Silvan High Security Fence Upgrade: Detailed Ecology Assessment

Document no: IA5000PB
Version: Final

Melbourne Water
Y10337

Silvan High Security Fence Upgrade
2 October 2024

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Client name:	Melbourne Water		
Project name:	Silvan High Security Fence Upgrade		
Client reference:	Y10337	**Project no:**	IA5000PB
Document no:	IA5000PB	**Project manager:**	Jennifer Spencer
Version:	Final	**Prepared by:**	John Kershaw
Date:	2 October 2024	**File name:**	Silvan High Security Fence Upgrade_Detailed Ecology Assessment_DRAFT_v2_18July2024

Document history and status

Version	Date	Description	Author	Checked	Reviewed	Approved
Draft	18/03/2024	Draft for review	J. Kershaw	-	A. Stephens	
Draft	9/07/2024	Inclusion of impact assessment	J. Kershaw	-	T. Birt	
Draft	19/07/2024	Impact assessment updated to reflect minimised footprint	J. Kershaw	-	-	
Final	2/10/2024	Client comments addressed	J. Kershaw	-	T. Birt	

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Executive summary

Jacobs Group (Australia) Pty Limited (Jacobs) were contracted by Melbourne Water to undertake functional investigations to support the design and construction of a c. 15 km long High Security Fence around Silvan Reservoir and its associated catchment. This report addresses the findings of ecological investigations undertaken for this Project and details ecological approval requirements associated with the proposed Project works.

A summary of flora and fauna values recorded within the Project Area is provided below, as are the recommended next steps to ensure that compliance with environmental policy and legislation is achieved. While this report provides a quantification of impacts to ecology values resulting from the proposed Project works, it is strongly recommended that as per the *Flora and Fauna Guarantee Act 1988* 'public authority duty' the Project continues to prioritise the minimisation of impacts to native vegetation and fauna habitat as the Project continues.

Summary of ecological values recorded within the Project Area:

- The majority of the Project Area supports native vegetation patches of three Ecological Vegetation Classes (EVC 16: Lowland Forest, EVC 18: Riparian Forest and EVC 45: Shrubby Foothill Forest). Most of this native vegetation is located within established fuel-breaks and is subject to regular slashing/mowing.
- Patches of native vegetation contain 566 Large Canopy Trees; one Scattered Tree (large size-class) was also recorded.
- Four flora species listed as threatened under the FFG Act were recorded within the Project Area:
  - Dandenong Wattle (*Acacia stictophylla*) – four plants
  - Famine Flat-pea (*Platylobium infecundum*) – approximately 19 plants
  - Powelltown Correa (*Correa reflexa* var. *lobata*) – 22 plants
  - Victorian Flat-pea (*Platylobium reflexum*) – approximately 706 plants.
- Seven flora species listed as relevant Protected flora under the FFG Act were recorded within the Project Area.
- Additional ecological values considered to have a moderate or high likelihood of occurrence within the Project Area:
  - 16 EPBC Act-listed threatened fauna species
  - 45 FFG Act-listed threatened fauna species.

Recommended next steps:

Further ecological work

- It is recommended that Melbourne Water has a fauna management plan prepared for fenced catchments (or other assets containing fauna habitat). This plan will be necessary to manage larger fauna (e.g. macropods, wombats and koalas) for which high-security fencing may act as a barrier to movement. Lack of management may result in significant ecological damage (e.g. over-browsing of vegetation) and animal welfare issues. The findings of this management plan should be used to inform the requirement, type and placement of fauna 'gates' within the new Silvan fence.

Mitigation measures

- Mitigation measures detailed in Section 4.3 of this report should be adopted by the Project to ensure the protection of ecology values throughout the life of the Project. Failure to adequately implement these measures may result in non-compliance with the policy and legislation detailed in Section 5. It is

recommended that a Construction Environmental Management Plan is developed that addresses these mitigation measures.

Permits

- A planning permit will be required under Clause 52.17 Native Vegetation of the Yarra Ranges Planning Scheme for the removal of 6.072 ha of native vegetation and seven Large Canopy Trees. If a permit is granted, Melbourne Water must secure the following offsets prior to commencing works:
  - General offset: 2.757 general habitat units with a minimum strategic biodiversity score of 0.465, in the vicinity of Port Phillip and Westernport Catchment Management Authority (CMA) or Yarra Ranges Shire Council, and protection of seven Large Canopy Trees.
- A FFG Act 'Permit to Take' will be required for impacts to species listed as Protected under the FFG Act as detailed in Section 3.1.3 of this report.

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1. Introduction

Jacobs Group (Australia) Pty Limited (Jacobs) were contracted by Melbourne Water to undertake functional investigations to support the design and construction of a High Security Fence around Silvan Reservoir and its associated catchment. The proposed fence will be approximately 15 km long. This report provides the findings of ecological investigations undertaken for this Project and details ecological approval requirements associated with the proposed Project works.

1.1 Assessment purpose

The purpose of this ecology assessment is to:

- Identify and document flora and fauna values present within the Project Area and/or with the potential to be impacted by the Project
- Undertake a review of State and Commonwealth legislation and policy in relation to ecological issues relevant to the Project
- Provide an assessment of the proposed impacts to ecological values to inform approvals under relevant legislation and the Yarra Ranges Planning Scheme; and
- Provide recommendations to avoid and/or minimise impacts to native vegetation and fauna habitat.

1.2 Project background

The Silvan Reservoir and associated catchment are an integral component of Melbourne Water's network and are defined as 'critical infrastructure' under the *Security of Critical Infrastructure Act 2018*. For this asset to achieve a Category One 'Protected Catchment' rating in accordance with the Water Services Association of Australia Health Based Targets Manual it is necessary to modernise the existing security arrangements. The first step to achieving this rating is the replacement of the currently inadequate 15 km of peripheral fencing surrounding the reservoir and catchment. However, prior to engaging a specialist contractor to design and construct a new fence, enabling works are required to ensure the Project can progress smoothly and efficiently, including:

- Defining requirements for the new fence
- Determining existing conditions and constraints which may impact design and construction of the new fence
- Engaging with external stakeholders and the local community
- Identifying and obtaining all necessary statutory and environmental approvals
- Exploring sustainability and liveability initiatives to align with Melbourne Water's strategic goals.

1.3 Project Area

The Project Area is located within the suburb of Silvan approximately 40 km east of Melbourne's Central Business District and comprises a 10 m buffer either side of the proposed fence line (Figure 1-1). It occurs within the Shire of Yarra Ranges, the Highlands – Southern Fall bioregion and within the Melbourne Water Catchment Management Authority region. Under the Yarra Ranges Planning Scheme the Project Area is variously zoned Public Use Zone (Schedule 1), Public Conservation and Resource Zone and Transport Zone (Schedule 2). The majority of the Project Area is subject to an Environmental Significance Overlay (Schedule 1) and a Significant Landscape Overlay (Schedule 1), while small areas intersect a Significant Landscape Overlay (Schedule 5) and Heritage Overlay (Schedule 278).

In this report the term Study Area is used in reference to a 10 km buffer around the Project Area in which flora and fauna data was reviewed to provide context when determining the potential occurrence of flora and fauna values.

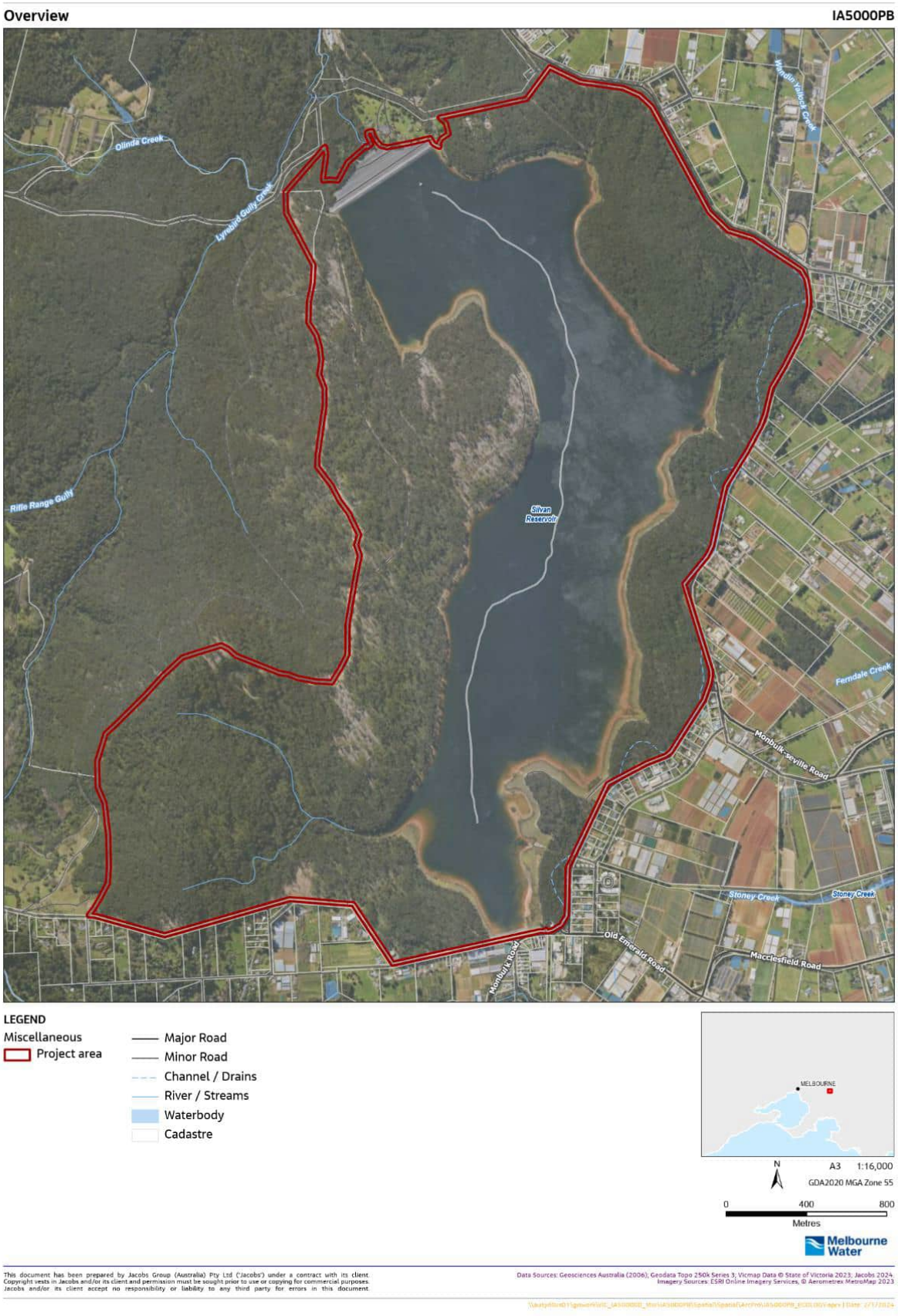

Figure 1-1. Silvan High Security Fence Project Area

2. Methods

The methods undertaken for this Project included desktop assessment, field surveys (ecological and arboricultural) and reporting.

2.1 Desktop assessment

The following biodiversity information resources were reviewed to determine the likelihood of flora and fauna values being present within the Project Area:

- Protected Matters Search Tool (DCCEEW 2023a): The Protected Matters Search Tool (PMST) highlights Matters of National Environmental Significance (MNES) protected under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) that are modelled to occur within a nominated area. Records from a 10 km radius of the Project Area have been assessed for this report.
- Victorian Biodiversity Atlas (VBA) (DEECA 2023a): This database comprises historical observation records of flora and fauna species from across Victoria. Records are added opportunistically, as flora and fauna surveys are conducted within Victoria for a variety of purposes. Records from a 10 km radius of the Project Area have been assessed for this report.
- NatureKit (DEECA 2023b): This database comprises large-scale modelling and classification of native vegetation across Victoria. Information includes modelled presence of native vegetation, modelled extent of Ecological Vegetation Classes (EVC) as of 2005, Strategic Biodiversity Values (indicative of the contribution of the area to Victoria's biodiversity values), and modelled condition of vegetation present.
- VicPlan (DTP 2023): Provides the relevant planning overlays such as Vegetation Protection, Significant Landscape and/or Environmental Significance Overlays.
- Technical reports for the Project Area and surrounds (Ecology Australia 2021).
- Ecological policy and legislative statements and guidelines.

2.2 Field assessment

2.2.1 Arboriculture assessment

An arboricultural assessment was completed by Tree Department, with field surveys undertaken in November–December 2023 (Howe 2024). The assessment was generally limited to trees as defined in AS4970-2009 (Protection of trees on development sites) – "Long lived woody perennial plant greater than (or usually greater than) 3 m in height with one or relatively few main stems or trunks". All trees within a 5 m buffer each side of the existing boundary fence were assessed, as well as any other trees outside the buffer area with branches that extend over the fence line to a height of 6 m or less. Further detail on the arboriculture methodology can be viewed in the Arboricultural Impact Assessment report located in Appendix G.

2.2.2 Ecological assessment

A field assessment was conducted by Jacobs ecologists on 12–14 December 2023 whereby all vegetation and habitat located within the Project Area was surveyed. Data was collected within ESRI Field Maps using a Trimble DA2 using Catalyst 30 subscription service (which generally achieves sub-metre accuracy).

Native vegetation was mapped in accordance with the *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP 2017) as either a patch or scattered tree, as described below:

Patch:

- an area of vegetation where at least 25 per cent of the total perennial understorey plant cover is native;
- any 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.

Scattered Tree:

- a native canopy tree that does not form part of a remnant patch. A native canopy tree is a mature tree (i.e. it is able to flower) that is greater than 3 m in height and is normally found in the upper layer of the relevant vegetation type.

Patches were further categorised into Ecological Vegetation Classes (EVC) and then into Habitat Zones. These areas were assessed using the habitat hectare method detailed in the *Vegetation Quality Assessment Manual – Guidelines for applying the habitat hectare scoring method – Version 1.3* (DSE 2004). Preliminary tree data for Scattered Trees was collected during the survey though was replaced by arborist data once available to maintain consistency between datasets.

The potential presence of threatened flora was determined by direct survey for obvious species (e.g. trees, shrubs and robust perennial herbs) as well as a determination of potential habitat for less obvious species (e.g. seasonal and/or small or cryptic species).The potential presence of threatened fauna species was determined by recording incidental sightings of fauna, signs of habitat utilisation (e.g. scats, tracks, scratchings, etc.) and undertaking habitat assessments of trees within the Project Area. The presence of pest animal and weed species declared under the *Catchment and Land Protection Act 1994* (CaLP Act) were also recorded, as was the indicative number of each FFG Act Generally Protected Flora species encountered.

2.3 Likelihood of occurrence assessment

An assessment of the likelihood of threatened species and threatened ecological communities occurring within the Project Area was undertaken. This assessment was based on the known preferred habitats in comparison to the habitat available in the Project Area, and the frequency, timing and location of previous records.

The criteria used for assessing likelihood of occurrence for threatened species are described in Table 2-1. The presence of threatened ecological communities—as listed under the EPBC Act and FFG Act—was determined for the entire Project Area during the field survey.

Table 2-1. Criteria for determining the likelihood of threatened species occurring in the Project Area

Likelihood	Criteria
Present	▪ Taxon recorded within the Project area by the present study or known to occur with supporting evidence.
High	▪ Recent records of the taxon in the vicinity, and/or ▪ The Project area contains high quality habitat for the taxon.
Moderate	▪ Limited records of the taxon in the vicinity, and/or ▪ The Project area contains habitat.
Low	▪ The taxon is only likely to rarely occur (irregularly and infrequently) in the Project area and/or ▪ No previous or only historic records of the taxon in the vicinity, and/or ▪ The Project area contains limited or no suitable habitat for the taxon, and/or ▪ The taxon was not observed during surveys and would likely have been observed if present, and/or ▪ The Project area lies outside the known geographic range of the taxon.
Negligible	▪ Conditions within the Project area are incongruous with requirements of the taxon (e.g. marine pelagic taxon could not occur in a terrestrial Project area; or a highly degraded environment lacking in habitat features required for taxon), and/or

Likelihood	Criteria
	▪ The taxon has been deemed absent after sufficient survey effort (criterion generally reserved for particularly conspicuous taxa).
N/A	▪ Legislation protecting taxon does not apply within the Project area, as: - The Project area is outside the natural geographic range of the taxon, and/or - The taxon is present for non-conservation purposes (e.g., planted for amenity, or has become naturalised in the area).

2.4 Summary of legislation and policies

A brief summary of the legislation and policies referred to throughout the document is provided in Appendix A. The relevant implications of these legislation and policies for the Project are summarised in Section 5. If additional works are proposed to be undertaken, further assessments and approvals may be required to adhere to the legislation and policies described herein. The relevant legislation and policy considered in this report includes:

- Commonwealth
  - *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- Victorian
  - *Environment Effects Act 1978* (EE Act)
  - *Flora and Fauna Guarantee Act 1988* (FFG Act)
  - *Planning and Environment Act 1987* (P&E Act)
  - Guidelines for the removal, destruction or lopping of native vegetation (DELWP 2017)
  - *Catchment and Land Protection Act 1994* (CaLP Act)
  - *Wildlife Act 1975*.

2.5 Nomenclature and taxonomy

An asterisk (*) preceding a plant or animal name indicates taxa which are not indigenous to Victoria. A hash (#) signifies a Victorian indigenous plant species that is not indigenous within the study area (i.e. it's occurrence is outside its natural range).

Plant taxonomy and the use of common names follow the Victorian Biodiversity Atlas (DEECA 2023a) and VicFlora (RBGV 2023).

2.6 Assumptions and limitations

- This report has been prepared by Jacobs Group (Australia) Pty Ltd (Jacobs) for Melbourne Water (the client) and is intended only for the purposes of identifying and informing potential environmental approvals and permits associated with the Project. This report has been prepared exclusively for Melbourne Water and no liability is accepted for any use or reliance on the report by third parties.
- Information presented in this report is based on available information at the time of assessment. Changes to legislation, policy or databases used to inform the report may alter the results and conclusions of this report. This report also reflects conditions assessed during the dates of the field assessment. Changes to ecological conditions occur over time through natural and human influences and may alter the conclusions of this report.
- This report addresses the requirements relating to ecological legislation and policy only, including the requirements of the Yarra Ranges Planning Scheme provisions for vegetation removal. As such,

vegetation which does not trigger requirements relating to ecological legislation and policy, or a permit for removal, may not be considered in this report.

- The timing of the surveys may not have been ideal for detecting all vegetation. Some seasonal species such as grasses, orchids and lilies, would not have been flowering or visible during the survey period and would not be able to be detected or identified to specific or sub-specific level due to a lack of identifying vegetative and/or reproductive material. This limitation has been partially addressed by the inclusion of a targeted survey for the threatened Wine-lipped Spider-orchid (*Caladenia oenochila*) which was conducted in early September 2024.
- Calculations and figures are based on design details available at the time of writing. Where design details change the outcomes of this report may require updating.

3. Results

The vast majority of the Project Area supports patches of native vegetation and fauna habitat of variable condition. Much of the Project Area is located within treed fuel-breaks and as such the structure of vegetation has been significantly altered from the surrounding forest. Significant flora and fauna values are variously present throughout the Project Area and are discussed below.

3.1 Flora

A total of 245 vascular plant species was recorded within the Project Area, of which 168 (68.6%) are indigenous, 75 (30.6%) are exotic and two (0.8%) are Victorian native species that are not indigenous to the Project Area (Appendix B). This total excludes species planted in horticultural contexts unless they were observed naturalising.

Native vegetation was identified and mapped in accordance with the Guidelines (DELWP 2017) within the Project Area. A Vegetation Quality Assessment was undertaken for patches of native vegetation, the results of which are presented in Section 3.1.5. A brief description of Ecological Vegetation Classes (EVCs) recorded is provided below.

3.1.1 Ecological Vegetation Classes (EVCs)

Three EVCs were recorded within the Project Area, each of which are discussed below.

3.1.1.1 EVC 16: Lowland Forest

Dominated by a eucalypt canopy of Messmate Stringybark (*Eucalyptus obliqua*) and Narrow-leaf Peppermint (*Eucalyptus radiata* subsp. *radiata*) over a largely slashed understorey (the result of ongoing fuel break management), Lowland Forest within the Project Area supported moderate native species richness, increasing in structural and floristic diversity in non-slashed locations.

Commonly occurring woody understorey species included Blackwood (*Acacia melanoxylon*), Hop Goodenia (*Goodenia ovata*), Prickly Currant-bush (*Coprosma quadrifida*) and Bootlace Bush (*Pimelea axiflora* subsp. *axiflora*), with ground-ferns Austral Bracken (*Pteridium esculentum* subsp. *esculentum*) and Common Ground-fern (*Calochlaena dubia*) variously abundant while Rough Tree-fern (*Cyathea australis*) were scattered throughout. Commonly occurring ground-layer species, particularly in slashed areas included Bidgee-widgee *(Acaena novae-zelandiae*), Kidney-weed (*Dichondra repens*), Star Cudweed (*Euchiton involucratus*), Ivy-leaf Violet (*Viola hederacea*), Sword Tussock-grass (*Poa ensiformis*), Weeping Grass (*Microlaena stipoides* var. *stipoides*) and Forest Wire-grass (*Tetrarrhena juncea*).

Weed cover was generally low, though some slashed locations supported increased weed cover associated with herbaceous species including Sweet Vernal-grass (**Anthoxanthum odoratum*), Flatweed (**Hypochaeris radicata*) and Self-heal (**Prunella vulgaris*).

Lowland Forest has a conservation status of Least Concern within the Highlands – Southern Fall bioregion.

Plate 3-1. EVC 16 Lowland Forest recorded within the Project Area.

3.1.1.2 EVC 18: Riparian Forest

Located in association with a tributary of Olinda Creek in the north of the Project Area, Riparian Forest vegetation was dominated by a canopy of large Messmate Stringybark and Narrow-leaf Peppermint over an understorey-tree/large-shrub layer dominated by Blackwood, Silver Wattle (*Acacia dealbata* subsp. *dealbata*), Victorian Christmas-bush (*Prostanthera lasianthos* var. *lasianthos*), Banyalla (*Pittosporum bicolor*) and Scented Paperbark (*Melaleuca squarrosa*). Rough Tree-fern was common in the mid-storey while the understorey contained a variety of lifeforms with commonly occurring species including Fishbone Water-fern (*Blechnum nudum*), Soft Water-fern (*Blechnum minus*), Red-fruit Saw-sedge (*Gahnia sieberiana*), Shrubby Fireweed (*Senecio minimus*) and Forest Wire-grass.

Riparian Forest has a conservation status of Least Concern within the Highlands – Southern Fall bioregion.

Plate 3-2. EVC 18 Riparian Forest recorded within the Project Area.

3.1.1.3 EVC 45: Shrubby Foothill Forest

Shrubby Foothill Forest within the Project Area was floristically and structurally similar to Lowland Forest (with the majority of this vegetation located within the slashed fuel-break), though some areas of canopy were dominated by Mountain Grey-gum (*Eucalyptus cypellocarpa*) and the threatened Victorian Flat-pea (*Platylobium reflexum*) was common within in the southwest portion of the Project Area.

Shrubby Foothill Forest has a conservation status of Least Concern within the Highlands – Southern Fall bioregion.

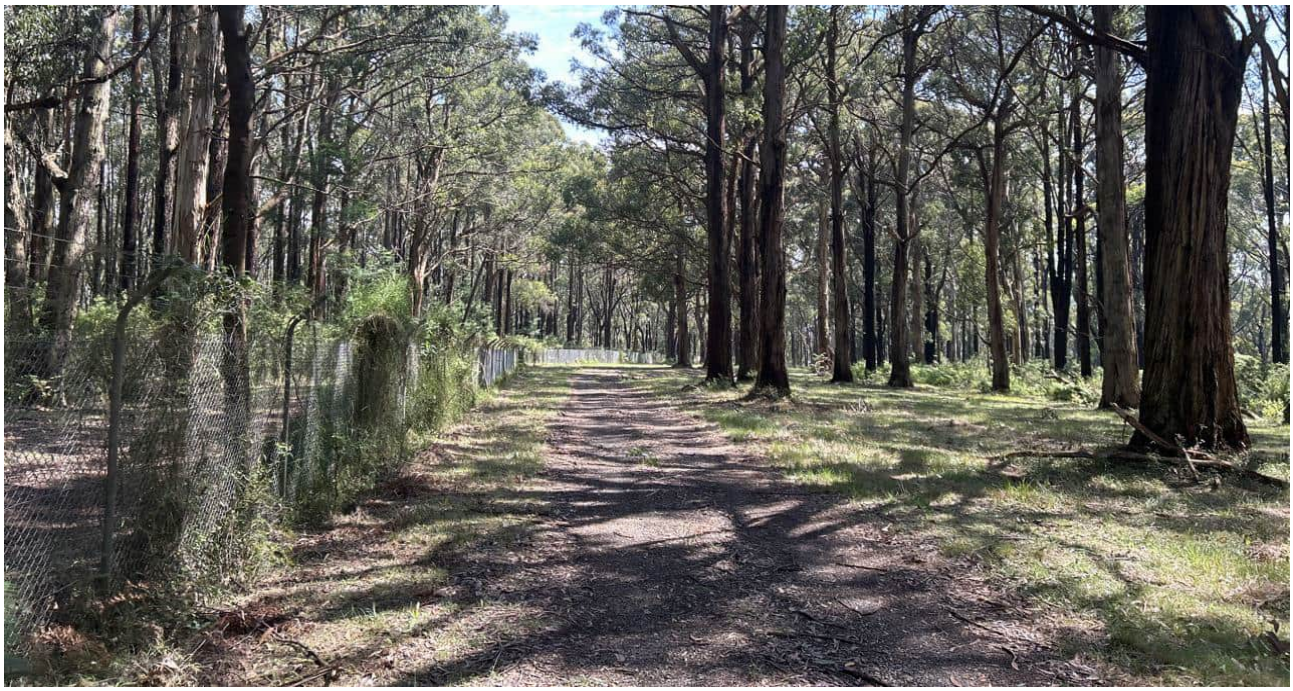

Plate 3-3. EVC 45 Shrubby Foothill Forest recorded within the Project Area.

3.1.2 Trees

A total of 2,119 trees were assessed as part of the arboricultural assessment (Howe 2024), with the majority, 1,795 trees, being locally indigenous taxa. The most frequently encountered species was Messmate, with 969 trees assessed, followed by Narrow-leaved Peppermint, 493 trees, Silver Wattle, 146 trees, and Blackwood, 103 trees (Howe 2024). Refer to the Arboricultural Impact Assessment (Appendix G) for further details.

3.1.3 Threatened and Protected flora

3.1.3.1 Threatened flora

A total of 73 threatened flora species have previously been recorded or are modelled to occur within 10 km of the Project Area based on the VBA database and PMST search. Following the field assessment, the likelihood of occurrence of each of the 73 threatened flora species within the Project Area was assessed and is provided in Appendix C.1.

Of the 73 threatened flora species previously recorded or modelled to occur, four were recorded onsite during surveys (Table 3-1). The remaining 69 species are considered unlikely to occur within the Project Area and no further consideration is given to these species in this report.

Table 3-1. Threatened flora species with a moderate or high likelihood of occurring within the Project Area

Species	Conservation status	Likelihood of occurrence	Likelihood of impact
Dandenong Wattle (*Acacia stictophylla*)	FFG – endangered	**Present** – Four mature plants of Dandenong Wattle were recorded in the Monbulk Road reserve on the eastern flank of the Project Area between Spring Road and Wilkens Lane. Plants occurred between 2-4 m off the fence line, with one plant having a branch leaning over the fence.	**High** – at least one plant will require pruning, if not removal.
Famine Flat-pea (*Platylobium infecundum*)	FFG – critically endangered	**Present** – Approximately 19 plants of Famine Flat-pea were recorded in two close-by locations within the reservoir reserve, all within several metres of the existing fence line on the eastern flank of the Project Area (between Wilkens Lane and Ferndale Road). These plants were growing at the base of trees and the existing fence line, as well as in slashed vegetation. Identification of this species was formally confirmed by the Identifications Botanist at the Royal Botanic Gardens, Victoria. Note: this species was forming spreading 'mats' in slashed areas, and for mapping purposes a single plant was	**High** – several plants are in close proximity (c. 1m) of existing fence.

Species	Conservation status	Likelihood of occurrence	Likelihood of impact
		accorded an approximate area of 3 square metres where the actual extent of the plant could not be determined.	
Powelltown Correa (*Correa reflexa var. lobata*)	FFG – endangered	**Present** – 22 mature plants were recorded within or adjoining the Project Area. Two plants were recorded at the base of trees in the southwest of the Project Area and the remaining 20 plants were located within un-slashed patches of vegetation in the McCarthy Road reserve and adjoining vegetation in the reserve.	**High** – five plants are in close proximity (c. 1–2 m) of existing fence.
Victorian Flat-pea (*Platylobium reflexum*)	FFG – endangered	**Present** – Approximately 706 plants were recorded over a 1.5 km stretch in the southwest of the Project Area and adjoining McCarthy Road in the south of the Project Area. Plants were largely recorded within slashed areas of the fuel-break, as well as at the base of trees and growing up the existing security fence. Identification of this species was formally confirmed by the Identifications Botanist at the Royal Botanic Gardens, Victoria. Note: this species was forming spreading 'mats' in slashed areas, and for mapping purposes a single plant was accorded an approximate area of 3 square metres where the actual extent of the plant could not be determined.	**High** – numerous plants are rooted at the base, or in close proximity (c. 1 m), of existing fence.

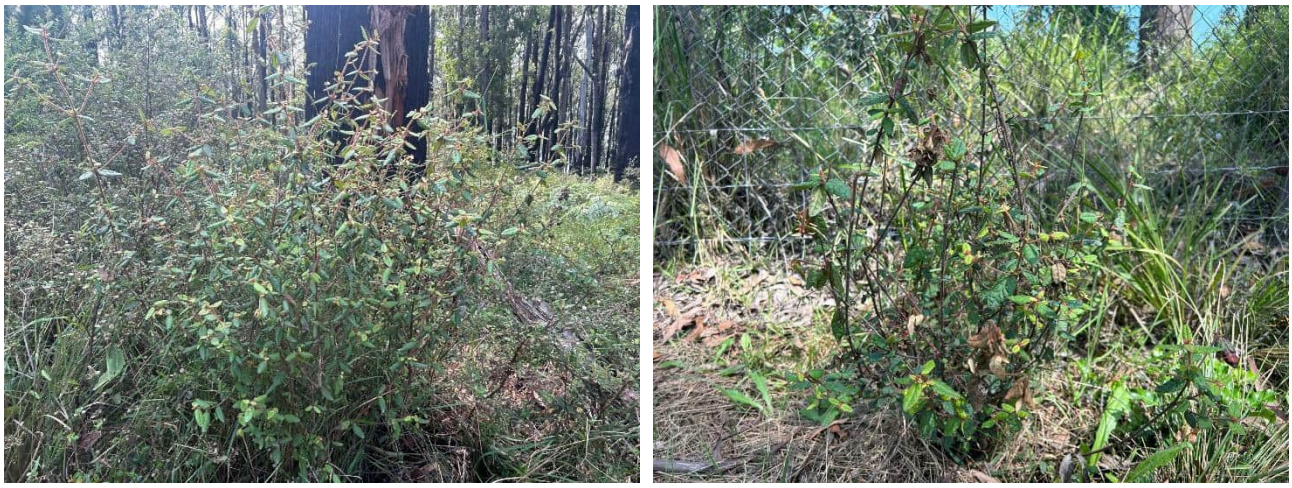

Plate 3-4. Powelltown Correa (*Correa reflexa* var. *lobata*) recorded within the Project Area. This taxon is listed as endangered within Victoria under the FFG Act.

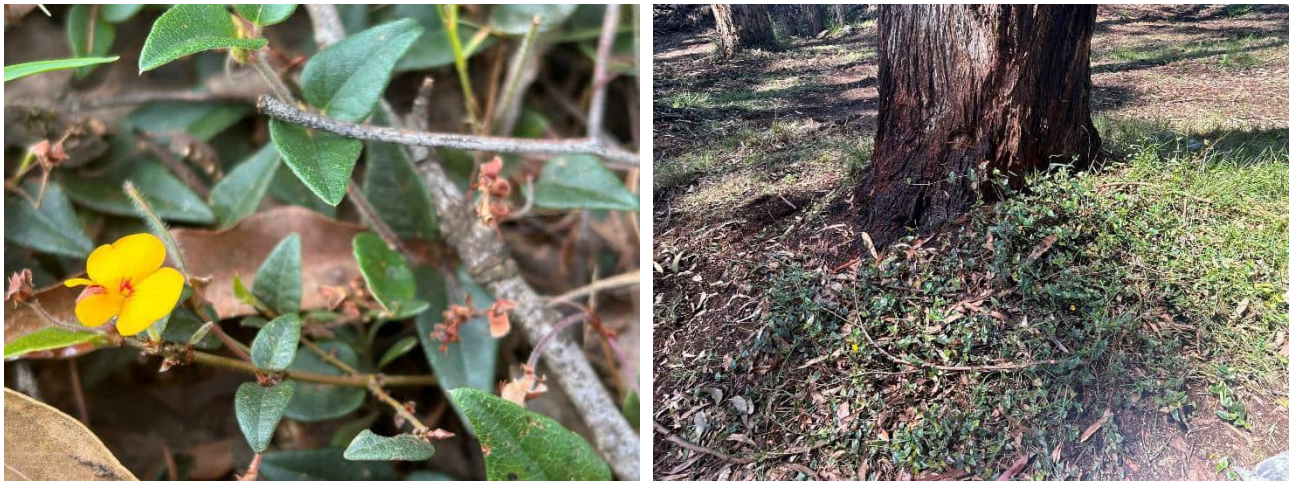

Plate 3-5. Victorian Flat-pea (*Platylobium reflexum*) recorded within the Project Area. This taxon is listed as endangered within Victoria under the FFG Act.

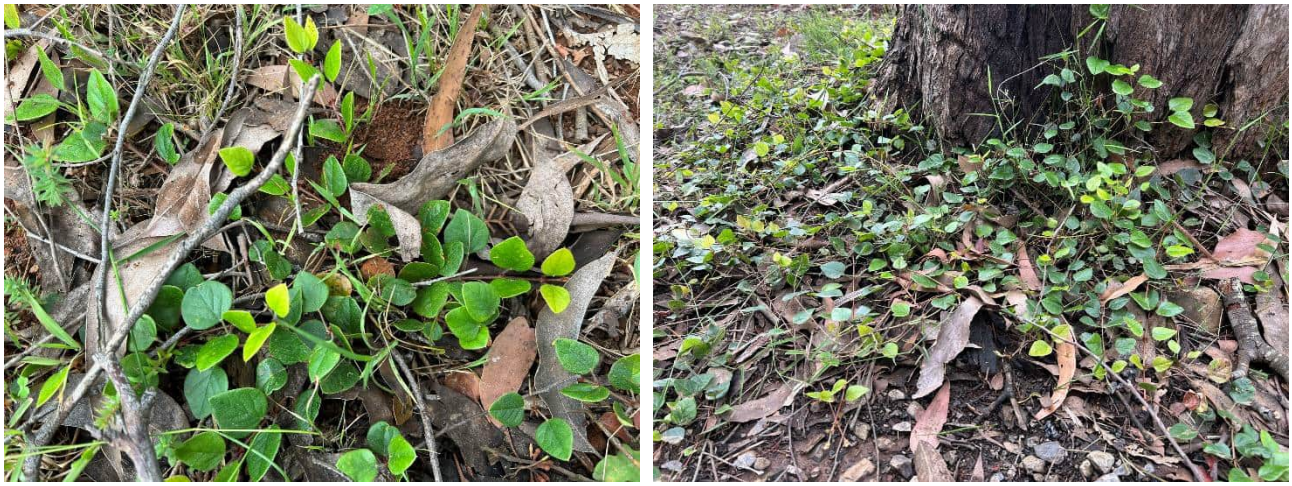

Plate 3-6. Famine Flat-pea (*Platylobium infecundum*) recorded within the Project Area. This taxon is listed as critically endangered within Victoria under the FFG Act.

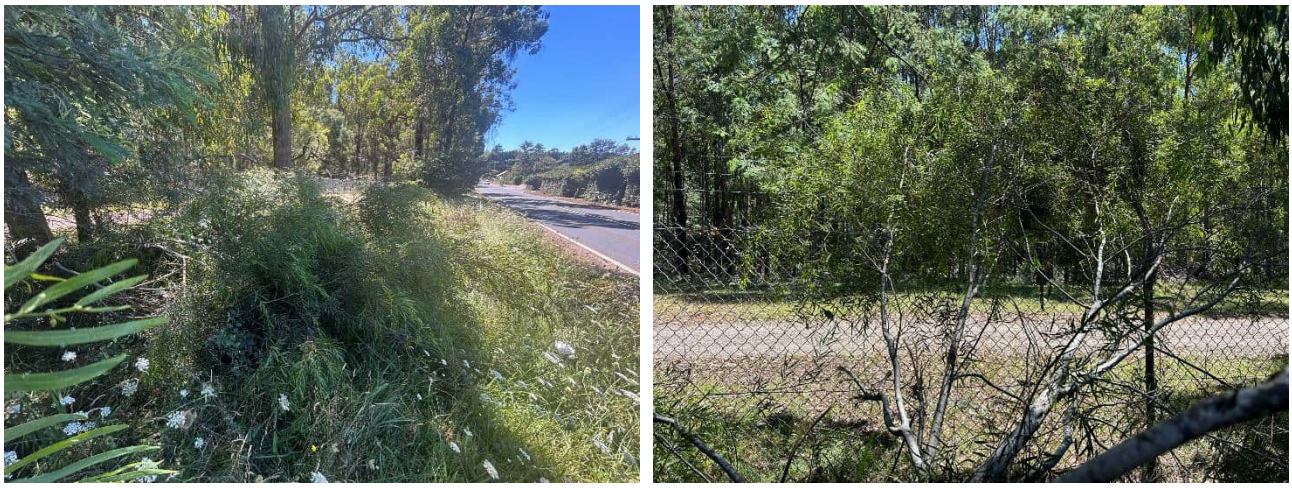

Plate 3-7. Dandenong Wattle (*Acacia stictophylla*) recorded within the Project Area. This taxon is listed as endangered within Victoria under the FFG Act.

3.1.3.2 Protected flora

Protected flora are native plants that have legal protection under the FFG Act and include plants from three sources:

- Plant taxa (species, subspecies or varieties) listed as threatened under the FFG Act
- Plant taxa belonging to communities listed as threatened under the FFG Act
- Plant taxa are listed under the FFG Act as Declared Protected Flora.

The FFG Act creates two categories of protected flora 'restricted use protected flora', and all other protected flora (referred to as 'generally protected flora'). These categories have separate controls in place regarding how people interact with them, and separate penalties if people don't adhere to them. Only 'generally protected flora' are relevant to the Project.

A total of seven Protected flora taxa was recorded within the Project Area. These taxa are detailed in Table 3-2 along with the indicative number of each taxon recorded.

Table 3-2. Indicative numbers of Protected Flora recorded within the Project Area

Species	Indicative no. plants	Protection category
Acacia stictophylla	4	Threatened species
Correa reflexa var. *lobata*	22	Threatened species
Chiloglottis sp.	350	Generally protected flora
Dipodium roseum	60	Generally protected flora
Gastrodia procera	30	Generally protected flora
Platylobium infecundum	19	Threatened species
Platylobium reflexum	706	Threatened species

3.1.4 Threatened ecological communities

Two threatened ecological communities listed under the EPBC Act were identified by the PMST as having the potential to occur within the Project Area: Natural Damp Grassland of the Victorian Coastal Plains and White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland. Following the site assessment, it was confirmed that neither of these communities. No other EPBC Act-listed communities are present within the Project Area. Likewise, no threatened communities listed under the FFG Act were present within the Project Area.

3.1.5 Vegetation Quality Assessment

A total of seven Habitat Zones of native vegetation was recorded within the Project Area, comprising three EVCs as listed in Section 3.1.1 and with habitat scores ranging from 61% to 83% of benchmark condition (Table 3-3, Appendix D). 566 Large Trees were recorded in patches along with one Scattered Tree (large size-class) (Appendix D).

Table 3-3. Vegetation Quality Assessment results for patches of native vegetation recorded within the Project Area

Habitat Zone			HZ1-LF	HZ2-LF	HZ3-LF	HZ1-SFF	HZ2-SFF	HZ1-RF	HZ2-RF
Bioregion			Highlands – Southern Fall						
EVC #: Name			16: LF	16: LF	16: LF	45: SFF	45: SFF	18: RF	18: RF
EVC Conservation Status		Max Score	Least Concern						
Site Condition	Large Old Trees	10	10	10	10	10	10	10	10
	Canopy Cover	5	5	5	5	5	5	5	5
	Understorey	25	15	25	15	15	15	25	15
	Lack of Weeds	15	11	11	4	7	0	11	7
	Recruitment	10	10	6	10	10	10	6	6
	Organic Litter	5	5	5	5	5	5	5	5
	Logs	5	0	4	0	0	0	5	3
	Standardiser	n/a	1	1	1	1	1	1	1
	Total	**75**	**56**	**66**	**49**	**52**	**45**	**67**	**51**
Landscape Context	Patch size	10	8	8	8	8	8	8	8
	Neighbourhood	10	4	4	4	4	4	4	4
	Distance to Core	5	4	4	4	4	4	4	4
	Total	25	16	16	16	16	16	16	16
Habitat Score		**100**	**72**	**82**	**65**	**68**	**61**	**83**	**67**
Habitat points = #/100		1	**0.72**	**0.82**	**0.65**	**0.68**	**0.61**	**0.83**	**0.67**

3.2 Fauna

The majority of the Project Area is heavily disturbed as a result of ongoing fuel-break works and supports limited fauna habitat beyond an open canopy of mature eucalypts (few of which support hollows) over a slashed field-layer. This eucalypt canopy provides canopy connectivity between structurally intact vegetation within the reservoir and the adjoining Dandenong Ranges National Park. Several small sections of the Project Area retained structurally intact vegetation on one or both sides of the fence, and should disturbance occur in these areas there is the chance for direct mortality of cryptic slow-moving ground dwelling fauna such as the threatened Broad-toothed Rat (*Mastacomys fuscus mordicus*) and Swamp Skink (*Lissolepis coventryi*), but

larger impacts such as fragmentation of habitat is likely to be minimal as these areas are all relatively small and with limited habitat connectivity inside of the fence.

The Project Area surrounds supported semi-intact forest with suitable features for hollow dependent species such as the threatened Gang-gang Cockatoo (*Callocephalon fimbriatum*), Sooty Owl (*Tyto tenebricosa*), Powerful Owl (*Ninox strenua*), Barking Owl (*Ninox connivens*), Southern Greater Gilder (*Petaurus volans*) and Yellow-bellied Glider (*Petaurus australis*). The relatively confined footprint of works for this Project is not expected to significantly impact these species given their highly mobile nature and the amount of suitable habitat in the broader area, though removal of mature eucalypts will contribute to the ongoing decline of habitat. A source of concern—albeit relatively minor given extant disturbance associated with facility operations—is disturbance during the breading season, particularly for owls and White-bellied Sea Eagle (*Haliaeetus leucogaster*), which could be minimised by undertaking works outside of the relevant breeding seasons[1]. It should be noted that no large raptor (White-bellied Sea Eagle and Little Eagle (*Hieraaetus morphnoides*)) nests were recorded during the survey. One eucalypt (located just outside the Project Area) was identified as supporting a potentially suitable nesting hollow for Powerful Owl, though there was no evidence of use at the time of survey.

No crayfish burrows were recorded during survey and, while it remains possible burrowing crayfish species are in the area, it is unlikely they would make use of the regularly slashed construction footprint.

The primary concern for fauna would be if the mesh size of the new fence is much finer than the existing fence, whereby it would create a movement barrier for terrestrial species that were previously able to cross the fence.

3.2.1 Threatened and migratory fauna

3.2.1.1 Threatened fauna

A total of 85 threatened fauna taxa have previously been recorded or are modelled to occur within 10 km of the Project Area based on the VBA database and PMST search. Following the field assessment, the likelihood of occurrence of each of these 85 taxa within the Project Area was assessed and is provided in Appendix C.2.

Of the 85 threatened fauna taxa previously recorded or modelled to occur, 32 are considered to have a high likelihood of occurrence within the Project Area, 15 a moderate likelihood and 38 a low likelihood (Table 3-4). A summary of the likelihood reasoning for taxa with a likelihood of moderate or high is provided below in Table 3-4.

Table 3-4. Threatened fauna species with a moderate or high likelihood of occurring within the Project Area

Taxon	EPBC	FFG	Likelihood occurrence	Potential impact	Likelihood reasoning
Amphibians					
Growling Grass Frog (*Litoria raniformis*)	VU	vu	Moderate	Low	Potential occurrence associated with wetland habitats. Low potential to be impacted by the Project.
Southern Toadlet (*Pseudophryne semimarmorata*)		en	Moderate	Moderate	Habitat likely restricted to the northwest of Project Area where the ground-layer has not been disturbed by fuel-break works. Removal of tree canopy reduces suitable nesting substrate for species (leaf/bark litter).
Birds					
Australasian Bittern (*Botaurus poiciloptilus*)	EN	cr	Moderate	Low	May make use of reservoir fringes but unlikely to utilise habitat within the Project Area.

[1] Sooty Owl (autumn-winter), Powerful Owl (May-September), Barking Owl (August-October), White-bellied Sea Eagle (June-August).

Taxon	EPBC	FFG	Likelihood occurrence	Potential impact	Likelihood reasoning
Australasian Shoveler (*Spatula rhynchotis*)		vu	High	Low	May make use of reservoir fringes but unlikely to utilise habitat within the Project Area.
Barking Owl (*Ninox connivens*)		cr	High	Moderate	May nest in large hollow-bearing trees in the area. Impacts would be mostly through loss of suitable large hollow-bearing trees (which may not occur) and potentially disturbance during the breeding season (though likely minimal due to current levels of disturbance from facility operations).
Blue-billed Duck (*Oxyura australis*)		vu	High	Low	Will use reservoir but unlikely to utilise habitat within the Project Area.
Blue-winged Parrot (*Neophema chrysostoma*)	VU		High	Low	Limited impact to mobile species. Only impact if hollow bearing trees are removed.
Brown Treecreeper (*Climacteris picumnus*)	VU		High	Low	Unlikely to be impacted based on the quantum of tree loss (fence will not act as a barrier/fragmentation of habitat).
Caspian Tern (*Hydroprogne caspia*)		vu	Moderate	Low	Will use reservoir but unlikely to utilise habitat within the Project Area.
Chestnut-rumped Heathwren (*Calamanthus pyrrhopygius*)		vu	Moderate	Low	Limited impact to highly mobile species. Only real impact would be if there is loss of existing nests when shrubby/tussocky vegetation is removed (northern area only), though none were recorded.
Eastern Great Egret (*Ardea alba modesta*)		vu	High	Low	May use reservoir but unlikely to utilise habitat within the Project Area.
Freckled Duck (*Stictonetta naevosa*)		en	High	Low	May make use of fringes of reservoir but unlikely to utilise habitat within the Project Area.
Gang-gang Cockatoo (*Callocephalon fimbriatum*)	EN	en	High	Moderate	Only impact would be through the loss of suitable breeding hollows (tree loss to be minimised).
Grey Goshawk (*Accipiter novaehollandiae*)		en	High	Low	May perch/roost in trees within the area. Only impacted through loss of trees. No nests observed.
Hardhead (*Aythya australis*)		vu	High	Low	Will use reservoir but unlikely to utilise habitat within the Project Area.
Hooded Robin (*Melanodryas cucullata*)	EN	vu	High	Low	Limited impact to highly mobile species. Only real impact would be from loss of existing nests when shrubby vegetation is removed (northern area only).
Lewin's Rail (*Lewinia pectoralis*)		vu	Moderate	Moderate	May occur in dense vegetation near waterbodies. Impacts would be from removal of habitat in these locations.
Little Eagle (*Hieraaetus morphnoides*)		vu	High	Moderate	May nest in large hollow-bearing trees in the area. Impacts would be mostly through loss of suitable large hollow-bearing trees (which may not occur). Also disturbance during the breeding season (though likely minimal due to current levels of disturbance from facility operations).
Masked Owl (*Tyto novaehollandiae*)		cr	High	Moderate	May nest in large hollow-bearing trees in the area. Impacts would be mostly through loss of suitable large hollow-bearing trees (which may not occur) and potentially disturbance during the breeding season (though likely minimal due to current levels of disturbance from facility operations).
Musk Duck (*Biziura lobata*)		vu	High	Low	Will use reservoir but unlikely to utilise habitat within the Project Area.

Taxon	EPBC	FFG	Likelihood occurrence	Potential impact	Likelihood reasoning
Pilotbird (*Pycnoptilus floccosus*)	VU	vu	High	Low	Limited impact to highly mobile species. New fence not expected to increase habitat fragmentation due to existing fuel-break/clearance around current fence.
Powerful Owl (*Ninox strenua*)		vu	High	Moderate	May nest in large hollow-bearing trees in the area. Impacts would be mostly through loss of suitable large hollow-bearing trees (which may not occur). And potentially disturbance during the breeding season (though likely minimal due to current levels of disturbance from facility operations).
Sooty Owl (*Tyto tenebricosa*)		en	High	Moderate	May nest in large hollow-bearing trees in the area. Impacts would be mostly through loss of suitable large hollow-bearing trees (which may not occur) and potentially disturbance during the breeding season (though likely minimal due to current levels of disturbance from facility operations).
Speckled Warbler (*Pyrrholaemus sagittatus*)		en	High	Low	Limited impact to highly mobile species.
Square-tailed Kite (*Lophoictinia isura*)		vu	High	Moderate	May nest in large trees in the area. Impacts mostly through loss of suitable large nesting trees (no nests observed) and potentially disturbance during the breeding season (though likely minimal due to current levels of disturbance from facility operations).
Superb Parrot (*Polytelis swainsonii*)	VU	en	High	Moderate	Limited impact to mobile species. Only impact if hollow bearing trees are removed.
Swift Parrot (*Lathamus discolor*)	CR	cr	Moderate	Low	Limited impact to mobile species.
Turquoise Parrot (*Neophema pulchella*)		vu	High	Low	Limited impact to mobile species. Only impact if hollow bearing trees are removed.
White-bellied Sea-Eagle (*Haliaeetus leucogaster*)		en	High	Moderate	May nest in large trees in the area. Impacts mostly through loss of suitable large nesting trees (no nests observed) and potentially disturbance during the breeding season (though likely minimal due to current levels of disturbance from facility operations).
White-throated Needletail (*Hirundapus caudacutus*)	VU	vu	High	Low	Mostly aerial species when in Australia. Unlikely to utilise habitat in Project Area.
Invertebrates					
Ancient Greenling Damselfly (*Hemiphlebia mirabilis*)		en	Moderate	Low	Not enough known about species ecology and distribution to rule out possible occurrence. Habitat associated with wetland areas.
Dandenong Burrowing Crayfish (*Engaeus urostrictus*)		cr	Moderate	Moderate	Impacts likely to be limited to direct disturbance during construction. Impacts likely focused to northern end of Project Area.
Dandenong Freshwater Amphipod (*Austrogammarus australis*)		cr	Moderate	Moderate	Known from upper reaches of Olinda Creek and from upper catchment of Lyrebird Creek which is located in the adjoining catchment to west of Project Area. May occur in tributary of Olinda Creek in north of Project Area.
Depressed Mussel (*Hyridella (Hyridella) depressa*)		en	Moderate	Low	Possible occurrence within tributary of Olinda Creek in north of Project Area.

Taxon	EPBC	FFG	Likelihood occurrence	Potential impact	Likelihood reasoning
Foothill Burrowing Crayfish (*Engaeus victoriensis*)		en	Moderate	Moderate	Impacts likely to be limited to direct disturbance during construction. Impacts likely focused to northern end of Project Area.
Narracan Corrugated Mussel (*Hyridella narracanensis*)		en	Moderate	Low	Possible occurrence within tributary of Olinda Creek in north of Project Area.
Tubercle Burrowing Crayfish (*Engaeus tuberculatus*)		en	High	Moderate	Impacts likely to be limited to direct disturbance during construction. Impacts likely focused to northern end of Project Area.
Mammals					
Broad-toothed Rat (*Mastacomys fuscus mordicus*)	VU	vu	High	Moderate	Unlikely to be utilising majority of habitat within the Project Area due to already cleared fence line. New fence is not considered to be a detrimental barrier due to fauna crossing holes. Potential for direct impact during clearing of structurally intact vegetation. The wider the break the more likely it will act as a barrier to the species due to increased predation risk due to lack of cover.
Eastern Bent-winged Bat (*Miniopterus orianae oceanensis*)		cr	Moderate	Low	May roost by day in caves, stormwater channels and comparable structures. Forages above the tree canopy.
Grey-headed Flying-fox (*Pteropus poliocephalus*)	VU	vu	High	Low	Limited impact to highly mobile species. No camp on site.
Platypus (*Ornithorhynchus anatinus*)		vu	High	Moderate	Only possibly area of impact in the tributary of Olinda Creek on the outflow of the reservoir.
Southern Brown Bandicoot (*Isoodon obesulus obesulus*)	EN	en	Moderate	Low	Unlikely to be utilising most habitat within the Project Area due to already cleared fence line. Existing fence may already act as a barrier. Will be able to pass through fauna crossing holes in new fence. The wider the break the more likely it will act as a barrier to the species due to increased predation risk due to lack of cover.
Southern Greater Glider (*Petauroides volans*)	EN	en	High	Moderate	May den in large hollow-bearing trees in the area. Impacts mostly through loss of suitable large hollow-bearing trees (which may not occur). New fence not expected in increase habitat fragmentation due to existing fuel-break/clearance around current fence.
Yellow-bellied Glider (*Petaurus australis*)	VU	vu	High	Moderate	May den in large hollow-bearing trees in the area. Impacts mostly through loss of suitable large hollow-bearing trees (which may not occur). New fence not expected in increase habitat fragmentation due to existing fuel-break/clearance around current fence.
Reptiles					
Glossy Grass Skink (*Pseudemoia rawlinsoni*)		en	High	Moderate	Unlikely to be utilising most habitat within the Project Area due to already cleared fence line. New fence will not act as much of a barrier due to fauna crossing holes. Potential for direct impact during clearing of structurally intact vegetation.
Lace Monitor (*Varanus varius*)		en	High	Moderate	Disturbance mainly through loss of suitable trees. Not further habitat fragmentation as existing fence is already acting as a barrier.
Swamp Skink (*Lissolepis coventryi*)	EN	en	High	Moderate	Unlikely to be utilising most habitat within the Project Area due to already cleared fence line. New

Taxon	EPBC	FFG	Likelihood occurrence	Potential impact	Likelihood reasoning
					fence will not act as much of a barrier due to fauna crossing gaps. Potential for direct impact during clearing of structurally intact vegetation.

3.2.1.2 Migratory fauna

The PMST search identified 13 migratory fauna species as having the potential to occur within the Project Area (Table 3-5). Migratory species are those animals that migrate to Australia and its external territories or pass though or over Australian waters during their annual migrations. Many of these species breed outside of Australia and spend a critical part of their lifecycle in Australia, often in areas of coastal or inland wetlands. These species are protected under the EPBC Act and listed under a number of international agreements and conventions.

Although the Project Area constitutes potential foraging habitat for some of these migratory species, the quantum of vegetation removal is considered to be negligible in the context of the broader landscape and thus these species are considered unlikely to be significantly impacted by the proposed works.

Table 3-5. Migratory fauna species modelled as having the potential to occur within Project Area

Common name	Scientific name	Common name	Scientific name
Black-faced Monarch	*Monarcha melanopsis*	Pectoral Sandpiper	*Calidris melanotos*
Common Greenshank	*Tringa nebularia*	Rufous Fantail	*Rhipidura rufifrons*
Common Sandpiper	*Actitis hypoleucos*	Satin Flycatcher	*Myiagra cyanoleuca*
Curlew Sandpiper	*Calidris ferruginea*	Sharp-tailed Sandpiper	*Calidris acuminata*
Fork-tailed Swift	*Apus pacificus*	White-throated Needletail	*Hirundapus caudacutus*
Latham's Snipe	*Gallinago hardwickii*	Yellow Wagtail	*Motacilla flava*
Osprey	*Pandion haliaetus*	-	-

3.3 Wetlands and waterways

No Ramsar wetlands occur within 10 km of the Project Area or are expected to be impacted by Project works. Several waterways and wetlands intersect or are in close proximity to the Project Area, and/or have the potential to be impacted by Project works. These are summarised below:

- Silvan Reservoir (DEECA Wetland no. 71764) which covers the entirety of the reservoir. The majority of the Project Area catchment flows towards this wetland.
- A tributary of Olinda Creek runs from the Silvan Reservoir spillway to Olinda Creek in the north of the Project Area. This stream runs under the exiting fence line and runs through a small gully supporting intact Riparian Forest vegetation. Riparian and instream habitat in this location is likely to support threatened species' habitat.
- Olinda Creek is located within c.100 m of the Project Area in the northwest. This receives water directly from the tributary of Olinda Creek.
- An intermittent minor watercourse/drain runs along the eastern flank of the Project Area on the inside of the fence line. This drainage line appears ephemeral and was noted to support minimal wetland values at the time of assessment.

4. Impact Assessment and Mitigation Measures

4.1 Proposed works and potential impacts

Proposed works

The main component of the Project is the construction of a c. 15 km long fence on the same alignment as an existing fence that is to be removed. The proposed fence material is to be weld-mesh (subject to further investigation). The fence will have a minimum height of three metres above ground level, and sections may exceed this on steep terrain. The fence will have a Perimeter Intruder Detection System (PIDS), and utilities would be attached to the fence structure.

Ancillary components of the Project are laydown areas within Melbourne Water owned land for construction team equipment storage, fence components, construction machinery and equipment and amenity facilities. Laydown areas are to be located within existing cleared areas. Temporary construction site office facilities would be located within or adjacent to Melbourne Water's Silvan Reservoir site office.

The construction activities will include:

- Erection of temporary fence during construction
- Removal of the existing open weave wire-mesh fence
- Construct the proposed fence
- Access along existing external public roads
- Access along internal/external maintenance and fire-access tracks
- Occupation and access over land within Silvan Reservoir, Gardens of the Dandenong Ranges, Dandenong Ranges National Park and public roads
- Removal of vegetation along the boundary fence, fire-access tracks, and within laydown areas to the minimum extent necessary for construction and access purposes
- Removal of trees where the trunk is within one metre on outside of fence and three metres on the inside of the fence
- Removal of tree limbs that overhang the proposed fence, but only where they are within three metres of the top of the proposed fence
- Material transportation
- Ancillary construction activities.

Determination of impacts

Potential impacts to native vegetation and fauna habitat have been conservatively based on a combination of total and partial removal[2] of native vegetation within the construction footprint[3]. A breakdown of how native vegetation impacts have been determined is provided below:

- Total removal – all native vegetation (trees and understorey) is considered 'lost' within a 4 m wide fence buffer (1 m outside of fence and 3 m inside fence).

[2] 'Partial removal' relates to how native vegetation removal is calculated under the Guidelines (DEPWP 2017). It applies to sections of the construction footprint where disturbance to the understorey may occur, but no trees will be impacted.

[3] The construction footprint is the total extent of the works area and includes laydown and storage locations. This is a corridor up to 13 m wide (3 m outside of fence, 10 m inside of fence) though is narrower where works can be constrained between the internal boundary track and the fence. Additionally, one laydown location extends to c. 40 m wide over c. 225 m stretch.

- Partial removal – only understorey vegetation is considered 'lost'; no removal or damage to trees will occur. This applies to the remainder of the construction footprint (i.e. 2 m outside fence and 7 m inside fence).

Native vegetation impacts have also been broken down into the extent of removal requiring a permit, and the extent exempt from requiring a permit (Table 4-1, Section 5).

It should be noted that through various mitigation measures (detailed below in Section 4.3) the actual extent of vegetation clearance, notably understorey removal, will be much less than what is accounted for above. It is the intent of the Project that the majority of understorey vegetation (namely that occurring within slashed fuel-breaks) will variously be maintained or reestablished to its current extent and condition following Project completion.

The total area of native vegetation to be impacted and the number of trees requiring removal based on the above is detailed in Table 4-1, and mapping on native vegetation and tree impacts is provided in Appendix D. A detailed account of native vegetation removal is provided in Section 5.1.

Table 4-1. Native vegetation patches and trees impacted to facilitate fence construction

Vegetation impacts		Extent of removal	Total
Native vegetation requiring a permit (partial removal)		5.708ha	6.072 ha
Native vegetation requiring a permit (total removal)		0.364 ha	
Native vegetation not requiring a permit		10.054 ha	10.054 ha
Trees	**Indigenous**	356 (incl. 114 Large Canopy Trees)	356 indigenous trees
	Exotic	60	77 non-indigenous trees
	Aus. Native	14	
	Vic. Native	3	

4.2 Avoidance and minimisation

In accordance with the Guidelines, all applications to remove native vegetation must provide a statement as to what steps have been taken to ensure that impacts on biodiversity from native vegetation removal have been avoided or minimised. A number of steps have been undertaken to avoid and minimise the impact of the Project on biodiversity through the removal of native vegetation. The following process has been implemented during the planning process to minimise native vegetation removal:

- A multi-criteria assessment was undertaken to assess options to locate the fence in one of three locations, as follows:
  - Along the existing fence line
  - Along an internal track inset from the property boundary
  - Along an internal track that borders the edge of the reservoir.

  The multi-criteria assessment examined the potential impacts on land use planning, community, ecology, historic heritage and Aboriginal heritage, ground conditions, potential for contaminants, construction methodology, Project objectives and cost. The assessment found that the preferred option is to maintain the fence on the existing alignment. The replacement of the fence on the existing alignment would have the least ecological impact, as the majority of native vegetation impacted has already been highly

modified due to its occurrence within a fuel-break. Both other options would result in additional clearance of structurally intact native vegetation of potentially higher quality. The multi-criteria assessment also examined the fence material and construction method and resulted in modifications to maintain site security while avoiding impacts to the roots of large trees.

- The initial construction method required the removal of all trees from a 3 m buffer either side of the fence alignment. This has been reduced to be a 1 m buffer on the outside of the fence and a 3 m buffer on the inside. While native vegetation losses have been calculated on the above tree removal area it is recommended (see Section 4.3) that trees (especially those of a large size-class) are retained wherever possible within this buffer.
- Various mitigation measures (detailed below in Section 4.3) will reduce the extent of vegetation clearance calculated under the Guidelines (refer Section 5.1). Understorey disturbance will be much less than what is accounted for above, which accounts for total removal of the understorey. It is the intent of the Project that the majority of understorey vegetation (namely that occurring within slashed fuel-breaks) will variously be maintained or reestablished to its current extent and condition following Project completion.
- Following the first draft of this report the construction footprint was further minimised to exclude areas of native vegetation located on the reservoir side of access tracks (within the Silvan Reservoir land).

4.3 Mitigation measures

The following mitigation measures are recommended to be variously implemented prior to, during and post-construction of the Project to minimise long-term deleterious impacts to biodiversity. These mitigation measures should be incorporated into a Construction Environmental Management Plan (CEMP) that is to be prepared prior to construction commencing.

Pre-construction

- While impacts to native vegetation have been conservatively estimated using a 13 m wide construction footprint, it is recommended that this area is minimised as far as possible to reduce unnecessary impacts to flora and fauna values. Reduction in the footprint should be considered in areas outside the current fuel-break that support structurally intact native vegetation (e.g. the area marked as 'small terrestrial mammal habitat' in Map Q in Appendix D and the riparian vegetation adjoining the tributary of Olinda Creek in the north of the Project Area, and along McCarthy Road in the south of the Project Area). Additionally, where the construction footprint exceeds access tracks, there should be no need for any works to take place on the non-fence side of the track.
- Tree removal has been calculated on complete removal of trees within a 4 m fence buffer area (1 m outside fence, 3 m inside). It is highly recommended that (at least) indigenous canopy trees of ≥70 cm Diameter at Breast Height (DBH) that are >1 m from the fence are retained. Consideration should also be given to retaining all indigenous trees that are >1 m from the fence.
- Ensure 'faunal movement gaps/holes' are incorporated into the fence design. It is understood that these will be a circular opening in the fence with a minimum diameter of 150 mm (though up to 280 mm is preferred). At least four gaps should be placed at ground level in the area marked as 'small terrestrial mammal habitat' in Map Q in Appendix D. Consideration should also be given to inserting these gaps at occasional points throughout the rest of the fence alignment.
    - If Melbourne Water does not have a fauna management plan for fenced catchments (or other habitat areas) it is recommended that one is prepared and implemented within Silvan Reservoir. This plan will be necessary to manage larger fauna (e.g. macropods, wombat and koala) for which a new fence would act as a barrier to movement (noting they can currently burrow under the existing fence). Lack of management may result in significant ecological damage and animal welfare issues.

- Minimise the width of clearing and tree removal in the area marked as 'small terrestrial mammal habitat' in Map Q in Appendix D. This location contains habitat for the threatened Southern Toadlet (*Pseudophryne semimarmorata*) and retention of natural leaf-litter is required to maintain a suitable nesting substrate for the species.
- All contractors to be undertaking works within the Project Area should undergo an ecological induction, whereby environmental protection measures adopted by the Project can be explained and contractor questions can be answered. The induction should cover flora and fauna values present, 'No Go Zones', tree protection measures and wildlife considerations (flushing, handling). Inductions should be run by a suitably qualified ecologist or by a Melbourne Water environmental specialist.

During construction:

- Native vegetation must be impacted to the minimal degree necessary to undertake the works. This can be achieved by:
  - Keeping vehicle movement to established tracks wherever possible
  - Only using allocated laydown areas for storing materials, equipment, etc
  - Minimising ground-disturbance (e.g. take care using tracked equipment, use fibreglass matting in sensitive locations, avoid machinery use where ground is sodden)
  - Ensure trees identified for retention are not damaged.
- Threatened flora is to be protected as far as practicable for the duration of works. Please refer to species specific measures detailed below. Where plants are to be fenced it is sufficient to use star-pickets and hi-vis barrier mesh with signage. Fencing of plants must be undertaken by a person with the requisite plant identification skills to identify the below species.
  - Famine Flat-pea (*Platylobium infecundum*) must be avoided by the Project (given the isolated occurrence of the species). All plants occur in a single location (though within two separated patches), and no plants were recorded climbing on or under the existing fence. These plants are to be fenced and protected for the duration of works.
  - Dandenong Wattle (*Acacia stictophylla*) and Powelltown Correa (*Correa reflexa* var. *lobata*). Plants of both species occur infrequently within the construction footprint. These plants are to be fenced and protected for the duration of works, acknowledging that some pruning may be required where plants are within a metre, or overhanging the fence.
  - Victorian Flat-pea (*Platylobium reflexum*) occurs extensively within the construction footprint in several locations. Locations supporting populations of this species must have signage erected at the start and end of each population specifying the following: Plants may be removed where:
    - they are situated in post-hole locations for the new fence
    - they are climbing the existing fence (though where possible plants should be cut off above ground-level instead of being dug up).

    In all other locations where plants occur, effort must be made to reduce traversing areas containing the species (on foot or with machinery). Where machinery must be driven over plants, fibreglass matting must be laid down to minimise potential damage to plants.
- Native vegetation patches adjoining the construction footprint must be treated as 'No Go Zones' whereby no entry is allowed. To achieve this, it is essential that the construction footprint can be delineated on-site, and this is likely to require fencing and signage where no other method is available. The extent of fencing shall be only that necessary to prevent construction access to the native vegetation patch (i.e. it is not necessary to completely surround native vegetation patch).

- Activities generally excluded from Tree Protection Zones (TPZ)[4] include storage, parking of vehicles and plant (unless on established tracks), preparation of chemicals, washing and cleaning of equipment, excavations (excluding those permitted under relevant approvals) and other activities identified in Clause 4.2 of Australian Standard 4970-2009 (Protection of trees on development sites).
- Prior to construction activities commencing standard spotting and flushing of vegetation would occur to encourage dispersal of mobile fauna species. Where nests and nesting birds are located, they will be suitably managed and relocated by a fauna spotter/catcher who is authorised to do so under the *Wildlife Act 1975*.
- Implement appropriate erosion and sedimentation controls. Environmental management for erosion and sediment control, in accordance with EPA Victoria construction guidelines (Publication 1834) will be implemented for works in the vicinity of waterways and wetlands. Controls are to be implemented such that the water quality of Olinda Creek, Silvan Reservoir and stormwater leaving the Project Area is to be maintained at pre-construction levels.
- The spread of noxious weeds, harmful pathogens and pest animals must be controlled in accordance with the CaLP Act as well as in accordance with Melbourne Waters biosecurity procedures.

Post-construction:

- Revegetation should be undertaken wherever Project works have resulted in bare ground (that is not naturally reestablishing with native species) as well as in areas previously supporting structurally intact native vegetation (i.e. native vegetation patches located outside of the existing fuel-break). The following revegetation prescriptions must be followed:
  - Only locally indigenous plant species that would naturally occur in the relevant Ecological Vegetation Class can be utilised.
  - Provenance of revegetation material must be local/regional.
  - Direct seeding of grasses is considered appropriate within fuel-breaks, though planting of tube-stock of a range of life-forms (e.g. shrubs, graminoids, forbs, grasses) is recommended in areas previously supporting structurally intact native vegetation.

[4] A Tree Protection Zone is an area around the trunk of the tree which has a radius of 12 × the diameter at breast height to a maximum of 15 metres but no less than 2 metres. Dead trees should be protected with a radius of 15 metres from the base (DELWP (2018) *Assessor's handbook: applications to remove, destroy or lop native vegetation, version 1.1*, Department of Environment, Land, Water and Planning, Government of Victoria.)

5. Policy and Legislative Implications

Likely impacts to ecological values resulting from the proposed works have been assessed against relevant policy and legislation. The specific legislation/policy and their environmental requirements as relevant to the Project are summarised in Table 5.1.

Table 5-1. Summary of policy/legislative requirements

Key:

EN – taxon listed as Endangered under the EPBC Act

VU – taxon listed as Vulnerable under the EPBC Act

CR – taxon listed as Critically Endangered under the EPBC Act

Policy/legislation	Project relevance	Implication and actions required
Commonwealth		
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	No EPBC Act-listed threatened flora species are considered to have a moderate or high likelihood of occurrence in the Project Area, and no EPBC Act-listed threatened ecological communities were recorded in the Project Area, therefore no impacts on these MNES are likely to occur. 12 threatened fauna species have a high likelihood of occurrence: ▪ Blue-winged Parrot (*Neophema chrysostoma*) (VU) ▪ Brown Treecreeper (*Climacteris picumnus*) (VU) ▪ Gang-gang Cockatoo (*Callocephalon fimbriatum*) (EN) ▪ Hooded Robin (*Melanodryas cucullata*) (EN) ▪ Pilotbird (*Pycnoptilus floccosus*) (VU) ▪ Superb Parrot (*Polytelis swainsonii*) (VU) ▪ White-throated Needletail (*Hirundapus caudacutus*) (VU) ▪ Broad-toothed Rat (*Mastacomys fuscus mordicus*) (VU) ▪ Grey-headed Flying-fox (*Pteropus poliocephalus*) (VU) ▪ Southern Greater Glider (*Petauroides volans*) (EN) ▪ Yellow-bellied Glider (*Petaurus australis*) (VU) ▪ Swamp Skink (*Lissolepis coventryi*) (EN)	Six of the 16 threatened fauna species have a moderate potential for being impacted by the Project. For five species impacts relate to the potential loss of suitable nesting trees (Gang-gang Cockatoo, Superb Parrot, Southern Greater Glider and Yellow-bellied Glider). For two species impacts relate to the potential for mortality of individuals during clearing of structurally intact vegetation (Broad-toothed Rat and Swamp Skink). Mitigation measures required to address potential impacts to the above species are: ▪ Flushing of structurally intact area of native vegetation prior to clearing and relocation of fauna as required. These works would be undertaken by someone with appropriate management authorisation (a permit) under the Wildlife Act. It is anticipated that through the implementation of the above mitigation measures **no referral is required under this Act**.

Policy/legislation	Project relevance	Implication and actions required
	Four threatened fauna species have a moderate likelihood of occurrence: ▪ Growling Grass Frog (*Litoria raniformis*) (VU) ▪ Australasian Bittern (*Botaurus poiciloptilus*) (EN) ▪ Swift Parrot (*Lathamus discolor*) (CR) ▪ Southern Brown Bandicoot (*Isoodon obesulus obesulus*) (EN). No EPBC Act-listed migratory species are likely to be significantly impacted by the Project works.	
Environment Effects Act 1978 (EE Act)	The following referral criteria is potentially met for two flora species: "*Potential for loss of a significant proportion (for example, 1 percent or greater) of known remaining habitat or population of a threatened species within Victoria*". Both Victorian Flat-pea (*Platylobium reflexum*) and Famine Flat-pea (*Platylobium infecundum*) were recorded in sufficient numbers within the Project Area that removal of plants could trigger the need for referral.	The Threatened Species Assessment for Victorian Flat-pea (DELWP 2021a) estimates the Victorian population of this species to be 1,000-2,000 to 5,000-10,000 mature individuals. Therefore, the removal of as few as 17 of the 706 plants recorded may constitute a >1% loss of the Victorian population of this species. Likewise, the Threatened Species Assessment for Famine Flat-pea (DELWP 2021b) estimates the Victorian population of this species to be 20 to 70 mature individuals. Therefore, the removal of any plants recorded would constitute a >1% loss of the Victorian population of this species. A referral under the EE Act has been submitted based on potential impacts to these species. At the time of writing this report a response to the EE Act referral has been received and is being responded to. **Actions required:** ▪ Undertake threatened flora protection measures (and other mitigation measures) detailed in Section 4.3.
Flora and Fauna Guarantee Act 1988 (FFG Act)	*Flora* Four threatened flora species were recorded within the Project Area and have the potential to be impacted by the Project: ▪ Dandenong Wattle (*Acacia stictophylla)* ▪ Famine Flat-pea (*Platylobium infecundum)* ▪ Powelltown Correa (*Correa reflexa var. lobata*)	**Actions required:** *Flora* Undertake threatened flora protection measures (and other mitigation measures) detailed in Section 4.3. A FFG Act 'Permit to Take' will be required for impacts to species listed as Protected under the Act (see Table 3-2 for indicative quantities of plants to be impacted). *Fauna*

Policy/legislation	Project relevance	Implication and actions required
	▪ Victorian Flat-pea (*Platylobium reflexum*) Seven flora species listed as Protected under the FFG Act were recorded within the Project area (refer Table 3-2). *Fauna* 30 threatened fauna species (refer Table 3-4) have a high likelihood of occurring within the Project Area and 15 threatened fauna species have a moderate likelihood. 22 of these species have a moderate likelihood of being impacted by Project works. *Threatening processes* The following FFG Act listed threatening processes may be relevant to the Project area: ▪ Degradation of native riparian vegetation along Victorian rivers and streams. ▪ Habitat fragmentation as a threatening process for fauna in Victoria. ▪ Increase in sediment input into Victorian rivers and streams due to human activities. ▪ Infection of amphibians with Chytrid Fungus, resulting in chytridiomycosis. ▪ Invasion of native vegetation by Blackberry *Rubus fruticosus L. agg.* ▪ Invasion of native vegetation by 'environmental weeds'. ▪ Loss of hollow-bearing trees from Victorian native forests. ▪ The spread of *Phytophthora cinnamomi* from infected sites into parks and reserves, including roadsides, under the control of a state or local government authority. ▪ Use of Phytophthora-infected gravel in construction of roads, bridges and reservoirs.	Retain hollow bearing trees and trees showing signs of White-bellied Sea-Eagle nesting (note: none of these trees were recorded within the current tree removal footprint). Consider retention of indigenous canopy trees of ≥70 cm Diameter at Breast Height (DBH) located >1 m from the fence (but that are currently allocated for removal within 3 m from the inside of the fence). Consideration should also be given to retaining all indigenous canopy trees that are >1 m from the fence. Flushing of structurally intact area of native vegetation prior to clearing and relocation of fauna as required. These works would be undertaken by someone with appropriate management authorisation (a permit) under the Wildlife Act. Where possible minimise the width of clearing and tree removal in the area marked as 'small terrestrial mammal habitat' in Map Q in Appendix D. This location contains habitat for the threatened Southern Toadlet (*Pseudophryne semimarmorata*) and retention of natural leaf-litter is required to maintain a suitable nesting substrate for the species. *Threatening processes (not already addressed above)* Mitigation measures required to address threatening processes and potential impacts to threatened fauna species are: ▪ Project Implementation of best practice sediment controls and avoidance of impacting riparian vegetation adjoining the tributary of Olinda Creek. ▪ Implementation of biosecurity hygiene controls to address the potential spread of weed species and harmful pathogens (e.g. *Phytophthora cinnamomi* and Chytrid Fungus).

Policy/legislation	Project relevance	Implication and actions required
Planning and Environment Act 1987 (P&E Act) & Guidelines for the removal, destruction or lopping of native vegetation (DELWP 2017)	The Project Area contains extensive areas of native vegetation in the form of patches (Ecological Vegetation Classes) and Large Canopy Trees, and a Scattered Trees. The Project Area contains numerous indigenous and non-indigenous trees, the majority of which require a permit for their removal. The Project Area is variously subject to the following environmental overlays: ▪ Clause 42.01 Environmental Significance Overlay – Schedule 1 ▪ Clause 42.03 Significant Landscape Overlay – Schedule 1. The following exemptions variously apply to the requirement to obtain a permit for vegetation removal within the Project Area: ▪ Clause 52.17-7 (fire protection) ▪ Clause 52.12-2 (fence line)	The Project will require the potential removal of 16.126 ha of native vegetation patches (EVCs). A permit is required for the removal of 6.072 ha of this native vegetation; the remaining 12.726 ha is exempt under the following clauses: ▪ Clause 52.17-7 (fire protection) ▪ Clause 52.12-2 (fence line) A total of 433 trees are proposed to be removed to facilitate the construction of the new fence (Appendix H). A permit is required for the removal of 356 of these trees. **Actions required:** A total of 6.072 ha of native vegetation will require a permit under Clause 52.17 for its removal. This vegetation comprises: ▪ 1.953 ha of EVC 16: Lowland Forest ▪ 0.291 ha of EVC 18: Riparian Forest ▪ 3.828 ha 0f EVC 45: Shrubby Foothill Forest ▪ Seven Large Canopy Trees. Offsets required for the removal of native vegetation detailed above are: ▪ General offset: - 0.2.757 general habitat units with a minimum strategic biodiversity score of 0.465, in the vicinity of Port Phillip and Westernport Catchment Management Authority (CMA) or Yarra Ranges Shire Council - Seven Large Canopy Trees. Melbourne Water is to secure these offsets prior to commencing works. A permit is required for the removal of 356 trees in accordance with the following clauses: ▪ Clause 42.01 Environmental Significance Overlay – Schedule 1 (338 trees) ▪ Clause 42.03 Significant Landscape Overlay – Schedule 1 (328 trees). Further detail provided in Section 5.1.1.
Catchment and Land Protection Act 1994 (CaLP Act)	A total of 12 noxious weed species was recorded within the Project Area: ▪ Angled Onion (*Allium triquetrum*) ▪ Asparagus Fern (*Asparagus scandens*) ▪ Spear Thistle (*Cirsium vulgare*) ▪ Hemlock (*Conium maculatum*)	**Actions required:** A CEMP should be prepared that includes mitigation measures to prevent the spread and establishment of noxious weed species. The CEMP should include best practice hygiene measures that ensure all individuals, equipment, and materials and must be clean, washed down and free of dirt or materials

Policy/legislation	Project relevance	Implication and actions required
	▪ Hawthorn (*Crataegus monogyna*) ▪ Fennel (*Foeniculum vulgare*) ▪ Flax-leaf (*Broom Genista linifolia*) ▪ Tutsan (*Hypericum androsaemum*) ▪ Ox-eye Daisy (*Leucanthemum vulgare*) ▪ Blackberry (*Rubus fruticosus spp. agg.*) ▪ Ragwort (*Senecio jacobaea*) ▪ Gorse (*Ulex europaeus*)	potentially containing weed propagules or pathogens prior to entering and upon leaving the site. Works must be undertaken in a manner that does not result in the spread of CaLP Act listed noxious weeds and other harmful organisms within, to, or from the site. A permit from Agriculture Victoria is required to remove soil/sand/gravel or stone that contains or is likely to contain any part of a noxious weed, or that comes from land on which noxious weeds grow.
Wildlife Act 1975	Fauna species present within the Project Area may require relocation during construction of the fence line.	To facilitate construction of the Project, it may be necessary to relocate wildlife to a suitable habitat outside of the construction footprint (this applies to non-fuel break sections of the Project Area supporting native vegetation, and to trees to be removed that contain hollows). Any persons engaged by the Project to relocate or otherwise handle wildlife will need to hold the appropriate management authorisation (a permit) under the Wildlife Act. This requirement will need to be addressed by the relevant construction contractor and should be included in the Project environmental management plan. A Management Authorisation is required for the purposes of capturing, handling or relocating fauna, and would be obtained at the time of the works.

5.1 Planning and Environment Act 1987

5.1.1 Guidelines for the Removal, Destruction and Lopping of Native Vegetation

Areas of native vegetation that are to be removed or impacted due to the Project require approval and offsetting under the Guidelines for the removal, destruction or lopping of native vegetation (The Guidelines), pursuant to Clause 52.17 of the Yarra Ranges Planning Scheme.

The Guidelines provide a risk-based level of assessment for approval to remove native vegetation. Based on the potential for biodiversity loss, the risk-based level of assessment identifies the level of risk posed by the Project to Victoria's biodiversity and requires an appropriately detailed level of assessment to be conducted to inform determining authorities in making approval decisions.

The application requirements are outlined in the Guidelines. They have been addressed in this report, including the avoid and minimise statement in Section 4.2.

Note: this section deals with native vegetation requiring a permit for removal. For a total quantification of native vegetation impacts please refer to Table 4-1 and

Table 5-1.

5.1.1.1 Extent of vegetation loss

A total of 6.072 ha of native vegetation assessable under the Guidelines will be lost as a result of the proposed works (Appendix D), comprising of:

- 1.953 ha of EVC 16: Lowland Forest
- 0.291 ha of EVC 18: Riparian Forest
- 3.828 ha 0f EVC 45: Shrubby Foothill Forest
- A total of seven Large Canopy Trees will also require removal.

5.1.1.2 Assessment Pathway

For this assessment the relevant details are:

- Location Category: Location 3 - The native vegetation is in an area where the removal of less than 0.5 hectares could have a significant impact on habitat for one or more rare or threatened species;
- Extent: 0.5 ha or greater.

In consideration of the Location Category and Extent details for the Project construction impacts, the Detailed Assessment Pathway is applicable and offset requirements are prepared by DEECA in the form of a Native Vegetation Removal Report (provided in Appendix E and summarised below in Table 5-2).

5.1.1.3 Offset requirements

Based on the native vegetation mapped within the current construction footprint an offset inclusive of general offsets, species offsets and large tree offsets is required to offset the proposed loss of native vegetation in accordance with the Guidelines. The offset must be in place prior to the removal of any native vegetation.

The required offsets have been determined by DEECA through the Native Vegetation Removal (NVR) report. The NVR report for this assessment is included in Appendix E and summarised below in Table 5-2.

Table 5-2. Native vegetation removal and offsets summary

Summary of native vegetation removal		
Extent of proposed vegetation removal		6.072 ha
Extent of past removal		0.000 ha
Number of Large Trees to be removed		7
Location Category		Location 3
Offset requirements		
General offset	General offset amount	0.2.757 general habitat units
	Vicinity	Port Phillip and Westernport Catchment Management Authority (CMA) or Yarra Ranges Shire Council
	Minimum strategic biodiversity value score	0.465
	Large trees	7 large trees

5.1.1.4 Obtaining Native Vegetation Offsets

Melbourne Water will engage an Offset Broker in order to obtain the required offsets for the Project. Offsets obtained will meet the required standards as listed in the NVR report (Appendix E).

5.1.2 Tree removal

A total of 433 trees are proposed to be removed to facilitate the construction of the new fence (Appendix F). A permit is required for the removal of 356 of these trees in accordance with:

- Clause 42.01 Environmental Significance Overlay – Schedule 1 (338 trees)
- Clause 42.03 Significant Landscape Overlay – Schedule 1 (328 trees).

A list of all trees requiring removal is provided in Appendix F and a summary of the origin of trees to be removed is provided below in Table 5-3.

Table 5-3. Origin of trees identified for removal.

Tree origin	No. trees to be removed
Indigenous	356 (incl. 114 Large Canopy Trees)
Exotic	60
Aus. native	14
Vic. native	3

6. Conclusion and Recommendations

A summary of flora and fauna values recorded within the Project Area is provided below, as are the recommended next steps to ensure that compliance with environmental policy and legislation is achieved. While this report provides a quantification of impacts to ecology values resulting from the proposed Project works, it is strongly recommended that the Project continues to prioritise the minimisation of impacts to native vegetation and fauna habitat as the Project continues.

Summary of ecological values recorded within the Project Area:

- The majority of the Project Area supports native vegetation patches of three Ecological Vegetation Classes. Most of this native vegetation is located within established fuel-breaks and is subject to regular slashing/mowing.
- Patches of native vegetation contain 566 Large Canopy Trees; one Scattered Tree (large size-class) was also recorded.
- Four flora species listed as threatened under the FFG Act were recorded within the Project Area:
  - Dandenong Wattle (*Acacia stictophylla*) – four plants
  - Famine Flat-pea (*Platylobium infecundum*) – approximately 19 plants
  - Powelltown Correa (*Correa reflexa* var. *lobata*) – 22 plants
  - Victorian Flat-pea (*Platylobium reflexum*) – approximately 706 plants.
- Seven flora species listed as Protected flora under the FFG Act and relevant to the Project were recorded within the Project Area.
- Additional ecological values considered to have a moderate or high likelihood of occurrence within the Project Area:
  - 16 EPBC Act-listed threatened fauna species
  - 45 FFG Act-listed threatened fauna species

Recommended next steps:

Further ecological work

- It is recommended that Melbourne Water has a fauna management plan prepared for fenced catchments (or other assets containing fauna habitat). This plan will be necessary to manage larger fauna (e.g. macropods, wombats and koalas) for which high-security fencing may act as a barrier to movement. Lack of management may result in significant ecological damage (e.g. over-browsing of vegetation) and animal welfare issues. The findings of this management plan should be used to inform the requirement, type and placement of fauna 'gates' within the new Silvan fence.

Mitigation measures

- Mitigation measures detailed in Section 4.3 of this report should be adopted by the Project to ensure the protection of ecology values throughout the life of the Project. Failure to adequately implement these measures may result in non-compliance with the policy and legislation detailed in Section 5. It is recommended that a Construction Environmental Management Plan is developed that addresses these mitigation measures.

Permits

- A planning permit will be required under Clause 52.17 Native Vegetation of the Yarra Ranges Planning Scheme for the removal of 6.072 ha of native vegetation and seven Large Canopy Trees. If a permit is granted, Melbourne Water must secure the following offsets prior to commencing works:

  - General offset: 2.757 general habitat units with a minimum strategic biodiversity score of 0.465, in the vicinity of Port Phillip and Westernport Catchment Management Authority (CMA) or Yarra Ranges Shire Council, and protection of seven Large Canopy Trees.

- A planning permit will also be required for the removal of 356 trees in accordance with the following clauses of the Yarra Ranges Planning Scheme: Clause 42.01 Environmental Significance Overlay – Schedule 1 (338 trees) and Clause 42.03 Significant Landscape Overlay – Schedule 1 (328 trees).
- A FFG Act 'Permit to Take' will be required for impacts to species listed as Protected under the FFG Act as detailed in Section 3.1.3 of this report.

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Appendix A. Summary of environmental legislation and policy relevant to this report

Legislation/policy	Description	Assessment process
Commonwealth		
***Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)**	The EPBC Act provides for the listing of nationally threatened species, threatened ecological communities and key threatening processes; and provides the legal framework to protect and manage nine matters of national environmental significance (MNES): world heritage properties; national heritage places; wetlands of international importance (Ramsar); listed threatened species and communities; listed migratory species; Commonwealth marine areas; the Great Barrier Reef Marine Park; nuclear actions; and water resources, in relation to coal seam gas and large coal mining development. Any Project, not covered by an approved strategic assessment, that is likely to have a significant impact on MNES, is required to be referred to the Commonwealth Minister of Climate Change, Energy, the Environment and Water (DCCEEW) for a decision on whether the Project is a 'controlled action' requiring assessment and approval under the EPBC Act.	Determine whether any MNES are likely to be 'significantly' impacted by the proposed works. Recommend further assessment where required, such as targeted surveys. Where MNES may be impacted, recommend mitigation measures to avoid and reduce impact. If a significant impact cannot be avoided, the Project will need to be referred to DCCEEW.
State		
***Environment Effects Act 1978* (EE Act)**	The EE Act provides for the assessment of actions that are capable of having a significant effect on the environment. A Project is required to be referred to the Victorian Minister for Planning for a decision on whether an Environment Effects Statement (EES) is required, if the Project triggers one individual or at least two combination referral criteria specified in the Ministerial guidelines for assessment of environmental effects under the *Environment Effects Act 1978* (DSE 2023). Biodiversity referral criteria include potential clearing of 10 ha or more of native vegetation (particularly endangered EVCs), potentially significant impacts on species or ecological communities threatened in Victoria, and potentially significant impacts on the ecological character of internationally or nationally important wetlands. The EE Act also allows an applicant to write to the Secretary to the Department of Transport and Planning (DTP) to confirm no EES is required. The assessment process under this Act is not an approval process itself, rather it enables statutory decision-makers to make decisions about whether a Project with potentially significant environmental effects should proceed. If an EES is required, statutory approval decisions (e.g. planning permit, FFG Act permit) are put on hold until the EES process is complete.	Determine whether the extent of removal of native vegetation and habitat for threatened taxa of state significance will trigger the need for a referral based on relevant biodiversity referral criteria in the Ministerial Guidelines. Recommend further assessment where required, such as targeted surveys. If a trigger for referral under the EE Act is met, recommend mitigation measures to avoid and reduce impact. If impact cannot be avoided or reduced below the referral thresholds, an EE Act referral will need to be submitted.
***Flora and Fauna Guarantee Act 1988* (FFG Act)**	The FFG Act provides a framework for biodiversity conservation in Victoria, including providing for the listing of threatened species and communities of flora and fauna, as well as threatening processes. A number of non-threatened	Determine if any FFG Act listed taxa or communities are likely to be affected or threatening processes occur by the proposed works.

	flora species are also listed as protected under the FFG Act. A permit to take is required to remove protected flora, including listed threatened and non-threatened flora, from public land. The FFG Act specifies two categories of protected flora: 'restricted use protected flora' and 'generally protected flora'. Restricted use protected flora are exclusively threatened by take for commercial/personal use, and the taking of these species incidental to clearing for development works, will not require a permit to take. Generally protected flora are threatened by take for reasons other than or additional to commercial/personal use (e.g. development clearing) and will require a permit to take for any purpose. Under the FFG Act, public authorities have a duty of care to consider potential biodiversity impacts when exercising their functions, including giving proper attention to the objectives of the FFG Act.	Recommend further assessment where required, such as targeted surveys. Where listed taxa and communities are identified or threatening processes likely, recommend mitigation measures to avoid and reduce impact. If protected flora are to be removed from public land, a permit to take will need to be obtained.
***Planning and Environment Act 1987* (P&E Act)**	The P&E Act regulates the use and development (including works involving vegetation removal) of land in Victoria, and provides the framework and procedures for preparing and amending planning schemes, obtaining planning permits and enforcing compliance with planning schemes. The Yarra Ranges Planning Scheme, through the Victoria Planning Provisions, identifies where a planning permit is required for the removal of vegetation: ▪ Planning approval is required to remove, destroy, or lop native vegetation pursuant to Clause 52.17 Native Vegetation; unless specific exemptions apply. ▪ Planning approval is required to remove, destroy, or lop any vegetation (whether native or exotic) pursuant to Clause 42.01 Environmental Significance Overlay, Clause 42.03 Significant Landscape Overlay and Clause 51.03 Upper Yarra Valley And Dandenong Ranges Regional Strategy Plan, unless specific exemptions apply.	Identify where native vegetation is present and may be impacted. Where native vegetation is present, recommend mitigation measures to avoid and minimise the impact (removal, destruction, or lopping) to native vegetation. If native vegetation impacts cannot be avoided, approval will be required under Clause 52.17 from the responsible authority and the appropriate offset requirements identified and obtained prior to works commencing. Native vegetation offsets will need to be calculated in accordance with the *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP 2017) once the extent of impacts is confirmed. Identify vegetation that may require a permit to remove under other relevant planning scheme overlays and provisions and address approval application requirements.
Guidelines for the removal, destruction or lopping of native vegetation (the Guidelines) (DELWP 2017)	The planning permit assessment process and offset requirements for impacts to native vegetation associated with Clause 52.17 of the planning scheme are undertaken in accordance with the *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP 2017). The Guidelines guide how impacts on biodiversity should be considered, including whether a permit should be granted when assessing a planning permit application. The primary objective of the Guidelines is to achieve no net loss of native vegetation, through a three-step approach of avoid and minimise impacts, and offset unavoidable losses through the protection and ongoing management of an area proportional to their importance in Victoria's biodiversity. Depending on the location and scale of native vegetation removal, the planning permit application may require statutory referral to DEECA.	
***Catchment and Land Protection Act 1994* (CaLP Act)**	The CaLP Act defines requirements to: ▪ Avoid land degradation ▪ Conserve soil ▪ Protect water resources	Determine whether any pest plant or animal species are present within the Project area. Recommend mitigation measures to control pest plant and animal species and

	▪ Eradicate and prevent the spread and establishment of noxious weed and pest animal species. The CaLP Act defines four categories of noxious weeds: State Prohibited Weeds, Regionally Prohibited Weeds, Regionally Controlled Weeds and Restricted Weeds. Noxious weed species and the category they are placed in is specific to individual CMA regions.	to prevent an increase in the population of the species as a result of proposed works.
***Wildlife Act 1975* (Wildlife Act)**	The Wildlife Act establishes procedures to protect and conserve Victoria's wildlife. It is an offence under the Wildlife Act to kill, take, control or harm wildlife or to damage, disturb or destroy wildlife habitat unless authorised to do so under the Act or associated Wildlife Regulations 2013. Approval to damage, disturb or destroy wildlife habitat is not required under this Act where authorised under another Act (e.g. permit to remove native vegetation under the P&E Act). Section 28A of the Act empowers the Secretary of DELWP (or delegate) to provide an individual written authorisation to take wildlife for a range of purposes, including for protection and enabling the care of sick, injured or orphaned wildlife. Such authorisation generally comes with strict terms and conditions which the individual must comply with.	To facilitate construction of the Project, it may be necessary to relocate wildlife to a suitable habitat outside of the construction area. Any persons engaged by the Project to relocate or otherwise handle wildlife will need to hold the appropriate authorisation under the Wildlife Act. This requirement will need to be addressed by the relevant construction contractor and should be included in the Project environmental management plan.

Appendix B. Vascular plant species recorded within the Project Area, December 2023

Key:

#	Victorian indigenous plant species that is not indigenous within the Project Area (i.e. it's occurrence is outside its natural range).
*	Plant taxa which are not indigenous to Victoria.
cr	Species is listed as critically endangered under the FFG Act.
en	Species is listed as endangered under the FFG Act.

Status	Scientific name	Common name
	Acacia dealbata subsp. dealbata	Silver Wattle
#	*Acacia longifolia subsp. longifolia*	Sallow Wattle
	Acacia melanoxylon	Blackwood
	Acacia mucronata subsp. longifolia	Narrow-leaf Wattle
	Acacia myrtifolia	Myrtle Wattle
	Acacia paradoxa	Hedge Wattle
	Acacia pycnantha	Golden Wattle
	Acacia stricta	Hop Wattle
	Acacia verticillata	Prickly Moses
	Acaena novae-zelandiae	Bidgee-widgee
*	*Acer pseudoplatanus*	Sycamore Maple
*	*Acetosella vulgaris*	Sheep Sorrel
	Acrotriche prostrata	Trailing Ground-berry
	Acrotriche serrulata	Honey-pots
	Adiantum aethiopicum	Common Maidenhair
*	*Agrostis capillaris var. capillaris*	Brown-top Bent
*	*Aira caryophyllea subsp. caryophyllea*	Silvery Hair-grass
	Alisma plantago-aquatica	Water Plantain
*	*Allium triquetrum*	Angled Onion
	Amperea xiphoclada var. xiphoclada	Broom Spurge
	Amyema pendula	Drooping Mistletoe
	Amyema quandang var. quandang	Grey Mistletoe
*	*Anthoxanthum odoratum*	Sweet Vernal-grass
*	*Arctotheca calendula*	Cape Weed
*	*Asparagus scandens*	Asparagus Fern
	Asperula conferta	Common Woodruff
	Austrostipa spp.	Spear Grass
	Banksia marginata	Silver Banksia
	Banksia spinulosa var. cunninghamii	Hairpin Banksia
	Bedfordia arborescens	Blanket Leaf
*	*Bellis perennis*	English Daisy
	Billardiera macrantha	Purple Apple-berry
	Billardiera mutabilis	Common Apple-berry
	Blechnum cartilagineum	Gristle Fern
	Blechnum minus	Soft Water-fern

Status	Scientific name	Common name
	Blechnum nudum	Fishbone Water-fern
	Bossiaea prostrata	Creeping Bossiaea
	Brachyscome spp.	Daisy
*	*Briza maxima*	Large Quaking-grass
*	*Bromus hordeaceus*	Soft Brome
	Brunonia australis	Blue Pincushion
	Burchardia umbellata	Milkmaids
	Bursaria spinosa subsp. spinosa	Sweet Bursaria
	Caesia parviflora	Pale Grass-lily
*	*Callitriche stagnalis*	Common Water-starwort
	Calochlaena dubia	Common Ground-fern
	Carex appressa	Tall Sedge
	Carex fascicularis	Tassel Sedge
	Cassinia aculeata subsp. aculeata	Common Cassinia
	Cassinia longifolia	Shiny Cassinia
*	*Cenchrus clandestinus*	Kikuyu
*	*Centaurium erythraea*	Common Centaury
*	*Centaurium tenuiflorum*	Slender Centaury
*	*Chamaecytisus palmensis*	Tree Lucerne
	Chamaescilla corymbosa var. corymbosa	Blue Stars
	Chiloglottis sp.	Bird Orchid
*	*Cirsium vulgare*	Spear Thistle
	Clematis aristata	Mountain Clematis
	Comesperma volubile	Love Creeper
*	*Conium maculatum*	Hemlock
	Coprosma hirtella	Rough Coprosma
	Coprosma quadrifida	Prickly Currant-bush
*	*Coprosma repens*	Mirror Bush
*	*Cordyline australis*	New Zealand Cabbage-tree
en	*Correa reflexa var. lobata*	Powelltown Correa
*	*Cotoneaster spp.*	Cotoneaster
*	*Cotula coronopifolia*	Water Buttons
	Crassula helmsii	Swamp Crassula
*	*Crataegus monogyna*	Hawthorn
*	*Crepis capillaris*	Smooth Hawksbeard
*	*Crocosmia X crocosmiiflora*	Montbretia
	Cyathea australis	Rough Tree-fern
*	*Cynodon dactylon var. dactylon*	Couch
*	*Cyperus eragrostis*	Drain Flat-sedge
*	*Dactylis glomerata*	Cocksfoot
	Daviesia leptophylla	Narrow-leaf Bitter-pea
	Daviesia ulicifolia	Gorse Bitter-pea
	Desmodium gunnii	Southern Tick-trefoil

Status	Scientific name	Common name
	Deyeuxia spp.	Bent Grass
	Dianella revoluta s.l.	Black-anther Flax-lily
	Dianella tasmanica	Tasman Flax-lily
	Dichelachne rara	Common Plume-grass
	Dichondra repens	Kidney-weed
	Dipodium roseum s.s.	Rosy Hyacinth-orchid
	Disa bracteata	South African Orchid
	Echinopogon ovatus	Common Hedgehog-grass
*	*Ehrharta erecta*	Panic Veldt-grass
	Eleocharis sphacelata	Tall Spike-sedge
	Empodisma minus	Spreading Rope-rush
	Epacris impressa	Common Heath
	Epilobium billardiereanum	Variable Willow-herb
*	*Epilobium ciliatum*	Glandular Willow-herb
	Epilobium pallidiflorum	Showy Willow-herb
*	*Erica lusitanica*	Spanish Heath
*	*Erigeron bonariensis*	Flaxleaf Fleabane
*	*Erigeron karvinskianus*	Seaside Daisy
	Eucalyptus baxteri s.s.	Brown Stringybark
	Eucalyptus cephalocarpa s.s.	Mealy Stringybark
	Eucalyptus cypellocarpa	Mountain Grey-gum
	Eucalyptus obliqua	Messmate Stringybark
	Eucalyptus radiata subsp. radiata	Narrow-leaf Peppermint
	Eucalyptus viminalis subsp. viminalis	Manna Gum
	Euchiton involucratus s.s.	Star Cudweed
	Euchiton japonicus s.s.	Creeping Cudweed
	Exocarpos cupressiformis	Cherry Ballart
*	*Foeniculum vulgare*	Fennel
*	*Fraxinus angustifolia subsp. angustifolia*	Desert Ash
	Gahnia radula	Thatch Saw-sedge
	Gahnia sieberiana	Red-fruit Saw-sedge
	Gastrodia procera	Tall Potato-orchid
*	*Genista linifolia*	Flax-leaf Broom
	Geranium spp.	Crane's Bill
*	*Gladiolus undulatus*	Wild Gladiolus
	Gleichenia microphylla	Scrambling Coral-fern
	Glyceria australis	Australian Sweet-grass
	Glycine clandestina	Twining Glycine
	Gonocarpus tetragynus	Common Raspwort
	Goodenia lanata	Trailing Goodenia
	Goodenia ovata	Hop Goodenia
	Goodia lotifolia s.s.	Common Golden-tip
	Hackelia latifolia	Forest Hound's-tongue

Status	Scientific name	Common name
	Hakea decurrens subsp. physocarpa	Bushy Needlewood
	Hardenbergia violacea	Purple Coral-pea
*	*Hedera hibernica*	Atlantic Ivy
*	*Helminthotheca echioides*	Ox-tongue
	Histiopteris incisa	Bat's Wing Fern
*	*Holcus lanatus*	Yorkshire Fog
	Hovea heterophylla	Common Hovea
	Hydrocotyle hirta	Hairy Pennywort
	Hydrocotyle spp.	Pennywort
*	*Hypericum androsaemum*	Tutsan
	Hypericum gramineum	Small St John's Wort
	Hypericum japonicum	Matted St John's Wort
*	*Hypochaeris radicata*	Flatweed
*	*Ilex aquifolium*	English Holly
	Juncus pallidus	Pale Rush
	Juncus spp.	Rush
	Kunzea leptospermoides	Yarra Burgan
	Lachnagrostis filiformis s.s.	Common Blown-grass
	Lagenophora stipitata s.l.	Common Bottle-daisy
	Lagenophora sublyrata	Slender Bottle-daisy
	Laphangium luteoalbum	Jersey Cudweed
*	*Leontodon saxatilis subsp. saxatilis*	Hairy Hawkbit
	Lepidosperma elatius	Tall Sword-sedge
	Lepidosperma laterale	Variable Sword-sedge
	Leptospermum continentale	Prickly Tea-tree
*	*Leucanthemum vulgare*	Ox-eye Daisy
*	*Ligustrum lucidum*	Large-leaf Privet
	Lindsaea linearis	Screw Fern
	Lobelia anceps	Angled Lobelia
	Lobelia gibbosa sensu Albrecht (1999)	Tall Lobelia
	Lomandra filiformis	Wattle Mat-rush
	Lomandra longifolia subsp. exilis	Cluster-headed Mat-rush
	Lomandra longifolia subsp. longifolia	Spiny-headed Mat-rush
	Lomatia ilicifolia	Holly Lomatia
*	*Lonicera japonica*	Japanese Honeysuckle
*	*Lotus corniculatus*	Bird's-foot Trefoil
*	*Lotus spp. (naturalised)*	Trefoil
	Luzula meridionalis	Common Woodrush
	Lycopus australis	Australian Gipsywort
*	*Lysimachia arvensis*	Pimpernel
	Lythrum hyssopifolia	Small Loosestrife
*	*Malus pumila*	Apple
*	*Medicago spp.*	Medic

Status	Scientific name	Common name
	Melaleuca ericifolia	Swamp Paperbark
	Melaleuca squarrosa	Scented Paperbark
	Microlaena stipoides var. stipoides	Weeping Grass
	Olearia argophylla	Musk Daisy-bush
	Olearia erubescens	Moth Daisy-bush
	Olearia lirata	Snowy Daisy-bush
	Opercularia varia	Variable Stinkweed
	Oxalis corniculata s.l.	Yellow Wood-sorrel
	Oxalis exilis	Shade Wood-sorrel
	Pandorea pandorea	Wonga Vine
*	*Paspalum dilatatum*	Paspalum
	Persicaria decipiens	Slender Knotweed
*	*Phalaris aquatica*	Toowoomba Canary-grass
	Phragmites australis	Common Reed
	Pimelea axiflora subsp. axiflora	Bootlace Bush
	Pimelea flava subsp. flava	Yellow Rice-flower
	Pittosporum bicolor	Banyalla
*	*Pittosporum eugenioides*	Tarata
#	*Pittosporum undulatum*	Sweet Pittosporum
*	*Plantago lanceolata*	Ribwort
	Plantago varia	Variable Plantain
cr	*Platylobium infecundum*	Famine Flat-pea
en	*Platylobium reflexum*	Victorian Flat-pea
	Poa ensiformis	Sword Tussock-grass
	Poa morrisii	Soft Tussock-grass
	Poa sieberiana	Grey Tussock-grass
	Poa tenera	Slender Tussock-grass
*	*Polygala vulgaris*	Common Milkwort
	Polyscias sambucifolia subsp. 3	Mountain Panax
	Polystichum proliferum	Mother Shield-fern
	Pomaderris aspera	Hazel Pomaderris
	Poranthera microphylla s.s.	Small Poranthera
	Prostanthera lasianthos var. lasianthos	Victorian Christmas-bush
*	*Prunella vulgaris*	Self-heal
*	*Prunus cerasifera*	Cherry Plum
	Pteridium esculentum subsp. esculentum	Austral Bracken
	Pultenaea forsythiana	Prickly Bush-pea
	Pultenaea gunnii subsp. gunnii	Golden Bush-pea
	Pultenaea scabra	Rough Bush-pea
	Ranunculus lappaceus	Australian Buttercup
*	*Ranunculus repens*	Creeping Buttercup
*	*Rubus fruticosus spp. agg.*	Blackberry
	Rytidosperma pallidum	Silvertop Wallaby-grass

Status	Scientific name	Common name
	Rytidosperma racemosum var. racemosum	Slender Wallaby-grass
	Rytidosperma spp.	Wallaby Grass
	Schoenus apogon	Common Bog-sedge
	Schoenus maschalinus	Leafy Bog-sedge
	Senecio glomeratus subsp. glomeratus	Annual Fireweed
	Senecio hispidulus s.s.	Rough Fireweed
*	*Senecio jacobaea*	Ragwort
	Senecio linearifolius	Fireweed Groundsel
	Senecio minimus	Shrubby Fireweed
	Senecio phelleus	Stony Fireweed
	Senecio quadridentatus	Cotton Fireweed
*	*Sisyrinchium micranthum*	Striped Rush-leaf
*	*Solanum mauritianum*	Wild Tobacco Tree
*	*Sonchus oleraceus*	Common Sow-thistle
*	*Sporobolus africanus*	Rat-tail Grass
	Spyridium parvifolium	Dusty Miller
	Stackhousia monogyna s.l.	Creamy Stackhousia
	Stellaria flaccida	Forest Starwort
	Stellaria pungens	Prickly Starwort
	Stylidium armeria	Common Triggerplant
	Stylidium graminifolium s.s.	Grass Triggerplant
*	*Symphyotrichum subulatum*	Aster-weed
	Tetrarrhena juncea	Forest Wire-grass
	Themeda triandra	Kangaroo Grass
	Thysanotus tuberosus	Common Fringe-lily
*	*Tragopogon porrifolius subsp. porrifolius*	Salsify
*	*Trifolium spp.*	Clover
*	*Ulex europaeus*	Gorse
	Urtica incisa	Scrub Nettle
*	*Verbena bonariensis s.l.*	Purple-top Verbena
	Veronica calycina	Hairy Speedwell
*	*Vicia sativa*	Common Vetch
	Viola hederacea sensu Entwisle (1996)	Ivy-leaf Violet
*	*Viola odorata*	Common Violet
*	*Vulpia spp.*	Fescue
	Wahlenbergia spp.	Bluebell
*	*Watsonia meriana var. bulbillifera*	Bulbil Watsonia
	Xanthorrhoea minor subsp. lutea	Small Grass-tree

Appendix C. Likelihood of occurrence of threatened flora and fauna

Key:

EPBC Act	
CR	Critically Endangered
EN	Endangered
VU	Vulnerable
FFG Act	
cr	Critically Endangered
en	Endangered
vu	Vulnerable

C.1 Threatened flora

EPBC	FFG	Origin	Scientific name	Common Name	Habitat/distribution	PMST	Last rec.	No. recs	Likelihood occurrence
	en		*Abrodictyum caudatum*	Jungle Bristle-fern	A rare fern of rainforests in far East Gippsland, the Beenak area and Wilsons Promontory. It grows on the trunks of tree-ferns, particularly Cyathea australis (RBGV 2020).		3/03/2015	2	Low
	vu	#	*Acacia howittii*	Sticky Wattle	Confined to eastern Victoria from the upper Macalister River area near Mt Howitt south to near Yarram and east to near Tabberabbera. Grows in moist forest. Widely cultivated and naturalising in some areas (e.g. Daylesford, Greater Melbourne, Dandenong Ranges etc.) (RBGV 2018).		30/06/2020	7	NA
	en		*Acacia stictophylla*	Dandenong Wattle	Restricted to the Dandenong Ranges where it is often locally common in the riparian zone on hillsides in tall forest and open woodland (RBGV 2019).		2/02/2023	133	Moderate
VU			*Amphibromus fluitans*	River Swamp Wallaby-grass	Largely confined to permanent swamps, principally along the Murray River between Wodonga and Echuca, uncommon to rare in the south (e.g. Casterton, Moe, Yarram), probably due to historic drainage of wetlands (RBGV 2016). Largely restricted in greater Melbourne to seasonal wetlands and mudflats of River Red Gum swamps of the Lower Yarra and Plenty/Merri volcanic plains north of Melbourne (Cam Beardsell pers. comm.).	Y			Low
VU	en		*Astelia australiana*	Tall Astelia	Rare, confined to a few gully-heads and stream margins in the Powelltown-Beenak district, and a similar site near Lavers Hill in the Otways. Plants form large colonies on humus-rich, waterlogged soils in Nothofagus and Eucalyptus regnans forests (Walsh and Entwisle 1994).	Y	27/12/1939	1	Low
CR	cr		*Asterolasia asteriscophora subsp. albiflora*	White Star-bush	Damp and valley sclerophyll forests (Gray and Knight 2001).	Y	28/06/2022	151	Low-Moderate
	en		*Austrostipa rudis subsp. australis*	Veined Spear-grass	Uncommon, mostly in cool areas of southern Victoria. Usually at moderate altitude, in open-forest on sandy or sandstone-derived soils (RBGV 2020).		1/02/2017	2	Low
	en		*Beyeria lanceolata*	Pinkwood	Apart from an isolated occurrence in the Dandenong Ranges, confined in Victoria to East Gippsland where usually found in gullies, often in rocky situations (RBGV 2018).		9/11/2017	8	Low
	en		*Billardiera scandens s.s.*	Velvet Apple-berry	Apparently uncommon in Victoria, occurring chiefly in dry open-forests and woodlands in the north-east (Beechworth, Whitfield etc.), with isolated occurrences near Mt Macedon, Eltham-Hurstbridge area, Eildon and Orbost (RBGV 2019). Database records of this taxon apparently confounded due to difficulty separating from B. mutabilis.		24/11/2009	11	Low-Moderate
	en		*Bossiaea cordigera*	Wiry Bossiaea	Occurs sporadically in south-western and central Victoria, apparently nowhere common. Favours moist situations in heathland, heathy woodland and open-forest (RBGV 2018).		8/08/2011	5	Low
	cr		*Botrychium australe*	Austral Moonwort	Rare, in lowland forest to subalpine grassland in eastern Victoria, formerly known from near Melbourne (Walsh and Entwisle 1994).		20/05/1909	2	Low
	en		*Burnettia cuneata*	Lizard Orchid	Occurs in dense, wet heathy vegetation in near-coastal areas from near Portland in the west to Mallacoota area in the east with a disjunct inland occurrence in the Grampians. Formerly more widespread but now rare due to destruction of habitat. Seldom or never flowering except in the season following Summer fires (RBGV 2014).		1/12/1905	3	Low
	cr		*Caladenia flavovirens*	Christmas Spider-orchid	Dry and valley sclerophyll forests with grassy understorey (Gray and Knight 2001).		19/11/2000	7	Low
	cr		*Caladenia oenochila*	Wine-lipped Spider-orchid	Endemic to Victoria where mostly known from the foothills immediately east of Melbourne, but sporadically distributed from Yarram through to Ararat. Relatively common in moist, often grassy forest or woodland, often in shaded habitats (RBGV 2018).		8/10/2021	39	Low-Moderate
CR	cr		*Caladenia sp. aff. venusta (Kilsyth South)*	Kilsyth South Spider-orchid	It grows in montane forest with a grassy understorey on a gentle slope (Walsh and Entwisle 1994).	Y	9/10/2004	3	Low
	vu		*Caladenia vulgaris*	Slender Pink-fingers	Confirmed from Portland area, Anglesea, Upper Beaconsfield and near the Genoa River, but probably more widespread. Flowers after late Spring (Walsh and Entwisle 1994).		19/12/1998	2	Low-Moderate
	en		*Carex alsophila*	Forest Sedge	Occurs in mountain gullies and swamps (Walsh and Entwisle 1994).		5/01/2010	6	Low-Moderate
	vu		*Chiloglottis jeanesii*	Mountain Bird-orchid	Growing in damp shaded areas in moist foothill and montane forest, particularly with Myrtle Beech present (Jeanes and Backhouse 2006).		23/10/2018	27	Low
	en		*Correa reflexa var. lobata*	Powelltown Correa	Locally common on moist, often heathy open-forest from the Dandenong Ranges to near Powelltown, with an isolated occurrence at Cranbourne (Walsh and Entwisle 1999).		14/02/2022	16	Present
	en		*Corybas aconitiflorus*	Spurred Helmet-orchid	Colonies grow in sheltered positions, often on damp sand under ferns or shrubs (Walsh and Entwisle 1994).		6/06/2020	5	Low-Moderate

EPBC	FFG	Origin	Scientific name	Common Name	Habitat/distribution	PMST	Last rec.	No. recs	Likelihood occurrence
	en		*Corybas grumulus*	Mountain Helmet-orchid	Found in mountain forests of eastern Victoria, often in fern gullies and wet sclerophyll forests growing in rich mountain loam or on rotting logs or treefern trunks (RBGV 2020).		26/08/2017	5	Low-Moderate
	vu	#	*Corymbia maculata*	Spotted Gum	Grows naturally only in far east Gippsland within Victoria - Commonly planted street tree. Flowers Jul–Sep (RBGV 2018).		6/02/2020	15	NA
	cr		*Cyathea cunninghamii*	Slender Tree-fern	Wet sclerophyll forests (Gray and Knight 2001).		1/07/2013	42	Low
EN	cr		*Dianella amoena*	Matted Flax-lily	Largely confined to drier grassy woodland and grassland communities south of the Dividing Range and now much depleted through its range (RBGV 2017).	Y			Low
	en		*Distichophyllum crispulum*	Crisped Mitre-moss	In moist sites in wet-sclerophyll forests and rainforests east of Melbourne and south of the Great Dividing Range (RBGV 2021).		8/08/1984	1	Low
	en		*Diuris behrii*	Golden Cowslips	Locally common in grassland and open woodland mostly in western Victoria; Flowers Sep.–Nov. (RBGV 2018).		1/10/1901	1	Low
	en		*Diuris punctata var. punctata*	Purple Diuris	Formerly widespread and common in Victoria, occurring in the open forests, woodlands and grasslands of the fertile lowlands, now much reduced through clearing for agriculture and restricted to relatively few, isolated sites, but sometimes locally abundant (RBGV 2018)..		1/11/1924	1	Low
EN	en	#	*Eucalyptus crenulata*	Buxton Gum	Swampy sites in foothills just north and south of great dividing range, near Buxton, Narbethong and Yarra Glen (Walsh and Entwisle 1994).	Y	1/08/2011	1	NA
	en		*Eucalyptus fulgens*	Green Scentbark	Occurs east from Healesville and Woori Yallock to the Latrobe Valley near Driffield (Walsh and Entwisle 1996). Open forest often with moist conditions (Bull 2014).		19/02/2020	81	Low
	en	#	*Eucalyptus globulus subsp. globulus*	Southern Blue-gum	Occur in Victoria only in the area south of the Strzelecki Range, e.g. Port Franklin, Wilsons Promontory, and that other populations in south Gippsland and the Otway Ranges probably represent intergrades between subsp. globulus and subsp. pseudoglobulus (RBGV 2016).		23/11/2017	1	NA
EN		*	*Eucalyptus macarthurii*	Camden Woollybutt	Native to the central and southern tablelands of NSW. In Victoria naturalised near Emerald and Gisborne (RBGV 2018).		11/12/2005	15	NA
VU	cr		*Eucalyptus strzeleckii*	Strzelecki Gum	Favours ridges, slopes and streambanks, and deep fertile soils. Flowers Spring (Walsh and Entwisle 1996).	Y			Low
	cr		*Eucalyptus yarraensis*	Yarra Gum	Extending west from Glengarry (near Traralgon) to Melbourne and north-west to Daylesford and Ararat. Collections of small-budded and -fruited swamp gums from east of Cavendish may be this taxon. Very small-fruited forms of the species occur in remnant stands in outer southeastern to northeastern Melbourne suburbs (e.g. Scoresby, Wantirna, Yan Yean).		15/03/2022	17	Low
EN	en		*Euphrasia collina subsp. muelleri*	Purple Eyebright	Historically, the Purple Eyebright was widespread in south-eastern Australia extending from south-central South Australia (SA) through Victoria to northern New South Wales (NSW). It is now known only from Victoria including the Mornington Peninsula, Jamieson, Little River, Benambra, Deep Lead and Maryborough, although some of these populations may have become extinct in recent years. It grows in heathland and heathy woodland on sand and in open forest. Associated communities include: Xanthorrhoea australis dominated sandy heath on the Mornington Peninsula; Eucalyptus cephalocarpa–Eucalyptus obliqua open forest at Merricks North; Eucalyptus pauciflora grassy woodland near Benambra; Eucalyptus radiata–Eucalyptus rubida grassy open forest near Jamieson; and Eucalyptus macrorhyncha heathy woodland at Deep Lead. It is now potentially extinct on the Peninsula as has not emerged at known sites since 2012 (Gidja Walker pers. comm.)		1/09/1905	2	Low
	en		*Gentianella polysperes*	Early Forest-gentian	Scattered through the State, usually in hilly country, e.g. Dandenong Ranges and foothills, Mt Sugarloaf, Mt Macedon (but apparently now rare at these localities), ascending to subalpine areas (e.g. Snowy Range, Mt Benambra, Mt Delusion) in the eastern ranges (RBGV 2020).		16/11/1906	4	Low
VU	vu		*Glycine latrobeana*	Clover Glycine	Widespread but of sporadic occurrence and rarely encountered. Grows mainly in grasslands and grassy woodlands (Walsh and Entwisle 1996).	Y	1/10/1980	1	Low
	en	#	*Grevillea parvula*	Genoa Grevillea	Often grows in riparian sites, but also in woodland and open forest (RBGV 2020).		9/05/2000	1	NA
	en		*Isolepis wakefieldiana*	Tufted Club-sedge	Scattered in cooler parts of the state (e.g. Halls Gap, Cape Otway, Healesville, Gelantipy, Marlo, Cann River, and Genoa areas) (Walsh and Entwisle 1994).		30/01/1907	1	Low
	en		*Lastreopsis hispida*	Bristly Shield-fern	Grows in wet forests (Walsh and Entwisle 1994).		27/06/2000	5	Low
	en		*Levenhookia sonderi*	Slender Stylewort	Wet depressions in valley sclerophyll forest, grassy wetlands, tea-tree heath (Walsh and Entwisle 1994).		20/10/1977	2	Low
VU	en		*Lepidium aschersonii*	Spiny Peppercress	Sprouts annually from perennial, relatively short-lived underground rootstock at periodically wet sites such as gilgai depressions and the margins of freshwater and saline marshes and shallow lakes, usually on heavy clay soils. Its population numbers can fluctuate greatly from year to year (and may be absent for several seasons following flooding), presumably due to the amount of bare soil available for seed germination. Flowering occurs from spring to autumn (Carter and Walsh 2010). In Victoria, mostly occurs on the volcanic plain, but with outlying populations from near Lake Omeo and the Barwon River floodplain in Geelong and pre-1900 records from the Grampians, Port Fairy and Williamstown (AVH 2020).	Y			Low
	cr		*Macromitrium longirostre*	Macromitrium	Most common in coastal Tas., also in King Is. in Bass Strait and Wilsons Promontory, Vic. Grows on exposed coastal rock and on tree trunks and branches in coastal areas McCarthy, 2006, 563}.		1/11/1950	1	Low
	en	#	*Melaleuca armillaris subsp. armillaris*	Giant Honey-myrtle	Mainly confined to near-coastal sandy heaths, scrubs slightly raised above saltmarsh, riparian scrubs, rocky coastlines and foothill outcrops eastwards from about Marlo. Occurrences to the west are naturalized from cultivated stock. Commonly grown for ornament across Victoria, as		6/02/2020	13	NA

EPBC	FFG	Origin	Scientific name	Common Name	Habitat/distribution	PMST	Last rec.	No. recs	Likelihood occurrence
					a windbreak or street tree and sometimes giving rise to seedlings, particularly after fire (RBGV 2019).				
	en	#	*Nymphoides montana*	Entire Marshwort	Typically edging streams in slow- to swift-flowing, fresh, clear water to 2 m deep or in still backwaters, occasionally in swamps, at altitudes from c. 600–1400 m, mostly in montane or subalpine areas in the east, recent (post 1980,) low-altitude collections at Riddells Creek and Cardinia Reservoir probably represent introduced occurrences (Walsh and Entwisle 1999).		2/12/1988	4	Low
	en		*Olearia asterotricha*	Rough Daisy-bush	Occurs in Damp Forest in disjunct areas of southern Victoria. Generally uncommon. Flowers mostly Oct-Feb. Confused with O. rugosa (Walsh and Entwisle 1999).		1/04/1979	4	Low
	en		*Orthrosanthus multiflorus*	Morning Flag	Very rare in Victoria where known only from heathland communities near Cape Nelson and Port Campbell (Walsh and Entwisle 1994).		14/11/2007	1	Low
	cr		*Platylobium infecundum*	Famine Flat-pea	Only known from a few locations in ranges east of Melbourne, growing in heathy forest and woodland (RBGV 2020).		20/08/2014	1	Present
	en		*Platylobium reflexum*	Victorian Flat-pea	Common in tall wet forest in ranges east of Melbourne and the in the Otways (RBGV 2019).		11/02/2020	4	Present
CR	cr		*Pomaderris vacciniifolia*	Round-leaf Pomaderris	Endemic in moist forest and scrubs in upper catchment of the Yarra, Plenty and Yea Rivers (Walsh and Entwisle 1999).	Y			Low
VU			*Prasophyllum colemaniarum*	Lilac Leek-orchid	Known with certainty only by the type collection (1922) from grassy woodland near Bayswater, probably now extinct (Walsh and Entwisle 1994).	Y			Low
EN	en		*Prasophyllum frenchii*	Maroon Leek-orchid	Widespread across southern Victoria, but rare. Occurs in grassland, heathland and open forest on well-drained or water-retentive sand or clay loams; flowers Oct-Nov (RBGV 2018).	Y			Low
	en		*Prasophyllum lindleyanum*	Green Leek-orchid	Widespread, but generally uncommon in near-coastal scrub, dry woodlands further inland and sub-alpine herbfield. Flowers Sep.-Jan (RBGV 2015).		16/10/2007	1	Low
VU	cr		*Prasophyllum spicatum*	Dense Leek-orchid	Localised across southern Victoria in coastal heathland and near-coastal heathy forest on sandy soils (RBGV 2015).	Y			Low
	en		*Pteris epaleata*	Netted Brake	Although restricted in distribution in Victoria, it is often locally abundant and conspicuous, favouring seepages, stream banks and damp flats in shady forests (e.g. Beech Forest in the Otway Range, Dandenong Ranges where rare, Wilsons Promontory, etc.) (RBGV, 2020)		27/06/2000	15	Low
VU	en		*Pterostylis chlorogramma*	Green-striped Greenhood	Apparently localized in Victoria, but exact range uncertain due to confusion with closely allied species. Grows in moist areas of heathy and shrubby forest, on well-drained soils (RBGV 2018).	Y			Low-Moderate
	en		*Pterostylis clivosa*	Red-tip Greenhood	Widespread across southern Victoria on slopes and ridges in drier open forests and woodlands on well-drained soils (RBGV 2020).		28/10/1998	1	Low
	en		*Pterostylis grandiflora*	Cobra Greenhood	Found growing on moist, shady slopes in open-forest (Walsh and Entwisle 1994).		27/09/2012	19	Low-Moderate
	cr		*Pterostylis truncata*	Brittle Greenhood	Currently only known from near Lara (You Yangs) and Melton where it occurs in sparsely shrubby dry woodland and mallee, often in rocky areas, on well drained clay to gravelly loam soils, sometimes growing in moss mats on granite rocks. The species previously occurred much more broadly in south central Victoria in a wide range of habitats (generally within 100km of Melbourne), including herb-rich basalt plains grasslands and moist foothill forest (Backhouse et al. 2016). Flowers Feb.–Jul (RBGV 2015).		11/04/1942	2	Low-Moderate
	en		*Pultenaea weindorferi*	Swamp Bush-pea	Confined to swamps and drainage lines in scattered localities including Tonimbuk area and near Daylesford and Kinglake. Often associated with Eucalyptus cephalocarpa (RBGV 2020).		17/06/2013	25	Low
	cr		*Ranunculus amplus*	Lacey River Buttercup	Occurs as partially submerged plant on stream verges and swamps scattered throughout southern Victoria, particularly in the south west (RBGV 2019).		28/11/2012	1	Low
	en		*Senecio campylocarpus*	Floodplain Fireweed	In Victoria mostly throughout central Victoria and in the north-east in loam to clay soils in forest and woodland, usually in seasonally inundated areas (RBGV 2018).		30/01/2018	3	Low
	vu		*Senecio glomeratus subsp. longifructus*	Annual Fireweed	Grows adjacent to streams and swamps throughout the south and north-east of the state (RBGV 2017).		1/02/2017	1	Low
VU	cr		*Senecio macrocarpus*	Large-headed Fireweed	In Victoria largely confined to remnant Themeda grasslands on loamy clay soils derived from basalt from near Melbourne west to Skipton area. Also known from auriferous ground near Stawell. Formerly recorded from near Horsham and Casterton, but apparently long extinct from these areas (Walsh and Entwisle 1999).	Y			Low
VU			*Senecio psilocarpus*	Swamp Fireweed	Rare, restricted in Victoria to a few herb-rich winter-wet swamps throughout the south of the state, west from Sale, growing on volcanic clays or peaty soils (RBGV 2017).	Y			Low
	en		*Tetratheca stenocarpa*	Long Pink-bells	Grows in open-forest and tall mountain forests (Walsh and Entwisle 1999).		1/11/1903	1	Low
CR	cr		*Thelymitra orientalis*	Slender Plum-orchid	Grows in damp heathy flats and seepage areas usually in peaty white sands. Flowers are self-pollinating and only open on warm, humid days. Flowers Oct-Nov.	Y			Low
VU	en		*Thesium australe*	Austral Toad-flax	Although once widespread, only currently known from highland areas where associated with grasslands (Walsh and Entwisle 1999).	Y			Low
	en		*Thismia rodwayi*	Fairy Lanterns	Recorded from the mountains around Melbourne, Tarra Valley [Tarra-Bulga]National Park and west of Portland, where now presumed extinct. Restricted to damp humus and leaf litter in deeply shaded tall forests and fern gullies (Walsh and Entwisle 1994).		27/06/2000	3	Low
	en		*Tmesipteris ovata*	Oval Fork-fern	Not common in Victoria. Localised in Wet Forest near Gembrook and Emerald, Morwell N.P., Wilsons Prom and East Gippsland. Intermediates with T. parva exist (Walsh and Entwisle 1994).		01/01/1853	1	Low
	en		*Tmesipteris parva*	Small Fork-fern	Grow on tree-ferns, occurring between Gembrook and Warburton and in east and south Gippsland (Walsh and Entwisle 1994).		3/03/2015	5	Low

EPBC	FFG	Origin	Scientific name	Common Name	Habitat/distribution	PMST	Last rec.	No. recs	Likelihood occurrence
	en	#	*Utricularia gibba*	Floating Bladderwort	Occurs in fresh-water swamps and wetlands at low elevations. Collections from urban areas around Melbourne are believed to be introduced. Flowers Nov.-Jun (RBGV 2019).		24/02/2017	1	Low
	en		*Xanthosia tasmanica*	Southern Xanthosia	Occurring in coastal areas in heath on sand. Flowers Spring and Summer (Walsh and Entwisle 1999).		16/11/1985	1	Low
VU	cr		*Xerochrysum palustre*	Swamp Everlasting	Occurs in lowland swamps, usually on black cracking clay soils, scattered from near the South Australian border north-west of Portland to Bairnsdale district, but rare due to habitat depletion (RBGV 2018).	Y	5/10/2015	2	Low

C.2 Threatened fauna

EPBC	FFG	Scientific name	Common Name	Habitat/distribution	PMST	Last rec.	No. recs	Likelihood occurrence	Potential impact
	en	*Accipiter novaehollandiae*	Grey Goshawk	Rainforests, forests; forest gullies and valleys; taller woodlands, timber on watercourses, open country in Autumn dispersal (Pizzey and Knight 2012).		2/02/2022	55	High	Low
	en	*Acrodipsas myrmecophila*	Small Ant Blue Butterfly	The Small Ant-blue is rare and localised throughout its range. The only recent Victorian record is from near Broadford. The species has been recorded previously from Ringwood, Heathmont, Glen Waverley, Lilydale, Wandin, Ocean Grove and another site near Broadford, but is believed to be extinct in these areas as a result of habitat disturbances (DSE 2003a).		1/11/1912	4	Low	Low
	vu	*Actitis hypoleucos*	Common Sandpiper	Shallow, pebbly, muddy or sandy edges of rivers and streams, coastal to far inland; dams, lakes, sewage ponds; margins of tidal rivers; waterways in mangroves or saltmarsh; mudflats; rocky or sandy beaches; causeways, riverside lawns, drains, street gutters (Pizzey and Knight 2012).		18/10/1962	1	Low	Low
VU	vu	*Antechinus minimus maritimus*	Swamp Antechinus	Dense wet heathlands, tussock grasslands, sedgelands, damp gullies, swamps and some shrubby woodlands (DAWE 2020).	Y			Low	Low
CR	cr	*Anthochaera phrygia*	Regent Honeyeater	Dry open forest, woodlands, or red ironbark, yellow box, white and yellow gum, mistletoe on river she-oaks, trees in farmlands, streets, gardens (Pizzey and Knight 2012).	Y	3/03/1986	11	Low	Low
VU		*Aphelocephala leucopsis*	Southern Whiteface	Live in a wide range of open woodlands and shrublands where there is an understorey of grasses or shrubs. These areas are usually in habitats dominated by acacias or eucalypts on ranges, foothills and lowlands, and plains. Forage almost exclusively on the ground, favouring habitat with low tree densities and an herbaceous understorey and litter cover. Generally sedentary but may move to wetter areas during drought years. Nest in hollows, crevices and sometimes bushes (DCCEEW 2023b).	Y	10/08/1978	1	Low	Low
VU	en	*Aprasia parapulchella*	Pink-tailed Worm-Lizard	The Pink-tailed Worm-lizard occurs in New South Wales (NSW), Victoria and the Australian Capital Territory (ACT) where it is widely but patchily distributed along the foothills of the western slopes of the Great Dividing Range between Bendigo in Victoria and Gunnedah in NSW. In Victoria its distribution is not fully known, but it is centered around Bendigo. The Pink-tailed Worm-lizard's habitat includes primary and secondary grassland, grassy woodland and woodland communities, and the species usually inhabits sloping sites that contain rocky outcrops or scattered, partially buried rocks. Individuals are most commonly found sheltering under these rocks and spend considerable time in ant burrows below these rocks, which are considered important foraging and shelter sites (TSSC 2015).	Y			Low	Low
	vu	*Ardea alba modesta*	Eastern Great Egret	Shallows of rivers, estuaries, tidal mudflats, freshwater wetlands; sewage ponds, irrigation areas, larger dams etc (Pizzey and Knight 2012).		26/05/2019	16	Moderate	Low
	cr	*Austrogammarus australis*	Dandenong Freshwater Amphipod	Known to occur within the upper reaches of the Olinda, Sassafras, Emerald, Dandenong and Monbulk Creeks (Doeg 1996, Papas 2000).		3/12/2021	55	Low-moderate	Low
	en	*Austrogammarus haasei*	Sherbrooke Amphipod	Known to occur within the Dandenong Ranges in the upper reaches of Sherbrooke Creek (Doeg 1996).		21/09/2011	12	Low	Low
	vu	*Aythya australis*	Hardhead	Deep, permanent wetlands, large open waters, brackish coastal swamps, farm dams, ornamental lakes , sewage ponds (Pizzey and Knight 2012).		1/11/2020	124	High	Low
	vu	*Biziura lobata*	Musk Duck	Well-vegetated swamps, wetlands, both brackish and fresh, lakes, reservoirs, shallow bays, inlets; occasionally at sea (Pizzey and Knight 2012).		19/06/2019	53	High	Low
EN	cr	*Botaurus poiciloptilus*	Australasian Bittern	Narrow habitat preferences, preferring shallow, vegetated freshwater or brackish swamps (Pizzey and Knight 2012).	Y	23/05/2005	4	Moderate	Low
	vu	*Calamanthus pyrrhopygius*	Chestnut-rumped Heathwren	Heathy woodlands/shrublands and Box/Ironbark forests (Pizzey and Knight 2012).		8/01/2000	6	Moderate	Low
CR	cr	*Calidris ferruginea*	Curlew Sandpiper	Tidal mudlfats; saltmarsh, saltfields; fresh, brackish or saline wetlands; sewage ponds (Pizzey and Knight 2012).	Y			Low	Low
EN	en	*Callocephalon fimbriatum*	Gang-gang Cockatoo	During summer months, Gang-gang Cockatoos primarily inhabit mature, wet sclerophyll forests, but also may occur across a broad range of forests and woodlands. During winter months, Gang-gang Cockatoos tend to range beyond montane forests to inhabit open eucalypt assemblages at lower, drier altitudes, including suburban areas of cities and coastal heathlands and thickets, including ornamental trees, shrubs, and hedges. Breeding requires stands of suitable hollow-bearing trees (DAWE 2022).	Y	16/03/2022	389	High	Moderate

EPBC	FFG	Scientific name	Common Name	Habitat/distribution	PMST	Last rec.	No. recs	Likelihood occurrence	Potential impact
VU		*Climacteris picumnus*	Brown Treecreeper	Drier forests/woodlands/scrubs, with fallen branches; particularly River Red Gum lined water courses (Pizzey and Knight 2012).	Y	18/11/2018	19	High	Moderate
EN	en	*Dasyurus maculatus maculatus*	Spot-tailed Quoll	Has a wide range of habitats, including rainforest, open forest, woodland, coastal heathland and inland riparian forest (Van Dyck and Strahan 2008).	Y	1/03/1995	3	Low	Low
EN	en (ex in Victoria)	*Dasyurus viverrinus*	Eastern Quoll	A range of open forests, woodlands and grasslands, where they would build a den amongst fallen logs or rock piles (Van Dyck and Strahan 2008).		01/01/1880	1	Low	Low
VU	en	*Delma impar*	Striped Legless Lizard	A grassland specialist, potential habitat for the Striped Legless Lizard includes all areas which have, or once had, native grasslands or grassy woodlands (including derived grasslands) across the historical range of the species, provided that area retains suitable tussock structure, the soil is of appropriate type and structure, and the site has not had major disturbance such as ploughing (DAWE 2020).	Y			Low	Low
	en	*Egretta garzetta*	Little Egret	Tidal mudflats, saltmarshes, mangroves, freshwater wetlands, sewage ponds (Pizzey and Knight 2012).		17/03/2020	8	Low	Low
	en	*Engaeus tuberculatus*	Tubercle Burrowing Crayfish	Engaeus spp. inhabit a variety of permanent and ephemeral lotic and lentic waters including creeks, streams, rivers, small tributaries, drainage channels, roadside gutters and seepages, swamps, pools, lagoons, ponds and billabongs (Hawking et al. 2009).		15/02/2022	28	High	High
	cr	*Engaeus urostrictus*	Dandenong Burrowing Crayfish	Engaeus spp. inhabit a variety of permanent and ephemeral lotic and lentic waters including creeks, streams, rivers, small tributaries, drainage channels, roadside gutters and seepages, swamps, pools, lagoons, ponds and billabongs (Hawking et al. 2009).		18/01/2021	32	Moderate-High	Moderate
	en	*Engaeus victoriensis*	Foothill Burrowing Crayfish	Engaeus spp. inhabit a variety of permanent and ephemeral lotic and lentic waters including creeks, streams, rivers, small tributaries, drainage channels, roadside gutters and seepages, swamps, pools, lagoons, ponds and billabongs (Hawking et al. 2009).		19/05/2011	13	Moderate	Moderate
VU	vu	*Falco hypoleucos*	Grey Falcon	Lightly treed inland plains, gibber deserts, sandridges, pastoral lands, timber watercourses; seldom in driest deserts (Pizzey and Knight 2012).	Y			Low	Low
	cr	*Falco subniger*	Black Falcon	Plains, grasslands, foothills, timbered watercourses, wetland environs; crops; occasionally over towns and cities (Pizzey and Knight 2012).		1/01/1983	4	Low	Low
VU	en	*Galaxiella pusilla*	Dwarf Galaxias	In streams, burrow in moist soil, in yabby burrows, ground water and underground streams (Hawking et al. 2009).	Y			Low	Low
VU	vu	*Grantiella picta*	Painted Honeyeater	Mistletoes in eucalypt forests/woodlands; black box on watercourses; box-ironbark-yellow gum woodlands; paperbarks, Casuarinas; mulga, other acacias; trees on farmland; gardens (Pizzey and Knight 2012).	Y			Low	Low
CR	cr	*Gymnobelideus leadbeateri*	Leadbeater's Possum	Montane wet forest. Requires mixed aged eucalypt stands with dense acacia mid-storey (Van Dyck and Strahan 2008).	Y	29/09/2022	171	Low	Low
	en	*Haliaeetus leucogaster*	White-bellied Sea-Eagle	Coasts, islands, estuaries, inlets, large rivers, inland lakes, reservoirs (Pizzey and Knight 2012).		23/10/2019	19	High	Moderate
	en	*Hemiphlebia mirabilis*	Ancient Greenling Damselfly	Has been recorded from a small number of scattered sites, including on King Island and in Mount William, Tasmania; in Wilsons Promontory National Park and near Yea, Victoria; and in Piccaninnie Ponds Conservation Park in south-eastern South Australia. Its recorded habitat includes permanent freshwater ponds, riverine lagoons and swamps that may dry out seasonally (DSE 2003b).		26/12/1917	2	Moderate	Low
	vu	*Hieraaetus morphnoides*	Little Eagle	Plains, foothills, open forests, woodlands and scrublands; river red gums on watercourses and lakes (Pizzey and Knight 2012).		17/06/2020	50	High	Moderate
VU	vu	*Hirundapus caudacutus*	White-throated Needletail	Airspace over forests, woodlands, farmlands, plains, lakes, coasts, towns, feeding companies frequency patrol back and forward along favoured hilltops and timbered ranges (Pizzey and Knight 2012).	Y	5/03/2021	188	High	Low
	vu	*Hydroprogne caspia*	Caspian Tern	Coastal, offshore waters, beaches, mudflats, estuaries, larger rivers, reservoirs and lakes (Pizzey and Knight 2012).		21/10/2000	2	Moderate	Low
	en	*Hyridella depressa*	Depressed Mussel	Endemic to eastern Australia. Throughout much of its natural range this species is often the most commonly encountered freshwater mussel. Its microhabitat is in slow-moderate currents in sand or gravel of glides and pools. Occurs from the upper reaches of streams to the lowlands and seems to occupy a range of flow regimes (all flowing streams that are well oxygenated) (FFG-Scientific Advisory Committee 2022b).		24/10/1994	1	Moderate	Low
	en	*Hyridella narracanensis*	Narracan Corrugated Mussel	Occurs in a small number of streams in the Yarra, Bunyip, La Trobe and South Gippsland river basins and may still be present in streams of the Otway Ranges. Found in areas well-shaded by overhanging vegetation, in shallow water with moderate currents over sandy, compacted substrata with low organic content. Requires clean, clear water that is permanently flowing (FFG-Scientific Advisory Committee 2022a).		20/01/2016	11	Moderate	Low
EN	en	*Isoodon obesulus obesulus*	Southern Brown Bandicoot	Prefers sandy soil with scrubby vegetation and / or areas with low ground cover that are burnt out from time to time (Van Dyck and Strahan 2008).	Y	12/09/2018	15	Moderate	Moderate
	en	*Ixobrychus dubius*	Australian Little Bittern	Dense reedbeds in freshwater swamps, lakes and rivers; tussocks in wetland areas (Pizzey and Knight 2012).		26/12/1894	1	Low	Low
CR	cr	*Lathamus discolor*	Swift Parrot	Open grassy woodland, with dead trees, near permanent water and forested hills, coastal heaths, pastures with exotic grasses, weeds, roadsides, orchards (Pizzey and Knight 2012).	Y	25/09/2002	17	Moderate	Low
	vu	*Lewinia pectoralis*	Lewin's Rail	Swamp woodlands, rushes, reeds, rank grass in swamps, creeks, paddocks; wet heaths (Pizzey and Knight 2012).		5/08/1994	5	Moderate	Moderate

EPBC	FFG	Scientific name	Common Name	Habitat/distribution	PMST	Last rec.	No. recs	Likelihood occurrence	Potential impact
CR	cr	*Lichenostomus melanops cassidix*	Helmeted Honeyeater	Streamside/swamp woodlands of Mountain Swamp Gum; with scented Paperbark, Woolly and Prickly Tea-tree understorey and sedges (Pizzey and Knight 2012).	Y	17/03/2017	###	Low	Low
EN	en	*Liopholis montana*	Mountain Skink	Widely but patchily distributed in the mountainous areas of the Great Dividing Range and occurs in the cool and cold temperature zones, usually at elevations above 900m, extending as far westwards as the upper Yarra Valley. It utilises more open habitats in Alpine, Wet Sclerophyll Forest, and Damp Sclerophyll Forest ecosystems (Robertson and Coventry 2019).	Y			Low	Low
EN	en	*Lissolepis coventryi*	Swamp Skink	Low lying marshes and lagoon margins, in paperbark swamps, sedges and Melaleuca thickets (Cogger 2014).	Y	29/01/2004	15	High	Moderate
VU	vu	*Litoria raniformis*	Growling Grass Frog	A largely aquatic species found among vegetation within or at the edges of permanent water – streams, swamps, lagoons, farm dams and ornamental ponds. Often found under debris on low, often flooded river flats. Frequently active by day (Cogger 2014).	Y	7/12/1990	12	Moderate	Low
EN	cr	*Lophochroa leadbeateri*	Major Mitchell's Cockatoo	Near water on timbered water courses, surrounding grasslands, gibber, saltbush, mulga and other acacias, stands of native cypress, casuarinas, larger mallee eucalypts with suitable nest hollows and mallee associated with riverine woodlands (Pizzey and Knight 2012).		1/01/1979	1	Low	Low
	vu	*Lophoictinia isura*	Square-tailed Kite	Heathlands, woodlands, forests, rainforest, timbered water courses, hills and gorges (Pizzey and Knight 2012).		24/01/2019	6	High	Moderate
EN	en	*Maccullochella macquariensis*	Trout Cod	Rapidly flowing streams, around the cover of logs and debris, over rocky or gravel bottoms. Larger fish occur in deeper sections (Allen et al. 2002).		1/01/1970	1	Low	Low
VU	en	*Maccullochella peelii*	Murray Cod	Slow flowing turbid water of rivers and streams at low elevations. Also fast-moving clear, rocky upland streams. Favours deeper water around boulders, longs, undercut banks and overhanging vegetation (Allen et al. 2002).		1/01/1970	1	Low	Low
EN	en	*Macquaria australasica*	Macquarie Perch	The Macquarie Perch was once widespread through the cooler upper reaches of the southern tributaries of the Murray-Darling river system in Victoria and New South Wales. Although it was considered rare downstream in the Murray River, in Victoria the Macquarie Perch occurred in the Barmah Lakes area and tributaries such as Broken Creek. In New South Wales, the species occurred in the upper reaches of the Macquarie River system. However, currently in Victoria only small discrete populations remain in the upper reaches of the Mitta Mitta, Ovens, Broken, Campaspe and Goulburn Rivers in northern Victoria. A larger, apparently self-sustaining translocated population exists in the Yarra River, around Warrandyte and is potentially the most secure in the country. It is also known to persist in Lake Eildon in the Goulburn River catchment (DAWE 2020).		1/01/1970	2	Low	Low
VU	vu	*Mastacomys fuscus mordicus*	Broad-toothed Rat	In Victoria, distributed from sea level to >2200 m in elevation, and is climatically characterised by areas with a mean annual rainfall above 1000mm. They prefer a moderate-to-dense ground cover of grasses or sedges, with shrubs usually present and exist in a broad range of habitats for coastal environments to alpine regions (SWIFFT 2020).	Y	1/01/1994	28	High	Moderate
EN	vu	*Melanodryas cucullata*	Hooded Robin	Drier Eucalypt forests, woodlands, scrubs with fallen logs, debris, mallee, Casuarina, cypress pine, mulga, cleared paddocks, Banksia dominated coastal scrubs (Pizzey and Knight 2012).	Y	22/12/1988	10	High	Moderate
	cr	*Miniopterus orianae oceanensis*	Eastern Bent-winged Bat	Commonly found by day in caves, old mines, stormwater channels and comparable structures including occasional buildings. Typically found in well-timbered valleys where it forages, above the tree canopy (Van Dyck and Strahan 2008).		11/11/1974	1	Moderate	Moderate
VU	vu	*Nannoperca obscura*	Yarra Pygmy Perch	Recorded from 42 locations, extending from Dandenong Creek in Victoria west through to Lake Alexandrina near the mouth of the Murray River in South Australia. The Yarra Pygmy Perch prefers slow-moving or still waters, such as pools in rivers and streams or in lakes in fresh and brackish water. They prefer sites which have abundant submerged and emergent aquatic vegetation, sometimes with wood debris. These characteristics are essential in providing shelter, protection, feeding and breeding habitat (SWIFFT 2020).	Y			Low	Low
VU		*Neophema chrysostoma*	Blue-winged Parrot	The Blue-winged Parrot inhabits a range of habitats from coastal, sub-coastal and inland areas, right through to semi-arid zones. Throughout their range they favour grasslands and grassy woodlands. They are often found near wetlands both near the coast and in semi-arid zones. Blue-winged Parrots can also be seen in altered environments such as airfields, golf-courses and paddocks (BirdLife Australia 2021).	Y	2/04/2021	84	High	Moderate
	vu	*Neophema pulchella*	Turquoise Parrot	Open grassy woodland, with dead trees, near permanent water and forested hills, coastal heaths, pastures with exotic grasses, weeds, roadsides, orchards (Pizzey and Knight 2012).		27/11/2019	9	High	Moderate
	cr	*Ninox connivens*	Barking Owl	Open forests, woodlands, dense scrubs, foothills, river red gums, other large trees near water courses, penetrating otherwise open country, and paperbark woodlands (Pizzey and Knight 2012).		20/04/2018	18	High	Moderate
	vu	*Ninox strenua*	Powerful Owl	Pairs occupy a large, probably permanent, home range in mountain forests, gullies and forest margins, sparser hilly woodlands, coastal forests, woodlands, scrubs, exotic pine plantations, large trees in private/public gardens, some in cities (Pizzey and Knight 2012).		15/03/2022	591	High	Moderate
	vu	*Ornithorhynchus anatinus*	Platypus	Creeks and rivers along Australia's eastern seaboard. Formerly at various locations along the Murray River. Burrows in banks of waterways, with an identifiably horizontally oval cross-section. Generally breeds in September.		1/12/2021	165	High	Moderate
	vu	*Oxyura australis*	Blue-billed Duck	Found on temperate, fresh to saline, terrestrial wetlands including sewerage ponds, rivers, salt lakes and saltpans. Preferring deep,		1/09/2001	23	High	Low

EPBC	FFG	Scientific name	Common Name	Habitat/distribution	PMST	Last rec.	No. recs	Likelihood occurrence	Potential impact
				permanent open water within or near dense vegetation (Pizzey and Knight 2012).					
	en	*Pasma tasmanica*	Two-spotted Grass-skipper Butterfly	Wet eucalypt tall open forests, open forests, sub-alpine woodlands, sometimes seen along roadsides. Food plants are Gahnia, Poa and Lomandra. Butterflies fly when sunny, close to the ground in open grassy areas, and stop frequently to visit flowers. Males are territorial and perch on low vegetation to stake out areas. On the mainland adults normally fly from October to March (ALA 2022).		3/12/1949	43	Low	Low
CR	cr	*Pedionomus torquatus*	Plains-wanderer	Sparse, treeless, lightly grazed native grasslands/herbfields with bare ground, old cereal crops, short Lucerne, sparse saltbush, low shrubland (Pizzey and Knight 2012).	Y			Low	Low
EN	en	*Petauroides volans*	Southern Greater Glider	A variety of eucalypt-dominated habitats, ranging from low, open forests on the coast to tall forests on in the ranges and low woodland westward of the Dividing Range	Y	26/04/2022	74	High	Moderate
VU	vu	*Petaurus australis*	Yellow-bellied Glider	In Victoria extending from the east coast to Melbourne. Occurs in eucalypt-dominated woodlands and forests, including both wet and dry sclerophyll forests (Kavanagh 1995).	Y	1/06/2021	75	High	Moderate
VU	en	*Polytelis swainsonii*	Superb Parrot	River red gums, black box, yellow box, river oak, mostly near rivers; mallee, stubbles, pastures, gardens (Pizzey and Knight 2012).		1/05/2005	1	High	Moderate
	vu	*Pomatostomus temporalis*	Grey-crowned Babbler	Live in open forest and woodland, acacia shrubland and adjoining farmland (Pizzey and Knight 2012).		1/07/1948	5	Low	Low
VU	vu	*Potorous tridactylus trisulcatus*	Long-nosed Potoroo	Inhabits coastal heath and dry and wet sclerophyll forests. Prefers relatively thick ground cover and is concentrated in areas where soil is light and sandy. Generally restricted to areas where rainfall > 760mm (Van Dyck and Strahan 2008).	Y			Low	Low
VU	en	*Prototroctes maraena*	Australian Grayling	Predominately a freshwater fish but is considered diadromous because the fry have a marine phase. The majority of its life is spent in freshwater, inhabiting rivers and streams, usually in cool (5-26°C), clear waters with a gravel substrate and alternating pool and riffle zones but it has also been recorded to occur in turbid water with muddy-bottomed, heavily silted habitat as well. Grayling can penetrate well inland, and have been reported over 100 km upstream from the sea, provided there are no barriers to movement (SWIFFT 2020).	Y	1/01/1979	1	Low	Low
	en	*Pseudemoia rawlinsoni*	Glossy Grass Skink	Confined to humid microhabitats such as marshlands and the margins of creeks, swamps and lakes (Cogger 2014).		7/05/2015	6	High	Moderate
EN	en	*Pseudomys fumeus*	Smoky Mouse	Ridgetop sclerophyll forest with a diverse understorey of heath dominated by legumes (Van Dyck and Strahan 2008). Population highly disjunct, with isolated groupings occurring in a variety of habitats, but rare. Local populations occur in areas of heathy understorey (Van Dyck and Strahan 2008). Likely to now be extinct in the Otway Ranges, coastal East Gippsland and ACT (Menkhorst and Broome 2008).	Y			Low	Low
VU	en	*Pseudomys novaehollandiae*	New Holland Mouse	Found in dry heath and open forest localities in coastal locations. It has a marked preference for soft substrates (Van Dyck and Strahan 2008).	Y			Low	Low
	en	*Pseudophryne bibronii*	Brown Toadlet	Found below rocks in logs in wet and dry sclerophyll forest, in proximity to seasonally inundated areas (Cogger 2014).		15/05/1943	1	Low	Low
	en	*Pseudophryne semimarmorata*	Southern Toadlet	In Victoria, the Southern Toadlet is mainly found on and south of the Great Dividing Range although there are records as far north as the Little Desert. is generally found at lower elevations in damp areas usually under leaf litter, logs or rocks. It is recorded from forests, woodlands, heaths and grasslands in a variety of damp situations, but not necessarily near permanent water. It shelters under leaf litter, logs and rocks and lives in small tunnels that fill with water during the breeding season (March-May). It can live for at least 10 years and has a very small home range of about 5 metres from the breeding site (Cogger 2014, SWIFFT 2020).		11/05/2006	12	Moderate	Moderate
VU	vu	*Pteropus poliocephalus*	Grey-headed Flying-fox	Camps of this species are found in gullies, typically not far from water and usually in vegetation with a dense canopy (Van Dyck and Strahan 2008).	Y	16/06/2021	6	High	Low
VU	vu	*Pycnoptilus floccosus*	Pilotbird	The pilotbird is found from the Wollemi National Park and Blue Mountains National Park in New South Wales through to the Dandenong Ranges, near Melbourne in Victoria. Its natural habitat is temperate wet sclerophyll forests and occasionally temperate rainforest, where there is dense undergrowth with abundant debris It is sedentary and common. (ALA 2022)	Y	20/08/2018	86	High	Low
	en	*Pyrrholaemus sagittatus*	Speckled Warbler	Drier woodlands with tussocks, branches and rocks (Pizzey and Knight 2012).		26/01/2000	12	High	Low
EN	cr	*Rostratula australis*	Australian Painted-snipe	Well-vegetated shallows and margins of wetlands, dams, sewage ponds; wet pastures, marshy areas, irrigation systems, lignum, tea-tree scrub, open timber (Pizzey and Knight 2012).	Y			Low	Low
	vu	*Spatula rhynchotis*	Australasian Shoveler	Larger waters, fresh and saline lakes, well-vegetated freshwater wetlands, coastal inlets, sewage ponds, floodwaters (Pizzey and Knight 2012).		22/07/2019	58	High	Low
VU	vu	*Stagonopleura guttata*	Diamond Firetail	Open Eucalypt forests/woodlands; River Red Gum, Mallee, Buloke, Cypress Pine (Pizzey and Knight 2012).	Y	9/12/1914	2	Low	Low
	en	*Stictonetta naevosa*	Freckled Duck	Large, well vegetated swamps; in dry periods moves to open lakes (Pizzey and Knight 2012).		8/06/2019	7	High	Low
VU	vu	*Synemon plana*	Golden Sun Moth	Native temperate grassland and open grassy woodlands, may also be found in degraded grasslands dominated by exotic Chilean Needlegrass (DAWE 2020).	Y	01/01/1760	1	Low	Low

EPBC	FFG	Scientific name	Common Name	Habitat/distribution	PMST	Last rec.	No. recs	Likelihood occurrence	Potential impact
	en	*Synoicus chinensis*	King Quail	Swampy heaths, dense grasslands, growth on edges of wetlands, weedy pastures and remnants, Lucerne crops, tall tropical grasslands, dry sedge plains, rice stubbles (Pizzey and Knight 2012).		3/03/1913	1	Low	Low
	en	*Temognatha sanguinipennis*	Jewel Beetle	Species specific habitat has limited literature. The genus however, is known to occur in forests, heathlands and woodlands. They are know to feed on flowers in heaths and woodlands. The larvae live in wood, more rarely, softer plant stems, with some species feeding on dry leaves (Australian Museum 2020).		21/02/1970	1	Low	Low
	cr	*Tyto novaehollandiae*	Masked Owl	Forests, open woodlands, farmlands with large trees, partly forested coastal plains, paperbark woodlands, caves (Pizzey and Knight 2012).		17/12/1999	2	High	Moderate
	en	*Tyto tenebricosa*	Sooty Owl	Tall, wet forests in sheltered east and south east facing mountain gullies with dense understorey layer (Pizzey and Knight 2012).		31/08/2021	213	High	Moderate
	en	*Varanus varius*	Lace Monitor	Coast, ranges, slopes and adjacent plains of eastern and south-eastern Australia, where it occurs in occur in well-timbered areas from dry woodlands to cool temperate forests. It feeds on insects, reptiles and small mammals, but is a major predator of nestling birds. Often forages on the ground, and in trees (Cogger 2014).		25/01/2022	26	High	Moderate