Final Report

Ecological Assessment for Phase 2: Jetty Road Urban Growth Plan: Curlewis, Victoria

Prepared for

Curlewis Land Pty Ltd

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Ecology and Heritage Partners Pty Ltd

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1 INTRODUCTION

1.1 Background

Ecology and Heritage Partners Pty Ltd was commissioned by Curlewis Land Pty Ltd to undertake an Ecological Assessment for Phase 2: Jetty Road Urban Growth Plan at Curlewis, Victoria (the study area).

We understand that Curlewis Land Pty Ltd is proposing to submit an application to rezone the study area to facilitate future development works, including residential development, in accordance with the objectives and guidelines contained within the Jetty Road Urban Growth Plan (UGP), which was adopted by the City of Greater Geelong (CoGG) on 26 June 2007, and later amended on 23 September 2008 (CoGG 2008).

As part of Amendment C387, it is proposed to rezone the study area from Rural Living Zone (RLZ) to General Residential Zone and introduce a Development Plan Overlay (DPO) and Development Contributions Plan Overlay (DCPO).

The purpose of this assessment was to identify the extent and type of native vegetation present within the study area and to determine the likely presence of significant flora and fauna species and/or ecological communities. This report presents the results of the assessment and discusses the potential ecological and legislative implications associated with the proposed action.

1.2 Study Area

The study area is located at Curlewis on the Bellarine Peninsula and is approximately 16 kilometres east of Geelong's CBD (Figure 1). The study area covers approximately 51.7 hectares and is bound by the Bellarine Rail Trail to the north, Portarlington Road to the south, Hackwill Place and Jetty Road to the east and Tivoli Drive to the west.

The study area is currently used for low density residential purposes, although previous agricultural use is evident via the presence of improved pasture. It is generally flat; however, a slight depression runs through the study area from the south-east corner to the centre of the site. Two dams are located within the parcel at 1421-1423 Portarlington Road.

No areas containing slopes of more than 20 percent, saline discharge areas, and areas of existing erosion were observed.

According to the Department of Environment, Land, Water and Planning (DELWP) NatureKit Map (DELWP 2022a), the study area is located within the Otway Plain bioregion, Corangamite Catchment Management Authority (CMA) and the City of Greater Geelong municipality.

Within the study area, a subset of three parcels were subject to on-ground assessment by Ecology and Heritage Partners (hereafter referred to as 'the assessed land'). These parcels were:

The parcels subject to on-ground assessment (the 'assessed land') as part of this report were:

- 1421-1423 Portarlington Road, Curlewis;

- 12-18 Hackwill Place, Curlewis; and,
- 292-300 Jetty Road, Curlewis.

In addition, the both sides of the road reserve of Tivoli Drive where it is adjacent to the Stage 2 Jetty Road UGP was assessed.

For all other parcels within the Stage 2 Jetty Road UGP, Ecology and Heritage Partners have relied on the quality and extent of ecological values as detailed in the Jetty Road Clifton Springs Vegetation Assessment report (Mark Trengove Ecological Services 2020).

2 METHODS

2.1 Desktop Assessment

Relevant literature, online-resources and databases were reviewed to provide an assessment of flora and fauna values associated with the study area. The following information sources were reviewed:

- The DELWP NatureKit Map (DELWP 2022a) and Native Vegetation Information Management (NVIM) Tool (DELWP 2022b) for:
    - Modelled data for location risk, native vegetation patches, scattered trees and habitat for rare or threatened species; and,
    - The extent of historic and current Ecological Vegetation Classes (EVCs).
- EVC benchmarks (DELWP 2022c) for descriptions of EVCs within the relevant bioregion;
- The Victorian Biodiversity Atlas (VBA) for previously documented flora and fauna records within the project locality (DELWP 2021a);
- The Commonwealth Department of Agriculture, Water and the Environment (DAWE) Protected Matters Search Tool (PMST) for matters of National Environmental Significance (NES) protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (DAWE 2022);
- Relevant listings under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act), including the latest Threatened (DELWP 2021b) and Protected (DELWP 2019) Lists;
- The online VicPlan Map (DELWP 2022d) to ascertain current zoning and environmental overlays in the study area;
- Aerial photography of the study area; and,
- Previous ecological assessments relevant to the study area; including;
    - Jetty Road Clifton Springs Vegetation Assessment – Mark Trengove Ecological Services 2020; and,
    - Jetty Road Urban Growth Plan (CoGG 2008).

2.2 Field Assessments

2.2.1 Flora Assessments

A field assessment was undertaken on 17 August 2021 and 3 March 2022 to obtain information on flora and fauna values within accessible parcels within the study area.

The parcels subject to on-ground assessment (the 'assessed land') as part of this report were:

- 1421-1423 Portarlington Road, Curlewis;
- 12-18 Hackwill Place, Curlewis; and,

- 292-300 Jetty Road, Curlewis.

The study area was walked, with all commonly observed vascular flora and fauna species recorded, significant records mapped and the overall condition of vegetation and habitats noted. Ecological Vegetation Classes (EVCs) were determined with reference to DELWP pre-1750 and extant EVC mapping (DELWP 2021a) and their published descriptions (DELWP 2021c).

Where native vegetation was identified a habitat hectare assessment was undertaken following methodology described in the Vegetation Quality Assessment Manual (Department of Sustainability and Environment (DSE) 2004).

Where the remaining parcels within the study area were not subject to on-ground assessment, for the purposes of this report, Ecology and Heritage Partners have relied on the quality and extent of ecological values as detailed in the Jetty Road Clifton Springs Vegetation Assessment report (Mark Trengove Ecological Services 2020) for the remainder of the Stage 2 Jetty Road UGP.

2.2.2 Fauna Assessments

A fauna assessment was undertaken concurrently with the flora assessment on 17 August 2021 and 3 March 2022 to obtain information on terrestrial fauna values within the study area. The study area was visually assessed and included active searching under and around ground debris for reptiles, frogs and small mammals was undertaken. Binoculars were also used to scan the area for birds, and observers listened for calls and searched for other signs of fauna such as nests, remains of dead animals, droppings and footprints. Potential habitat for fauna was assessed, with an emphasis on waterbodies and other habitats that may provide shelter, food or other resources for significant species.

As part of the fauna assessment on 17 August 2021, potential habitat for the nationally significant Growling Grass Frog *Litoria raniformis* was identified within the parcel located at 421-1423 Portarlington Road.

2.2.3 Growling Grass Frog Targeted Surveys

Growling Grass Frog Habitat

There are two water bodies present in the assessed land in the form of constructed dams and ephemeral ponds. The presence of permanent still or slow-flowing water sources is conducive to the breeding and foraging requirements of the Growling Grass Frog and a range of other locally common frog species. Favoured sites also include those with aquatic and fringing vegetation lining the banks, and water bodies with a large proportion of emergent, submerged and floating vegetation. The two waterbodies present on-site vary in their size, hydroperiod and presence of vegetation around/ in the water which provides a range of potential habitats for the Growling Grass Frog.

Survey Methodology

Nocturnal Growling Grass Frog surveys were undertaken at two waterbodies within the study area (Figure 2). Targeted surveys were undertaken in accordance with the methods outlined in the *Significant Impact Guidelines for the Vulnerable Growling Grass Frog* (DEWHA 2009). The targeted were undertaken over three separate nights on 24 November, 9 and 15 December 2021, during suitable weather conditions (i.e. warm, relatively still and clear) when Growling Grass Frog was known to be active. Based on the survey protocols to

be adhered to for this study, this would achieve a probability detection threshold of 0.99 as per the probability thresholds specified by DELWP (Heard *et al.*, 2010).

Each survey involved spotlighting surveys, call identification, and active searching for adults and metamorphs. More specifically;

- An initial period of five minutes was spent listening to any calling frogs (all species) in and adjacent to habitats;
- The advertisement call was broadcast to elicit a response from any adult males present;
- Surveyors used "Olight" LED hand-held spotlights (up to 1020 lumens/8.4 volts) to locate any calling males on floating vegetation in the waterbody and around the perimeter of waterbodies;
- Surveyors actively searched ground-level habitat including surface rocks, underneath hard litter, and at the base of vegetation for frogs; and,
- Surveyors used the resulting information to determine the significance of any recorded Growling Grass Frog populations.

The following attributes of habitat quality for the Growling Grass Frog were recorded:

- The hydroperiod;
- The location and extent of instream pools and off stream waterbodies;
- Habitat values including the type (e.g. dam, creek etc.) flow (still, slow rapid), depth and presence of terrestrial refuge sites (e.g. rocks, logs, debris);
- Aquatic vegetation cover (% cover of emergent, submergent and floating aquatic plants);
- Presence/ absence of predator fish (opportunistic); and
- Barriers to frog movement between waterbodies.

The hydroperiod (as defined in Heard *et al.*, 2010) is the likelihood that an individual wetland will remain inundated over the course of a single breeding season, on an ordinal scale where:

- 0 = fills only in years with above average rainfall (intermittent);
- 1 = fills and dries out annually with average rainfall (ephemeral);
- 2 = dries out only during years of below average rainfall (semi-permanent); and,
- 3 = never dries out regardless of rainfall (permanent).

2.3 Removal, Destruction or Lopping of Native Vegetation (the Guidelines)

Under the *Planning and Environment Act 1987,* Clause 52.17 of the Greater Geelong Planning Scheme requires a planning permit to remove, destroy or lop native vegetation. The assessment process for the clearing of vegetation follows the '*Guidelines for the removal, destruction or lopping of native vegetation*' (the Guidelines)

(DELWP 2017). The '*Assessor's handbook: Applications to remove, destroy or lop native vegetation*' (Assessor's handbook) (DELWP 2018) provides clarification regarding the application of the Guidelines (DELWP 2017).

2.3.1 *Assessment Pathway*

The Guidelines manage the impacts on biodiversity from native vegetation removal using an assessment-based approach. Two factors – extent risk and location category – are used to determine the risk associated with an application for a permit to remove native vegetation. The location category (1, 2 or 3) has been determined for all areas in Victoria and is available on DELWP's NVIM Tool (DELWP 2021b). Determination of assessment pathway is summarised in Table 1.

Table 1. Assessment pathways for applications to remove, destroy or lop native vegetation (DELWP 2017).

Extent		Location		
		1	2	3
Native Vegetation	Less than 0.5 hectares and not including any large trees	Basic	Intermediate	Detailed
	Less than 0.5 hectares and including one or more large trees	Intermediate	Intermediate	Detailed
	0.5 hectares or more	Detailed	Detailed	Detailed

Notes: For the purpose of determining the assessment pathway of an application to remove native vegetation the extent includes any other native vegetation that was permitted to be removed on the same contiguous parcel of land with the same ownership as the native vegetation to be removed, where the removal occurred in the five year period before an application to remove native vegetation is lodged.

2.3.2 *Vegetation Assessment*

Native vegetation (as defined in Table 2) is assessed using two key parameters: extent (in hectares) and condition. For the purposes of this assessment, both condition and extent were determined as part of the habitat hectare assessment.

Table 2. Determination of a patch of native vegetation (DELWP 2017).

Category	Definition	Extent	Condition
Patch of native vegetation	An area of vegetation where at least 25 per cent of the total perennial understorey plant cover is native; OR An area with three or more native canopy trees where the drip line 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.	Measured in hectares. Based on hectare area of the native patch.	Vegetation Quality Assessment Manual (DSE 2004). Modelled condition for *Current Wetlands*.

Category	Definition	Extent	Condition
Scattered tree	A native canopy tree that does not form part of a native patch.	Measured in hectares. Each Large scattered tree is assigned an extent of 0.071 hectares (15m radius). Each Small scattered tree is assigned a default extent of 0.031 hectares (10 metre radius)	Scattered trees are assigned a default condition score of 0.2 (outside a patch).

Notes: Native vegetation is defined in the Victoria Planning Provisions as 'plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses'.

2.3.3 Impact Avoidance and Minimisation

All applications to remove native vegetation must demonstrate the three-step approach of avoid, minimise and offset. This is a precautionary approach that aims to ensure that the removal of native vegetation is restricted to what is reasonably necessary, and that biodiversity is appropriately compensated for any native vegetation removal that is approved.

2.3.4 Offsets

Biodiversity offsets are required to compensate for the permitted removal of native vegetation. Offset obligations and offset site criteria are determined in accordance with the Guidelines (DELWP 2017) and are divided into two categories, being General Habitat Units and Species Habitat Units.

The offset requirements for native vegetation removal are calculated by DELWP and presented in a Native Vegetation Removal (NVR) Report, which are based on the vegetation condition scores determined during the biodiversity assessment.

2.4 Likelihood of Occurrence Assessment

Relevant biological databases, literature and expert advice were used to identify all species records of national and State conservation significance within 10 kilometres of the study area. The proximity, number, dispersion and date of known locality records (assuming over-dispersed and random patterns of locality records being more likely to occur in the study area) were considered to determine a species' likelihood of occurrence within the study area.

Additional factors also taken into consideration include: the known biogeographical distribution of the species; underlying geology of existing locality records; and vegetation and habitat associations. The decision guidelines for determining the likelihood of occurrence of flora and fauna species are presented in Table 3 and Table 4, respectively.

Table 3. Decision guidelines for determining a flora species likelihood of occurrence within the study area.

Likelihood of occurrence	Ecology and Heritage Partners Decision Criteria
1 – Known occurrence	Recorded within the study area recently (i.e. within ten years).
2 - High	Previous records of the species in the local vicinity; and/or, the study area contains areas of high quality habitat.
3 – Moderate	Limited previous records of the species in the local vicinity; and/or, the study area contains some characteristics of the species' preferred habitat.
4 – Low	Poor or limited habitat for the species however other evidence (such as a lack of records or environmental factors) indicates there is a low likelihood of presence.
5 – Unlikely	No suitable habitat and/or outside the species range.

Table 4. Decision guidelines for determining fauna species likelihood of occurrence within the study area.

Likely presence or use of the study area	Ecology and Heritage Partners Decision Criteria
1 – Known occurrence	Recorded within the study area recently (i.e. within ten years).
2 - High	Likely resident in the study area based on database records, or expert advice; and/or, recent records (i.e. within ten years) of the species in the local area; and/or, the study area contains the species' preferred habitat.
3 - Moderate	The species is likely to visit the study area regularly (i.e. at least seasonally); and/or, previous records of the species in the local area; and/or, the study area contains some characteristics of the species' preferred habitat.
4 - Low	The species may visit the study area occasionally or opportunistically whilst en route to more suitable sites; and/or, there are only limited or historical records of the species in the local area (i.e. more than 20 years old); and/or, the study area contains few or no characteristics of the species' preferred habitat.
5 - Unlikely	No previous records of the species in the local area; and/or, the species may fly over the study area when moving between areas of more suitable habitat; and/or, out of the species' range; and/or, no suitable habitat present.

2.5 Assessment Qualifications and Limitations

This report has been written based on the quality and extent of the ecological values and habitat considered to be present or absent at the time of the desktop and/or field assessments being undertaken.

The 'snapshot' nature of a standard biodiversity assessment meant that migratory, transitory or uncommon fauna species may have been absent from typically occupied habitats at the time of the field assessment. In addition, annual or cryptic flora species such as those that persist via underground tubers may also be absent.

A comprehensive list of all terrestrial flora and fauna present within the study area was not undertaken as this was not the objective of the assessment. Rather a list of commonly observed species was recorded to inform the habitat hectare assessment and assist in determining the broader biodiversity values present within the study area.

Ecological values identified within the study area were recorded using a hand-held GPS or tablet with an accuracy of +/-3 metres. This level of accuracy is considered to provide an accurate assessment of the

ecological values present within the study area; however, this data should not be used for detailed surveying purposes.

For the purposes of this report, Ecology and Heritage Partners have relied on the quality and extent of ecological values as detailed in the Jetty Road Clifton Springs Vegetation Assessment report (Mark Trengove Ecological Services 2020) for all areas not subject to on-ground assessment by Ecology and Heritage Partners within Stage 2 of the Jetty Road UGP.

The terrestrial flora and fauna data collected during the field assessment and information obtained from relevant desktop sources is considered to adequately inform an accurate assessment of the ecological values present within the study area.

All fieldwork was carried out under the appropriate licences, including a Research Permit (1008283) and Scientific Procedures Fieldwork Licence (SPFL20005) issued by DELWP under the *Wildlife Act 1975*, and an Animal Research permit issued by the Wildlife and Small Institutions Animal Ethics Committee (05.17).

3 EXISTING CONDITIONS

The following description of the existing environment is based on the landscape, vegetation, fauna habitats and species identified from the desktop assessment and within the study area during the field surveys

3.1 Vegetation Condition

The majority of the study area is highly modified due to past agricultural, and current residential practices and is dominated by non-indigenous grasses and weeds and planted native and non-native vegetation.

Native vegetation, where present is confined to a small number of scattered trees, as well as small, discrete patches of native vegetation that lack structure and are species poor - sited along or adjacent to waterbodies (Figure 2).

The environmental weed Galenia *Aizoon pubescens* is the dominant ground cover throughout much of the study area and presents a significant threat to the remaining ecological values present.

A list of all flora species recorded during the field assessment are provided in Appendix 1.1.

3.1.1 Patches of Native Vegetation

Native vegetation in the study area is representative of four EVCs: Aquatic Herbland (EVC 653), Plains Grassy Wetland (EVC 125), Grassy Woodland (EVC 175) and Tall Marsh (EVC 821). The presence of Grassy Woodland is consistent with the modelled pre-1750s and extant (2005) native vegetation mapping (DELWP 2022c). However, due to the modified land use and coarseness of the resolution of the EVC mapping, the presence of Plains Grassy Wetland, Tall Marsh and Aquatic Herbland are not captured by the model. However, the presence of these EVCs is not unexpected on the Bellarine Peninsula, particularly in low lying areas or areas subject to periodic inundation where native flora can outcompete exotic flora, or at least temporarily flourish during suitable conditions.

Specific details relating to the observed EVCs are provided below

The results of the habitat hectare assessment are provided in Appendix 1.2.

Grassy Woodland

Grassy Woodland is generally described as a variable, open eucalypt woodland to 15 metres tall over a diverse layer of grasses and herbs, and sparse shrub layer (DELWP 2022c).

Within the study area, no patches of Grassy Woodland were recorded. However, a small number of scattered trees comprising the remnant overstory component of this EVC is still present within the study area (Figure 2; Section 3.1.2).

These trees composed River Red-gum *Eucalypts camaldulensis,* Manna Gum *Eucalyptus viminalis*, Swamp Gum *Eucalyptus ovata* and the State significant Bellarine Yellow-gum *Eucalyptus leucoxylon* subsp. *bellarinensis*.

Aquatic Herbland

Aquatic Herbland is found on permanent to semi-permanent wetlands, with sedges and other herbs dominating the outer verges (DELWP 2022c).

Within the assessed area, Aquatic Herbland was present within both waterbodies, with the small, central waterbody entirely covered by a layer of Pacific Azolla *Azolla rubra*, and the larger dam to the south-east of the assessed area comprising a narrow band of Pacific Azolla around the perimeter of the bank (Figure 2; Plate 1; Plate 2).

Plate 1. Dominant cover of Pacific Azolla in the central dam (Ecology and Heritage Partners Pty Ltd 17/08/2021).

Plate 2. Thin band of Aquatic Herbland around the large waterbody (Ecology and Heritage Partners Pty Ltd 03/03/2022).

Plains Grassy Wetland

Plains Grassy Wetland is a generally treeless EVC characteristically dominated by grasses, sedges and herbs. It is usually species rich on the outer verges, and species-poor in the central, wetter areas (DELWP 2022c).

Within the study area, Plains Grassy Wetland (PGWe) was present in two habitat zones of differing quality. Habitat zone PGWe1 was present on the drier, outer verges of the large wetland in the assessed area and comprised a moderate diversity of species including Common Spike-sedge *Eleocharis acuta,* Variable Willow-herb *Epilobium billardierianum*, Lesser Loosestrife *Lythrum hyssopifolia* and Slender Knotweed *Persicaria decipiens*. Habitat zone PGWe2 was situated in the drainage line immediately south of the central wetland, and as solely comprised of Pale Rush *Juncus pallidus* (Plate 3; Plate 4).

Tall Marsh

Tall Marsh generally occurs is shallow water with low levels of salinity and is usually comprised of a closed grassland dominated by Common Reed *Phragmites australis* and/or Cumbungi *Typha* spp. (DELWP 2022c).

A small, discrete area of Tall Marsh was recorded within the parcel located to the far south-east of the study area (Figure 2) (Mark Trengove Ecological Services 2020).

No patches of Tall Marsh were present within the assessed land.

Plate 3. Habitat Zone PGWe1 on the edge of the dam, with AH1 immediately adjacent (Ecology and Heritage Partners Pty Ltd 03/03/2022).

Plate 4. A patch of PGWe2 wholly comprising of Pale Rush (Ecology and Heritage Partners Pty Ltd 03/03/2022).

3.1.2 Large Trees in Patches and Scattered Trees

No Large Trees in patches were recorded within the assessment area, nor by Mark Trengove (2020) elsewhere in Stage 2. However a total of seven scattered trees were recorded within the Stage 2 Jetty Road UGP (Table 5; Figure 2)).

These trees would have once formed part of the Grassy Woodland EVC; however, the understorey vegetation is dominated by introduced species and the trees no longer formed a patch of native vegetation (Plate 5; Plate 6).

Table 5. Summary of scattered trees within the study area

Tree ID *	Common Name	Species Name	DBH	Size Class	Notes ^
1	Manna Gum	*Eucalyptus viminalis*	106	Large	-
2	River Red-gum	*Eucalyptus camaldulensis*	70	Large	-
3	River Red-gum	*Eucalyptus camaldulensis*	50	Small	-
4	River Red-gum	*Eucalyptus camaldulensis*	60	Small	-
5	Swamp Gum	*Eucalyptus ovata*	147	Large	-
6	River Red-gum	*Eucalyptus camaldulensis*	201	Large	-
7	Bellarine Yellow-gum	*Eucalyptus leucoxylon* subsp. *bellarinensis*	25	Small	endangered

Notes: * Tree ID as shown in Figure 2; Trees #1-5 recorded by Mark Trengove (2020); ^ endangered under the FFG Act.

Plate 5. River Red-gum (Tree #6 Figure 2) (Ecology and Heritage Partners Pty Ltd 03/03/2022).

Plate 6. Bellarine Yellow-gum (Tree #7 on Figure 2) (Ecology and Heritage Partners Pty Ltd 03/03/2022).

3.1.3 Introduced and Planted Vegetation

Areas not supporting native vegetation were dominated by a high cover (>95%) of exotic species, including the environmental weeds such as Galenia, Yorkshire Fog *Holcus lanatus* and Couch *Cynodon dactylon* (Plate 7; Plate 8).

Noxious weeds, as defined under the CaLP Act, were present within the study area, with Spear Thistle *Cirsium vulgare* and Paterson's Curse *Echium plantagineum* scattered throughout the assessed land.

Plate 7. Galenia-dominated paddock (Ecology and Heritage Partners Pty Ltd 03/03/2022).

Plate 8. Couch-dominated paddock (Ecology and Heritage Partners Pty Ltd 03/03/2022).

Planted vegetation is present in the form of windrows in paddocks and along fencelines, and ornamental gardens around existing dwellings. Windows are generally comprised of a variety of Australian and/or Victorian native (but not locally indigenous) species, including Tuart *Eucalyptus gomphocephala*, Southern

Mahogany *Eucalyptus botryoides*, Spotted Gum *Corymbia maculata*, Sugar Gum *Eucalyptus cladocalyx*, Willow Myrtle *Agonis flexuosa* and Paperbark *Melaleuca* sp., (Plate 9; Plate 10).

Ornamental plantings include Peppercorn *Shinus molle*, Cotoneaster *Cotoneaster* spp., Silky Oak *Grevillea robusta*, Agapanthus *Agapanthus praecox* and a range of native and non-native flowering shrubs (Plate 11; Plate 12).

Plate 9. Sugar Gum windrow along Jetty Road dominate most of the study area (Ecology and Heritage Partners Pty Ltd 03/03/2022).

Plate 10. Planted natives along a boundary fence (Ecology and Heritage Partners Pty Ltd 03/03/2022).

Plate 11. Planted ornamentals around existing dwelling (Ecology and Heritage Partners Pty Ltd 03/03/2022).

Plate 12. Ornamental plantings along driveway (Ecology and Heritage Partners Pty Ltd 03/03/2022).

3.2 Fauna Habitat

Most of the study area consisted of paddocks, which contained improved exotic pastures, likely to be used as a foraging resource by common generalist bird species that are tolerant of modified open areas. Fauna observed using this habitat included; Australian Magpie *Cracticus tibicen*, Common Blackbird *Turdus merula*, Little Raven *Corvus mellori*, Magpie-lark *Grallina cyanoleuca* and House Sparrow *Passer domesticus*.

Frequent sightings of European Rabbit *Oryctolagus cuniculus* was also made during the site assessments, with hundreds of rabbit burrows present within the assessed area. European Rabbit is listed as pest animals under the CaLP Act.

The presence of scattered trees and windrows throughout the study area also provides foraging habitat for bird species that occupy modified landscapes, including nectivorous birds such as lorikeets and honeyeaters. Mature trees provide excellent habitat for nesting birds and mammals which utilise tree hollows. Fauna observed using this habitat included Galah *Eolophus roseicapilla*, Welcome Swallow *Hirundo neoxena*, Willie Wagtail *Rhipidura leucophrys*, Rainbow Lorikeet *Trichoglossus moluccanus*, Red Wattlebird *Anthochaera carunculata* and the non-native Indian Miner *Acridotheris tristis*.

3.3 Removal, Destruction or Lopping of Native Vegetation (the Guidelines)

A native vegetation impact assessment will be undertaken once a development plan has been prepared. Following this, the implications under the Guidelines will be determined.

3.4 Significance Assessment

3.4.1 Flora

The VBA contains records of seven State significant flora species previously recorded within five kilometres of the study area (DELWP 2021a) (Figure 3).

No nationally significant flora were recorded during the site assessment. However, the Stage significant Bellarine Yellow-gum was recorded.

One Bellarine Yellow-gum was present to the south of the dwelling located at 1421-1423 Portarlington Road (Figure 2). This specimen is potentially planted given it is sited in an area surrounded by ornamental plantings, as well as other planted native vegetation including Southern Mahogany, Blue Gum and Spotted Gum. However, given the known presence of the species within the broader locality, it may also be a naturally occurring species, and as part of this assessment, is considered as such given there is currently no definitive evidence to the contrary.

Several planted Bellarine Yellow-gum specimens are present within a windrow at 292-300 Jetty Road, as well as along the boundary between the parcel at 1421-14332 Portarlington Road, and adjacent parcels to the east. As evidenced by the spacing, age and tree guards present, these specimens are considered to be planted.

Based on the highly modified nature of the study area, landscape context and the proximity of previous records, no additional significant flora species are considered likely to occur within the study area due to the and high levels of disturbance and absence of suitable habitat.

3.4.2 Fauna

The VBA contains records of 30 nationally and State significant fauna species previously recorded within five kilometres of the study area (DELWP 2021a) (Figure 4). The majority of these species are waterbirds and have been recorded to the east of the study area near Lake Lorne Reserve and Drysdale Recreation Reserve.

Potential habitat for the nationally significant Growling Grass Frog was identified during the site assessment, and as such, targeted surveys for the species were undertaken (Section 3.5).

The study area contains potential foraging habitat for a range of significant avifauna, including Swift Parrot *Lathamus discolor*. Swift Parrot may forage on eucalypts within the study area on occasion. However, the species breeds only in Tasmania and migrates to mainland Australia in autumn and is usually recorded over-wintering in habitats located between Stawell in the central west and Wodonga in the north-east. As such the study area is not considered to provide important or limiting habitat for this species.

The large waterbody in the assessment area provides foraging habitat for waterbirds including Hardhead *Aythya australis*, Freckled Duck *Stictonetta naevosa* and Blue-billed Duck *Oxyura australis*. It is likely that these species opportunistically utilise this habitat. However, it is unlikely that this is an important breeding or limiting site given the degraded condition of the surrounding land, as well as higher quality habitats located within Lake Lorne Reserve and Drysdale Recreation Reserve.

Based on the modified nature of the study area, landscape context and the proximity of previous records, additional significant fauna species are considered highly unlikely to rely on habitat within the study area for foraging or breeding purposes due to the lack of suitable and/or important habitat features

3.4.3 Ecological Communities

No national or State-significant communities occur within the study area.

3.5 Growling Grass Frog Targeted Survey

Targeted surveys for Growling Grass Frog was undertaken in accordance with the Commonwealth survey guidelines (DEWHA 2010), when the weather conditions being conducive for frogs to be active and following the confirmation of a known population of the species being active at a nearby location on two of the three nights of the surveys (Baenches Wetland, Armstrong Creek).

No Growling Grass Frog was detected within the survey sites. However, two other native frog species were heard calling within the large wetland during all three nights of the targeted surveys. These species were identified as Spotted Marsh Frog *Limnodynastes tasmaniensis*, Eastern Common Froglet *Crinia signifera* and Brown Tree Frog *Litoria ewingii* (Table 6).

Table 6. Summary of Growling Grass Frog survey results.

Survey Date	Survey Time	Weather conditions							Other Species
		Survey Temp C°	Wind direction	Wind speed (km/hr)	Relative Humidity (%)	Cloud Cover (%)	Rain	GGF (No.)	
24/11/2021	21:20 - 22:05	16	S	26	79	30	1.2 mm	0	Spotted Marsh Frog Eastern Common Froglet Brown Tree Frog
09/12/2021	20:34 – 21:32	14.1	SE	12	100	90	12.6 mm	0	Spotted Marsh Frog Eastern Common Froglet

Survey Date	Survey Time	Weather conditions						GGF (No.)	Other Species
		Survey Temp C°	Wind direction	Wind speed (km/hr)	Relative Humidity (%)	Cloud Cover (%)	Rain		
15/12/2021	21:22 - 22:10	15.5	SW	11	71	60	0	0	Spotted Marsh Frog Eastern Common Froglet

3.5.1 Habitat Assessment

Habitats favoured by Growling Grass Frogs include permanent or largely permanent still water bodies with extensive emergent and submergent vegetation (DEPI 2013a; Hero *et al*. 1991; Robertson *et al*., 2002). The species is also associated with swamps, irrigated areas, farm dams, former quarry holes and off-stream habitats (DSE 2012). Suitable terrestrial habitat for post-breeding dispersal and overwintering refuge sites are also required, these include dense ground-level vegetation, rocks, logs and other ground debris (Robertson et al., 2002). This species can also utilise temporarily inundated waterbodies for breeding purposes providing they contain water over the breeding season (Organ 2003).

Waterbodies on-site were highly variable in relation to their size, water quality, hydroperiod, presence of pollution, and availability of suitable vegetation and other refuge sites. The highest quality habitat was the large waterbody, which consisted of a large dam with open water, and fringing vegetation around the perimeter (Plate 13). In contrast, the small dam in the centre of the site had a complete covering of Pacific Azolla, and at the time of the March 2022 site assessment, was almost completely dry (Plate 14), reducing its suitability to support breeding habitat for the species.

A summary of the habitat assessment is provided in Table 7.

Table 7. Summary of Growling Grass Frog habitat assessment.

GGF #	Hydroperiod	Instream Pools	Offstream Waterbodies	Habitat Value	Refuge Type	Aquatic Veg Cover (%)
1	3	No	No	Moderate	Expanses of open water Thick cover of exotic and native fringing vegetation. Presence of sedges and rushes.	5%
2	1	No	No	Low	Dominant cover of Pacific Azolla over water. Thick cover of exotic and native fringing vegetation. Presence of sedges and rushes. Pugging from stock.	100%

Note: Site 1 is the large waterbody; Site 2 is the small waterbody.

Based on the findings of detailed survey and habitat assessments, there is a low likelihood that the waterbodies surveyed currently supports a breeding population of Growling Grass Frog. The assessed waterbodies and are considered to provide poor quality habitat for the Growling Grass Frog, with breeding and dispersal opportunities limited by:

- The cover of aquatic and fringing vegetation in modified water bodies;

- Lack of dispersal opportunities to other areas of potential habitats within the locality;
- Absence of submerged vegetation;
- Limited refuge opportunities to facilitate dispersal between waterbodies.

Plate 13. Waterbody #1 (Ecology and Heritage Partners Pty Ltd 03/03/2022).

Plate 14. Waterbody #2 (Ecology and Heritage Partners Pty Ltd 03/03/2022).

4 LEGISLATIVE AND POLICY IMPLICATIONS

4.1 *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)

The EPBC Act establishes a Commonwealth process for the assessment of proposed actions likely to have a significant impact on any matters of National Environment Significance (NES). The proposed action is highly unlikely to have a significant impact on any matter of NES. As such, a referral to the Commonwealth Environment Minister is unlikely to be required regarding matters listed under the EPBC Act.

4.2 *Flora and Fauna Guarantee Act 1988* (Victoria)

The FFG Act is the primary legislation dealing with biodiversity conservation and sustainable use of native flora and fauna in Victoria. Proponents are required to apply for an FFG Act Permit to 'take' threatened and/or protected flora species, listed vegetation communities and listed fish species in areas of public land (e.g. within road reserves, drainage lines and public reserves/parks). An FFG Act permit is generally not required for removal of species or communities on private land, or for the removal of habitat for a listed terrestrial fauna species.

There are confirmed records of one species (Bellarine Yellow-gum) listed as threatened under the FFG Act. However, the study area is privately owned, and as such a permit under the FFG Act is not required. Although some planted Coast Wattle (protected under the FFG Act) is present within the assessed area, planted specimens are not considered 'wild' under the Act, and therefore a permit is not required.

4.3 *Planning and Environment Act 1987* (Victoria)

The *Planning and Environment Act 1987* outlines the legislative framework for planning in Victoria and for the development and administration of planning schemes. All planning schemes contain native vegetation provisions at Clause 52.17, which requires a planning permit from the relevant local Council to remove, destroy or lop native vegetation, unless an exemption at Clause 52.17-7 of the Victoria Planning Provisions applies.

As part of Clause 52.17, all native vegetation is considered lost as part of a subdivision development where the lots are 0.4 hectares or less in area, which must be offset at the time of subdivision.

4.3.1 The Guidelines

The State Planning Policy Framework and the decision guidelines at Clause 12.01 Biodiversity and Clause 52.17 Native Vegetation require Planning and Responsible Authorities to have regard for the Guidelines (DELWP 2017).

4.3.2 Implications

A planning permit from the City of Greater Geelong is required to remove, destroy or lop any native vegetation under Clause 52.17.

Once a Development Plan has been prepared, the implications associated with the Guidelines, and Clause 52.17 will be determined.

4.4 *Catchment and Land Protection Act 1994* (Victoria)

Two weeds listed as noxious under the *Catchment and Land Protection Act 1994* were recorded during the assessment (Spear Thistle, Paterson's Curse). Similarly, there is evidence that the study area is currently occupied by pest fauna species listed under the CaLP Act (European Rabbit). A Weed and/or Pest Management Plan should be prepared as part of the future Development Plan.

4.5 *Wildlife Act 1975* and Wildlife Regulations 2013 (Victoria)

The *Wildlife Act 1975* (and associated Wildlife Regulations 2013) is the primary legislation in Victoria providing for protection and management of wildlife. Authorisation for habitat removal may be obtained under the *Wildlife Act 1975* through a licence granted under the *Forests Act 1958*, or under any other Act such as the *Planning and Environment Act 1987*. Any persons engaged to remove, salvage, hold or relocate native fauna during construction must hold a current Management Authorisation under the *Wildlife Act 1975*, issued by DELWP.

5 MITIGATION MEASURES

5.1 Avoid and Minimise Statement

It is understood that the ecological information presented in this report will be used to inform the proposed impacts associated with the future development of the Stage 2 Jetty Road UGP.

However, given the modified ecological nature within the proposed alignment, it is possible that the majority of impacts to native vegetation and fauna habitat can be avoided and/or minimised.

Demonstration of impact avoidance and/or minimisation is a key objective of Clause 52.17 and the Guidelines (DELWP 2017) and needs to be strongly considered as part of the preparation of the proposed Development Plan.

Following the preparation of the proposed Development Plan, the Avoid and Minimise Statement will be prepared to reflect the mitigation measures chosen to be implemented.

5.2 Best Practice Mitigation Measures

Recommended measures to mitigate impacts upon terrestrial and aquatic values present within the study area may include:

- Minimise impacts to native vegetation and habitats through construction and micro-siting techniques, including fencing retained areas of native vegetation. If indeed necessary, trees should be lopped or trimmed rather than removed. Similarly, soil disturbance and sedimentation within wetlands should be avoided or kept to a minimum, to avoid, or minimise impacts to fauna habitats;
- All contractors should be aware of ecologically sensitive areas to minimise the likelihood of inadvertent disturbance to areas marked for retention. Native vegetation (areas of sensitivity) should be included as a mapping overlay on any construction plans;
- Tree Protection Zones (TPZs) should be implemented to prevent indirect losses of native vegetation during construction activities (DSE 2011). A TPZ applies to a tree and is a specific area above and below the ground, with a radius 12 x the Diameter at Breast Height (DBH). At a minimum standard a TPZ should consider the following:
    - A TPZ of trees should be a radius no less than two metres or greater than 15 metres;
    - Construction, related activities and encroachment (i.e. earthworks such as trenching that disturb the root zone) should be excluded from the TPZ;
    - Where encroachment is 10% or more of the total area of the TPZ, the tree should be considered as lost and offset accordingly (unless an arboricultural report specifies otherwise);
    - Directional drilling may be used for works within the TPZ without being considered encroachment. The directional bore should be at least 600 millimetres deep;

  - The above guidelines may be varied if a qualified arborist confirms the works will not significantly damage the tree (including stags / dead trees). In this case the tree would be retained, and no offset would be required; and,
  - Where the minimum standard for a TPZ has not been met an offset may be required.
- Removal of any habitat trees or shrubs (particularly hollow-bearing trees or trees/shrubs with nests) should be undertaken between February and September to avoid the breeding season for most fauna species. If any habitat trees or shrubs are proposed to be removed, this should be undertaken under the supervision of an appropriately qualified zoologist to salvage and translocate any displaced fauna. A Fauna Management Plan may be required to guide the salvage and translocation process;
- Where possible, construction stockpiles, machinery, roads, and other infrastructure should be placed away from areas supporting native vegetation, Large Trees and/or wetlands; and,
- Ensure that best practice sedimentation and pollution control measures are undertaken at all times, in accordance with Environment Protection Authority guidelines (EPA 1991; EPA 1996; Victorian Stormwater Committee 1999) to prevent offsite impacts to waterways and wetlands; and,
- As indigenous flora provides valuable habitat for indigenous fauna, it is recommended that any landscape plantings that are undertaken as part of the proposed works are conducted using indigenous species sourced from a local provenance, rather than exotic deciduous trees and shrubs.

5.3 Offset Impacts and Strategy

Once the proposed impacts are known, the availability of offsets and any associated offset obligations can be determined.

6 FURTHER REQUIREMENTS

Further requirements associated with development of the study area, as well as additional studies or reporting that may be required, are provided in Table 8.

Table 8. Further requirements associated with development of the study area.

Relevant Legislation	Implications	Further Action
Environment Protection and Biodiversity Conservation Act 1999	The EPBC Act establishes a Commonwealth process for the assessment of proposed actions likely to have a significant impact on any matters of National Environment Significance (NES). The proposed action is highly unlikely to have a significant impact on any matter of NES. As such, a referral to the Commonwealth Environment Minister is unlikely to be required regarding matters listed under the EPBC Act.	No further action required.
Flora and Fauna Guarantee Act 1988	There are confirmed records of one species (Bellarine Yellow-gum) listed as threatened under the FFG Act. However, the study area is privately owned, and as such a permit under the FFG Act is not required. Although some planted Coast Wattle (protected under the FFG Act) is present within the assessed area, planted specimens are not considered 'wild' under the Act, and therefore a permit is not required.	Further assessment in the road reserves of Portalington Road, Jetty Road and Hackwill Place should be undertaken to confirm the presence or absence of FFG Act flora.
Planning and Environment Act 1987	A planning permit from the City of Greater Geelong is required to remove, destroy or lop any native vegetation under Clause 52.17 of the Planning Scheme.	Determine potential impacts to native vegetation.
Catchment and Land Protection Act 1994	Two weed species and one pest species listed under the CaLP Act were recorded within the study area (Spear Thistle, Paterson's Curse, European Rabbit).	PSA conditions may include a requirement for a Weed and/or Pest Management Plan.
Wildlife Act 1975	Any persons engaged to conduct salvage and translocation or general handling of terrestrial fauna species must hold a current Management Authorisation.	Ensure wildlife specialists hold a current Management Authorisation.

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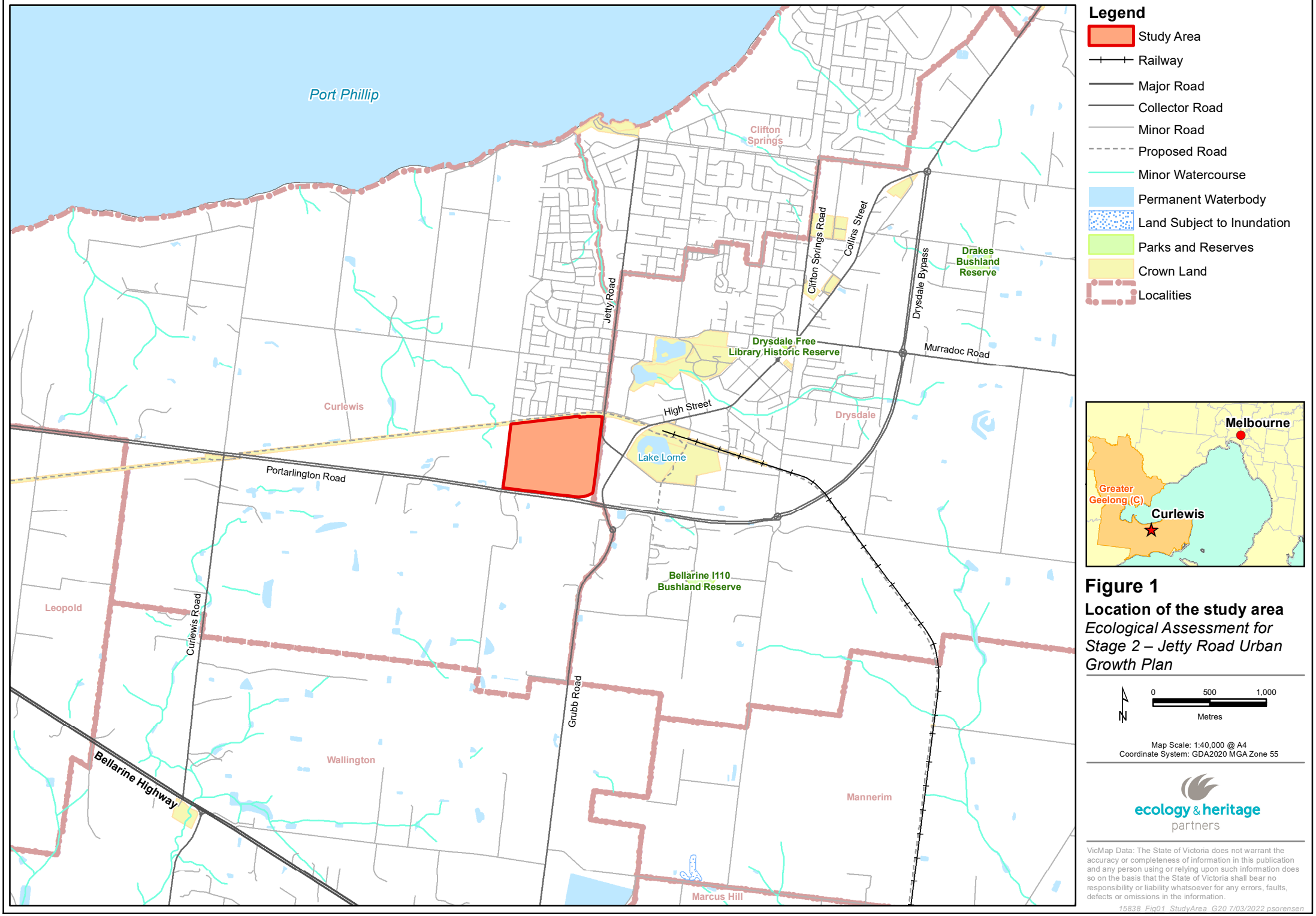


Figure 1

Location of the study area

Ecological Assessment for Stage 2 – Jetty Road Urban Growth Plan

Map Scale: 1:40,000 @ A4
Coordinate System: GDA2020 MGA Zone 55

ecology & heritage partners

15838_Fig01_StudyArea_G20 7/03/2022 psorensen

Legend

- Study Area
- Desktop assessment (Mark Trengove 2020)
- Scattered Large Tree
- Scattered Small Tree
- FFG Act species
- Flora
- Noxious weed
- Growling Grass Frog survey location
- Planted native vegetation

Ecological Vegetation Class

- Aquatic Herbland (EVC 653)
- Plains Grassy Wetland (EVC 125)
- Tall Marsh (EVC 821)

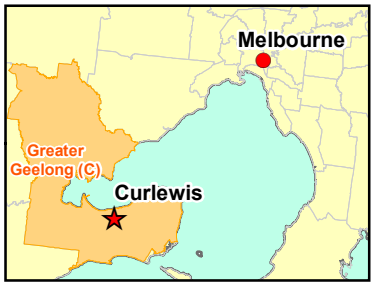


Figure 2

Ecological features

Ecological Assessment for Stage 2 – Jetty Road Urban Growth Plan

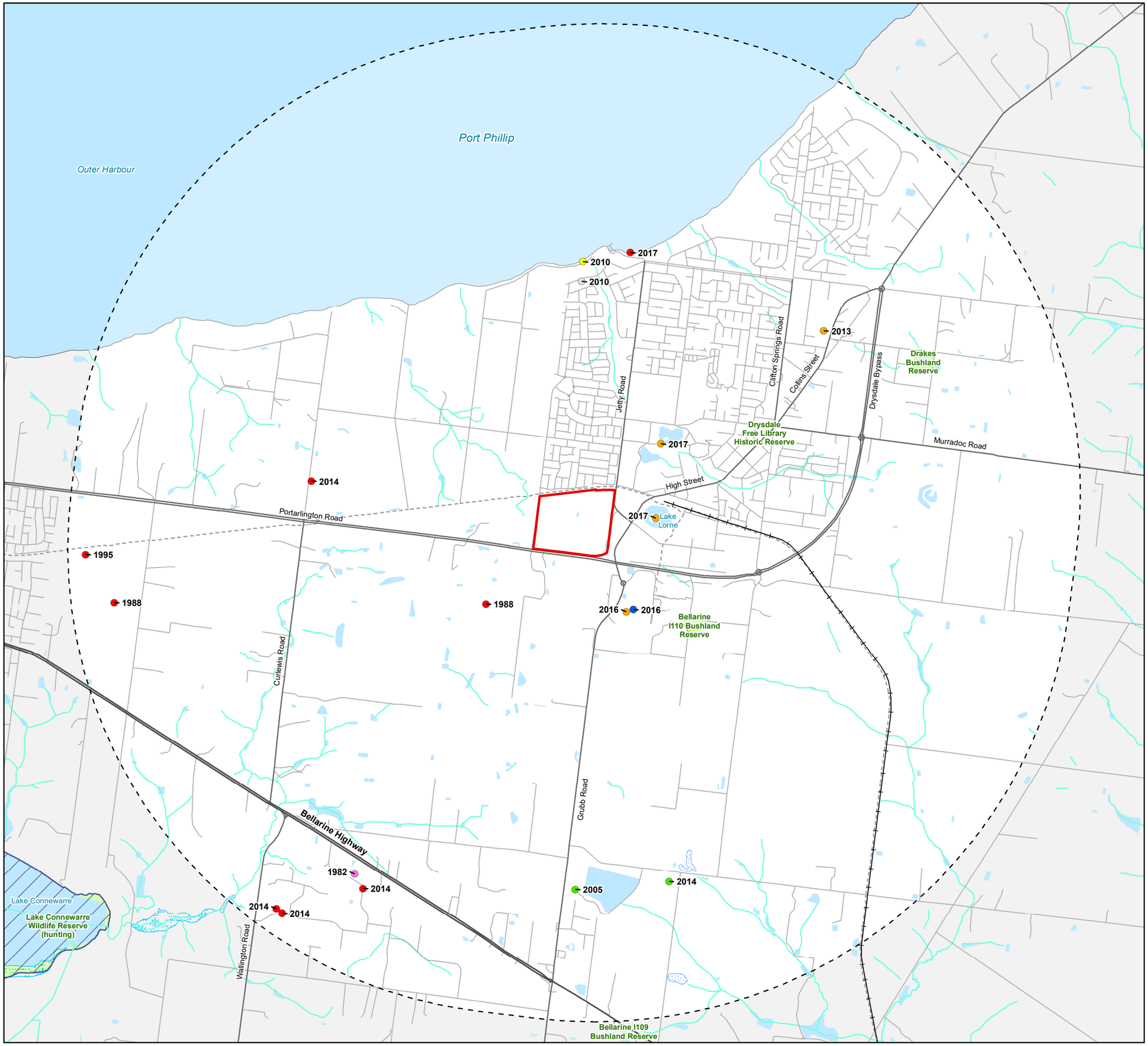
0 50 100
Metres

Map Scale: 1:4,200 @ A4
Coordinate System: GDA2020 MGA Zone 55

ecology & heritage partners

15838_Fig02_EcolFeat_G20 11/03/2022 psorensen

Aerial source: Nearmap 2022



Legend

Study Area

Significant flora

- Australian Grass-wrack
- Bellarine Yellow-gum
- Giant Honey-myrtle
- Marsh Saltbush
- Snowy Mint-bush
- Spotted Gum
- Yellow Sea-lavender

Figure 3

Previously documented significant flora within 5km of the study area

Ecological Assessment for Stage 2 – Jetty Road Urban Growth Plan

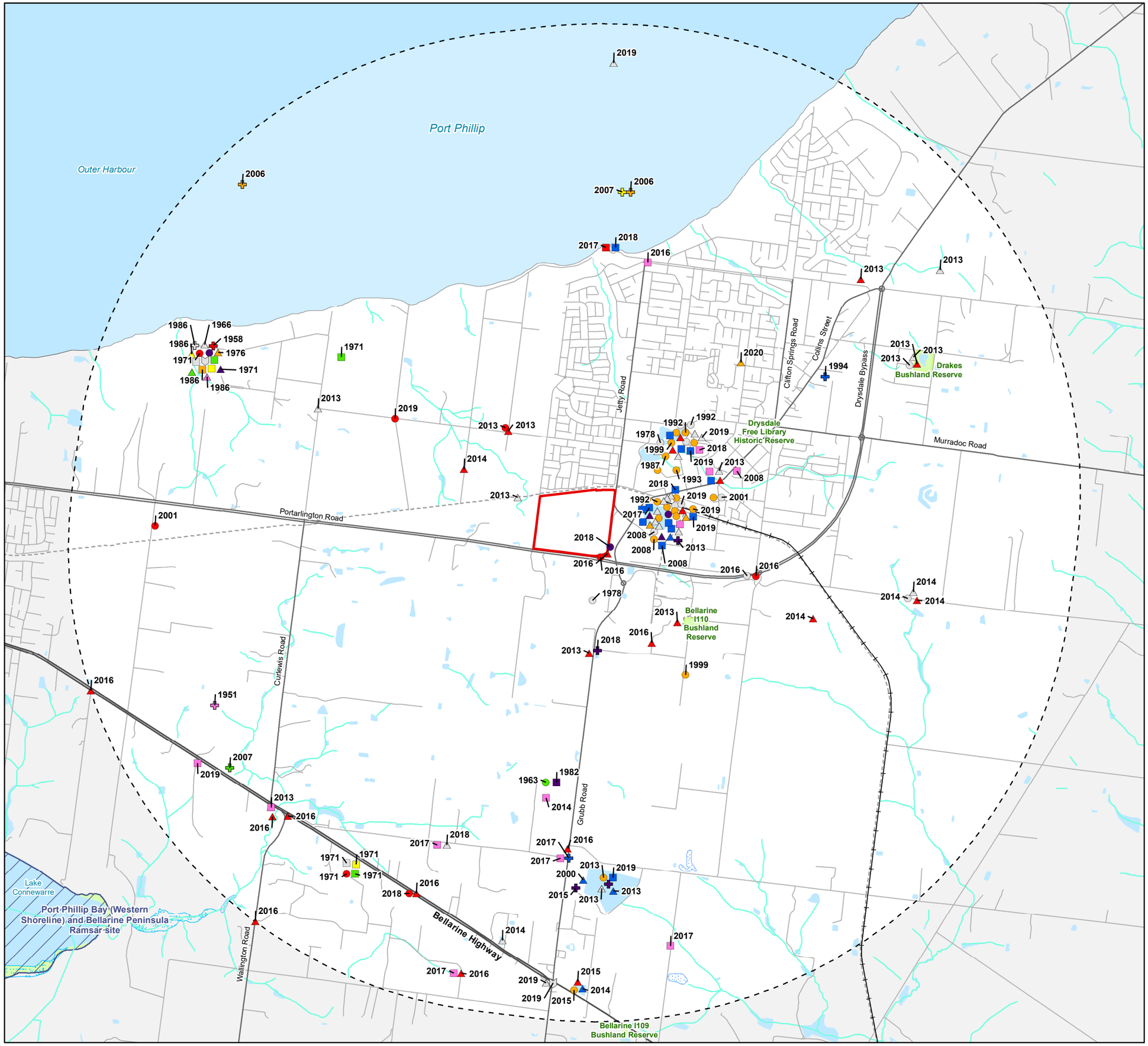
N

0 1 2

Kilometres

Map Scale: 1:39,000 @ A3
Coordinate System: GDA2020 MGA Zone 55

ecology & heritage partners



Legend

- Study Area

Significant fauna

- Australasian Shoveler
- Black Falcon
- Blue-billed Duck
- Brush-tailed Phascogale
- Caspian Tern
- Common Greenshank
- Common Sandpiper
- Curlew Sandpiper
- Eastern Curlew
- Fairy Tern
- Freckled Duck
- Grey Goshawk
- Growling Grass Frog
- Hardhead
- Little Eagle
- Little Egret
- Little Tern
- Marsh Sandpiper
- Musk Duck
- Pacific Golden Plover
- Plumed Egret
- Ruddy Turnstone
- Southern Giant-Petrel
- Southern Humpback Whale
- Southern Right Whale
- Square-tailed Kite
- Swift Parrot
- Wandering Albatross
- White-bellied Sea-Eagle
- White-throated Needletail

Figure 4

Previously documented significant fauna within 5km of the study area

Ecological Assessment for Stage 2 – Jetty Road Urban Growth Plan

N

0 1 2

Kilometres

Map Scale: 1:39,000 @ A3
Coordinate System: GDA2020 MGA Zone 55

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APPENDIX 1 FLORA

Appendix 1.1 Flora Results

Legend:

E Listed as endangered under the FFG Act (DELWP 2021b);

***** Listed as a noxious weed under the CaLP Act;

Table A1.1. Flora within the study area.

Scientific Name	Common Name	Comment
NATIVE SPECIES		
Azolla filiculoides	Pacific Azolla	
Cynodon dactylon	Couch	
Eleocharis acuta	Common Spike-sedge	
Epilobium billardierianum	Variable Willow-herb	
Eucalyptus camaldulensis	River Red-gum	
Eucalyptus leucoxylon subsp. *bellarinensis*	Bellarine Yellow-gum	**E**
Eucalyptus ovata	Swamp Gum	
Eucalyptus viminalis	Manna Gum	
Juncus pallidus	Pale Rush	
Lythrum hyssopifolia	Small Loosestrife	
Persicaria decipiens	Slender Knotweed	
Solanum laciniatum	Large Kangaroo Apple	
NON-NATIVE SPECIES		
Holcus lanatus	Yorkshire Fog	
Cirsium vulgare	Spear Thistle	*****
Echium plantagineum	Paterson's Curse	*****
Aizoon pubescens	Galenia	
Phalaris aquatica	Toowoomba Canary-grass	
Bromus diandrus	Great Brome	
Dactylis glomerata	Cocksfoot	
Salix spp.	Willow	
Phytolacca octandra	Red-ink Weed	

Note: Planted species that were not naturally spreading were not recorded.

Appendix 1.2 Habitat Hectare Assessment

Table A1.2. Habitat Hectare Assessment Table.

Vegetation Zone		AH1	PGWe1	PGWe2
Bioregion		Otway Plain	Otway Plain	Otway Plain
EVC / Tree		Aquatic Herbland*	Plains Grassy Wetland*	Plains Grassy Wetland*
EVC Number		647	647	647
EVC Conservation Status		Endangered	Endangered	Endangered
Patch Condition	Large Old Trees /10			
	Canopy Cover /5			
	Under storey /25	10	10	5
	Lack of Weeds /15	3	6	0
	Recruitment /10	3	3	0
	Organic Matter /5	5	3	2
	Logs /5			
	Treeless EVC Multiplier	1.36	1.36	1.36
	Subtotal =	28.56	29.92	9.52
Landscape Value /25		3	3	3
Habitat Points /100		32	33	13
Habitat Score		**0.32**	**0.33**	**0.13**

Note: * Given the absence of a benchmark for this EVC in the Otway Plain bioregion, the benchmark from the Victorian Volcanic Plain bioregion was used to score the condition of native vegetation patches.