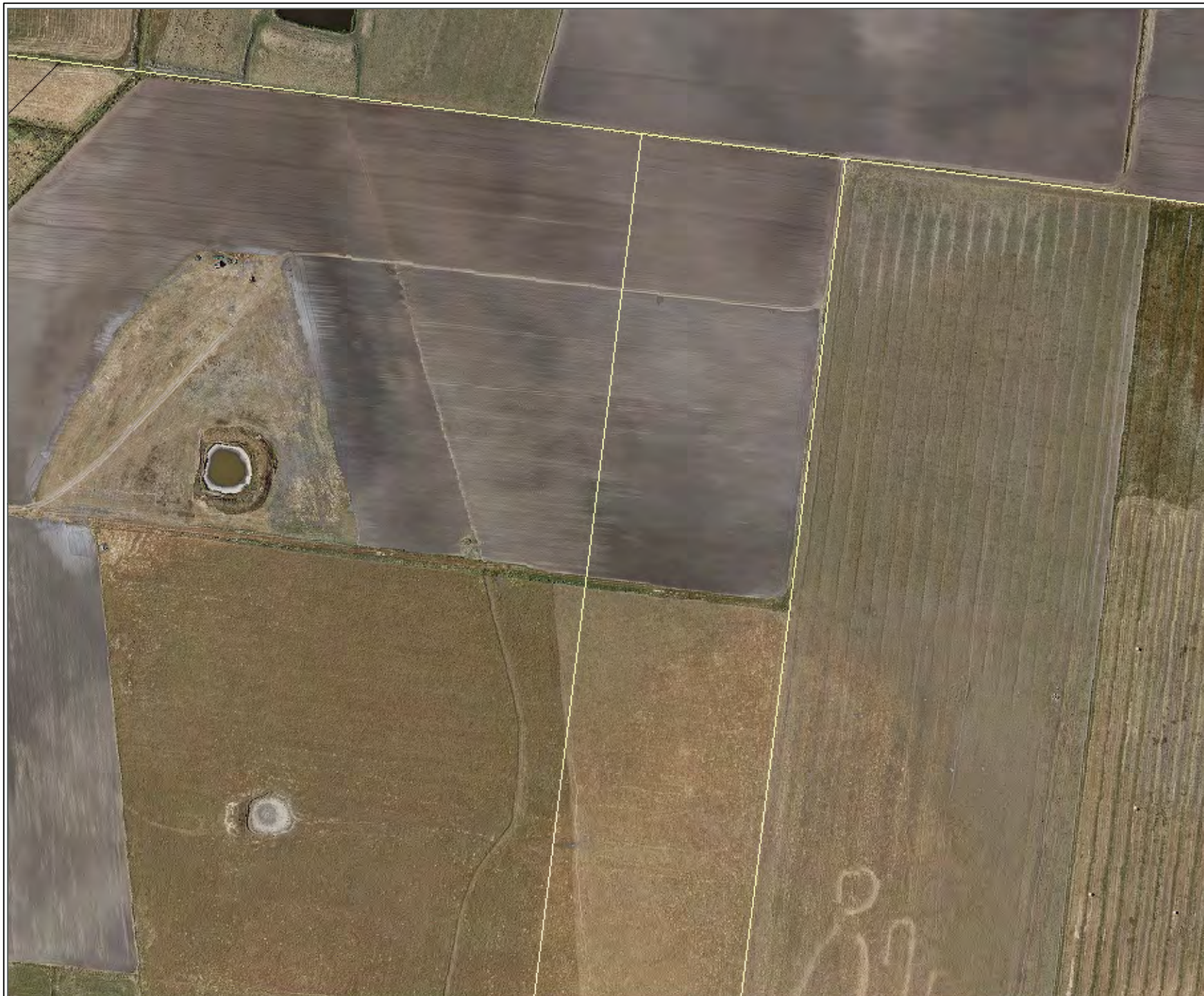


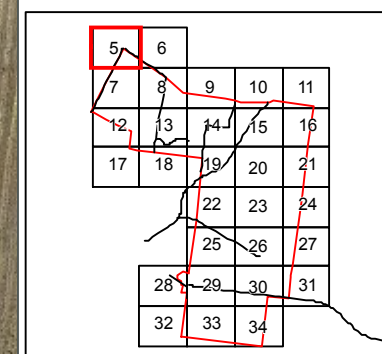
Figure 23: Study area and native vegetation

Project: North East Wonthaggi PSP

Client: Bass Coast Shire Council

Date: 14/01/2020

 Study area



Metres
0 40



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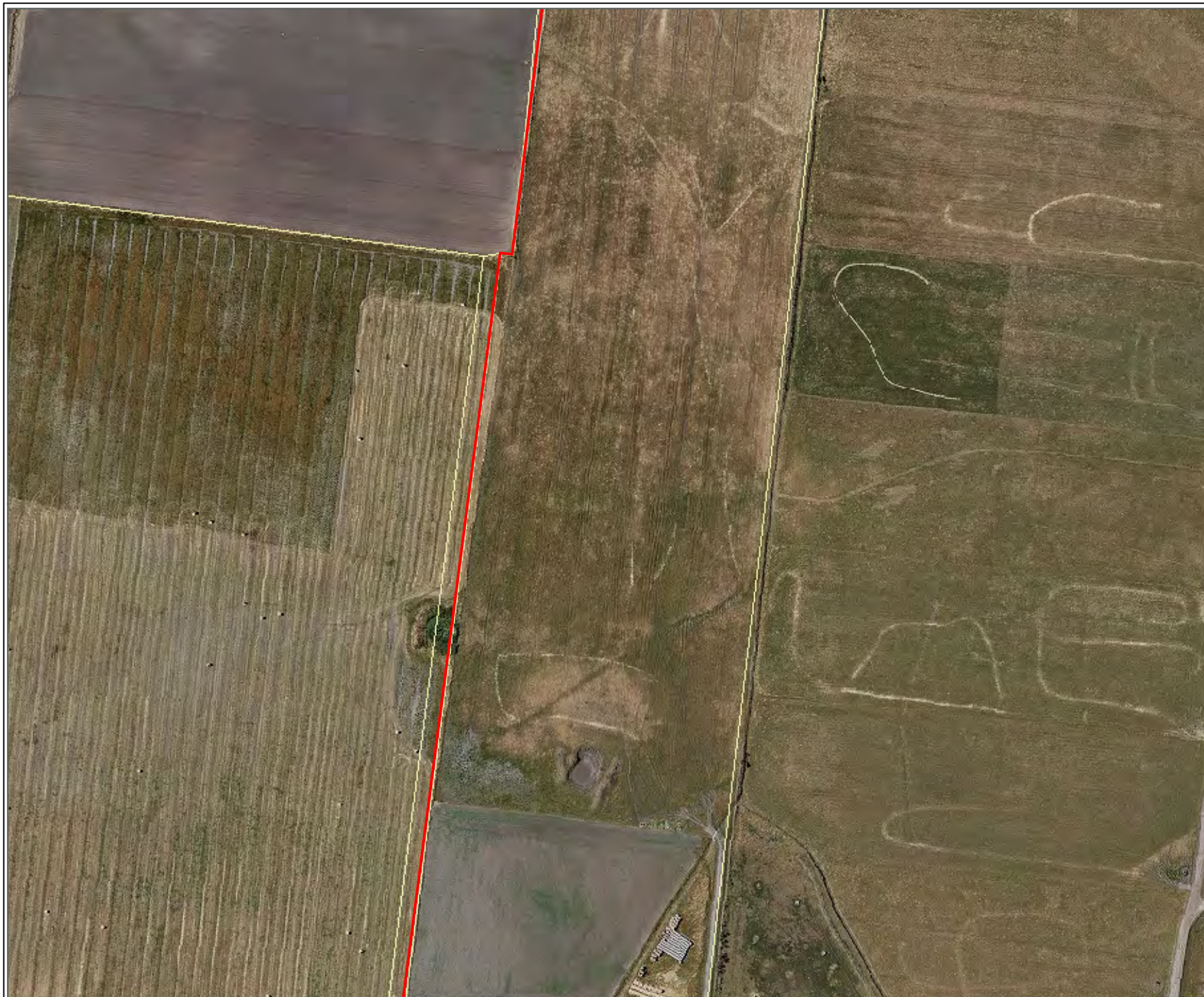


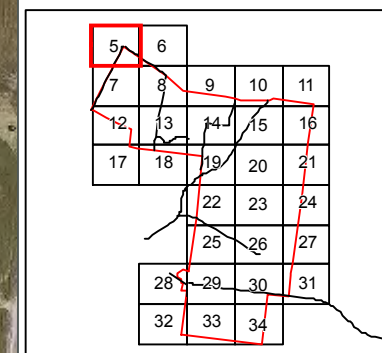
Figure 24: Study area and native vegetation

Project: North East Wonthaggi PSP

Client: Bass Coast Shire Council

Date: 14/01/2020

 Study area



Metres
0 40



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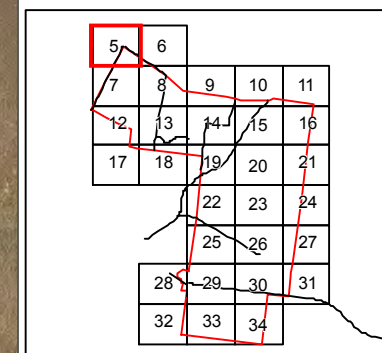
Figure 25: Study area and native vegetation

Project: North East Wonthaggi PSP
Client: Bass Coast Shire Council
Date: 14/01/2020

- Study area
- Remnant Patches of Native Vegetation to be Retained (8)

Native trees

- Small ST (2)
- ⊗ Native trees to be Removed (2)



Metres
 0 40

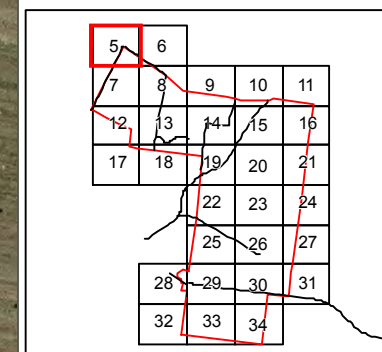
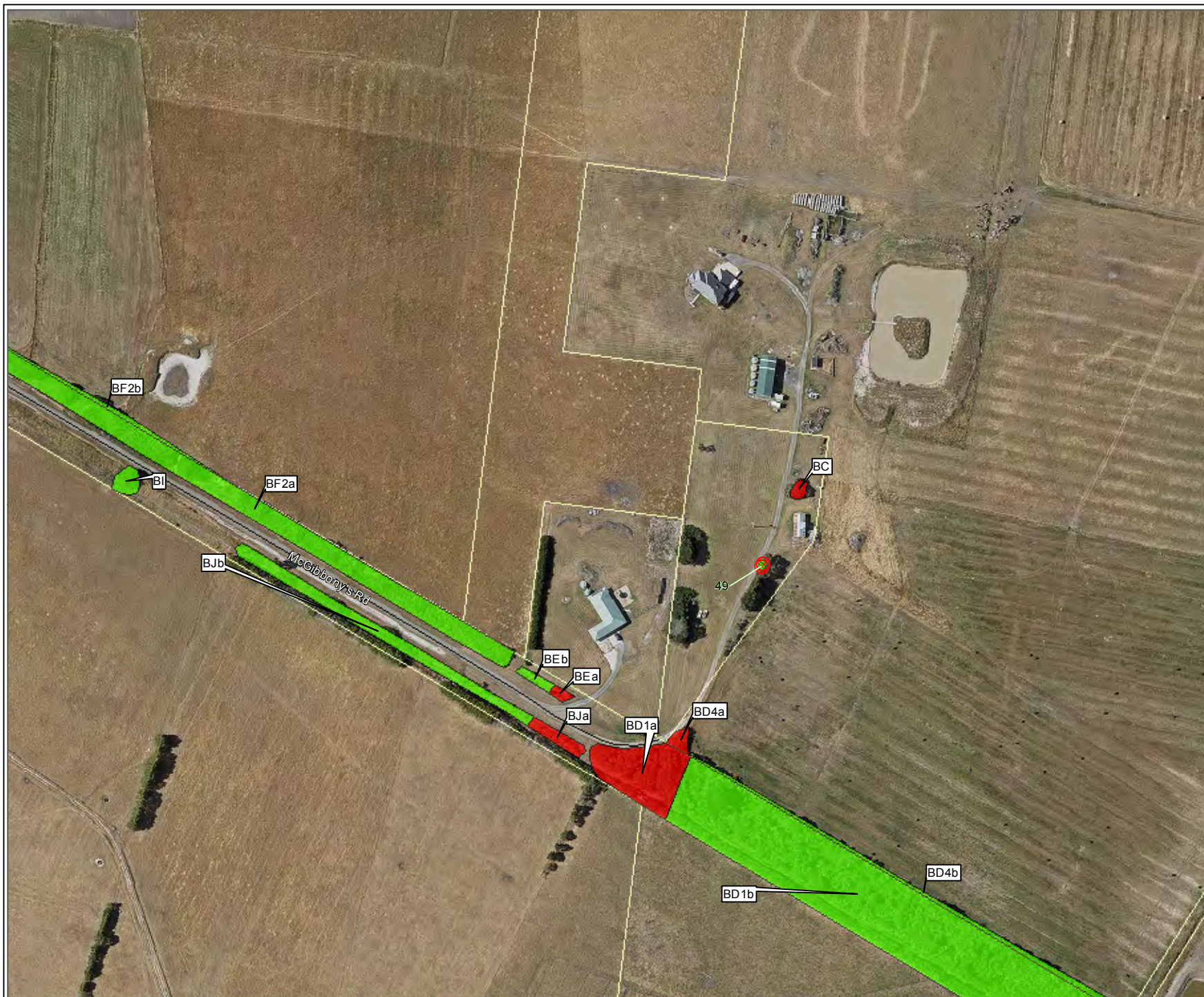


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Figure 26: Study area and native vegetation

Project: North East Wonthaggi PSP
Client: Bass Coast Shire Council
Date: 14/01/2020

- Study area
- Remnant Patches of Native Vegetation to be Removed (5)
- Remnant Patches of Native Vegetation to be Retained (7)
- Native trees**
 - Small ST (2)
 - ⊗ Native trees to be Removed (2)



Metres
 0 40



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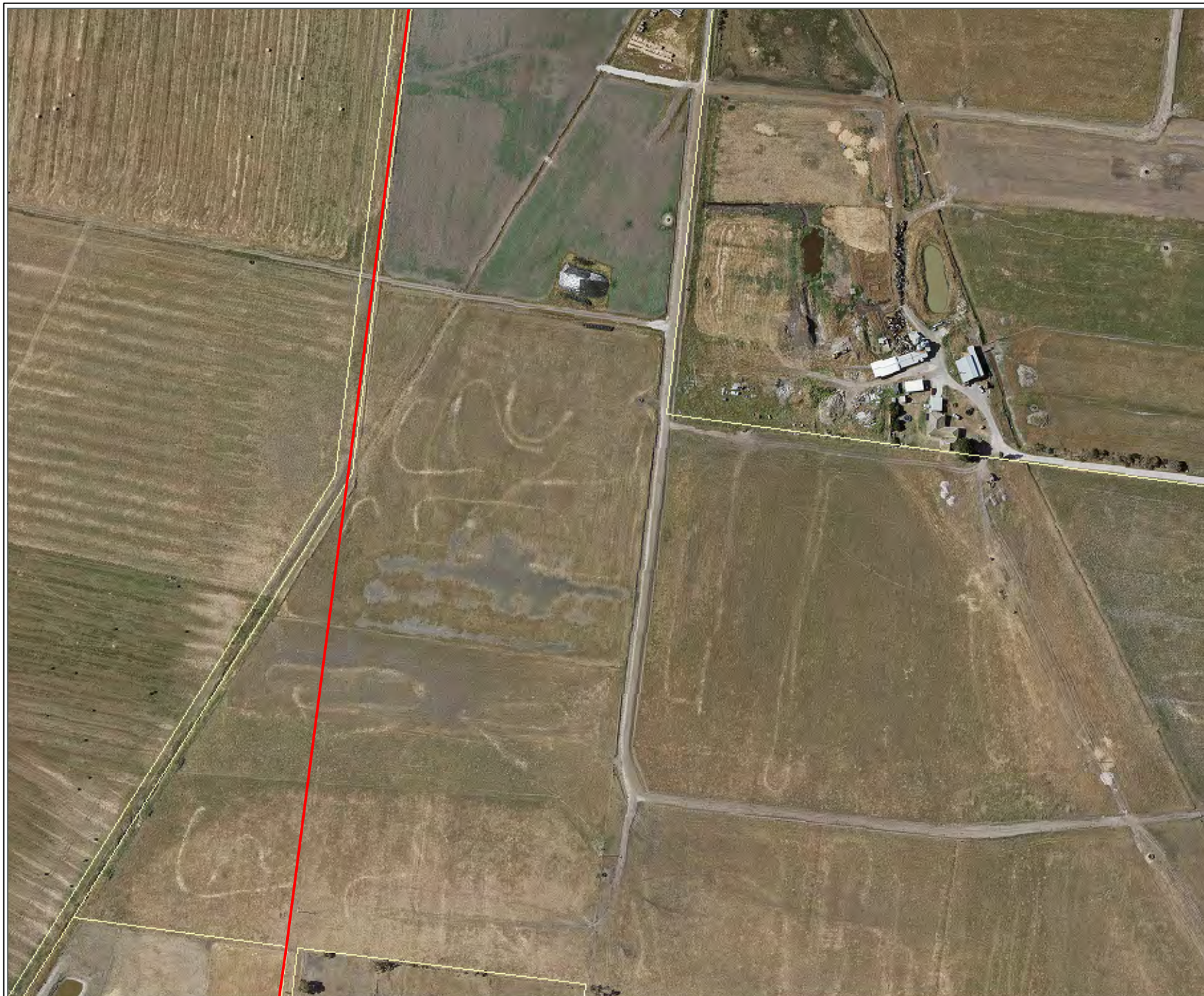
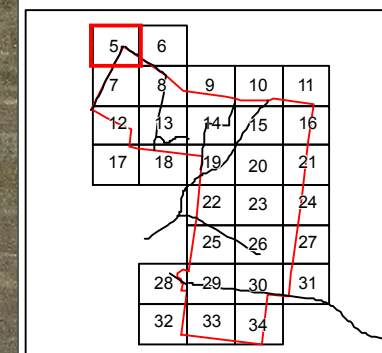


Figure 27: Study area and native vegetation

Project: North East Wonthaggi PSP
Client: Bass Coast Shire Council
Date: 14/01/2020

 Study area



Metres
 0 40



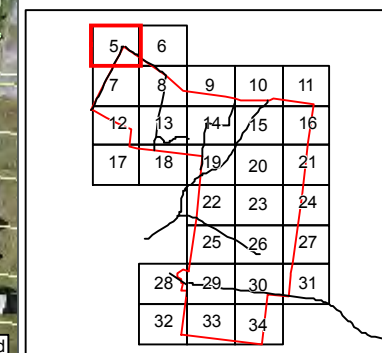
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Figure 28: Study area and native vegetation

Project: North East Wonthaggi PSP
Client: Bass Coast Shire Council
Date: 14/01/2020

- Study area
- Remnant Patches of Native Vegetation to be Removed (4)
- Remnant Patches of Native Vegetation to be Retained (11)
- Native trees**
 - Small ST (2)
 - Large Tree in HZ (2)
 - ⊗ Native trees to be Removed (2)
 - Native trees to be Retained (2)



Metres
 0 40

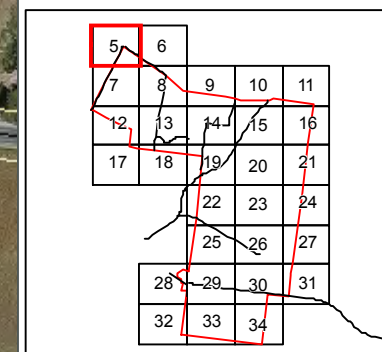


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Figure 29: Study area and native vegetation

Project: North East Wonthaggi PSP
Client: Bass Coast Shire Council
Date: 14/01/2020

- Study area
- Remnant Patches of Native Vegetation to be Removed (23)
- Remnant Patches of Native Vegetation to be Retained (13)
- Native trees**
 - Large scattered tree (3)
 - Small ST (18)
 - Large Tree in HZ (6)
 - ⊗ Native trees to be Removed (26)
 - Native trees to be Retained (2)



Metres
 0 40



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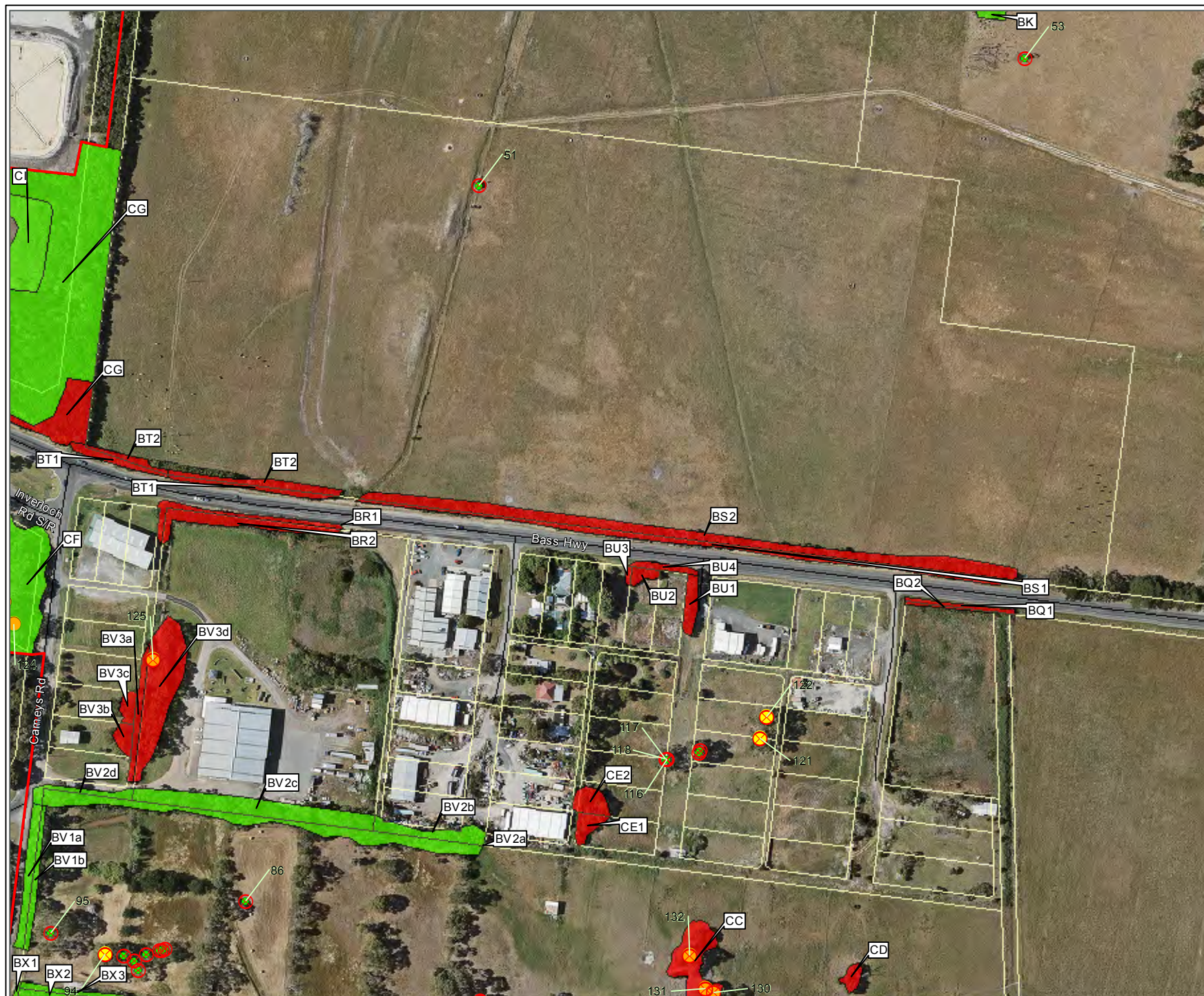
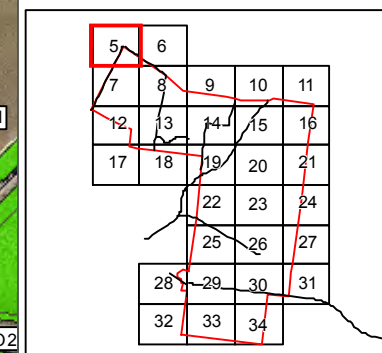




Figure 30: Study area and native vegetation

Project: North East Wonthaggi PSP
Client: Bass Coast Shire Council
Date: 14/01/2020

- Study area
- Remnant Patches of Native Vegetation to be Retained (16)
- Small ST (1)
- ⊗ Native trees to be Removed (1)



Metres
 0 40



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Figure 31: Study area and native vegetation

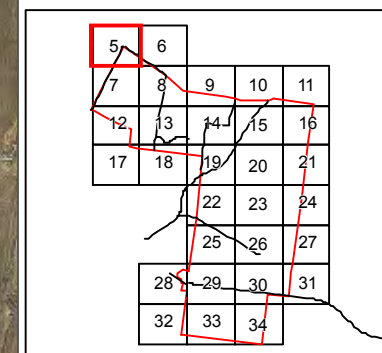
Project: North East Wonthaggi PSP

Client: Bass Coast Shire Council

Date: 14/01/2020

Study area

Remnant Patches of Native Vegetation to be Retained (9)



Metres
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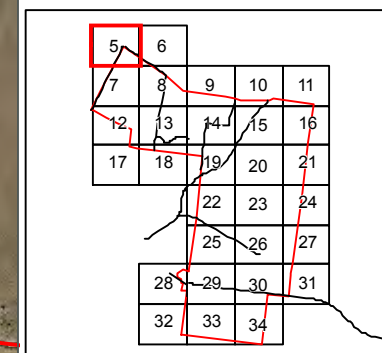
Figure 32: Study area and native vegetation

Project: North East Wonthaggi PSP
Client: Bass Coast Shire Council
Date: 14/01/2020

- Study area
- Remnant Patches of Native Vegetation to be Retained (4)

Native trees

- Large scattered tree (1)
- ⊗ Native trees to be Removed (1)



Metres
 0 40



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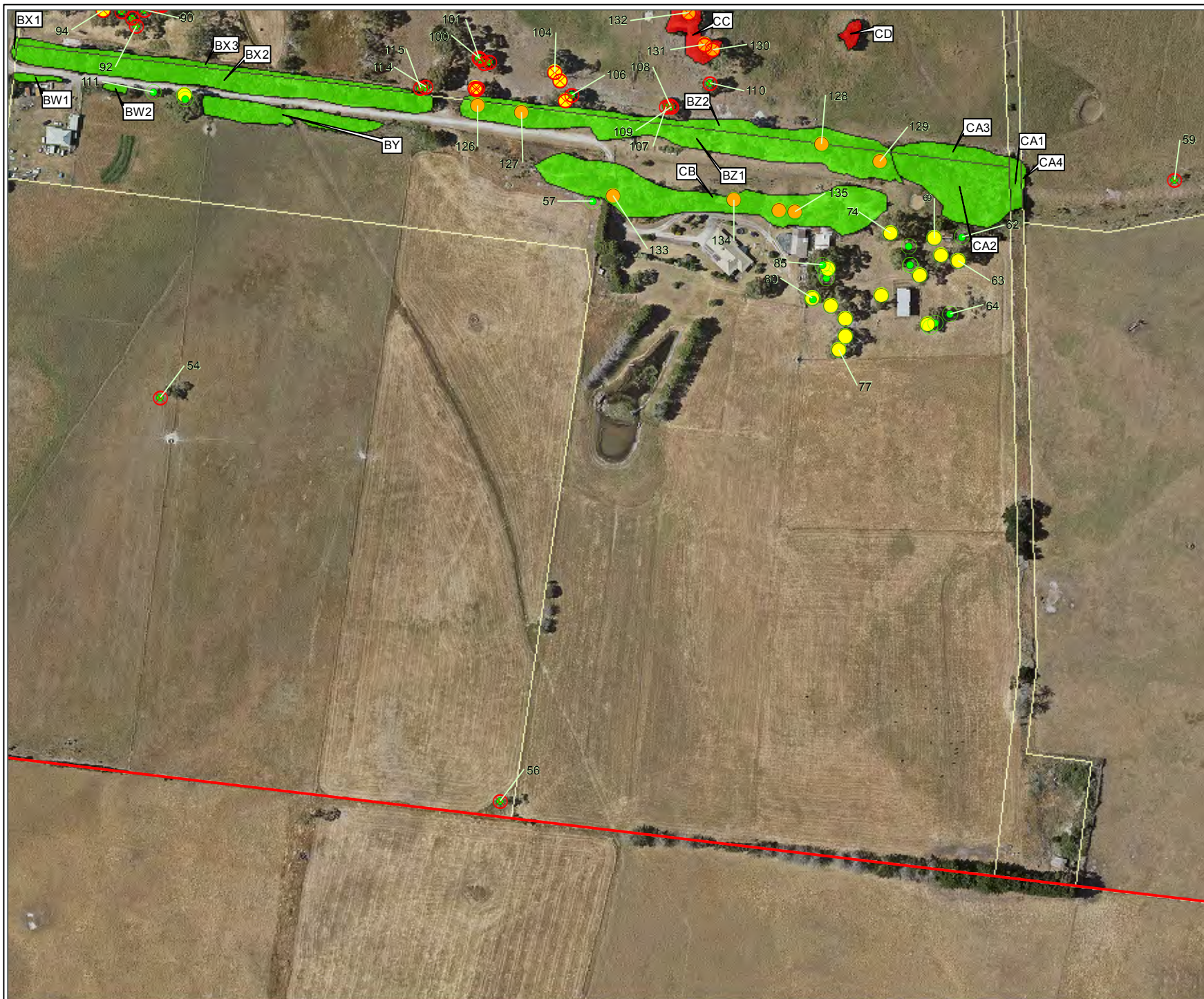


Figure 33: Study area and native vegetation

Project: North East Wonthaggi PSP

Client: Bass Coast Shire Council

Date: 14/01/2020

Study area

Remnant Patches of Native Vegetation to be Removed (2)

Remnant Patches of Native Vegetation to be Retained (13)

Native trees

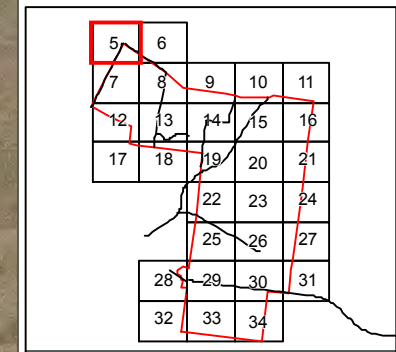
Large scattered tree (19)

Small ST (36)

Large Tree in HZ (11)

Native trees to be Removed (31)

Native trees to be Retained (36)



N



Metres



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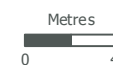
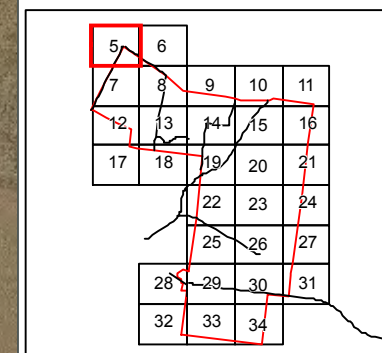
Figure 34: Study area and native vegetation

Project: North East Wonthaggi PSP
Client: Bass Coast Shire Council
Date: 14/01/2020

 Study area

Native trees

-  Small ST (4)
-  Native trees to be Removed (4)



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7. Implications Under Legislation and Policy

This section provides the implications under relevant legislation and policy for the removal of native vegetation associated with the proposed development of the Wonthaggi North East PSP area as directed by Bass Coast Shire Council.

7.1. Summary of planning implications

Environmental Significance Overlay – Schedule 4 (ESO4) applies to large sections of the study area. A permit is required under ESO4 to remove native vegetation as per the current proposed development of the PSP area.

A planning permit under Clause 52.17 of the Bass Coast Planning Scheme would currently be required for the removal of native vegetation, but will not be required for vegetation marked as not retained in the future Native Vegetation Precinct Plan.

7.2. Implications under the Guidelines

7.2.1. Avoid and minimise statement

In accordance with the Guidelines, all applications to remove native vegetation must provide an avoid and minimise statement which details any efforts undertaken to avoid the removal of, and minimise the impacts on biodiversity and other values of native vegetation, and how these efforts focussed on areas of native vegetation that have the most value. Efforts to avoid and minimise impacts to native vegetation in the current application are presented as follows:

- Strategic level planning – As part of the initial assessment undertaken by Nature Advisory, several recommendations were provided to Bass Coast Shire Council to inform the preparation of the Native Vegetation Precinct Plan (NVPP) for the area. Namely, areas of native vegetation with the highest retention values, as well as areas providing habitat linkages for fauna were specified and recommended for retention. Following submission of the initial assessment and discussions with Bass Coast Shire Council, these recommendations (Appendix 7) have been largely incorporated into an updated development plan for the Wonthaggi North East PSP area. This shows strong adherence to the avoid and minimise requirements of the Guidelines as per Clause 52.17 of the Bass Coast Planning Scheme.
- Site level planning – N/A.
- Furthermore, no feasible opportunities exist to further avoid and minimise impacts on native vegetation without undermining the key objectives of the proposal.

7.2.2. Assessment pathway

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

- Location Category: Location 2
- Extent of native vegetation: A total of 7.540 ha of native vegetation (including 14 large trees).

Based on these details, the Guidelines stipulate that the proposal is to be assessed under the **Detailed** assessment pathway.

This proposal **would** trigger a referral to DELWP.

7.2.3. Offset requirements

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

- 1.744 *general habitat units* and must include the following offset attribute requirements:
 - Minimum strategic biodiversity value (SBV) of 0.338
 - Occur within the West Gippsland CMA boundary or the Bass Coast municipal district.
 - Include protection of at least 14 large trees.

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

7.2.4. Offset statement

The offset target for the current proposal is unlikely to be achievable within the study area given the above requirements and the area of native vegetation to be retained.

Appropriate third party (offsite) offsets would need to be identified through a native vegetation broker. Offsets must be protected using an appropriate on-title security agreement and managed for the first ten years of establishment to meet specific targets set out in an offset plan and maintained in perpetuity.

7.3. EPBC Act

The *Environment Protection and Biodiversity Conservation Act 1999* 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 EPBC Act listed values presented below.

- Growling Grass Frog (EPBC Act, vulnerable)
- Latham's Snipe (EPBC Act listed Migratory)
- Eastern Great Egret (FFG listed)
- Fork-tailed Swift (EPBC Act listed Migratory)
- White-throated Needletail (EPBC Act listed Migratory)

Therefore, there are no implications under the EPBC Act for the development of the North East Wonthaggi PSP.

7.4. FFG Act

The Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act) lists threatened and protected species and ecological communities (DELWP 2015a, DELWP 2015b). 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 following FFG Act values listed as threatened or protected are susceptible to impacts from the proposed development on public land:

- Flora genera (protected):

- Acacia
- Senecio
- Xanthorrhoea

A Protected Flora Permit would be required from DELWP to remove any of the plant taxa comprising the abovementioned protected values from public land (and Xanthorrhoea from private land). Application forms for Protected Flora Permits can be obtained from DELWP offices or from their customer service centre.

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.

One or more 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 the current development proposal, a Referral to the state Minister for Planning would not be required under the EE Act.

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 take all reasonable steps on their land to, amongst other things, prevent the growth and spread of regionally controlled weeds on their property as well as on roadsides that adjoin the land owner's land.

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;
- Bulbil *Watsonia*;
- Montpellier Broom (Cape Broom); and
- Spear Thistle.

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

8. References

- Allen, GR, Midgley, SH & Allen, M 2002, *Field Guide to the Freshwater Fishes of Australia*, Western Australian Museum, Perth.
- Bates RJ 1994, 'Prasophyllum', in NG Walsh & TJ Entwisle (eds), *Flora of Victoria*, Volume 2: Ferns and Allied Plants, Conifers and Monocotyledons, Inkata Press, Melbourne, pp. 869-886.
- Beveridge Williams 2011, Fuller Road and Haywood Street, Wonthaggi – Vegetation Report. Consultant Report for Summerfields Wonthaggi Pty Ltd, 25th March 2011, Beveridge Williams, Melbourne.
- Brooker MIH & Slee AV 1996, 'Eucalyptus', in NG Walsh & TJ Entwisle (eds), *Flora of Victoria*, Volume 3: Dicotyledons Winteraceae to Myrtaceae, Inkata Press, Melbourne, pp. 946-1009.
- Cadwallader, PL & Backhouse, GN 1983, *A Guide to the Freshwater Fish of Victoria*. F.D. Atkinson Government Printer, Melbourne.
- Clemann N and Gillespie GR 2004. 'Recovery Plan for *Litoria raniformis* 2004 – 2008. Department of Environment and Heritage, Canberra.
- Cogger, H 2000, *Reptiles and Amphibians of Australia*, Reed Books, Australia.
- Department of Environment and Primary Industries (DEPI) 2013a, *Permitted clearing of native vegetation: Biodiversity assessment guidelines* (dated September 2013), Department of Environment and Primary Industries, now Department of Environment, Land, Water and Planning, East Melbourne, Victoria.
- Department of Environment and Primary Industries (DEPI) 2013b, *Advisory List of Threatened Vertebrate Fauna in Victoria*, Department of Environment and Primary Industries, now Department of Environment, Land, Water and Planning, East Melbourne, Victoria.
- Department of Environment and Primary Industries (DEPI) 2014, *Advisory List of Rare or Threatened Plants in Victoria*, Department of Environment and Primary Industries, now Department of Environment, Land, Water and Planning (DELWP), East Melbourne, Victoria.
- Department of Environment, Land, Water and Planning (DELWP) 2015a, *Flora and Fauna Guarantee Act 1988 - Protected Flora List October 2015*, Department of Environment, Land, Water and Planning, East Melbourne, Victoria, <<http://www.depi.vic.gov.au>>
- Department of Environment, Land, Water and Planning (DELWP) 2015b, *Flora and Fauna Guarantee Threatened List May 2015*, Department of Environment, Land, Water and Planning, East Melbourne, Victoria, <<http://www.depi.vic.gov.au>>
- Department of Environment, Land, Water and Planning (DELWP) 2015c, *Ecological Vegetation Class (EVC) Benchmarks by Bioregion*, Department of Environment, Land, Water and Planning, East Melbourne, Victoria, <<http://www.depi.vic.gov.au>>.
- Department of Environment, Land, Water and Planning (DELWP) 2016a, *Native Vegetation Information Management system*, Department of Environment, Land, Water and Planning, East Melbourne, Victoria, viewed 8th February 2017, <<https://nvim.delwp.vic.gov.au/>>
- Department of Environment, Land, Water and Planning (DELWP) 2016b, *Biodiversity Interactive Map 3.2*, Department of Environment, Land, Water and Planning, East Melbourne, Victoria,

viewed 24th January 2017, <<http://mapshare2.dse.vic.gov.au/MapShare2EXT/imf.jsp?site=bim>>.

Department of Environment, Land, Water and Planning (DELWP) 2016c, *Victorian Biodiversity Atlas 3.1.0*, Department of Environment, Land, Water and Planning, East Melbourne, Victoria, viewed 24th January 2017, <<https://vba.dse.vic.gov.au>>.

Department of Environment, Water, Heritage and the Arts (DEWHA) 2009, Background Paper to EPBC Act Policy Statement 3.12 – Significant Impact Guidelines for the Critically Endangered Golden Sun Moth (*Synemon plana*), Department of Environment, Water, Heritage and the Arts, now Department of the Environment and Energy, Canberra.

Department of Sustainability and Environment (DSE) 2004, *Native Vegetation: sustaining a living landscape, Vegetation Quality Assessment Manual – guidelines for applying the Habitat Hectare scoring method* (Version 1.3), Department of Sustainability and Environment, now Department of Environment, Land, Water and Planning, East Melbourne, Victoria.

Department of Sustainability and Environment (DSE) 2006, *Ministerial Guidelines for Assessment of Environmental Effects under the Environmental Effects Act 1978*, Department of Sustainability and Environment, now Department of Environment, Land, Water and Planning, East Melbourne, Victoria.

Department of Sustainability and Environment (DSE) 2009, *Advisory List of Threatened Invertebrate Fauna*, Department of Sustainability and Environment, now Department of Environment, Land, Water and Planning, East Melbourne, Victoria.

Department of Sustainability and Environment (DSE) 2010a, *Native Vegetation – Technical information sheet: Best and remaining habitat determinations*, Department of Sustainability and Environment, now Department of Environment, Land, Water and Planning, East Melbourne, Victoria.

Department of Sustainability and Environment (DSE) 2010b, *Native Vegetation – Technical information sheet: Degraded treeless vegetation*, Department of Sustainability and Environment, now Department of Environment, Land, Water and Planning, East Melbourne, Victoria.

Department of Sustainability and Environment (DSE) 2011, *Native Vegetation – Technical information sheet: Defining an acceptable distance for tree retention during construction works*, Department of Sustainability and Environment, now Department of Environment, Land, Water and Planning, East Melbourne, Victoria.

Department of the Environment 2015, Referral guideline for 14 birds listed as migratory species under the EPBC Act, Commonwealth of Australia, now Department of the Environment and Energy, Canberra.

Department of the Environment and Energy 2017a, *EPBC Act Protected Matters Search Tool*, Department of the Environment and Energy, Canberra, viewed 24th January 2017, <http://www.environment.gov.au>

Department of the Environment and Energy 2017b, 'Neophema chrysogaster', in Species Profile and Threats Database, Department of the Environment and Energy, Canberra, accessed 12th July 2016.

- Department of the Environment and Energy 2017c, 'Amphibromus fluitans', in Species Profile and Threats Database, Department of the Environment and Energy, Canberra, accessed 11th Jan 2017, <http://www.environment.gov.au/sprat>.
- Department of the Environment and Energy 2017d, 'Glycine latrobeana', in Species Profile and Threats Database, Department of the Environment and Energy, Canberra, accessed 11th Jan 2017, <http://www.environment.gov.au/sprat>.
- Department of the Environment and Energy 2017e, 'Prasophyllum frenchii', in Species Profile and Threats Database, Department of the Environment and Energy, Canberra, accessed 11th Jan 2017, <http://www.environment.gov.au/sprat>.
- Duncan M 2010, National Recovery Plan for the Leafy Greenhood (*Pterostylis cucullata*), Department of Sustainability and Environment, now Department of Environment, Land, Water and Planning, Victoria.
- Emison, WB, Beardsell, CM, Norman, FI Loyn, RH, & Bennett, SC 1987, *Atlas of Victorian Birds*. Department of Conservation, Forests and Lands & Royal Australasian Ornithologists Union, Melbourne.
- Environment Protection Authority Victoria (EPAV) 1991, *Construction Techniques for Sediment Pollution Control*, Environment Protection Agency Victoria, Carlton.
- Higgins, PJ & Davies, SJJF (eds) 1996, *Handbook of Australian, New Zealand & Antarctic Birds*, Volume 3 Snipe to Pigeons, Oxford University Press, Melbourne.
- Higgins, PJ & Peter, JM (eds) 2002, *Handbook of Australian, New Zealand and Antarctic Birds*, Volume 6: Pardalotes to Shrike-thrushes, Oxford University Press, Melbourne.
- Higgins, PJ (ed) 1999, *Handbook of Australian, New Zealand and Antarctic Birds*, Volume 4: Parrots to Dollarbird, Oxford University Press, Melbourne.
- Jeanes J & Backhouse G 2006, *Wild Orchids of Victoria, Australia*, Aquatic Photographics, Seaford.
- Jones DL 2006, *A Complete Guide to Orchids of Australia Including the Island Territories*, Reed New Holland, Sydney.
- Kennedy, SJ & Tzaros, CL 2005, 'Foraging ecology of the Swift Parrot *Lathamus discolor* in the Box-ironbark forests and woodlands of Victoria', *Pacific Conservation Biology* 11, 158 – 173.
- Marchant, S & Higgins, PJ (eds) 1990, *Handbook of Australian, New Zealand and Antarctic Birds*, Volume 1: Ratites to Ducks', Oxford University Press, Melbourne.
- Marchant, S & Higgins, PJ (eds) 1993, *Handbook of Australian, New Zealand and Antarctic Birds*, Volume 2, Raptors to Lapwings, Oxford University Press, Melbourne.
- Menkhorst, P 1995, *Mammals of Victoria*, Oxford University Press, Melbourne.
- Naarding, J.A. 1983. Latham's Snipe in Southern Australia. Wildlife Division Technical Report 83/1. Tasmania National Parks and Wildlife Service.
- Parkes D, Newell G, & Cheal D 2003, 'Assessing the Quality of Native Vegetation: The 'habitat hectares' approach'. *Ecological Management and Restoration*, 4:29-38.
- Tzaros, C 2005, *Wildlife of the Box-Ironbark Country*. CSIRO Publishing, Melbourne.

Weber JZ & Entwisle TJ 1994, 'Thelymitra', in NG Walsh & TJ Entwisle (eds), Flora of Victoria, Volume 2: Ferns and Allied Plants, Conifers and Monocotyledons, Inkata Press, Melbourne, pp. 840-854.

Wilson, S & Swan G 2003, *A Complete Guide to Reptiles of Australia*. Reed New Holland, Sydney.

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 on the *Location Map*, and occurring over most of Victoria.
 - **Location 2** – shown in dark blue on the *Location Map*, and includes areas mapped as endangered EVCs and/or sensitive wetlands and coastal areas.
 - **Location 3** – shown in orange on the *Location Map*, and includes areas where the removal of less than 0.5 ha 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 10 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.

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:

$$\text{Habitat hectares} = \text{extent of native vegetation} \times \text{condition score}$$

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			AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO
Bioregion			GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP
EVC Number			53	53	175	53	53	53	53	175	53	53	53	53	53	53	53
Total area of Habitat Zone (ha)			0.047	0.789	0.081	0.053	0.23	0.458	0.393	0.033	0.032	1.015	0.021	0.484	0.17	0.221	0.019
Site Condition	Large Old Trees	/10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tree Canopy Cover	/5	2	2	4	2	2	2	2	3	2	2	2	2	2	2	2
	Lack of Weeds	/15	6	4	6	6	6	6	6	6	6	4	6	6	4	4	0
	Understorey	/25	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	Recruitment	/10	5	5	3	5	5	5	5	0	5	5	5	5	5	5	5
	Organic Matter	/5	2	2	4	2	2	2	2	0	2	2	2	2	2	2	2
	Logs	/5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site condition standardising multiplier*		1.15	1.15	1.00	1.15	1.15	1.15	1.15	1.00	1.15	1.15	1.15	1.15	1.15	1.15	1.15
	Site Condition subtotal		23	21	22	23	23	23	23	14	23	21	23	23	21	21	16
Landscape Context	Patch Size	/10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Neighbourhood	/10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Distance to Core	/5	1	1	1	0	0	1	1	1	1	0	0	0	1	1	0
Total Condition Score		/100	25	23	24	24	24	25	25	16	25	22	24	24	23	23	17
Habitat Hectares^ in Habitat Zone			0.012	0.181	0.019	0.013	0.055	0.115	0.098	0.005	0.008	0.223	0.005	0.116	0.039	0.051	0.003

* Modified approach to habitat scoring - refer to Table 14 of DELWP's Vegetation Quality Assessment Manual (DSE, 2004); ^ = Area x habitat score (out of 1).

Habitat Zone			AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD
Bioregion			GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP
EVC Number			53	53	53	53	53	53	53	53	175	53	53	53	53	3	53
Total area of Habitat Zone (ha)			0.042	0.025	0.018	0.018	0.168	1.223	0.595	1.378	0.128	0.233	0.81	0.021	0.014	0.009	2.119
Site Condition	Large Old Trees	/10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tree Canopy Cover	/5	2	2	2	2	2	2	0	4	4	2	2	2	2	4	4
	Lack of Weeds	/15	6	6	6	6	6	6	6	0	6	6	6	6	4	2	0
	Understorey	/25	5	5	5	5	5	5	5	5	5	5	5	5	5	0	5
	Recruitment	/10	5	5	5	5	5	5	0	5	3	5	5	5	5	0	5
	Organic Matter	/5	2	2	2	2	2	2	2	2	4	2	2	2	2	5	2
	Logs	/5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site condition standardising multiplier*		1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.00	1.15	1.15	1.15	1.15	1.00	1.15
	Site Condition subtotal		23	23	23	23	23	23	15	18	22	23	23	23	21	11	18
Landscape Context	Patch Size	/10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Neighbourhood	/10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Distance to Core	/5	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1
Total Condition Score		/100	25	25	25	25	25	25	16	19	23	24	25	25	23	13	20
Habitat Hectares^ in Habitat Zone			0.011	0.006	0.005	0.005	0.042	0.306	0.095	0.262	0.029	0.056	0.203	0.005	0.003	0.001	0.424

* Modified approach to habitat scoring - refer to Table 14 of DELWP's Vegetation Quality Assessment Manual (DSE, 2004); ^ = Area x habitat score (out of 1).

Habitat Zone			BE	BF	BG	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS
Bioregion			GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP
EVC Number			53	53	53	53	53	53	53	53	53	53	53	53	53	53	53
Total area of Habitat Zone (ha)			0.022	1.279	0.594	0.108	0.023	0.179	0.188	0.001	0.036	0.379	0.883	0.21	0.026	0.111	0.377
Site Condition	Large Old Trees	/10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tree Canopy Cover	/5	0	2	2	2	2	0	2	2	2	2	4	2	2	2	2
	Lack of Weeds	/15	0	6	6	6	6	0	6	6	6	6	4	6	6	6	6
	Understorey	/25	5	5	5	5	5	5	5	5	5	5	15	5	5	5	5
	Recruitment	/10	5	5	5	5	5	5	5	5	5	5	6	5	5	5	5
	Organic Matter	/5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	Logs	/5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site condition standardising multiplier*		1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15
	Site Condition subtotal		14	23	23	23	23	14	23	23	23	23	36	23	23	23	23
Landscape Context	Patch Size	/10	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1
	Neighbourhood	/10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Distance to Core	/5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total Condition Score			/100	16	25	25	25	25	16	25	25	25	25	39	25	25	25
Habitat Hectares^ in Habitat Zone			0.004	0.320	0.149	0.027	0.006	0.029	0.047	0.000	0.009	0.095	0.344	0.053	0.007	0.028	0.094

* Modified approach to habitat scoring - refer to Table 14 of DELWP's Vegetation Quality Assessment Manual (DSE, 2004); ^ = Area x habitat score (out of 1)

Habitat Zone			BT	BU	BV	BW	BX	BY	BZ	CA	CB	CC	CD	CE
Bioregion			GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP
EVC Number			53	53	3	53	53	53	3	53	3	3	3	3
Total area of Habitat Zone (ha)			0.111	0.064	0.697	0.021	0.391	0.115	0.48	0.297	0.42	0.098	0.015	0.054
Site Condition	Large Old Trees	/10	0	0	3	0	0	0	3	0	0	9	0	0
	Tree Canopy Cover	/5	2	2	5	2	4	2	4	2	4	4	4	4
	Lack of Weeds	/15	6	6	0	6	0	6	2	4	6	2	2	2
	Understorey	/25	5	5	5	5	5	5	15	5	5	5	0	0
	Recruitment	/10	5	5	1	5	5	5	6	5	0	0	0	0
	Organic Matter	/5	2	2	2	2	2	2	4	2	2	2	2	2
	Logs	/5	0	0	0	0	0	0	0	0	0	0	0	0
	Site condition standardising multiplier*		1.15	1.15	1.00	1.15	1.15	1.15	1.00	1.15	1.00	1.00	1.00	1.00
	Site Condition subtotal		23	23	16	23	18	23	34	21	17	22	8	8
Landscape Context	Patch Size	/10	1	1	1	1	1	1	1	1	1	1	1	1
	Neighbourhood	/10	0	0	0	0	0	0	0	0	0	0	0	0
	Distance to Core	/5	1	1	1	1	1	1	1	1	1	1	1	1
Total Condition Score			/100	25	25	18	25	20	25	36	23	19	24	10
Habitat Hectares^ in Habitat Zone			0.028	0.016	0.125	0.005	0.078	0.029	0.173	0.068	0.080	0.024	0.002	0.005

* Modified approach to habitat scoring - refer to Table 14 of DELWP's Vegetation Quality Assessment Manual (DSE, 2004); ^ = Area x habitat score (out of 1).

Habitat Zone			CF	CG	CH	CI
Bioregion			GipP	GipP	GipP	GipP
EVC Number			16	53	937	821
Total area of Habitat Zone (ha)			0.507	1.636	0.106	0.189
Site Condition	Large Old Trees	/10	2	NA	0	NA
	Tree Canopy Cover	/5	4	4	4	NA
	Lack of Weeds	/15	4	4	4	13
	Understorey	/25	5	5	5	5
	Recruitment	/10	3	3	3	0
	Organic Matter	/5	5	5	5	5
	Logs	/5	4	0	0	NA
	Site condition standardising multiplier*		1.00	1.15	1.00	1.36
	Site Condition subtotal		25	24	21	31
Landscape Context	Patch Size	/10	1	6	6	6
	Neighbourhood	/10	1	2	1	2
	Distance to Core	/5	1	1	1	1
Total Condition Score		/100	28	33	29	40
Habitat Hectares in Habitat Zone#			0.142	0.540	0.031	0.076

Appendix 3: Scattered trees in the study area

Tree No.	Common name	Scientific Name	DBH (cm)	Circumference (cm)	Status
1	Swamp Gum	<i>Eucalyptus ovata</i>	65	204	Small Scattered Tree
2	Swamp Gum	<i>Eucalyptus ovata</i>	66	207	Small Scattered Tree
3	Swamp Paperbark	<i>Melaleuca ericifolia</i>	17	53	Small Scattered Tree
4	Swamp Gum	<i>Eucalyptus ovata</i>	38	119	Small Scattered Tree
5	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	45	141	Small Scattered Tree
6	Swamp Paperbark	<i>Melaleuca ericifolia</i>	21	66	Small Scattered Tree
7	Swamp Paperbark	<i>Melaleuca ericifolia</i>	24	75	Small Scattered Tree
8	Swamp Paperbark	<i>Melaleuca ericifolia</i>	12	38	Small Scattered Tree
9	Swamp Paperbark	<i>Melaleuca ericifolia</i>	15	47	Small Scattered Tree
10	Swamp Paperbark	<i>Melaleuca ericifolia</i>	15	47	Small Scattered Tree
11	Swamp Paperbark	<i>Melaleuca ericifolia</i>	14	44	Small Scattered Tree
12	Swamp Paperbark	<i>Melaleuca ericifolia</i>	22	69	Small Scattered Tree
13	Swamp Paperbark	<i>Melaleuca ericifolia</i>	17	53	Small Scattered Tree
14	Swamp Paperbark	<i>Melaleuca ericifolia</i>	21	66	Small Scattered Tree
15	Swamp Paperbark	<i>Melaleuca ericifolia</i>	21	66	Small Scattered Tree
16	Swamp Paperbark	<i>Melaleuca ericifolia</i>	18	57	Small Scattered Tree
17	Swamp Paperbark	<i>Melaleuca ericifolia</i>	22	69	Small Scattered Tree
18	Narrow-leaf Peppermint	<i>Eucalyptus radiata</i>	33	104	Small Scattered Tree
19	Swamp Paperbark	<i>Melaleuca ericifolia</i>	15	47	Small Scattered Tree
20	Swamp Gum	<i>Eucalyptus ovata</i>	112	352	Large Scattered Tree
21	Swamp Paperbark	<i>Melaleuca ericifolia</i>	35	110	Small Scattered Tree
22	Swamp Paperbark	<i>Melaleuca ericifolia</i>	18	57	Small Scattered Tree
23	Swamp Gum	<i>Eucalyptus ovata</i>	70	220	Large Scattered Tree
24	Swamp Paperbark	<i>Melaleuca ericifolia</i>	5	16	Small Scattered Tree
25	Swamp Gum	<i>Eucalyptus ovata</i>	40	126	Small Scattered Tree
26	Swamp Gum	<i>Eucalyptus ovata</i>	24	75	Small Scattered Tree

Tree No.	Common name	Scientific Name	DBH (cm)	Circumference (cm)	Status
27	Swamp Gum	<i>Eucalyptus ovata</i>	14	44	Small Scattered Tree
28	Swamp Gum	<i>Eucalyptus ovata</i>	29	91	Small Scattered Tree
29	Swamp Gum	<i>Eucalyptus ovata</i>	33	104	Small Scattered Tree
30	Swamp Gum	<i>Eucalyptus ovata</i>	27	85	Small Scattered Tree
31	Swamp Gum	<i>Eucalyptus ovata</i>	15	47	Small Scattered Tree
32	Swamp Gum	<i>Eucalyptus ovata</i>	20	63	Small Scattered Tree
33	Swamp Gum	<i>Eucalyptus ovata</i>	20	63	Small Scattered Tree
34	Swamp Gum	<i>Eucalyptus ovata</i>	25	79	Small Scattered Tree
35	Swamp Gum	<i>Eucalyptus ovata</i>	25	79	Small Scattered Tree
36	Swamp Gum	<i>Eucalyptus ovata</i>	25	79	Small Scattered Tree
37	Swamp Gum	<i>Eucalyptus ovata</i>	20	63	Small Scattered Tree
38	Swamp Gum	<i>Eucalyptus ovata</i>	10	31	Small Scattered Tree
39	Swamp Gum	<i>Eucalyptus ovata</i>	10	31	Small Scattered Tree
40	Swamp Gum	<i>Eucalyptus ovata</i>	20	63	Small Scattered Tree
41	Swamp Gum	<i>Eucalyptus ovata</i>	20	63	Small Scattered Tree
42	Swamp Gum	<i>Eucalyptus ovata</i>	20	63	Small Scattered Tree
43	Swamp Gum	<i>Eucalyptus ovata</i>	20	63	Small Scattered Tree
44	Swamp Gum	<i>Eucalyptus ovata</i>	20	63	Small Scattered Tree
45	Swamp Gum	<i>Eucalyptus ovata</i>	25	79	Small Scattered Tree
46	Swamp Gum	<i>Eucalyptus ovata</i>	25	79	Small Scattered Tree
47	Swamp Gum	<i>Eucalyptus ovata</i>	15	47	Small Scattered Tree
48	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	46	145	Small Scattered Tree
49	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	36	113	Small Scattered Tree
50	Swamp Paperbark	<i>Melaleuca ericifolia</i>	10	31	Small Scattered Tree
51	Swamp Paperbark	<i>Melaleuca ericifolia</i>	10	31	Small Scattered Tree
52	Swamp Gum	<i>Eucalyptus ovata</i>	35	110	Small Scattered Tree
53	Swamp Gum	<i>Eucalyptus ovata</i>	40	126	Small Scattered Tree

Tree No.	Common name	Scientific Name	DBH (cm)	Circumference (cm)	Status
54	Swamp Gum	<i>Eucalyptus ovata</i>	38	119	Small Scattered Tree
55	Swamp Gum	<i>Eucalyptus ovata</i>	100	314	Large Scattered Tree
56	Swamp Gum	<i>Eucalyptus ovata</i>	50	157	Small Scattered Tree
57	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	55	173	Small Scattered Tree
58	Swamp Gum	<i>Eucalyptus ovata</i>	30	94	Small Scattered Tree
59	Swamp Gum	<i>Eucalyptus ovata</i>	27	85	Small Scattered Tree
60	Swamp Gum	<i>Eucalyptus ovata</i>	23	72	Small Scattered Tree
61	Swamp Gum	<i>Eucalyptus ovata</i>	35	110	Small Scattered Tree
62	Narrow-leaf Peppermint	<i>Eucalyptus radiata</i>	63	198	Small Scattered Tree
63	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	76	239	Large Scattered Tree
64	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	10	31	Small Scattered Tree
65	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	64	201	Small Scattered Tree
66	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	34	107	Small Scattered Tree
67	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	70	220	Large Scattered Tree
68	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	71	223	Large Scattered Tree
69	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	73	229	Large Scattered Tree
70	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	74	232	Large Scattered Tree
71	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	66	207	Small Scattered Tree
72	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	64	201	Small Scattered Tree
73	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	40	126	Small Scattered Tree
74	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	79	248	Large Scattered Tree
75	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	92	289	Large Scattered Tree
76	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	75	236	Large Scattered Tree
77	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	89	280	Large Scattered Tree
78	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	99	311	Large Scattered Tree
79	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	71	223	Large Scattered Tree
80	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	70	220	Large Scattered Tree

Tree No.	Common name	Scientific Name	DBH (cm)	Circumference (cm)	Status
81	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	57	179	Small Scattered Tree
82	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	63	198	Small Scattered Tree
83	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	68	214	Small Scattered Tree
84	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	80	251	Large Scattered Tree
85	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	49	154	Small Scattered Tree
86	Swamp Gum	<i>Eucalyptus ovata</i>	53	167	Small Scattered Tree
87	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	16	50	Small Scattered Tree
88	Swamp Gum	<i>Eucalyptus ovata</i>	44	138	Small Scattered Tree
89	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	15	47	Small Scattered Tree
90	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	59	185	Small Scattered Tree
91	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	35	110	Small Scattered Tree
92	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	39	123	Small Scattered Tree
93	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	45	141	Small Scattered Tree
94	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	126	396	Large Scattered Tree
95	Swamp Gum	<i>Eucalyptus ovata</i>	42	132	Small Scattered Tree
96	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	61	192	Small Scattered Tree
97	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	51	160	Small Scattered Tree
98	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	77	242	Large Scattered Tree
99	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	20	63	Small Scattered Tree
100	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	29	91	Small Scattered Tree
101	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	30	94	Small Scattered Tree
102	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	22	69	Small Scattered Tree
103	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	73	229	Large Scattered Tree
104	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	94	295	Large Scattered Tree
105	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	70	220	Large Scattered Tree
106	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	62	195	Small Scattered Tree
107	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	30	94	Small Scattered Tree

Tree No.	Common name	Scientific Name	DBH (cm)	Circumference (cm)	Status
108	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	44	138	Small Scattered Tree
109	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	27	85	Small Scattered Tree
110	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	58	182	Small Scattered Tree
111	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	30	94	Small Scattered Tree
112	Swamp Gum	<i>Eucalyptus ovata</i>	77	242	Large Scattered Tree
113	Swamp Gum	<i>Eucalyptus ovata</i>	55	173	Small Scattered Tree
114	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	60	188	Small Scattered Tree
115	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	25	79	Small Scattered Tree
116	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	42	132	Small Scattered Tree
117	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	33	104	Small Scattered Tree
118	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	44	138	Small Scattered Tree
119	Swamp Gum	<i>Eucalyptus ovata</i>	65	204	Small Scattered Tree
120	Swamp Gum	<i>Eucalyptus ovata</i>	32	101	Small Scattered Tree
121	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	94	295	Large Scattered Tree
122	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	114	358	Large Scattered Tree
123	Messmate Stringybark	<i>Eucalyptus obliqua</i>	76	239	Large Tree in Habitat Zone CF
124	Messmate Stringybark	<i>Eucalyptus obliqua</i>	90	283	Large Tree in Habitat Zone CF
125	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	72	226	Large Tree in Habitat Zone BV3
126	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	79	248	Large Tree in Habitat Zone BZ
127	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	78	245	Large Tree in Habitat Zone BZ
128	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	71	223	Large Tree in Habitat Zone BZ
129	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	75	236	Large Tree in Habitat Zone BZ
130	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	82	258	Large Tree in Habitat Zone CC
131	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	80	251	Large Tree in Habitat Zone CC
132	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	86	270	Large Tree in Habitat Zone CC
133	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	85	267	Large Tree in Habitat Zone CB
134	Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	70	220	Large Tree in Habitat Zone CB

Tree No.	Common name	Scientific Name	DBH (cm)	Circumference (cm)	Status
135	Coast Manna-gum	<i>Eucalyptus viminalis subsp. pryoriana</i>	70	220	Large Tree in Habitat Zone CB
136	Coast Manna-gum	<i>Eucalyptus viminalis subsp. pryoriana</i>	90	283	Large Tree in Habitat Zone CB

Notes: DBH = Diameter at breast height (130 cm from the ground).

Appendix 4: Flora species recorded in the study area and listed species known (or with the potential) to occur in the search region

Origin	Common name	Scientific name	EPBC	FFG-T	FFG-P	DELWP	CaLP Act	WONS	Recorded
*	African Box-thorn	<i>Lycium ferocissimum</i>					C	WONS	X
*	Agapanthus	<i>Agapanthus praecox</i> subsp. <i>orientalis</i>							X
	Angled Lobelia	<i>Lobelia anceps</i>							X
*	Annual Veldt-grass	<i>Ehrharta longiflora</i>							X
	Austral Bracken	<i>Pteridium esculentum</i>							X
	Austral Trefoil	<i>Lotus australis</i> var. <i>australis</i>				k			
	Bassian Pomaderris	<i>Pomaderris oraria</i> subsp. <i>oraria</i>				r			
	Beaded Glasswort	<i>Sarcocornia quinqueflora</i> subsp. <i>tasmanica</i>				k			
	Bidgee-widgee	<i>Acaena novae-zelandiae</i>							X
*	Black Nightshade	<i>Solanum nigrum</i> s.l.							X
	Black Wattle	<i>Acacia mearnsii</i>			p				X
*	Blackberry	<i>Rubus fruticosus</i> spp. <i>agg.</i>					C	WONS	X
	Blackwood	<i>Acacia melanoxylon</i>							X
	Bog Gum	<i>Eucalyptus kitsoniana</i>				r			
	Broad-leaf Prickly Moses	<i>Acacia verticillata</i> subsp. <i>ruscifolia</i>			p	r			
*	Brown-top Bent	<i>Agrostis capillaris</i> var. <i>capillaris</i>							X
*	Bulbil Watsonia	<i>Watsonia meriana</i> var. <i>bulbillifera</i>					C		X
	Bulrush	<i>Typha</i> spp.							X
*	Carrot	<i>Daucus carota</i>							X
*	Cat's Ear	<i>Hypochaeris</i> spp.							X
	Cherry Ballart	<i>Exocarpos cupressiformis</i>							X
*	Cherry Plum	<i>Prunus cerasifera</i>							X
*	Clover	<i>Trifolium</i> spp.							X

Origin	Common name	Scientific name	EPBC	FFG-T	FFG-P	DELWP	CaLP Act	WONS	Recorded
	Clover Glycine	<i>Glycine latrobeana</i>	VU	L	p	v			
*	Clustered Dock	<i>Rumex conglomeratus</i>							X
	Coast Ballart	<i>Exocarpos syrticola</i>				r			
	Coast Manna-gum	<i>Eucalyptus viminalis subsp. pryoriana</i>							X
#	Coast Tea-tree	<i>Leptospermum laevigatum</i>							X
	Cobra Greenhood	<i>Pterostylis grandiflora</i>			p	r			
*	Cocksfoot	<i>Dactylis glomerata</i>							X
*	Common Centaury	<i>Centaureum erythraea</i>							X
	Common Reed	<i>Phragmites australis</i>							X
*	Common Sow-thistle	<i>Sonchus oleraceus</i>							X
	Common Spike-sedge	<i>Eleocharis acuta</i>							X
*	Common Vetch	<i>Vicia sativa</i>							X
	Cotton Fireweed	<i>Senecio quadridentatus</i>			p				X
	Crested Sun-orchid	<i>Thelymitra X irregularis</i>			p	r			
*	Cypress	<i>Cupressus spp.</i>							X
	Dense Leek-orchid	<i>Prasophyllum spicatum</i>	VU		p	e			
	Dodder Laurel	<i>Cassytha spp.</i>							X
*	Drain Flat-sedge	<i>Cyperus eragrostis</i>							X
	Dune Poa	<i>Poa poiformis var. ramifer</i>				r			
	Dune Wood-sorrel	<i>Oxalis rubens</i>				r			
	Dusky Violet	<i>Viola fuscoviolacea</i>				r			
	Eastern Spider-orchid	<i>Caladenia orientalis</i>	EN	L	p	e			
*	English Ivy	<i>Hedera helix</i>							X
*	English Oak	<i>Quercus robur</i>							X
*	Fat Hen	<i>Chenopodium album</i>							X

Origin	Common name	Scientific name	EPBC	FFG-T	FFG-P	DELWP	CaLP Act	WONS	Recorded
*	Fennel	<i>Foeniculum vulgare</i>					R		X
	Floodplain Fireweed	<i>Senecio campylocarpus</i>			p	r			
*	Flowering Gum	<i>Corymbia ficifolia</i>							X
#	Giant Honey-myrtle	<i>Melaleuca armillaris subsp. armillaris</i>				r			X
*	Great Brome	<i>Bromus diandrus</i>							X
	Green Leek-orchid	<i>Prasophyllum lindleyanum</i>			p	v			
	Grey Mangrove	<i>Avicennia marina subsp. australasica</i>				r			
	Groundsel	<i>Senecio spp.</i>			p				X
*	Hare's-tail Grass	<i>Lagurus ovatus</i>							X
	Kangaroo Apple	<i>Solanum aviculare</i>							X
	Kangaroo Grass	<i>Themeda triandra</i>							X
	Kidney-weed	<i>Dichondra repens</i>							X
*	Kikuyu	<i>Cenchrus clandestinus</i>							X
	Knobby Club-sedge	<i>Ficinia nodosa</i>							X
	Large River Buttercup	<i>Ranunculus papulentus</i>				k			
	Leafy Greenhood	<i>Pterostylis cucullata subsp. cucullata</i>	VU	L	p	e			
	Lizard Orchid	<i>Burnettia cuneata</i>			p	r			
	Maroon Leek-orchid	<i>Prasophyllum frenchii</i>	EN	L	p	e			
	Merran's Sun-orchid	<i>Thelymitra X merraniae</i>		L	p	e			
	Messmate Stringybark	<i>Eucalyptus obliqua</i>							X
*	Mirror Bush	<i>Coprosma repens</i>							X
*	Montpellier Broom	<i>Genista monspessulana</i>					C	WONS	X
	Narrow-leaf Peppermint	<i>Eucalyptus radiata s.l.</i>							X
	Native Couch	<i>Cynodon dactylon var. pulchellus</i>				k			
*	Oat	<i>Avena spp.</i>							X

Origin	Common name	Scientific name	EPBC	FFG-T	FFG-P	DELWP	CaLP Act	WONS	Recorded
	Orange-tip Finger-orchid	<i>Caladenia aurantiaca</i>			p	r			
	Otway Bush-pea	<i>Pultenaea prolifera</i>				r			
*	Panic Veldt-grass	<i>Ehrharta erecta</i> var. <i>erecta</i>							X
*	Paspalum	<i>Paspalum dilatatum</i>							X
*	Pimpernel	<i>Lysimachia arvensis</i>							X
*	Prairie Grass	<i>Bromus catharticus</i> var. <i>catharticus</i>							X
	Prickly Currant-bush	<i>Coprosma quadrifida</i>							X
*	Prickly Lettuce	<i>Lactuca serriola</i>							X
	Prickly Moses	<i>Acacia verticillata</i> subsp. <i>verticillata</i>			p				X
	Prickly Tea-tree	<i>Leptospermum continentale</i>							X
	Prom Sheoak	<i>Allocasuarina media</i>				k			
*	Prostrate Knotweed	<i>Polygonum aviculare</i> s.l.							X
*	Radiata Pine	<i>Pinus radiata</i>							X
*	Ribwort	<i>Plantago lanceolata</i>							X
	River Swamp Wallaby-grass	<i>Amphibromus fluitans</i>	VU						
	Rock Mitrewort	<i>Phyllangium sulcatum</i>				x			
*	Rough Sow-thistle	<i>Sonchus asper</i> s.l.							X
	Rush	<i>Juncus</i> spp.							X
*	Rye Grass	<i>Lolium</i> spp.							X
#	Sallow Wattle	<i>Acacia longifolia</i>			p				X
	Sandhill Sword-sedge	<i>Lepidosperma concavum</i>							X
	Scrub Sheoak	<i>Allocasuarina paludosa</i>							X
	Sea Bindweed	<i>Calystegia soldanella</i>				v			
	Sea Nymph	<i>Amphibolis antarctica</i>				k			
	Sharp Greenhood	<i>Pterostylis</i> X <i>ingens</i>			p	r			

Origin	Common name	Scientific name	EPBC	FFG-T	FFG-P	DELWP	CaLP Act	WONS	Recorded
*	Sheep Sorrel	<i>Acetosella vulgaris</i>							X
	Silver Banksia	<i>Banksia marginata</i>							X
	Silver Everlasting	<i>Argentipallium dealbatum</i>			p	r			
	Slender Bottle-washers	<i>Enneapogon gracilis</i>				v			
	Slender Leek-orchid	<i>Prasophyllum parviflorum</i>			p	v			
	Small Grass-tree	<i>Xanthorrhoea minor subsp. lutea</i>			p				X
	Small-leaf Bramble	<i>Rubus parvifolius</i>							X
	Small-leaved Clematis	<i>Clematis microphylla s.s.</i>							X
	Soft Slender Tussock-grass	<i>Poa sp. aff. tenera (Hairy)</i>				r			
#	Southern Blue-gum	<i>Eucalyptus globulus</i>							X
#	Southern Mahogany	<i>Eucalyptus botryoides</i>							X
	Southern Plume-orchid	<i>Pterostylis tasmanica</i>			p	k			
	Southern Spider-orchid	<i>Caladenia australis</i>			p	k			
*	Spear Thistle	<i>Cirsium vulgare</i>					C		X
	Spiny-headed Mat-rush	<i>Lomandra longifolia</i>							X
	Spurred Helmet-orchid	<i>Corybas aconitiflorus</i>			p	r			
	Strzelecki Gum	<i>Eucalyptus strzeleckii</i>	VU	L	p	v			
*	Sugar Gum	<i>Eucalyptus cladocalyx</i>							X
	Swamp Gum	<i>Eucalyptus ovata</i>							X
#	Swamp Paperbark	<i>Melaleuca ericifolia</i>							X
#	Sweet Pittosporum	<i>Pittosporum undulatum</i>							X
*	Sweet Vernal-grass	<i>Anthoxanthum odoratum</i>							X
*	Tall Fleabane	<i>Conyza sumatrensis var. sumatrensis</i>							X
	Tall Rush	<i>Juncus procerus</i>							X
	Tasman Flax-lily	<i>Dianella tasmanica</i>							X

Origin	Common name	Scientific name	EPBC	FFG-T	FFG-P	DELWP	CaLP Act	WONS	Recorded
	Tassel Rope-rush	<i>Hypolaena fastigiata</i>							X
*	Toowoomba Canary-grass	<i>Phalaris aquatica</i>							X
	Tree Violet	<i>Melicytus dentatus s.l.</i>							X
*	Turnip	<i>Brassica spp.</i>							X
	Variable Spider-orchid	<i>Caladenia X variabilis</i>			p	e			
	Variable Sword-sedge	<i>Lepidosperma laterale</i>							X
*	Velvet Cotoneaster	<i>Cotoneaster pannosus</i>							X
	Weeping Grass	<i>Microlaena stipoides var. stipoides</i>							X
*	Weeping Willow	<i>Salix babylonica s.l.</i>							X
*	Wild Sage	<i>Salvia verbenaca</i>							X
*	Yorkshire Fog	<i>Holcus lanatus</i>							X

Notes: EPBC = threatened species status under EPBC Act: EX = presumed extinct in the wild; CR = critically endangered; EN = endangered; VU = vulnerable; FFG-T = threatened species status under the FFG Act: L = listed as threatened under the FFG Act; FFG-P = protected species status under the FFG Act: p = listed as protected; DELWP = status under DELWP's Advisory List (DEPI 2014); x = presumed extinct in the wild; cr = critically endangered; e = endangered; v = vulnerable; r = rare; k = insufficiently known; CaLP Act = declared noxious weeds status under the CaLP Act; S = State Prohibited Weeds (any infestations are to be reported to DELWP. DELWP is responsible for control of State Prohibited Weeds); P = Regionally Prohibited Weeds (Land owners must take all reasonable steps to eradicate regionally prohibited weeds on their land); C = Regionally Controlled Weeds (Land owners have the responsibility to take all reasonable steps to prevent the growth and spread of Regionally controlled weeds on their land); R = Restricted Weeds (Trade in these weeds and their propagules, either as plants, seeds or contaminants in other materials is prohibited); WONS = Weeds of National Significance

X = recorded in the study area

* = introduced to Victoria

= Victorian native taxa occurring outside their natural range

Appendix 5: Terrestrial vertebrate fauna species recorded and listed species that have the potential to occur in the study area

Origin	Common name	Scientific name	EPBC-T	EPBC-M	FFG	DELWP	Recorded
Birds							
	Australasian Pipit	<i>Anthus novaeseelandiae</i>					X
	Australian Magpie	<i>Gymnorhina tibicen</i>					X
	Australian Wood Duck	<i>Chenonetta jubata</i>					X
	Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>					X
	Black-shouldered Kite	<i>Elanus axillaris</i>					X
	Brown Falcon	<i>Falco berigora</i>					X
	Brown Goshawk	<i>Accipiter fasciatus</i>					X
	Chestnut Teal	<i>Anas castanea</i>					X
*	Common Blackbird	<i>Turdus merula</i>					X
*	Common Myna	<i>Acridotheres tristis</i>					X
*	Common Starling	<i>Sturnus vulgaris</i>					X
	Eastern Great Egret	<i>Ardea modesta</i>			L	v	
	Eastern Rosella	<i>Platycercus eximius</i>					X
	European Goldfinch	<i>Carduelis carduelis</i>					X
*	European Skylark	<i>Alauda arvensis</i>					X
	Fairy Martin	<i>Petrochelidon ariel</i>					X
	Fork-tailed Swift	<i>Apus pacificus</i>		M (JAMBA,CAMBA, ROKAMBA)			
	Grey Butcherbird	<i>Cracticus torquatus</i>					X
	Grey Fantail	<i>Rhipidura albiscarpa</i>					X
*	House Sparrow	<i>Passer domesticus</i>					X
	Latham's Snipe	<i>Gallinago hardwickii</i>		M (JAMBA, CAMBA, ROKAMBA, Bonn A2H)		nt	X

Origin	Common name	Scientific name	EPBC-T	EPBC-M	FFG	DELWP	Recorded
	Laughing Kookaburra	<i>Dacelo novaeguineae</i>					X
	Little Raven	<i>Corvus mellori</i>					X
	Magpie-lark	<i>Grallina cyanoleuca</i>					X
	Masked Lapwing	<i>Vanellus miles</i>					X
	Nankeen Kestrel	<i>Falco cenchroides</i>					X
	Noisy Miner	<i>Manorina melanocephala</i>					X
	Pacific Black Duck	<i>Anas superciliosa</i>					X
	Peregrine Falcon	<i>Falco peregrinus</i>					X
	Red Wattlebird	<i>Anthochaera carunculata</i>					X
	Silvereye	<i>Zosterops lateralis</i>					X
*	Spotted Turtle-Dove	<i>Streptopelia chinensis</i>					X
	Superb Fairy-wren	<i>Malurus cyaneus</i>					X
	Wedge-tailed Eagle	<i>Aquila audax</i>					X
	Welcome Swallow	<i>Petrochelidon neoxena</i>					X
	White-faced Heron	<i>Egretta novaehollandiae</i>					X
	White-throated Needletail	<i>Hirundapus caudacutus</i>		M (JAMBA, CAMBA, ROKAMBA)		v	
Mammals							
	Common Wombat	<i>Vombatus ursinus</i>					#
	Eastern Grey Kangaroo	<i>Macropus giganteus</i>					X
*	European Rabbit	<i>Oryctolagus cuniculus</i>					X

Notes: EPBC-T = threatened species status under EPBC Act; EX = presumed extinct in the wild; CE = 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; L = listed as threatened under the FFG Act; **DELWP** = status under DELWP's Advisory List (DSE 2013); x = presumed extinct in the wild; cr = critically endangered; e = endangered; v = vulnerable; nt = lower risk near threatened; dd = data deficient

Appendix 6: EVC benchmarks

Gippsland Plain:

- Damp Sands herb-rich Woodland (EVC 3)
- Swamp Scrub (EVC 53)
- Grassy Woodland (EVC 175)

EVC/Bioregion Benchmark for Vegetation Quality Assessment

Gippsland Plain bioregion

EVC 3: Damp Sands Herb-rich Woodland

Description:

A low, grassy or bracken-dominated eucalypt forest or open woodland to 15 m tall with a large shrub layer and ground layer rich in herbs, grasses, and orchids. Occurs mainly on flat or undulating areas on moderately fertile, relatively well-drained, deep sandy or loamy topsoils over heavier subsoils (duplex soils).

Large trees:

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

Tree Canopy Cover:

%cover	Character Species	Common Name
15%	<i>Eucalyptus viminalis</i> ssp. <i>pryoriana</i>	Rough-barked Manna Gum

Understorey:

Life form	#Spp	%Cover	LF code
Immature Canopy Tree		5%	IT
Understorey Tree or Large Shrub	1	5%	T
Medium Shrub	5	25%	MS
Small Shrub	3	5%	SS
Prostrate Shrub	1	1%	PS
Large Herb	2	5%	LH
Medium Herb	8	15%	MH
Small or Prostrate Herb	5	10%	SH
Large Tufted Graminoid	2	10%	LTG
Large Non-tufted Graminoid	1	1%	LNG
Medium to Small Tufted Graminoid	4	10%	MTG
Medium to Tiny Non-tufted Graminoid	2	10%	MNG
Ground Fern	1	15%	GF
Bryophytes/Lichens	na	10%	BL

EVC 3: Damp Sands Herb-rich Woodland - Gippsland Plain bioregion

LF Code	Species typical of at least part of EVC range	Common Name
T	<i>Acacia mearnsii</i>	Black Wattle
T	<i>Acacia melanoxylon</i>	Blackwood
MS	<i>Epacris impressa</i>	Common Heath
MS	<i>Leptospermum continentale</i>	Prickly Tea-tree
MS	<i>Banksia marginata</i>	Silver Banksia
MS	<i>Leptospermum myrsinoides</i>	Heath Tea-tree
SS	<i>Leucopogon virgatus</i>	Common Beard-heath
SS	<i>Dillwynia glaberrima</i>	Smooth Parrot-pea
SS	<i>Amperea xiphoclada</i> var. <i>xiphoclada</i>	Broom Spurge
PS	<i>Astroloma humifusum</i>	Cranberry Heath
MH	<i>Gonocarpus tetragynus</i>	Common Raspwort
MH	<i>Drosera peltata</i> ssp. <i>auriculata</i>	Tall Sundew
MH	<i>Viola hederacea</i> sensu Willis (1972)	Ivy-leaf Violet
MH	<i>Geranium solanderi</i> s.l.	Austral Cranesbill
SH	<i>Hydrocotyle laxiflora</i>	Stinking Pennywort
SH	<i>Opercularia varia</i>	Variable Stinkweed
SH	<i>Dichondra repens</i>	Kidney-weed
SH	<i>Poranthera microphylla</i>	Small Poranthera
LTG	<i>Lomandra longifolia</i>	Spiny-headed Mat-rush
LTG	<i>Austrostipa mollis</i>	Supple Spear-grass
LNG	<i>Tetrarrhena juncea</i>	Forest Wire-grass
MTG	<i>Lepidosperma concavum</i>	Sandhill Sword-sedge
MTG	<i>Dianella revoluta</i> s.l.	Black-anther Flax-lily
MTG	<i>Lomandra filiformis</i>	Wattle-headed Mat-rush
MTG	<i>Poa sieberiana</i>	Grey Tussock-grass
MNG	<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Grass
GF	<i>Pteridium esculentum</i>	Austral Bracken

Recruitment:

Continuous

Organic Litter:

40 % cover

Logs:

15 m/0.1 ha.

Weediness:

LF Code	Typical Weed Species	Common Name	Invasive	Impact
MH	<i>Hypochoeris radicata</i>	Cat's Ear	high	low
LTG	<i>Anthoxanthum odoratum</i>	Sweet Vernal Grass	high	high
LNG	<i>Holcus lanatus</i>	Yorkshire Fog	high	high

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EVC/Bioregion Benchmark for Vegetation Quality Assessment

Gippsland Plain bioregion

EVC 16: Lowland Forest

Description:

Eucalypt forest to 20 m tall on relatively fertile, moderately well-drained soils in areas of relatively high rainfall. Characterised by the diversity of life forms and species in the understorey including a range of shrubs, grasses and herbs.

Large trees:

Species	DBH(cm)	#/ha
<i>Eucalyptus</i> spp.	70 cm	20 / ha

Tree Canopy Cover:

%cover	Character Species	Common Name
30%	<i>Eucalyptus obliqua</i>	Messmate Stringybark
	<i>Eucalyptus radiata</i> s.l.	Narrow-leaf Peppermint
	<i>Eucalyptus consideriana</i>	Yertchuk

Understorey:

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

LF Code

Species typical of at least part of EVC range

Common Name

T	<i>Acacia melanoxylon</i>	Blackwood
MS	<i>Epacris impressa</i>	Common Heath
MS	<i>Leptospermum continentale</i>	Prickly Tea-tree
MS	<i>Banksia marginata</i>	Silver Banksia
MS	<i>Leptospermum myrsinoides</i>	Heath Tea-tree
SS	<i>Amperea xiphoclada</i> var. <i>xiphoclada</i>	Broom Spurge
PS	<i>Acrotriche serrulata</i>	Honey-pots
MH	<i>Gonocarpus tetragynus</i>	Common Raspwort
MH	<i>Drosera peltata</i> ssp. <i>auriculata</i>	Tall Sundew
MH	<i>Viola hederacea</i> sensu <i>Willis (1972)</i>	Ivy-leaf Violet
SH	<i>Opercularia varia</i>	Variable Stinkweed
LTG	<i>Xanthorrhoea minor</i> ssp. <i>lutea</i>	Small Grass-tree
LTG	<i>Lomandra longifolia</i>	Spiny-headed Mat-rush
LNG	<i>Gahnia radula</i>	Thatch Saw-sedge
MTG	<i>Lomandra filiformis</i>	Wattle Mat-rush
MTG	<i>Poa australis</i> spp. <i>agg.</i>	Tussock Grass
MNG	<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Grass
GF	<i>Pteridium esculentum</i>	Austral Bracken
SC	<i>Billardiera scandens</i>	Common Apple-berry

EVC 16: Lowland Forest - Gippsland Plain bioregion

Recruitment:

Continuous

Organic Litter:

40 % cover

Logs:

20 m/0.1 ha.

Weediness:

LF Code	Typical Weed Species	Common Name	Invasive	Impact
MH	<i>Hypochoeris radicata</i>	Cat's Ear	high	low

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EVC/Bioregion Benchmark for Vegetation Quality Assessment

Gippsland Plain bioregion

EVC 53: Swamp Scrub

Description:

Closed scrub to 8 m tall at low elevations on alluvial deposits along streams or on poorly drained sites with higher nutrient availability. The EVC is dominated by Swamp Paperbark *Melaleuca ericifolia* (or sometimes Woolly Tea-tree *Leptospermum lanigerum*) which often forms a dense thicket, out-competing other species. Occasional emergent eucalypts may be present. Where light penetrates to ground level, a moss/lichen/liverwort or herbaceous ground cover is often present. Dry variants have a grassy/herbaceous ground layer.

Canopy Cover:

%cover	Character Species	Common Name
50%	<i>Leptospermum lanigerum</i> <i>Melaleuca ericifolia</i>	Woolly Tea-tree Swamp Paperbark

Understorey:

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

LF Code	Species typical of at least part of EVC range	Common Name
MS	<i>Coprosma quadrifida</i>	Prickly Currant-bush
MS	<i>Leptospermum continentale</i>	Prickly Tea-tree
LH	<i>Lycopus australis</i>	Australian Gipsywort
LH	<i>Lythrum salicaria</i>	Purple Loosestrife
LH	<i>Persicaria praetermissa</i>	Spotted Knotweed
MH	<i>Hydrocotyle pterocarpa</i>	Wing Pennywort
MH	<i>Stellaria angustifolia</i>	Swamp Starwort
MH	<i>Lobelia anceps</i>	Angled Lobelia
SH	<i>Crassula helmsii</i>	Swamp Crassula
LTG	<i>Juncus procerus</i>	Tall Rush
LTG	<i>Poa labillardierei</i>	Common Tussock-grass
LNG	<i>Gahnia radula</i>	Thatch Saw-sedge
LNG	<i>Phragmites australis</i>	Common Reed
LNG	<i>Baumea rubiginosa</i> s.l.	Soft Twig-rush
MTG	<i>Triglochin procerum</i> s.l.	Water Ribbons
MTG	<i>Juncus gregiflorus</i>	Green Rush
MNG	<i>Eleocharis acuta</i>	Common Spike-sedge
GF	<i>Blechnum cartilagineum</i>	Gristle Fern
SC	<i>Calystegia sepium</i>	Large Bindweed

EVC 53: Swamp Scrub - Gippsland Plain bioregion

Recruitment:

Continuous

Organic Litter:

40 % cover

Weediness:

LF Code	Typical Weed Species	Common Name	Invasive	Impact
MH	<i>Hypochoeris radicata</i>	Cat's Ear	high	low
LNG	<i>Holcus lanatus</i>	Yorkshire Fog	high	high

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EVC/Bioregion Benchmark for Vegetation Quality Assessment

Gippsland Plain bioregion

EVC 175: Grassy Woodland

Description:

A variable open eucalypt woodland to 15 m tall or occasionally Sheoak woodland to 10 m tall over a diverse ground layer of grasses and herbs. The shrub component is usually sparse. It occurs on sites with moderate fertility on gentle slopes or undulating hills on a range of geologies.

Large trees:

Species	DBH(cm)	#/ha
<i>Eucalyptus</i> spp.	70 cm	15 / ha
<i>Allocasuarina</i> spp.	40 cm	

Tree Canopy Cover:

%cover	Character Species	Common Name
15%	<i>Eucalyptus radiata</i> s.l. <i>Allocasuarina verticillata</i>	Narrow-leaf Peppermint Drooping Sheoak

Understorey:

Life form	#Spp	%Cover	LF code
Immature Canopy Tree		5%	IT
Understorey Tree or Large Shrub	2	10%	T
Medium Shrub	6	15%	MS
Small Shrub	2	5%	SS
Prostrate Shrub	2	1%	PS
Large Herb	2	5%	LH
Medium Herb	8	10%	MH
Small or Prostrate Herb	3	5%	SH
Large Tufted Graminoid	2	10%	LTG
Large Non-tufted Graminoid	1	10%	LNG
Medium to Small Tufted Graminoid	6	20%	MTG
Medium to Tiny Non-tufted Graminoid	2	10%	MNG
Ground Fern	1	5%	GF
Scrambler or Climber	2	5%	SC
Bryophytes/Lichens	na	10%	BL

EVC 175: Grassy Woodland - Gippsland Plain bioregion

LF Code	Species typical of at least part of EVC range	Common Name
T	<i>Acacia mearnsii</i>	Black Wattle
T	<i>Allocasuarina littoralis</i>	Black Sheoak
T	<i>Exocarpos cupressiformis</i>	Cherry Ballart
MS	<i>Leptospermum continentale</i>	Prickly Tea-tree
MS	<i>Epacris impressa</i>	Common Heath
MS	<i>Cassinia aculeata</i>	Common Cassinia
MS	<i>Acacia paradoxa</i>	Hedge Wattle
SS	<i>Pimelea humilis</i>	Common Rice-flower
SS	<i>Hibbertia riparia</i>	Erect Guinea-flower
PS	<i>Bossiaea prostrata</i>	Creeping Bossiaea
PS	<i>Astroloma humifusum</i>	Cranberry Heath
PS	<i>Acrotriche serrulata</i>	Honey-pots
LH	<i>Pterostylis longifolia</i> s.l.	Tall Greenhood
MH	<i>Gonocarpus tetragynus</i>	Common Raspwort
MH	<i>Drosera peltata</i> ssp. <i>auriculata</i>	Tall Sundew
SH	<i>Dichondra repens</i>	Kidney-weed
SH	<i>Opercularia varia</i>	Variable Stinkweed
SH	<i>Drosera whittakeri</i> ssp. <i>aberrans</i>	Scented Sundew
LTG	<i>Deyeuxia quadriseta</i>	Reed Bent-grass
LTG	<i>Xanthorrhoea minor</i> ssp. <i>lutea</i>	Small Grass-tree
LTG	<i>Lomandra longifolia</i>	Spiny-headed Mat-rush
LNG	<i>Gahnia radula</i>	Thatch Saw-sedge
MTG	<i>Lomandra filiformis</i>	Wattle Mat-rush
MTG	<i>Themeda triandra</i>	Kangaroo Grass
MTG	<i>Poa sieberiana</i>	Grey Tussock-grass
MTG	<i>Lepidosperma laterale</i>	Variable Sword-sedge
MNG	<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Grass
GF	<i>Pteridium esculentum</i>	Austral Bracken
SC	<i>Comesperma volubile</i>	Love Creeper
SC	<i>Billardiera scandens</i>	Common Apple-berry

Recruitment:

Continuous

Organic Litter:

20 % cover

Logs:

15 m/0.1 ha.

Weediness:

LF Code	Typical Weed Species	Common Name	Invasive	Impact
T	<i>Pinus radiata</i>	Radiata Pine	high	high
T	<i>Pittosporum undulatum</i>	Sweet Pittosporum	high	high
MS	<i>Chrysanthemoides monilifera</i>	Boneseed	high	high
MH	<i>Hypochoeris radicata</i>	Cat's Ear	high	low
MTG	<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass	high	high
MTG	<i>Briza maxima</i>	Large Quaking-grass	high	low

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EVC/Bioregion Benchmark for Vegetation Quality Assessment

Gippsland Plain bioregion

EVC 821: Tall Marsh

Description:

Occurs on Quaternary sedimentary geology of mainly estuarine sands, soils are peaty, silty clays, and average annual rainfall is approximately 600 mm. It requires shallow water (to 1 m deep) and low current-scour, and can only tolerate very low levels of salinity. Closed to open grassland/sedgeland to 2-3 m tall, dominated by Common Reed and Cumbungi. Small aquatic and semi-aquatic species occur amongst the reeds.

Life Forms:

Life form	#Spp	%Cover	LF code
Large Herb	3	10%	LH
Medium Herb	2	5%	MH
Small or Prostrate Herb	6	10%	SH
Large Tufted Graminoid	1	5%	LTG
Large Non-tufted Graminoid	2	40%	LNG
Medium to Tiny Non-tufted Graminoid	1	1%	MNG
Total understorey projective foliage cover		70%	

LF Code	Species typical of at least part of EVC range	Common Name
LH	<i>Myriophyllum verrucosum</i>	Red Water-milfoil
LH	<i>Myriophyllum salsugineum</i>	Lake Water-milfoil
LH	<i>Villarsia reniformis</i>	Running Marsh-flower
MH	<i>Rumex bidens</i>	Mud Dock
MH	<i>Lilaeopsis polyantha</i>	Australian Lilaeopsis
MH	<i>Lepilaena bilocularis</i>	Small-fruit Water-mat
SH	<i>Lemna disperma</i>	Common Duckweed
SH	<i>Azolla filiculoides</i>	Pacific Azolla
SH	<i>Wolffia australiana</i>	Tiny Duckweed
SH	<i>Mimulus repens</i>	Creeping Monkey-flower
LTG	<i>Triglochin procerum s.l.</i>	Water Ribbons
LTG	<i>Juncus ingens</i>	Giant Rush
LNG	<i>Schoenoplectus tabernaemontani</i>	River Club-sedge
LNG	<i>Phragmites australis</i>	Common Reed
LNG	<i>Typha domingensis</i>	Cumbungi
LNG	<i>Typha orientalis</i>	Broad-leaf Cumbungi
MNG	<i>Lepilaena cylindrocarpa</i>	Long-fruit Water-mat
MNG	<i>Eleocharis acuta</i>	Common Spike-sedge

Recruitment:

Episodic/Flood: desirable period of disturbance is every five years

Organic Litter:

10% cover

Weediness:

LF Code	Typical Weed Species	Common Name	Invasive	Impact
MH	<i>Cotula coronopifolia</i>	Water Buttons	high	high
MNG	<i>Paspalum distichum</i>	Water Couch	high	high

EVC/Bioregion Benchmark for Vegetation Quality Assessment

Gippsland Plain bioregion

EVC 937: Swampy Woodland

Description:

Open eucalypt woodland to 15 m tall with ground-layer dominated by tussock grasses and/or sedges and often rich in herbs. Occurs on poorly drained, seasonally waterlogged heavy soils, primarily on swamp deposits but extending to suitable substrates within some landscapes of sedimentary origin.

Large trees:

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

Tree Canopy Cover:

%cover	Character Species	Common Name
15%	<i>Eucalyptus ovata</i>	Swamp Gum
	<i>Eucalyptus cephalocarpa</i> s.s.	Mealy Stringybark
	<i>Eucalyptus radiata</i> s.l.	Narrow-leaf Peppermint
	<i>Eucalyptus obliqua</i>	Messmate Stringybark

Understorey:

Life form	#Spp	%Cover	LF code
Immature Canopy Tree		5%	IT
Understorey Tree or Large Shrub	1	5%	T
Medium Shrub	2	20%	MS
Medium Herb	5	10%	MH
Small or Prostrate Herb	3	10%	SH
Large Tufted Graminoid	4	30%	LTG
Large Non-tufted Graminoid	2	10%	LNG
Medium to Small Tufted Graminoid	4	10%	MTG
Bryophytes/Lichens	na	20%	BL

LF Code	Species typical of at least part of EVC range	Common Name
T	<i>Melaleuca ericifolia</i>	Swamp Paperbark
MS	<i>Leptospermum continentale</i>	Prickly Tea-tree
MH	<i>Acaena novae-zelandiae</i>	Bidgee-widgee
MH	<i>Centella cordifolia</i>	Centella
MH	<i>Gratiola peruviana</i>	Austral Brooklime
SH	<i>Mazus pumilio</i>	Swamp Mazus
LTG	<i>Gahnia sieberiana</i>	Red-fruit Saw-sedge
LTG	<i>Poa labillardierei</i>	Common Tussock-grass
LTG	<i>Carex appressa</i>	Tall Sedge
LNG	<i>Gahnia radula</i>	Thatch Saw-sedge
LNG	<i>Phragmites australis</i>	Common Reed
MTG	<i>Schoenus apogon</i>	Common Bog-sedge
MTG	<i>Lepidosperma laterale</i>	Variable Sword-sedge
MNG	<i>Poa tenera</i>	Slender Tussock-grass
MNG	<i>Juncus holoschoenus</i>	Joint-leaf Rush

Recruitment:

Continuous

Organic Litter:

20 % cover

Logs:

15 m/0.1 ha.

EVC 937: Swampy Woodland - Gippsland Plain bioregion

Weediness:

LF Code	Typical Weed Species	Common Name	Invasive	Impact
MS	<i>Rubus</i> sp. aff. <i>armeniacus</i>	Blackberry	high	high
MH	<i>Hypochoeris radicata</i>	Cat's Ear	high	low
LNG	<i>Holcus lanatus</i>	Yorkshire Fog	high	high
MTG	<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass	high	high

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Appendix 7: Recommendations from initial assessment

Native vegetation

Native vegetation in the study area comprises two broad vegetation types; scrub and woodland, which have been classified into three different Ecological Vegetation Classes (EVCs). Consideration should be given to retaining the highest quality vegetation across all three EVCs. The areas of native vegetation with the highest retention value in the study area are:

- **AC and AX** - Roadside remnants of Grassy Woodland (EVC 175);
- **Scattered Trees 62 to 85** – Cluster of 24 scattered trees including one Narrow-leaf Peppermint and 23 Coast Manna-gums. These trees are all generally in good health and more than half of them (13) are considered Large Old Trees (LOTs);
- **BO** – Swamp Scrub (EVC 53) south east of Sharrocks Road;
- **BZ and CB** - Linear remnants of Damp sands Herb-rich Woodland (EVC3) dominated by Coast Manna-gum and supporting Small Grass-trees.



Grassy Woodland (HZ AX), and Scattered Coast Manna-gum (LOT)



Swamp Scrub (HZ BO) and Damp Sands Herb-rich Woodland (HZ BZ)

It is recommended that the above native vegetation is retained in a final development plan for the North East Wonthaggi PSP.

Habitat linkages for fauna

A large proportion of native vegetation throughout the proposed North East Wonthaggi PSP area comprises vegetation that is restricted to roadside remnants. While these areas currently support a high weed cover, they also provide important habitat linkages for common fauna. Roadsides that support remnant native vegetation in the study area include Fullers Road, Heslop Road, Wentworth Road, Oates Road, Korumburra-Wonthaggi Road, McGibbony's Road and Bass Highway.

The areas of roadside vegetation that provide the highest retention value habitat linkages for fauna in the study area are:

- The numerous patches of scrub (habitat zones BD, BE, BF, BG, BH, BI, BJ) that form a habitat corridor along **McGibbony's Road**; and
- The numerous patches of scrub (habitat zones AS, AT, AU, AW, AX, AY, AZ) that form a habitat corridor along **Korumburra-Wonthaggi Road**.

It is recommended that the above fauna habitat linkages are retained in a final development plan for the North East Wonthaggi PSP.

Opportunities for revegetation

Any landscaping and/or planting of vegetation for the North East Wonthaggi PSP should incorporate the planting of appropriate indigenous species, namely species listed in the either of the EVC Benchmarks listed in Appendix 6. Swamp Scrub, and particularly Swamp Paperbark, regularly regenerates naturally in wetter areas like that found along roadside drains. Any natural regeneration of Swamp Scrub that occurs along roadsides constructed within the PSP area should be encouraged and maintained within the road reserve.

Appendix 8: 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: 14/05/2020

Report ID: NAA_2020_068

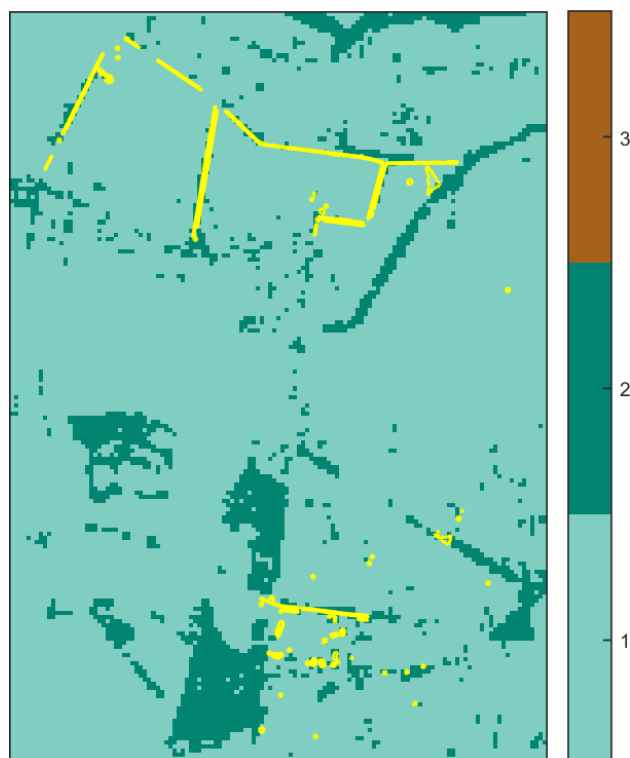
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Project ID	16188_Wonthaggi_psp_removal
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Assessment pathway

Assessment pathway	Detailed Assessment Pathway
Extent including past and proposed	7.540 ha
Extent of past removal	0.000 ha
Extent of proposed removal	7.540 ha
No. Large trees proposed to be removed	14
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	1.744 general habitat units
Vicinity	West Gippsland Catchment Management Authority (CMA) or Bass Coast Shire Council
Minimum strategic biodiversity value score ²	0.338
Large trees	14 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 Detailed Assessment Pathway and it will be assessed under the Detailed 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 (partly met)
- Maps showing the native vegetation and property (partly met)
- Information about the impacts on rare or threatened species.
- 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 defensible space statement as applicable
- A statement about the Native Vegetation Precinct Plan as applicable
- A site assessment report including a habitat hectare assessment of any patches of native vegetation and details of trees
- An offset statement that explains that an offset has been identified and how it will be secured.

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Obtaining this publication does not guarantee that an application will meet the requirements of Clauses 52.16 or 52.17 of the Victoria Planning Provisions and Victorian planning schemes or that a permit to remove native vegetation will be granted.

Notwithstanding anything else contained in this publication, you must ensure that you comply with all relevant laws, legislation, awards or orders and that you obtain and comply with all permits, approvals and the like that affect, are applicable or are necessary to undertake any action to remove, lop or destroy or otherwise deal with any native vegetation or that apply to matters within the scope of Clauses 52.16 or 52.17 of the Victoria Planning Provisions and Victorian planning schemes.

Appendix 1: Description of native vegetation to be removed

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

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

$$\text{Species habitat units} = \text{extent} \times \text{condition} \times \text{species landscape factor} \times 2, \text{ where the species landscape factor} = 0.5 + (\text{habitat importance score}/2)$$

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

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

$$\text{General habitat units} = \text{extent} \times \text{condition} \times \text{general landscape factor} \times 1.5, \text{ where the general landscape factor} = 0.5 + (\text{strategic biodiversity value score}/2)$$

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-AB1	Patch	gipp0053	Endangered	0	no	0.230	0.506	0.506	0.405		0.123	General
1-AA	Patch	gipp0053	Endangered	0	no	0.250	0.047	0.047	0.416		0.013	General
1-AD	Patch	gipp0053	Endangered	0	no	0.240	0.053	0.053	0.429		0.014	General
1-AE	Patch	gipp0053	Endangered	0	no	0.240	0.230	0.230	0.418		0.059	General
1-AF	Patch	gipp0053	Endangered	0	no	0.250	0.458	0.458	0.331		0.114	General
1-AJ1	Patch	gipp0053	Endangered	0	no	0.220	0.519	0.519	0.317		0.113	General
1-AJ2	Patch	gipp0053	Endangered	0	no	0.220	0.190	0.190	0.312		0.041	General
1-AJ3	Patch	gipp0053	Endangered	0	no	0.220	0.010	0.010	0.397		0.002	General

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-AJ4	Patch	gipp0053	Endangered	0	no	0.220	0.103	0.103	0.260		0.021	General
1-AJ5	Patch	gipp0053	Endangered	0	no	0.220	0.193	0.193	0.365		0.043	General
1-AK	Patch	gipp0053	Endangered	0	no	0.240	0.020	0.020	0.390		0.005	General
1-AP1	Patch	gipp0053	Endangered	0	no	0.250	0.036	0.036	0.380		0.009	General
1-AP2	Patch	gipp0053	Endangered	0	no	0.250	0.006	0.006	0.380		0.002	General
1-AM	Patch	gipp0053	Endangered	0	no	0.230	0.170	0.170	0.383		0.040	General
1-AL1	Patch	gipp0053	Endangered	0	no	0.240	0.270	0.270	0.670		0.081	General
1-AL2	Patch	gipp0053	Endangered	0	no	0.240	0.006	0.006	0.350		0.001	General
1-AL3	Patch	gipp0053	Endangered	0	no	0.240	0.003	0.003	0.375		0.001	General
1-AL4	Patch	gipp0053	Endangered	0	no	0.240	0.205	0.205	0.358		0.050	General
1-AO	Patch	gipp0053	Endangered	0	no	0.170	0.019	0.019	0.355		0.003	General
1-AN1	Patch	gipp0053	Endangered	0	no	0.230	0.150	0.150	0.383		0.036	General
1-AN2	Patch	gipp0053	Endangered	0	no	0.230	0.072	0.072	0.381		0.017	General
1-AV	Patch	gipp0053	Endangered	0	no	0.160	0.595	0.595	0.910		0.136	General
1-BC	Patch	gipp0003	Vulnerable	0	no	0.130	0.009	0.009	0.420		0.001	General
1-BD1a	Patch	gipp0053	Endangered	0	no	0.200	0.181	0.181	0.380		0.038	General

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-BD4a	Patch	gipp0053	Endangered	0	no	0.200	0.015	0.015	0.392		0.003	General
1-BT2	Patch	gipp0053	Endangered	0	no	0.250	0.055	0.055	0.390		0.014	General
1-BS1	Patch	gipp0053	Endangered	0	no	0.250	0.130	0.130	0.332		0.033	General
1-BS2	Patch	gipp0053	Endangered	0	no	0.250	0.247	0.247	0.369		0.063	General
1-BU1	Patch	gipp0053	Endangered	0	no	0.250	0.027	0.027	0.200		0.006	General
1-BU2	Patch	gipp0053	Endangered	0	no	0.250	0.013	0.013	0.200		0.003	General
1-BU3	Patch	gipp0053	Endangered	0	no	0.250	0.004	0.004	0.200		0.001	General
1-BU4	Patch	gipp0053	Endangered	0	no	0.250	0.018	0.018	0.200		0.004	General
1-BR1	Patch	gipp0053	Endangered	0	no	0.250	0.043	0.043	0.352		0.011	General
1-BR2	Patch	gipp0053	Endangered	0	no	0.250	0.067	0.067	0.297		0.016	General
1-CC	Patch	gipp0003	Vulnerable	3	no	0.240	0.098	0.098	0.720		0.030	General
1-BQ1	Patch	gipp0053	Endangered	0	no	0.250	0.017	0.017	0.540		0.005	General
1-BQ2	Patch	gipp0053	Endangered	0	no	0.250	0.007	0.007	0.540		0.002	General
1-BEa	Patch	gipp0053	Endangered	0	no	0.160	0.008	0.008	0.420		0.001	General
1-BJa	Patch	gipp0053	Endangered	0	no	0.160	0.030	0.030	0.399		0.005	General

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-CE1	Patch	gipp0003	Vulnerable	0	no	0.100	0.022	0.022	0.200		0.002	General
1-CE2	Patch	gipp0003	Vulnerable	0	no	0.100	0.031	0.031	0.200		0.003	General
1-BV3a	Patch	gipp0003	Vulnerable	0	no	0.180	0.033	0.033	0.200		0.005	General
1-BV3b	Patch	gipp0003	Vulnerable	0	no	0.180	0.019	0.019	0.207		0.003	General
1-BV3c	Patch	gipp0003	Vulnerable	0	no	0.180	0.017	0.017	0.200		0.003	General
1-BV3d	Patch	gipp0003	Vulnerable	1	no	0.180	0.159	0.159	0.200		0.026	General
1-CD	Patch	gipp0003	Vulnerable	0	no	0.100	0.015	0.015	0.471		0.002	General
1-BT1	Patch	gipp0053	Endangered	0	no	0.250	0.056	0.056	0.358		0.014	General
1-CG	Patch	gipp0053	Endangered	0	no	0.330	0.102	0.102	0.210		0.031	General
1-CH	Patch	gipp0937	Endangered	0	no	0.290	0.010	0.010	0.210		0.003	General
1-96	Scattered Tree	gipp0003	Vulnerable	0	no	0.200	0.031	0.000			0.000	
1-97	Scattered Tree	gipp0003	Vulnerable	0	no	0.200	0.031	0.000			0.000	
1-98	Scattered Tree	gipp0003	Vulnerable	1	no	0.200	0.070	0.070	0.397		0.015	General
1-99	Scattered Tree	gipp0003	Vulnerable	0	no	0.200	0.031	0.002	0.677		0.000	General
1-100	Scattered Tree	gipp0003	Vulnerable	0	no	0.200	0.031	0.002	0.383		0.000	General
1-101	Scattered Tree	gipp0003	Vulnerable	0	no	0.200	0.031	0.015	0.341		0.003	General

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
1-102	Scattered Tree	gipp0003	Vulnerable	0	no	0.200	0.031	0.017	0.720		0.004	General
1-103	Scattered Tree	gipp0003	Vulnerable	1	no	0.200	0.070	0.027	0.720		0.007	General
1-104	Scattered Tree	gipp0003	Vulnerable	1	no	0.200	0.070	0.043	0.720		0.011	General
1-105	Scattered Tree	gipp0003	Vulnerable	1	no	0.200	0.070	0.054	0.720		0.014	General
1-106	Scattered Tree	gipp0003	Vulnerable	0	no	0.200	0.031	0.000	0.720		0.000	General
1-107	Scattered Tree	gipp0003	Vulnerable	0	no	0.200	0.031	0.016	0.720		0.004	General
1-108	Scattered Tree	gipp0003	Vulnerable	0	no	0.200	0.031	0.009	0.720		0.002	General
1-109	Scattered Tree	gipp0003	Vulnerable	0	no	0.200	0.031	0.014	0.720		0.004	General
1-110	Scattered Tree	gipp0003	Vulnerable	0	no	0.200	0.031	0.031	0.720		0.008	General
1-86	Scattered Tree	gipp0003	Vulnerable	0	no	0.200	0.031	0.031	0.240		0.006	General
1-87	Scattered Tree	gipp0003	Vulnerable	0	no	0.200	0.031	0.017	0.240		0.003	General
1-88	Scattered Tree	gipp0003	Vulnerable	0	no	0.200	0.031	0.003	0.240		0.001	General
1-89	Scattered Tree	gipp0003	Vulnerable	0	no	0.200	0.031	0.010	0.240		0.002	General
1-90	Scattered Tree	gipp0003	Vulnerable	0	no	0.200	0.031	0.015	0.240		0.003	General
1-91	Scattered Tree	gipp0003	Vulnerable	0	no	0.200	0.031	0.007	0.240		0.001	General

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
1-92	Scattered Tree	gipp0003	Vulnerable	0	no	0.200	0.031	0.020	0.240		0.004	General
1-93	Scattered Tree	gipp0003	Vulnerable	0	no	0.200	0.031	0.003	0.240		0.001	General
1-94	Scattered Tree	gipp0003	Vulnerable	1	no	0.200	0.070	0.070	0.772		0.019	General
1-95	Scattered Tree	gipp0003	Vulnerable	0	no	0.200	0.031	0.031	0.880		0.009	General
1-116	Scattered Tree	gipp0003	Vulnerable	0	no	0.200	0.031	0.016	0.200		0.003	General
1-118	Scattered Tree	gipp0003	Vulnerable	0	no	0.200	0.031	0.001	0.200		0.000	General
1-117	Scattered Tree	gipp0003	Vulnerable	0	no	0.200	0.031	0.016	0.200		0.003	General
1-119	Scattered Tree	gipp0003	Vulnerable	0	no	0.200	0.031	0.017	0.200		0.003	General
1-120	Scattered Tree	gipp0003	Vulnerable	0	no	0.200	0.031	0.017	0.200		0.003	General
1-121	Scattered Tree	gipp0003	Vulnerable	1	no	0.200	0.070	0.055	0.200		0.010	General
1-122	Scattered Tree	gipp0003	Vulnerable	1	no	0.200	0.070	0.055	0.200		0.010	General
1-5	Scattered Tree	gipp0937	Endangered	0	no	0.200	0.031	0.031	0.210		0.006	General
1-58	Scattered Tree	gipp0937	Endangered	0	no	0.200	0.031	0.031	0.350		0.006	General
1-52	Scattered Tree	gipp0053	Endangered	0	no	0.200	0.031	0.031	0.330		0.006	General
1-53	Scattered Tree	gipp0053	Endangered	0	no	0.200	0.031	0.031	0.330		0.006	General

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
1-114	Scattered Tree	gipp0003	Vulnerable	0	no	0.200	0.031	0.019	0.240		0.004	General
1-115	Scattered Tree	gipp0003	Vulnerable	0	no	0.200	0.031	0.019	0.240		0.004	General
1-6	Scattered Tree	gipp0053	Endangered	0	no	0.200	0.031	0.025	0.380		0.005	General
1-7	Scattered Tree	gipp0053	Endangered	0	no	0.200	0.031	0.027	0.380		0.006	General
1-8	Scattered Tree	gipp0053	Endangered	0	no	0.200	0.031	0.012	0.380		0.003	General
1-10	Scattered Tree	gipp0053	Endangered	0	no	0.200	0.031	0.012	0.380		0.002	General
1-9	Scattered Tree	gipp0053	Endangered	0	no	0.200	0.031	0.007	0.380		0.001	General
1-11	Scattered Tree	gipp0053	Endangered	0	no	0.200	0.031	0.019	0.380		0.004	General
1-12	Scattered Tree	gipp0053	Endangered	0	no	0.200	0.031	0.031	0.380		0.006	General
1-13	Scattered Tree	gipp0053	Endangered	0	no	0.200	0.031	0.031	0.380		0.006	General
1-14	Scattered Tree	gipp0053	Endangered	0	no	0.200	0.031	0.029	0.380		0.006	General
1-15	Scattered Tree	gipp0053	Endangered	0	no	0.200	0.031	0.027	0.380		0.006	General
1-16	Scattered Tree	gipp0053	Endangered	0	no	0.200	0.031	0.029	0.380		0.006	General
1-17	Scattered Tree	gipp0053	Endangered	0	no	0.200	0.031	0.028	0.395		0.006	General
1-1	Scattered Tree	gipp0175	Endangered	0	no	0.200	0.031	0.031	0.380		0.006	General

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
1-2	Scattered Tree	gipp0175	Endangered	0	no	0.200	0.031	0.031	0.371		0.006	General
1-56	Scattered Tree	gipp0937	Endangered	0	no	0.200	0.031	0.031	0.360		0.006	General
1-55	Scattered Tree	gipp0937	Endangered	1	no	0.200	0.070	0.070	0.420		0.015	General
1-59	Scattered Tree	gipp0937	Endangered	0	no	0.200	0.031	0.031	0.400		0.007	General
1-60	Scattered Tree	gipp0937	Endangered	0	no	0.200	0.031	0.031	0.400		0.007	General
1-61	Scattered Tree	gipp0937	Endangered	0	no	0.200	0.031	0.031	0.400		0.007	General
1-23	Scattered Tree	gipp0937	Endangered	1	no	0.200	0.070	0.070	0.450		0.015	General
1-19	Scattered Tree	gipp0053	Endangered	0	no	0.200	0.031	0.031	0.380		0.006	General
1-3	Scattered Tree	gipp0053	Endangered	0	no	0.200	0.031	0.031	0.360		0.006	General
1-21	Scattered Tree	gipp0053	Endangered	0	no	0.200	0.031	0.031	0.380		0.006	General
1-20	Scattered Tree	gipp0937	Endangered	1	no	0.200	0.070	0.070	0.380		0.015	General
1-4	Scattered Tree	gipp0937	Endangered	0	no	0.200	0.031	0.031	0.330		0.006	General
1-18	Scattered Tree	gipp0937	Endangered	0	no	0.200	0.031	0.031	0.420		0.007	General
1-46	Scattered Tree	gipp0937	Endangered	0	no	0.200	0.031	0.021	0.390		0.004	General
1-47	Scattered Tree	gipp0937	Endangered	0	no	0.200	0.031	0.021	0.390		0.004	General

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
1-48	Scattered Tree	gipp0003	Vulnerable	0	no	0.200	0.031	0.017	0.420		0.004	General
1-49	Scattered Tree	gipp0003	Vulnerable	0	no	0.200	0.031	0.017	0.420		0.004	General
1-51	Scattered Tree	gipp0053	Endangered	0	no	0.200	0.031	0.031	0.391		0.007	General
1-54	Scattered Tree	gipp0937	Endangered	0	no	0.200	0.031	0.031	0.360		0.006	General
1-50	Scattered Tree	gipp0053	Endangered	0	no	0.200	0.031	0.031	0.370		0.006	General
1-AG1	Patch	gipp0053	Endangered	0	no	0.250	0.247	0.247	0.346		0.062	General
1-AG2	Patch	gipp0053	Endangered	0	no	0.250	0.146	0.146	0.305		0.036	General

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

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

Species common name	Species scientific name	Species number	Conservation status	Group	Habitat impacted	% habitat value affected
Bassian Pomaderris	<i>Pomaderris oraria subsp. oraria</i>	502665	Rare	Dispersed	Habitat importance map	0.0011
Strzelecki Gum	<i>Eucalyptus strzeleckii</i>	504558	Vulnerable	Dispersed	Habitat importance map	0.0006
Netted brake	<i>Pteris comans</i>	502778	Rare	Dispersed	Habitat importance map	0.0006
Dune Wood-sorrel	<i>Oxalis rubens</i>	502390	Rare	Dispersed	Habitat importance map	0.0005
Dense Leek-orchid	<i>Prasophyllum spicatum</i>	504506	Endangered	Dispersed	Habitat importance map	0.0003
Small Sickle Greenhood	<i>Pterostylis lustra</i>	504876	Endangered	Dispersed	Habitat importance map	0.0002
Green Leek-orchid	<i>Prasophyllum lindleyanum</i>	502702	Vulnerable	Dispersed	Habitat importance map	0.0001
Bog Gum	<i>Eucalyptus kitsoniana</i>	501290	Rare	Dispersed	Habitat importance map	0.0001
Australian Grayling	<i>Prototroctes maraena</i>	4686	Vulnerable	Dispersed	Habitat importance map	0.0001
Glossy Grass Skink	<i>Pseudemoia rawlinsoni</i>	12683	Vulnerable	Dispersed	Habitat importance map	0.0001
Floodplain Fireweed	<i>Senecio campylocarpus</i>	507136	Rare	Dispersed	Habitat importance map	0.0001
Currant-wood	<i>Monotoca glauca</i>	503859	Rare	Dispersed	Habitat importance map	0.0001
Sticky Wattle	<i>Acacia howittii</i>	500044	Rare	Dispersed	Habitat importance map	0.0001
Rough Blown-grass	<i>Lachnagrostis rudis subsp. rudis</i>	500159	Endangered	Dispersed	Habitat importance map	0.0001
Lax Twig-sedge	<i>Baumea laxa</i>	500378	Rare	Dispersed	Habitat importance map	0.0001
Lewin's Rail	<i>Lewinia pectoralis pectoralis</i>	10045	Vulnerable	Dispersed	Habitat importance map	0.0001
Silky Kidney-weed	<i>Dichondra sp. 1</i>	505786	Rare	Dispersed	Habitat importance map	0.0001
Swamp Skink	<i>Lissolepis coventryi</i>	12407	Vulnerable	Dispersed	Habitat importance map	0.0000
Grey Goshawk	<i>Accipiter novaehollandiae novaehollandiae</i>	10220	Vulnerable	Dispersed	Habitat importance map	0.0000

Southern Xanthosia	<i>Xanthosia tasmanica</i>	504088	Rare	Dispersed	Habitat importance map	0.0000
Gull-billed Tern	<i>Gelochelidon nilotica macrotarsa</i>	10111	Endangered	Dispersed	Habitat importance map	0.0000
Australasian Bittern	<i>Botaurus poiciloptilus</i>	10197	Endangered	Dispersed	Habitat importance map	0.0000
Baillon's Crake	<i>Porzana pusilla palustris</i>	10050	Vulnerable	Dispersed	Habitat importance map	0.0000
Australasian Shoveler	<i>Anas rhynchos</i>	10212	Vulnerable	Dispersed	Habitat importance map	0.0000
Eastern Spider-orchid	<i>Caladenia orientalis</i>	503660	Endangered	Dispersed	Habitat importance map	0.0000
Hardhead	<i>Aythya australis</i>	10215	Vulnerable	Dispersed	Habitat importance map	0.0000

Habitat group

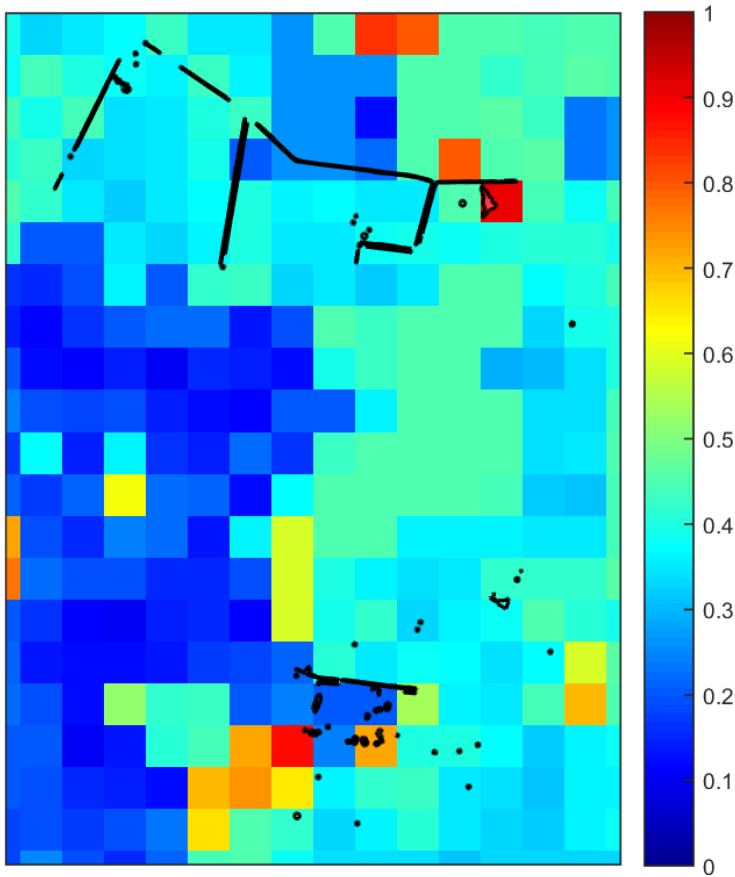
- Highly localised habitat means there is 2000 hectares or less mapped habitat for the species
- Dispersed habitat means there is more than 2000 hectares of mapped habitat for the species

Habitat impacted

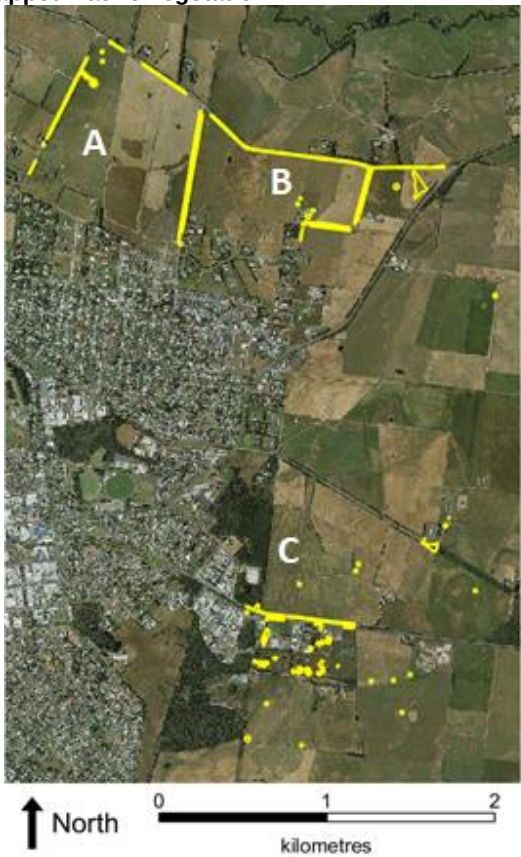
- Habitat importance maps are the maps defined in the Guidelines that include all the mapped habitat for a rare or threatened species
- Top ranking maps are the maps defined in the Guidelines that depict the important areas of a dispersed species habitat, developed from the highest habitat importance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

Appendix 3 – Images of mapped native vegetation

2. Strategic biodiversity values map



3. Aerial photograph showing mapped native vegetation



A



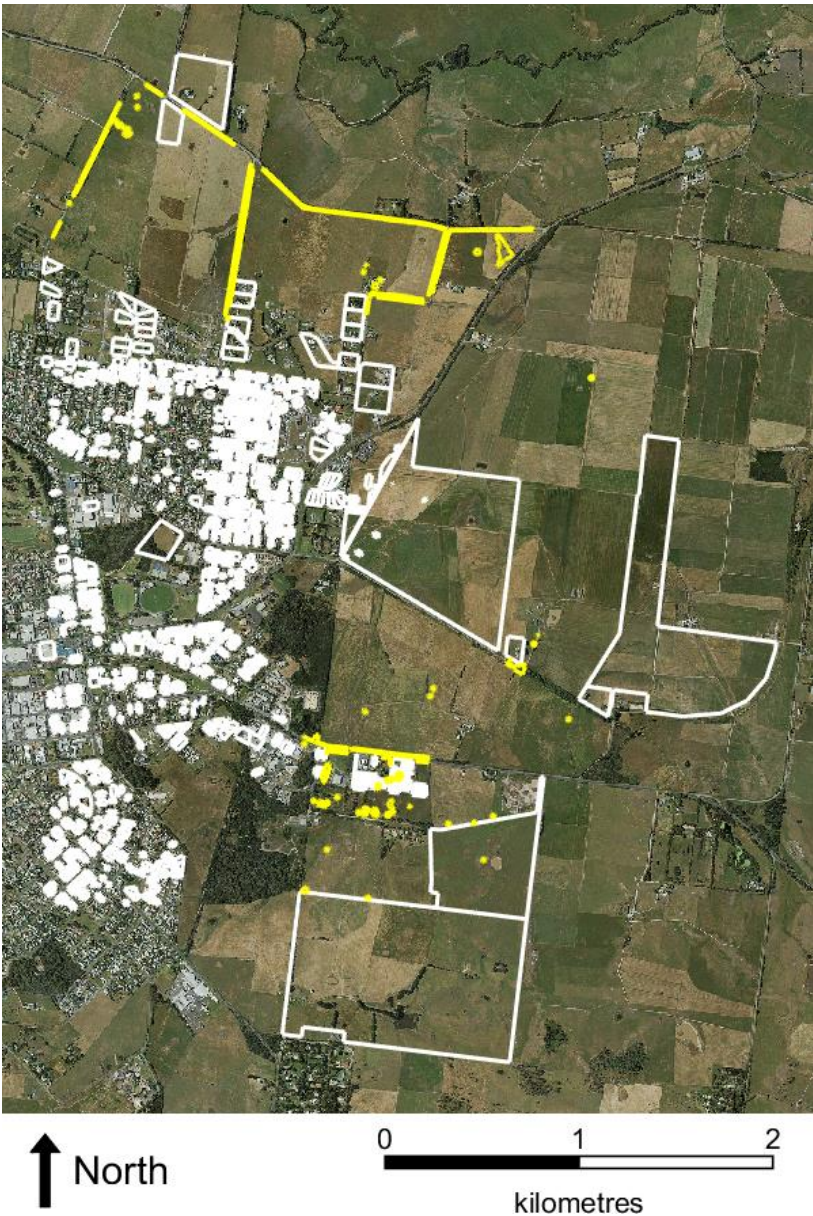
B



C



4. Map of the property in context



Yellow boundaries denote areas of proposed native vegetation removal.