39671 Beveridge Intermodal Precinct Stage 1A

Flora and fauna assessment

FINAL REPORT

Prepared for National Intermodal Corporation

27 February 2025

Biosis offices

NEW SOUTH WALES

Albury

Phone: (02) 6069 9200

Email: albury@biosis.com.au

Gosford

Phone: (02) 9101 8700

Email: gosford@biosis.com.au

Newcastle

Phone: (02) 4911 4040

Email: newcastle@biosis.com.au

Sydney

Phone: (02) 9101 8700

Email: sydney@biosis.com.au

Western Sydney

Phone: (02) 9101 8700

Email: sydney@biosis.com.au

Wollongong

Phone: (02) 4201 1090

Email: wollongong@biosis.com.au

VICTORIA

Ballarat

Phone: (03) 5304 4250

Email: ballarat@biosis.com.au

Melbourne

Phone: (03) 8686 4800

Email: melbourne@biosis.com.au

Wangaratta

Phone: (03) 5718 6900

Email: wangaratta@biosis.com.au

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- National Intermodal Corporation: [redacted]
- Rain Hydrology
- Victorian Government Department of Environment, Energy and Climate Action for access to the Victorian Biodiversity Atlas, NatureKit and EnSym/Native Vegetation Information Management tool
- Australian Government Department of Climate Change Energy the Environment and Water for access to the Protected Matters Search Tool
- Biosis staff involved in this project were: [redacted]

Summary

Biosis Pty Ltd (Biosis) was commissioned by National Intermodal Corporation (National Intermodal) to undertake a flora and fauna assessment of the proposed Beveridge Intermodal Precinct. This report details the impacts of early works being undertaken for Stage 1A of the Precinct.

The Stage 1A Project involves the construction and operation of a permanent rail connection to the existing Australian Rail Track Corporation (ARTC) rail freight corridor, together with sidings, a basic intermodal terminal and associated infrastructure for the initial stage of the Beveridge Intermodal Precinct. The Stage 1A terminal will have the ability to operate 24 hours a day, 7 days a week, with up to two (2) 1,800-metre-long trains being processed per day in each 24-hour period (train shunting movements will be one 1,800 metre train at a time).

The operation of the Stage 1A Project will be predominately rail to rail. For the rail to road proportion, truck movements will be capped (through the use of a vehicle booking system) to four (4) truck movements per hour averaged over each 24-hour period, with a maximum of eight (8) truck movements in any one hour (unless otherwise agreed and approved).

The Stage 1A Project has been designed to provide rail infrastructure which will be utilised by future development of the broader Beveridge Intermodal Precinct, without pre-empting the further assessment and approval of the precinct planning and development. It comprises the following key components:

- Rail connection – rail connection (southern and northern lines) from the existing ARTC rail corridor to the terminal. Including an approximately 700m long double track viaduct to be constructed over the floodplain zone to maintain natural flood passage.
- Rail infrastructure – turnouts and sidings (adjacent to the terminal hardstand) to accommodate interstate trains up to 1,800 metres long.
- Intermodal terminal – container handling and storage area (hardstand) for loading and unloading of trains. Manual handling only with reach stackers.
- Site access and internal roads – Beveridge Road intersection and internal access road for heavy and light vehicle movement within the site.
- Drainage infrastructure – drainage and stormwater quality treatment works and stormwater infrastructure to manage and control the stormwater runoff appropriately.
- Ancillary development – demountable administration facility (office, toilet, lunch room) and packaged equipment (inc. but not limited to refuelling, water storage and drainage, lighting, fencing, weighbridge, solar generation and power storage, signage).
- External roads – local road improvement works between the Hume Hwy and the subject site as agreed by the relevant parties.
- Utilities – connection and site lead in for electricity, telecommunications, sewer and potable water.
- Vegetation removal – removal of native vegetation within the project area boundary to the minimum extent required to facilitate the use and development.

The Stage 1A Site, including construction laydown areas, comprises approximately 67 hectares of currently undeveloped land located approximately 40 kilometres north of Melbourne CBD and to the east of the township of Beveridge (Figure 1).

The Stage 1A Site is predominately located within the Whittlesea Local Government Area (LGA) and partly within the Mitchell LGA.

Previous assessments

Flora and fauna assessment and Draft Environment Report – Ecology and Heritage Partners (EHP), 2021

Ecology and Heritage Partners (EHP) was engaged to complete a flora and fauna assessment (FFA) of the whole Beveridge Intermodal Precinct site for the previous proponent (Qube). The FFA included:

- Review of relevant literature, online-resources and databases to determine the presence or likely occurrence of ecological values within the local area, including the study area.
- A field assessment on 23 July 2019 to obtain information about flora values for the study area. Two additional field assessments on 20 January 2021 and 8 November 2021 were also completed to obtain information about flora values within the Herne Swamp area.
- A fauna habitat suitability assessment was undertaken on 23 July 2019 to obtain information about terrestrial fauna values within the study area. The study area was visually assessed, and active searching was undertaken under and around ground debris for reptiles, frogs and small mammals.
- Targeted surveys were undertaken for the nationally significant (EPBC Act listed) Growling Grass Frog *Litoria raniformis* in December 2019, Golden Sun Moth *Synemon plana* in December 2019 and January 2020, and Seasonal Herbaceous Wetlands of the Temperate Lowland Plains (SHWTLP) ecological community in November 2019, January 2021 and November 2021.

Survey results found that two matters of national environmental significance (MNES) listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) occurred within the site:

- Seasonal Herbaceous Wetland of the Temperate Lowland Plains (SHWTLP) ecological community.
- Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP) ecological community.

Ecology field assessment report – Arcadis 2022

Arcadis was engaged by National Intermodal during preliminary site investigations in 2022 to undertake a desktop and field assessment. The field assessment was designed to confirm or exclude the presence or potential presence of a range of listed ecological values within the investigation area.

The Arcadis field assessment covered a narrow strip of the Stage 1A area adjacent the rail corridor (Figure 2, page 4). This 25 hectare area of assessment is 3.2 kilometres long and 100 metres wide. The Arcadis field assessment was conducted over four days on the 27, 28 and 31 October, and 1 November 2022 and was focused on a potential rail connection at this location.

The purpose of the field assessment was to identify any biodiversity constraints within this area, namely threatened species and ecological communities listed under the EPBC Act and Victorian *Flora and Fauna Guarantee Act 1998* (FFG Act).

Survey results found that three MNES (or habitat to support such) listed under the EPBC Act occurred within the Arcadis study area:

- Seasonal Herbaceous Wetland of the Temperate Lowland Plains (SHWTLP) ecological community.
- Growling Grass Frog.

- Swamp Fireweed *Senecio psilocarpus*.

Whilst not recorded during survey, Arcadis noted that two further EPBC listed species may not have been recorded due to seasonal considerations:

- River Swamp Wallaby-grass *Amphibromus fluitans*.
- Swamp Everlasting *Xerochrysum palustre.*

Arcadis recommended that if works were to be undertaken within Herne Swamp or the buffer area, then an EPBC Act referral would be required. They also noted the need for indirect impacts on Herne Swamp (e.g. changes in hydrology), as a result of the project, to be considered including works outside of the buffer.

Biosis flora and fauna assessment report (current report)

The following report includes data collected by EHP, Arcadis and Biosis to describe ecological values within the study area (Figure 2).

Biosis data is used in favour of EHP or Arcadis data within the Stage 1A area as it is the most current. Arcadis and EHP data are used across the remainder of the study area, Biosis are confident the values recorded across Stage 1A are complete and correct.

Biosis survey methods are described in Section 2.4 and results are presented in Section 3.

Ecological values

Key ecological values identified within the study area are as follows:

- 4.57 hectares of Plains Grassland Ecological Vegetation Class (EVC) 132. This EVC has a Bioregional Conservation Status (BCS) of Endangered within the Victorian Volcanic Plain.
- 36.4 hectares of Plains Grassy Wetland EVC 125. This EVC has a BCS of Endangered within the Victorian Volcanic Plain.
- 0.36 hectares of Tall Marsh EVC 821. This EVC does not have a BCS in the Victorian Volcanic Plain. However, the adjacent bioregional BCS has been applied for the impact assessment. This EVC has been given a BCS of depleted.
- 0.04 hectares of Plains Grassy Woodland EVC 55_61. This EVC has a BCS of Endangered within the Victorian Volcanic Plain.
- Two EPBC Act listed Threatened Ecological Communities (TECs):
  - 21.91 hectares of confirmed Seasonal Herbaceous Wetland (Freshwater) of the Temperate Lowland Plain (SHWTLP).
  - An additional potential 6.27 hectares of SHWTLP.
  - A potential 4.57 hectares of Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP).
- One *Flora and Fauna Guarantee Act 1988* (FFG Act) listed TEC:
  - 4.57 hectares of potential Western (Basalt) Plains Grassland.
- Fourteen large and 12 small scattered trees.

- One EPBC Act listed flora species was previously recorded within the study area and potential suitable habitat remains: Swamp Fireweed.
- Suitable habitat for three additional EPBC Act listed flora species: Matted Flax-lily *Dianella amoena*, River Swamp Wallaby-grass and Swamp Everlasting. Matted Flax-lily and Swamp Everlasting are also listed under the FFG Act.
- Two FFG Act listed flora species were recorded within the study area during a site assessment on 20 January 2021 (Ecology and Heritage Partners 2020): Austral Crane's-bill *Geranium solanderi* var. *solanderi* and Pale Swamp Everlasting *Coronidium gunnianum*.
- Suitable habitat for an additional four FFG Act listed flora species: Curly Sedge *Carex tasmanica*, Small Scurf-pea *Cullen parvum*, Tough Scurf-pea *Cullen tenax* and Plains Yam-daisy *Microseris scapigera*.
- Suitable habitat within Herne Swamp for two EPBC listed migratory shorebird species: Common Sandpiper *Actitis hypoleucos* and Latham's Snipe *Gallinago hardwickii*.
- Suitable habitat within Herne Swamp, Merri Creek, farm dams and associated drainage lines for one EPBC Act listed fauna species, Growling Grass Frog *Litoria raniformis*.
- Suitable habitat within Herne Swamp, Merri Creek, farm dams and associated drainage lines for seven FFG Act listed fauna species: Brown Toadlet *Pseudophryne bibronii*, Eastern Great Egret *Ardea alba modesta*, Australasian Shoveler *Spatula rhynchotis*, Hardhead *Aythya australis*, Blue-billed Duck *Oxyura australis*, Musk Duck *Biziura lobata* and Common Sandpiper *Actitis hypoleucos*.
- Potential aerial habitat for one EPBC Act listed fauna species: White-throated Needletail *Hirundapus caudacutus*.
- Suitable habitat within Plains Grassland (EVC 132) and surrounding grasses for one FFG Act listed threatened fauna species: Tussock Skink *Pseudemoia pagenstecheri*.
- 125.02 hectares of DEECA modelled wetlands (DEECA *Current wetlands map*) including Herne Swamp and several smaller wetland areas.

Government legislation and policy

An assessment of the project in relation to key biodiversity legislation and policy is provided and summarised below.

Legislation / policy	Relevant ecological feature on site	Permit /approval required	Notes
EPBC Act	**Flora** One EPBC Act listed flora species recorded within the study area: • Swamp Fireweed *Senecio psilocarpus* (Arcadis 2022). Three additional EPBC Act listed flora species with a medium to high likelihood of occurrence within the study area: • Swamp Everlasting *Xerochrysum palustre* • Matted Flax-lily *Dianella amoena*	A referral under the EPBC Act for Matters of National Environmental Significance was submitted in October 2023. A Controlled Action decision was received in June 2024. Preliminary Documentation is currently being prepared for	The Stage 1A project works will remove 0.03 hectares of SHWTLP. Given the impact is less than 0.15% of the TEC on the site, we do not consider it to be a significant impact. There are no impacts to NTGVVP from the Stage 1A project works. A targeted survey was undertaken for Swamp Everlasting, River Swamp Wallaby-grass and Swamp Fireweed in suitable habitat within the impact area. These EPBC Act listed species were not recorded

Legislation / policy	Relevant ecological feature on site	Permit /approval required	Notes
	• River Swamp Wallaby-grass *Amphibromus fluitans.* **Communities** Two EPBC Act listed communities recorded within the study area: • Seasonal Herbaceous Wetland (freshwater) of the Temperate Lowland Plains (SHWTLP) • Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP). **Fauna** Two EPBC Act listed fauna species with a medium or higher likelihood of occurrence within the study area: • Growling Grass Frog *Litoria raniformis* • White-throated Needletail *Hirundapus caudacutus.* One additional EPBC Act listed fauna species was predicted likely to occur in the study area by Ecology and Heritage Partners (EHP 2020): • Golden Sun Moth *Synemon plana*. Three EPBC Act listed migratory species were assessed as likely to use the study area: • Common Sandpiper *Actitis hypoleucos* • Latham's Snipe *Gallinago hardwickii* • White-throated Needletail.	assessment by DCCEEW.	within the impact footprint during targeted surveys on 6 December 2023. The species were also not recorded during targeted survey along the length of the drainage line connecting to Merri Creek in November 2024. A SIC assessment is provided for these species in Appendix 3. Matted Flax-lily habitat is outside the impact footprint, thus no targeted surveys are recommended. Targeted surveys for Growling Grass Frog and Golden Sun Moth were previously undertaken by EHP (EHP 2020). Neither species were identified during these surveys. Biosis agrees Golden Sun Moth is unlikely to occur within the study area due to a lack of suitable habitat. There is potential habitat present for Growling Grass Frog, Latham's Snipe and Common Sandpiper. However, if all recommendations outlined in Section 6 are implemented, there should be no significant impact to these species. The Construction Environmental Management Plan should outline how these recommendations will be addressed. White-throated Needletail is exclusively an aerial species, thus a significant impact is unlikely to occur on this species. Victorian Grassland Earless Dragon has a negligible to low likelihood of occurrence within the study area, a significant impact is unlikely to occur for this species.
FFG Act	Two FFG Act species were recorded within the study area by Ecology & Heritage Partners (EHP 2020): • Austral Crane's-bill *Geranium solanderi* var. *solanderi* • Pale Swamp Everlasting *Coronidium gunnianum.*	Protected Flora Permit is required for works in rail corridor.	Remainder of site is considered private land under the FFG Act.

Legislation / policy	Relevant ecological feature on site	Permit /approval required	Notes
	Suitable habitat for an additional six flora and ten fauna species listed under the FFG Act. Seven Protected flora species recorded within the study area by Biosis and/or EHP (2020). One FFG Act listed Threatened Ecological Community recorded within the study area (EHP 2020): • Western (Basalt) Plains Grasslands.		
Planning & Environment Act	All native vegetation proposed to be removed within the impact area. The *Planning and Environment Act 1988* defines 'native vegetation' as 'Plants that are indigenous to Victoria, including trees, shrubs, herbs, and grasses'.	Planning permissions may be required.	The outcome of the PSA process will determine the implications for Native Vegetation removal. In any instance, the project is required to consider State Planning Policy Clause 12.01-2 and the Guidelines.
Environment Effects Act	Native vegetation and threatened species	EE referral process completed.	In July 2020, the Minister for Planning determined that no EES would be required for the proposed project, subject to various conditions being satisfied. An Environment Report and Environmental Management Framework to satisfy conditions are currently being prepared for Stage 1A.
CaLP Act	Nine Regionally Controlled and two Restricted CaLP listed noxious weeds were recorded within the study area during the Biosis and EHP assessments assessment.	Landowners are legally required to prevent the growth and spread of regionally controlled weeds.	Hygiene controls will need to be implemented during construction to ensure weeds are not spread beyond the study area by machinery.
Pest animals	One pest species recorded, European Hare *Lepus europaeus.*	Landowners must take all reasonable steps to prevent the spread of -and as far as possible eradicate – established pest animals on their land.	N/A
Water Act	Merri Creek	Referral to Melbourne Water may be required if construction is likely to result in indirect impacts to the creek	Indirect impacts to the Merri Creek should be avoided if a Construction Environmental Management Plan (CEMP) is implemented and includes measures to avoid and minimise impacts to the creek.

Legislation / policy	Relevant ecological feature on site	Permit /approval required	Notes
		(through, for example, sedimentation).	
Fisheries Act	Merri Creek and drainage lines	No permit required	No permit required provided mitigation measures in this report are adhered to.

Guidelines for the removal, destruction or lopping of native vegetation

Stage 1A has been designed to avoid a significant portion of Herne Swamp and the surrounding wetland vegetation. The majority of the impact footprint occurs within degraded and highly modified paddocks that no longer support patches of native vegetation. Impacts to Plains Grassy Wetland and SHWTLP habitat occur to the minimum extent necessary to deliver the project. Results of the ecological assessments of the study area have been incorporated into the current design during the design phase of Stage 1A to avoid mapped patches of native vegetation where possible/practical. All patches of Plains Grassland EVC 132 within the study area are avoided by the design footprint. As a result, the EPBC Act listed Natural Temperate Grassland of the Victorian Volcanic Plain threatened community has been completely avoided.

Based on the current design the proposed development will require the removal of:

- 0.27 hectares of Tall Marsh (EVC 821)
- 0.03 hectares of Plains Grassy Wetland (EVC 125)
- 0.03 hectares Plains Grassy Woodland (EVC 55_61)
- two small scattered trees
- 5.46 hectares of DEECA Modelled Wetland.

A total of 0.520 hectares of native vegetation is to be removed outside of the MSA Levy area from within location category 2. Therefore, any planning permit permission would be assessed on the detailed assessment pathway. The strategic biodiversity value score of the native vegetation to be removed ranges from 0.325 to 0.495.

The offset requirements for this area would be 0.1520 general habitat units. The general offset must be within the Melbourne Water Catchment Management Authority area or the Mitchell Shire or Whittlesea City Council area and must have a minimum strategic biodiversity value score of 0.3121.

In addition to the offsets above, an MSA Environmental Compensation Levy is payable to compensate for native vegetation loss within the MSA Area.

Avoid and minimise statement

Several design iterations of the disturbance footprint (i.e. project design) have been developed in response to ecological investigations and advice, particularly to avoid and minimise impacts to the EPBC Act listed community SHWTLP and EPBC and FFG Act listed Growling Grass Frog habitat. The following has been achieved through the design process:

- Impacts to SHWTLP have been significantly reduced from the original Qube design. The original rail design was to impact 2.25 hectares of the threatened community. The current design has reduced impacts to a maximum of 0.03 hectares of SHWTLP.
- National Intermodal is continuing to refine design development to minimise impacts to hydrology. The Beveridge Intermodal Precinct Stage 1A Surface Water Modelling and Assessment (Aurecon, 2025) has confirmed that the current design has negligible impacts to water quality and flows into Herne Swamp and Merri Creek.
- Avoiding effects of lighting design on wildlife in line with the National Light Pollution Guidelines for Wildlife (DEE 2020).

- Bridge/culvert design for drainage line crossing and in the northern section of the proposed rail have been replaced by an approximately 700m long double track viaduct over the Herne Swamp area to maintain natural flood passage. Clearance under the viaduct will range from approximately 0.5m at the west end to 3m at the east end. It will be constructed from a series of concrete piers and box section concrete girders
- Culverts within the Herne Swamp Buffer area are to be designed with consideration of the Growling Grass Frog Crossing Design Standards from *Department of Environment, Lane, Water and Planning* (DELWP, now *Department of Energy, Environment and Climate Action* (DEECA)) (DELWP 2017a).
- Temporary exclusion fencing where the impact footprint crosses through Growling Grass Frog habitat.
- Avoid areas of potential EPBC Act listed community Natural Temperate Grassland of the Victorian Volcanic Plains (NTGVVP). This community may also provide habitat for the EPBC Act listed species Matted Flax-lily.
- Impacts to SHWTLP occur in a small, low quality portion of the community and will be temporary in nature, and thus the works are considered unlikely to fragment the ecological community.

Recommendations

Specific detail relating to preventing impacts to retained native vegetation and aquatic and terrestrial habitat should be addressed in a site-specific Construction Environmental Management Plan (CEMP). In particular, the CEMP should specifically address how Biosis' recommendations around Growling Grass Frog will be implemented. These specific recommendations can be found in Appendix 3.

A Conservation Management Plan (CMP) will be developed for Herne Swamp. This CMP should provide a framework for the protection and management of Herne Swamp during the operational phase and should include:

- Ecological Assessment and Monitoring
- Habitat Restoration and Enhancement
- Water Management
- Community Engagement and Education
- Invasive Species Management
- Climate Change Adaptation
- Funding and Resource Management.

All mitigation measures need to be committed to by National Intermodal as planning and construction progresses to ensure impacts to protected species and communities are avoided.

Contents

Tables

Figures

1. Introduction

1.1 Project background

Biosis Pty Ltd (Biosis) was commissioned by National Intermodal to undertake a flora and fauna assessment of the proposed Beveridge Intermodal Precinct. The project will consist of multiple stages and this report details the impacts of Stage 1A Early Works.

Stage 1A Early Works (the Stage 1A Project) involves the construction and operation of a permanent rail connection to the existing ARTC rail freight corridor, together with sidings and a basic intermodal terminal and associated infrastructure for the initial stage of the Beveridge Intermodal Terminal. The terminal will have the ability to operate 24 hours a day, 7 days, with up to two 1,800 metre long trains being processed per day in each 24 hour period (train shunting movements will be one 1,800 metre long train at a time).

The operation of the Stage 1A Project will be predominately rail to rail. For the rail to road proportion, truck movements will be capped (through the use of a vehicle booking system) to four truck movements per hour averaged over each 24 hour period (unless otherwise agreed and approved).

The Stage 1A Project comprises the following key components:

- Rail connection – rail connection (southern and northern lines) from the existing ARTC rail corridor (future Inland Rail) to the terminal. Including an approximately 700m long double track viaduct to be constructed over the floodplain zone to maintain natural flood passage.
- Rail infrastructure – turnouts and sidings (adjacent to the terminal hardstand) to accommodate interstate trains up to 1,800 metres long.
- Intermodal terminal – container handling and storage area (hardstand) for loading and unloading of trains. Manual handling only with reach stackers.
- Roads – Beveridge Road intersection and internal access road for heavy and light vehicle movement within the site.
- Ancillary development – demountable administration facility (office, toilet, lunch room) and packaged equipment (inc. but not limited to refuelling, water storage and drainage, lighting, fencing, weighbridge, solar generation and power storage, signage).
- Utilities – connection and site lead in for electricity, telecommunications, sewer and potable water.

The Stage 1A Site, including construction laydown areas, comprises approximately 67 hectares of currently undeveloped land located approximately 40 kilometres north of Melbourne CBD and to the east of the township of Beveridge (Figure 1).

The full extent of the study area was previously assessed by Ecology Heritage Partners (Ecology & Heritage Partners 2020). A smaller portion of the study area (25 hectares in the west) was previously assessed by Arcadis (Arcadis 2022). Vegetation mapping by Ecology and Heritage Partners and Arcadis was reviewed during this assessment and, where deemed accurate, has been incorporated into the figures and results of this report, however data collected by Biosis has been used in areas that were assessed on ground by Biosis.

1.2 Scope of assessment

The objectives of this investigation are to:

- Assess previous mapping of vegetation and habitat features across the study area and make changes where necessary.
- Review the previous Ecology reports by Arcadis and Ecology Heritage Partners.
- Map native vegetation and other habitat features where they differ from findings in previous ecology assessment reports (Ecology & Heritage Partners 2020 and Arcadis 2022).
- Conduct a vegetation quality assessment.
- Review the implications of relevant biodiversity legislation and policy, including Victoria's Guidelines for the removal, destruction or lopping of native vegetation ('the Guidelines').
- Identify potential implications of the proposed development and provide recommendations to assist with development design.
- Conduct targeted surveys for EPBC Act listed flora species with a medium to high likelihood of occurrence within the impact footprint.

1.3 Location of the study area

The study area is located approximately 2 kilometres northeast of the centre of Beveridge and approximately 40 kilometres north of Melbourne CBD (Figure 1). It encompasses approximately 900 hectares of private land and occurs within the following Whittlesea Planning Scheme zones:

- Urban Floodway Zone (UFZ).
- Rural Conservation Zone – Schedule 1 (RCZ).
- Green Wedge Zone (GWZ).
- Farming Zone (FZ).

The study area is also subject to the following environmental and land management overlays in the Whittlesea Planning Scheme:

- Rural Floodway Overlay (RFO).
- Environmental Significance Overlay – Schedule 3 (ESO3).

While the majority of the study area occurs within the Melbourne Strategic Assessment (MSA) an MSA approval exclusion zone surrounds Herne Swamp in the northwest of the study area.

The study area is within the:

- Victorian Volcanic Plain Bioregion and the Highland Southern Fall Bioregion.
- Yarra River Basin (Port Philip and Westernport catchment).
- Management area of Melbourne Water.
- City of Whittlesea.
- Traditional lands of the Wurundjeri Woi-Wurrung people.

1.4 Project area details and definitions

Table 1 outlines key project terms, abbreviations and their definitions.

Table 1 Definitions of project terms, acronyms and abbreviations

Term, acronym, or abbreviation	Definition
BCS	Bioregional Conservation Status
Biosis survey area	The north-western corner of the study area, as displayed in Figure 2.
CaLP Act	*Catchment and Land Protection Act 1994*
CEMP	Construction Environmental Management Plan
CMA	Catchment Management Authority
DCCEEW	Department of Climate Change, Energy, the Environment and Water (Federal)
DEECA	Department of Energy, Environment and Climate Action (State)
EE Act	*Environment Effects Act 1978*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EVC	Ecological Vegetation Class
FFG Act	*Flora and Fauna Guarantee Act 1988*
Herne Swamp	Also, Hearne's Swamp, Hernes Swamp, Hearne Swamp. For the purposes of this report, considered the extent of DEECA mapped wetland located in the northern extent of the study area.
Impact footprint / Stage 1A	Where vegetation removal and soil disturbance is likely to occur to construct the Stage 1A project within the study area.
MNES	Matters of National Environmental Significance (as defined under the EPBC Act)
MSA	Melbourne Strategic Assessment
PMST	Protected Matter Search Tool
SIC	Significant Impact Criteria (as defined under the EPBC Act)
Study area	The area surveyed on ground during the flora and fauna assessment by Biosis, EHP and Arcadis collectively
TEC	Threatened Ecological Community

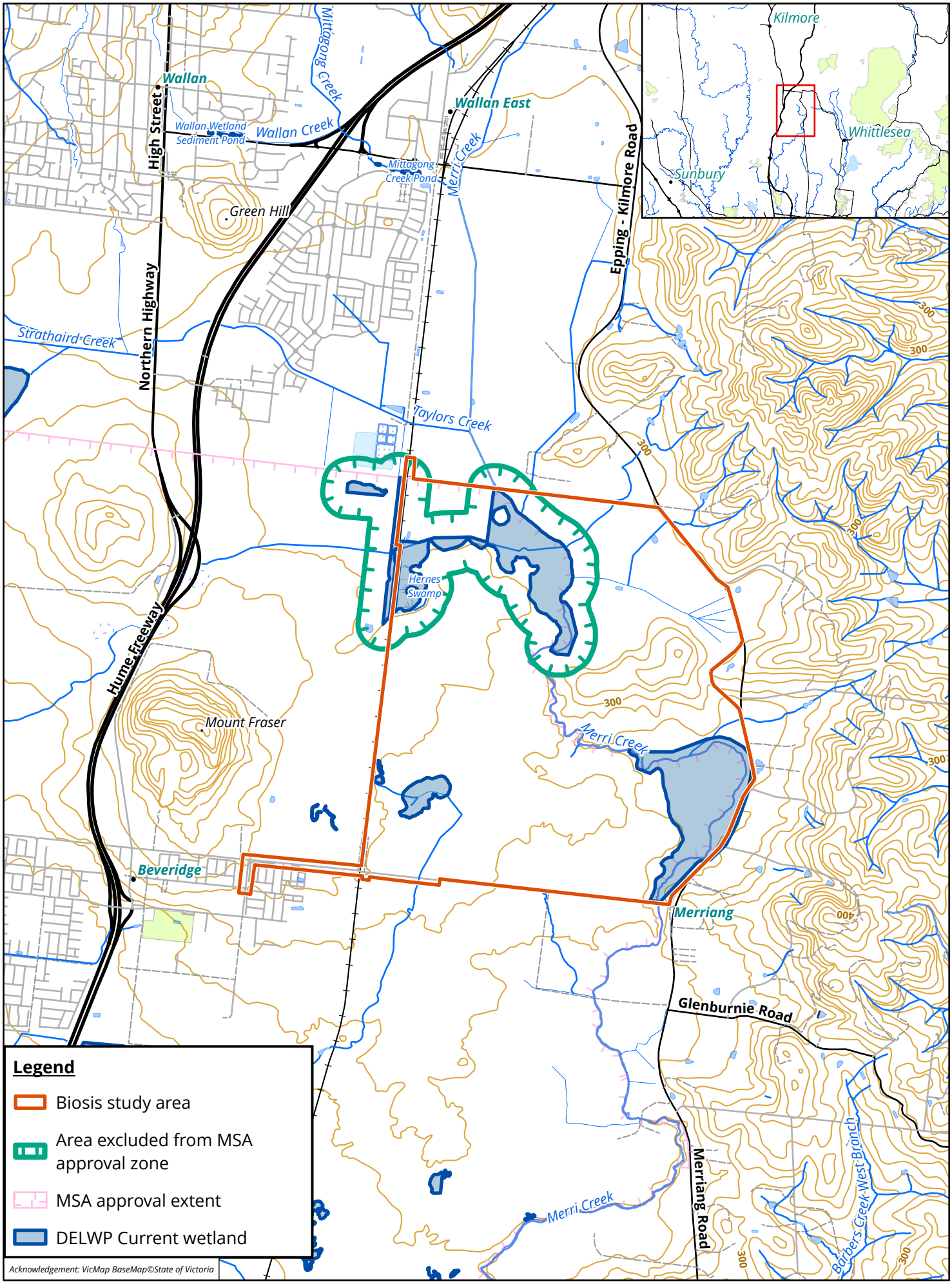
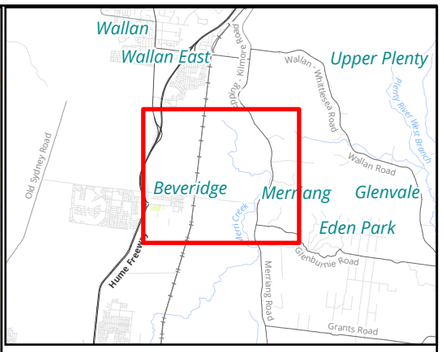


Figure 1 Location of the study area: 125 - 256 Beveridge Road, Beveridge, Victoria

Matter: 39671,
Date: 18 October 2023,
[redacted]



Legend

- Biosis study area
- Biosis survey extent
- Biosis aquatic survey location
- Ecology and Heritage Partners survey extent
- Arcadis survey extent
- Stage 1A impact area

Hydrography

- Current wetland (DEECA)
- Lake, dam, watercourse area
- Swamp
- Area subject to inundation
- Stream
- Drain, channel

Topography

- Contour 10 m interval

Administrative boundaries

- Current parcel boundary

Figure 2 Survey extents of Biosis, Ecology and Heritage Partners & Arcadis

0 200 400 600 800 1,000

Metres
Scale: 1:19,000 @ A3
Coordinate System: GDA2020 MGA Zone 55

N

Matter: 39671,
Date: 27 February 2025,
Prepared for [redacted]
Layout: 39671_F2_survey_extents
Project: <LINK>P:\39600s\39671\Mapping\</LINK>
39671_FFA_BIFT_1A.aprx

2. Methods

2.1 Database review

In order to provide a context for the study area, information about flora and fauna from within 5 kilometres of the study area (the 'local area') was obtained from relevant biodiversity databases, many of which are maintained by the Victorian Government Department of Energy, Environment and Climate Action (DEECA) (formerly Department of Environment, Land, Water and Planning (DELWP)) or the Australian Government Department of Climate Change, Energy, Environment and Water (DCCEEW). Records from the following databases were collated and reviewed:

- DEECA's Victorian Biodiversity Atlas (VBA), including the 'VBA_FLORA25, FLORA100 & FLORA Restricted' and 'VBA_FAUNA25, FAUNA100 & FAUNA Restricted' datasets.
- DCCEEW's Protected Matters Search Tool for matters protected by the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Other sources of biodiversity information were examined including:

- Arcadis 2022. *Beveridge Intermodal Freight Terminal: Ecology survey and mapping*, Report prepared for National Intermodal Corporation.
- Ecology & Heritage Partners 2020. *Biodiversity Assessment for the Proposed Beveridge Intermodal Freight Terminal.*, Report prepared for Beveridge Property Management Services Pty Ltd.
- Ecology & Heritage Partners 2022. *Environment report for the proposed Beveridge Intermodal Freight Terminal: Beveridge Road, Beveridge, Victoria*. Report prepared for Beveridge Property Management Services Pty Ltd.
- DEECA's NatureKit mapping tool.
- DEECA's Habitat Importance maps.
- DEECA's Native Vegetation Information Management (NVIM) system.
- DEECA's Ensym NVR Tool Support team was provided with site-based spatial information in order to generate a Native Vegetation Removal Report for the study area.
- Planning Scheme overlays relevant to biodiversity based on http://planningschemes.dpcd.vic.gov.au.

2.2 Definitions of threatened species or communities

Threatened species or communities include those species or communities that are listed under the EPBC Act and/or FFG Act. The conservation status of a species or ecological community is determined by its listing status under Commonwealth or State legislation / policy (Table 2).

Table 2 Conservation status of threatened species and ecological communities

Government level	Conservation status
National	Listed as nationally critically endangered, endangered or vulnerable under the EPBC Act
State	Listed as extinct, extinct in the wild, critically endangered, endangered, vulnerable or conservation dependent in Victoria under the FFG Act

Lists of threatened species generated from the databases are provided in Appendix 1 (flora) and Appendix 2 (fauna) and the species have been assessed to determine their likelihood of occurrence based on the process outlined below.

2.3 Determining likelihood of occurrence of threatened species

Likelihood of occurrence indicates the potential for a species or ecological community to occur regularly within the study area. It is based on expert opinion, information in relevant biodiversity databases and reports, and an assessment of the habitats on site. Likelihood of occurrence is ranked as negligible, low, medium, high or recorded. The rationale for the rank assigned is provided for each species in Appendix 1 (flora) and Appendix 2 (fauna). Those species for which there is little or no suitable habitat within the study area are assigned a likelihood of low or negligible and are not considered further.

Only those species listed under the EPBC Act or the FFG Act (hereafter referred to as ' threatened species') are assessed to determine their likelihood of occurrence. The habitat value for threatened species is calculated by the Habitat Importance Modelling produced by DEECA (DELWP 2017b). Where threatened species are recorded in the study area this is noted in Appendix 1 (flora) and Appendix 2 (fauna).

Threatened species which have at least medium likelihood of occurrence are given further consideration in this report. The need for targeted survey for these species is also considered.

2.4 Site investigation

2.4.1 Flora assessment

A flora assessment was undertaken on 4 May 2023 by [redacted] (Senior Botanist) and [redacted]k (Principal Botanist) to confirm the extent of native vegetation and threatened communities mapped by Ecology Heritage Partners (Ecology & Heritage Partners 2020, Ecology & Heritage Partners 2022).

Additional assessments were undertaken by [redacted] (Senior Botanist) on 21 September 2023 to confirm vegetation values within the rail corridor.

[redacted] undertook survey on October 21 2024 to further assess potential values associated the drainage line in the north of the study area.

The total extent of the Biosis on ground assessment is displayed in Figure 2.

Where native vegetation on-ground differed from the patches presented in the previous reports, habitat zones were mapped to reflect the current extent of native vegetation more accurately. Most updates to mapped habitat zones were required in the northwest of the study area surrounding Herne Swamp. Previous mapping of vegetation in the southern and eastern section of the study area were also checked, however EHP mapping appeared accurate in these areas and did not need to be updated at the time of assessment. The Arcadis (2022) data from the area south of Herne Swamp is also included in the current report.

The large size of the study area required assessments to be undertaken on foot and in vehicles. Highly modified areas (no vegetation mapped in previous reports) were assessed from a vehicle to confirm the absence of native vegetation. More complex areas, such as the rail corridor, and the wetland vegetation around Herne Swamp and the Merri Creek were assessed on foot.

Native vegetation is defined in the Victoria Planning Provisions as 'plants that are indigenous to Victoria, including trees, shrubs, herbs, and grasses' (Clause 73.01).

The Guidelines classify native vegetation into two categories (DELWP 2017c):

- A **patch** of native vegetation (measured in hectares) is either:
  - An area of native vegetation, with or without trees, where at least 25% of the total perennial understorey cover is native plants.
  - An area with three or more native canopy trees where the drip line (i.e. the outermost boundary of a tree canopy) of each tree touches the drip line of at least one other tree, forming a continuous canopy.
  - Any mapped wetland included in the Current wetlands map, available in DEECA systems and tools.

Patch vegetation is classified into ecological vegetation classes (EVCs). An EVC contains one or more floristic (plant) communities, and represents a grouping of broadly similar environments. Definitions of EVCs and benchmarks (condition against which vegetation quality at the site can be compared) are determined by DEECA.

- A **scattered tree** is defined as a native canopy tree that does not form part of a patch of native vegetation.

A canopy tree is a mature tree that is greater than three metres in height and is normally found in the upper layer of a vegetation type. Ecological vegetation class descriptions provide a list of the typical canopy species. A scattered tree is defined as either small or large, and is determined using the large tree benchmark for the relevant EVC. The extent of a small scattered tree is the area of a circle with a 10 metre radius (i.e. 0.031 hectares), while the extent of a large scattered tree is a circle with a 15 metre radius (i.e. 0.070 hectares). A condition score is applied to each scattered tree based on information provided by DEECA's NVIM.

A Vegetation Quality Assessment (VQA) was undertaken for all patches of native vegetation identified in the study area. This assessment is consistent with DEECA's habitat hectare method (DSE 2004) and the Guidelines (DELWP 2017c). For the purposes of this assessment the limit of the resolution for identification of a patch of native vegetation was taken to be 0.001 habitat hectares (Hha). That is, if a discrete patch native vegetation was present with sufficient cover but its condition and extent would not have resulted in the identification of at least 0.001 habitat hectares, the vegetation patch of vegetation was not mapped or included in the assessment.

Species nomenclature for flora follows the Victorian Biodiversity Atlas (VBA).

2.4.2 Targeted flora surveys

During the detailed assessment, suitable habitat was deemed present for the following three threatened flora species listed as vulnerable under the EPBC Act:

- Swamp Fireweed *Senecio psilocarpus*
- Swamp Everlasting *Xerochrysum palustre*
- River Swamp Wallaby-grass *Amphibromus fluitans.*

A targeted survey was undertaken by [redacted] (Senior Botanist) on 6 December 2023 in suitable habitat within the impact footprint for each species. The following methods were used:

- One botanist systematically surveyed suitable habitat within the study area by walking transects spaced at five metres apart.
- Survey effort increased in areas where habitat was deemed particularly suitable for a given species.

- The target species are cryptic and only readily identifiable when flowering, which occurs at particular times of the year depending on environmental conditions. Surveys were timed to target the peak flowering periods for the species (November to January).

Additional targeted survey for the above species was undertaken across the extent of the drainage line running from the Stage 1A impact area to Merri Creek. This survey was undertaken by [redacted] (Senior Botanist) on 29 November 2024.

Reference sites

Where there were known populations of the target species within close proximity to the study area, an accessible reference site was selected and the botanist undertaking the survey checked whether the known population was above ground and flowering or finished flowering at the time the survey was conducted.

Table 3 lists reference sites visited during the targeted surveys for threatened flora, including observations made during the visit on whether plants were found and flowering status.

Table 3 Reference sites visited during targeted surveys

Flora species	Reference site	Coordinates	Source	Date of visit	Observations/notes
Reference site checks					
Swamp Fireweed	Western border of the study area, adjacent to the train line	-37.450835, 144.999812	Arcadis (2022)	6-Dec-23	No plants were found at the time of survey at the reference site. Cattle grazing within the reference area may have impacted detectability of the species. Survey timing was considered appropriate as the peak flowering period for the species is November – December.
Swamp Everlasting	South Station Street, Wallan	-37.436830, 145.001390 (plus several other nearby records in vicinity)	Victorian Biodiversity Atlas (VBA)	6-Dec-23	No plants were found at the time of survey at the reference site. However, expert Botanist Dylan Osler confirmed on 27 November 2023 that the species had been observed flowering at revegetation sites at Morang Wetlands and Waterways, and the peak flowering period for the species is December. The habitat at the VBA reference sites appeared degraded and may no longer provide suitable habitat for the species, or the record may have been unknowingly situated within the railway reserve which was inaccessible at the time of the survey.
River Swamp Wallaby-grass	NA	NA	NA	NA	This species is identifiable during the flowering and fruiting period of most grasses (peak November – December). Common Swamp Wallaby-grass *Amphibromus nervosus* was recorded flowering and with ripe seed during the targeted survey.

2.4.3 Terrestrial fauna assessment

The Biosis survey area was investigated on 4 May 2023 and the rail corridor on 21 September 2023 by [redacted] (Zoologist) and [redacted] (Principal Zoologist) undertook additional survey on October 21 2024 to further assess potential values associated with the drainage line in the north of the study area.

The above assessment was undertaken to determine values for fauna and confirm the likelihood of occurrence of threatened fauna determined by Ecology Heritage Partners in 2020 (Ecology & Heritage Partners 2020) and again by Arcadis in 2021 (Arcadis 2022). These were determined primarily on the basis of the types and qualities of habitat(s) present. All species of fauna observed during the assessment were noted and active searching for fauna was undertaken. This included direct observation, searching under rocks, examination of tracks and scats and identifying calls. Particular attention was given to searching for significant species and their habitats. Fauna species were recorded with a view to characterising the values of the site and the investigation was not intended to provide a comprehensive survey of all fauna that has potential to utilise the site over time.

Targeted surveys for Growling Grass Frog and Golden Sun Moth have previously been undertaken for this site by Ecology and Heritage Partners in 2020 (Ecology & Heritage Partners 2020) within areas of suitable habitat across the study area.

2.4.4 Aquatic fauna survey

An aquatic assessment was undertaken by two suitably qualified zoologists to provide a description of the existing aquatic environment and value present within the study sit that may be affected by the project. A high-level aquatic habitat assessment was undertaken along Merri Creek and along the drainage line in the north-west of the study area, which intersects the proposed rail corridor upgrade to document the presence of aquatic vegetation and habitat for aquatic fauna such as Burrowing Crayfish (*Engaeus* spp.).

In addition, targeted fish surveys were conducted at six sites along the length of Merri Creek, within the study area. Surveys were conducted in sections located upstream and downstream of the proposed impact area. Surveys were undertaken in alignment with the EPBC Act survey guidelines for Australia's threatened fish species, as outlined below:

- Active searching using hand-held dip nets in suitable areas where the creek was narrow and shallow enough.
- A total of 50 traps baited with phosphorescent light sticks were deployed with five to 10 traps deployed at each of the six sampling locations along Merri Creek. Bait traps were small (23 x 23 x 50 centimetres), collapsible 2 millimetre mesh boxes with two funnel entrances of approximately 40 millimetre in diameter. Bait traps were semi-submerged in order to prevent drowning of air-breathing animals (e.g. frogs and late stage tadpoles) and to reduce the risk of asphyxiation of fish due to low dissolved oxygen. Bait traps were deployed during the morning of 11 September 2023 and were left over one night. Baited traps were retrieved on the morning of 12 September 2023 between dip netting surveys and contents examined to identify any fish or aquatic invertebrates captured.

2.4.5 Victorian Grassland Earless Dragon Habitat Assessment

At the time of initial assessment the modelled distribution for the Critically Endangered Victorian Grassland Earless Dragon (VGED) was limited to Melbourne's west (with an eastward extent of Sunbury) and as such although the species was considered in Biosis' initial likelihood assessment (Appendix 2), it was concluded to have a low likelihood of occurrence in the Study Area due to its distance from the mapped distribution and a lack of records in the area.

In February 2024 the modelled distribution of 'species or species habitat known or likely to occur' for the species was expanded significantly eastward (DCCEEW, 2024) and as such the Study Area (Figure 1) is now included in the outer reaches of the modelled distribution polygon.

Following this update a site-based qualitative habitat assessment was undertaken by two experienced ecologists, including a Senior Zoologist and Senior Botanist. The assessment was undertaken in two stages, an initial assessment (14 June 2024) covered the area located within the Herne Swamp and associated buffer, which is excluded from the MSA approval area, and a second assessment of the remainder of the study area (14 and 15 August 2024). Full details of the assessment methodology are included in Appendix 9.

2.4.6 Permits

Biosis undertakes flora and fauna assessments under the following permits and approvals:

- Wildlife Authorisation issued by DEECA under the *Victorian Wildlife Act 1975* (Permit Number 10010193)
- Permit to Take/Keep Protected Flora issued by DEECA under the *Flora and Fauna Guarantee Act 1988* (FFG Act) (Permit Number 10010194)
- Permit to Take Protected Fish issued by DEECA under the *Flora and Fauna Guarantee Act 1988* (FFG Act) (Permit Number 10010195)
- Permit to catch and release fish issued by the Victorian Fisheries Authority under the *Victorian Fisheries Act 1995* (Permit Number RP 1220, Personal File Number 13041)
- Approvals 18.21 and 20.21 issued by the Wildlife and Small Institutions Animal Ethics Committee of the Victorian Government Department of Economic Development, Jobs, Transport and Resources (DEDJTR)

2.5 Qualifications

Ecological surveys provide a sampling of flora and fauna at a given time and season. There are a number of reasons why not all species will be detected at a site during survey, such as low abundance, patchy distribution, species dormancy, seasonal conditions, and migration and breeding behaviours. In many cases these factors do not present a significant limitation to assessing the overall biodiversity values of a site.

The Biosis flora and fauna assessment was conducted in autumn, which is a sub-optimal time for surveying SHWTLP. However all areas within the impact footprint that had the potential to be SHWTLP were confirmed to be the threatened community due to the presence of several key indicator species. Thus, the autumn survey is adequate for recording and mapping vegetation and habitat within the impact footprint area.

Native Vegetation Removal Reports are prepared through DEECA's NVIM system or requested through DEECA's Ensym NVR Tool Support team. Biosis supplies relevant site-based spatial information as inputs to DEECA and we are entirely reliant on DEECA's output reports for all assessment pathway applications. Biosis makes every effort to ensure site and spatial information entered into the NVIM, or supplied to DEECA, is an accurate reflection of proposed native vegetation removal. The Native Vegetation Removal Report can be viewed in Appendix 6.

2.6 Legislation and policy

The implications for the project were assessed in relation to key biodiversity legislation and policy including:

- Matters listed under the EPBC Act, associated policy statements, significant impacts guidelines, listing advice and key threatening processes.
- Threatened taxa, communities and threatening processes listed under Section 10 of the FFG Act and associated action statements and listing advice.
- Guidelines for the removal, destruction or lopping of native vegetation (DELWP 2017c).
- *Planning and Environment Act 1987* – specifically Clauses 12.01-2, 52.17 and 66.02 and Overlays in the Whittlesea Planning Scheme.
- Noxious weeds and pest animals lists under the *Catchment and Land Protection Act 1994* (CaLP Act).
- *Environment Effects Act 1978.*
- *Fisheries Act 1995.*
- *Water Act 1989.*
- *Environment Protection Act 2017*: Environmental Reference Standards.

2.7 Mapping

National Intermodal Corporation supplied spatial data from EHP and Arcadis and site plans (drawing number: BEV-ARC-PC-WS-SKE-CE-100201).

Mapping in the field was conducted using hand-held GPS-enabled tablets and aerial photo interpretation. The accuracy of this mapping is therefore subject to the accuracy of the tablets (generally ± 7 metres) and dependent on the limitations of aerial photo rectification and registration.

Mapping has been produced using a Geographic Information System (GIS). Electronic GIS files which contain our flora and fauna spatial data are available to incorporate into design concept plans. However, this mapping may not be sufficiently precise for detailed design purposes.

3. Results

The ecological features of the study area are described below and mapped in Figure 3.

Species recorded during the flora and fauna assessment are listed in Appendix 1 (flora) and Appendix 2 (fauna). Unless of particular note, these species are not discussed further.

Threatened species recorded or predicted to occur in the local area are also provided in appendices, along with an assessment of the likelihood of the species occurring within the study area.

3.1 Vegetation and fauna habitat

While most of the study area is highly modified due to livestock grazing, a range of ecological features occur. These include: Native patch vegetation, Herne Swamp (which forms part of the EPBC Act listed threatened community Seasonal Herbaceous Wetland (Freshwater) of the Temperate Lowland Plains (SHWTLP) and is a DELWP modelled wetland), Merri Creek and small and large scattered trees.

Patches of Plains Grassland – Heavier Soils EVC 132 occur around rocky outcrops and are of relatively low quality (Figure 3). These patches are characterised by a high cover of bryophytes on rocks and a low cover of native flora species. Native species include Kangaroo Grass *Themeda triandra*, Spear Grass *Austrostipa* sp., Weeping Grass *Microlaena stipoides* var. *stipoides* and Wattle Mat-rush *Lomandra filiformis*. Weed cover is moderate and dominated by Brown Top Bent *Agrostis capillaris* and Ribwort *Plantago lanceolata*. These areas were mapped by EHP (2020) as the EPBC Act listed community Natural Temperate Grassland of the Victorian Volcanic Plain. At the time of the current survey (May 2023) patches of Plains Grassland did not meet the definition of the threatened community, as native tussock cover was below the 50% cover threshold, however, May is a sub-optimal time to undertake grassland surveys. As such, these patches of native vegetation have the potential to be the threatened community. Plains Grassland provides habitat for reptiles and frogs, as well as foraging birds and mammals. Common Froglet *Crinia signifera* and Spotted Marsh Frog *Limnodynastes tasmaniensis*, Little Whip Snake *Suta flagellum* and Bougainville's Skink *Lerista bougainvillii* were found underneath rocks.

Plains Grassy Wetland EVC 125 occurs across the Herne Swamp area and in small patches along the western border of the study area (Figure 3). Outside of Herne Swamp, Plains Grassy Wetland is characterised by wetland or inundation-tolerant plant species including Common Tussock-grass *Poa labillardierei,* Poong'ort *Carex tereticaulis,* Knob Sedge *Carex inversa*, Brown-back Wallaby Grass *Rytidosperma duttonianum* and Spike Rush *Eleocharis acuta* (Arcadis 2022).

Areas of Plains Grassy Wetland within Herne Swamp corresponds to the EPBC Act listed community SHWTLP. This area was inundated at the time of survey and dominated by a high cover and diversity of SHWTLP characteristic species including Common Tussock-grass, Poong'ort, Common Spike-rush, Joint-leaf Rush *Juncus holoschoenus*, Brown-back Wallaby-grass, White Purslane *Montia australasica,* Willow-herb *Epilobium* sp., River Buttercup *Ranunculus inundatus* and Milky Beauty-heads *Calocephalus lacteus*. EPBC Act listed species Swamp Fireweed was recorded within the Herne Swamp area by Arcadis (2022) (Figure 3). Herne Swamp is also mapped from DEECA's Current wetlands dataset as Freshwater Marshes/Meadow (temporary). Common Froglet and Spotted Marsh Frog were heard calling throughout the swamp area and surrounding grassy vegetation, and birds such as Swamp Harrier *Circus approximans* and White-necked Heron *Ardea pacifica* were observed foraging around the swamp.

The Merri Creek runs through the middle of the study area. Ecology Heritage Partners (2020) identified several patches of Tall Marsh EVC 821 along the creek (Figure 3). These patches contain a mixture of Broadleaf Cumbungi *Typha orientalis* and Common Reed *Phragmites australis*, with Water Ribbon *Cycnogeton procerum* (EHP 2020). Tall Marsh was also identified along the western boundary of the study area within the rail corridor during the Biosis assessment. These areas are dominated by Common Reed and Rush species *Juncus* spp. with associated herb species including Red Azolla *Azolla rubra*, Common Duckweed *Lemna disperma* and Water Plantain *Alisma plantago-aquatica*.

Several small patches of Plains Grassy Woodland EVC 55_61 occur along the western boundary of the study area within the rail corridor. These patches have a sparse overstorey of River Red-gum *Eucalyptus camaldulensis* and a shrub layer dominated by Silver Wattle *Acacia dealbata*, Tree Violet *Melicytus dentatus* and Black Wattle *Acacia melanoxylon.* Several common woodland bird species were observed using this habitat.

Twenty-six scattered remnant trees were recorded across the study area (EHP 2020 and Biosis 2023). Species include: River Red-gum and Manna Gum *Eucalyptus viminalis.* Planted trees and shrubs are situated in the southern half of the study area and comprised of River Red Gum, Sugar Gum *Eucalyptus cladocalyx*, Blackwood *Acacia melanoxylon*, Honey-myrtle *Melaleuca* spp. and Sheoak *Allocasuarina* spp. (Arcadis 2022).

The remaining parts of the study area support introduced vegetation, including Sweet Vernal Grass *Anthoxanthum odoratum,* Rye Grass *Lolium rigidum*, Squirrel-tail Fescue *Vulpia bromoides*, Yorkshire Fog *Holcus lanatus* and Cocksfoot *Dactylis glomerata* (Arcadis 2022, EHP 2022).

These features are described further in Table 4. Photos are provided in Appendix 4.

3.2 Aquatic habitat and fauna

While some patches of Tall Marsh vegetation persist along Merri Creek and emergent vegetation is also present in some areas, the majority of the creek banks have been severely trampled by livestock. Despite this, *Engaeus* burrows were located along most of the creek, particularly in areas comprising jumbled rocks embedded into the bank. Gaps between rocks likely offer some refuge to the species to avoid trampling by livestock. Although it is not possible to accurately identify the species without capturing individuals, we consider it unlikely that the burrows present within the study area belong to any of the EPBC Act or FFG Act listed *Engaeus* spp. as no records of these species are known from the local area nor were any of these species picked up during the PMST searches. It is also likely that impacts to burrowing crayfish from the proposed development can be avoided as works are not expected to directly impact the creek and impacts from runoff associated with works can be mitigated. No evidence of burrowing crayfish was apparent along the north-western drainage line, likely due to the fact that this area is trampled significantly by livestock.

Targeted surveys for fish species yielded no fish throughout Merri Creek and the north-western drainage line. Aquatic invertebrates such as the Common Yabby *Cherax destructor destructor* and Common Freshwater Shrimp *Paratya australiensis*, were commonly captured in traps along most of Merri Creek. In addition, several other macroinvertebrates were opportunistically captures in the bait traps, with individuals from several families including Aeshnidae, Dytiscidae, Notonectidae, Coenagrionidae and Baetidae present. The presence of individuals from these macroinvertebrate families suggests that although under anthropogenic influence, water quality within Merri Creek remains reasonable. A possible explanation for the absence of fish captured in bait traps and using dip netting may reflect the seasonal patterns of fish species distribution and abundance in Victorian freshwater systems. According to the approved survey guidelines for Australia's threatened fish, recommended sampling periods for most of Australia's threatened ichthyofauna should

ideally be undertaken between December and May, when water flows are lower and migratory species are more detectable. Despite this, it is considered unlikely that the proposed works will directly impact Merri Creek and therefore, are unlikely to constitute a significant impact to any fish species present. In addition, it should be possible to avoid and mitigate any indirect impacts to the creek associated with runoff.

Table 4 Summary of vegetation and habitat types within the study area

Vegetation or habitat type	Description	Location	Significant values
Plains Grassland EVC 132 **Bioregional Conservation Status: Endangered**	Treeless vegetation mostly less than 1 metre tall dominated by largely graminoid and herb life forms. Dominant species within this EVC include Kangaroo Grass, Spear Grass and Cranesbill *Geranium* sp. A moderate cover (25-50%) cover of introduced species include Brown-top Bent, Sheep-sorrel *Acetosella vulgaris* and White Clover *Trifolium repens* var. *repens*.	Rocky outcrops in the north-western portion of the study area	• Areas of potential EPBC Act listed community Natural Temperate Grassland of the Victorian Volcanic Plain. • Suitable habitat for EPBC Act listed species Matted Flax-lily. • Suitable habitat for FFG Act listed flora species: Small Scurf-pea, Tough Scurf-pea and Austal's Cranes-bill. • Suitable habitat for FFG Act listed fauna species: Tussock Skink. • Suitable overwintering habitat under rocks for EPBC Act listed Growling Grass Frog and FFG Act listed Brown Toadlet. • Provides habitat for other common reptile and frog species.
Plains Grassy Wetland EVC 125 **Bioregional Conservation Status: Endangered**	Treeless vegetation characterised by a ground cover of grasses, small sedges and herbs. Dominant species include Common Tussock-grass, Poong'ort, Brown-back Wallaby-grass and Swamp Starwort *Stellaria angustifolia*. Weed cover is relatively low (5-25%) and includes Lesser Hawkbit *Leontodon saxatilis* subsp. *saxatilis*, Toowoomba Canary-grass *Phalaris aquatica* and Yorkshire Fog *Holcus lanatus.*	North-western corner of the study area. Some small patches along the western border	• The Herne Swamp area within this EVC correspond to the EPBC Act listed community SHWTLP. There are other small patches outside of Herne Swamp that may also correspond to the threatened community. • The Herne Swamp area also corresponds to the DELWP modelled wetland Freshwater Marshes/Meadow (temp). • EPBC Act listed flora species Swamp Fireweed recorded within this EVC (Figure 3). • Suitable habitat for EPBC Act listed species Swamp Fireweed, Swamp Everlasting and River Swamp Wallaby-grass. • Suitable habitat for EPBC Act listed Growling Grass Frog • Suitable habitat for FFG Act listed species: Curly Sedge, Pale Swamp Everlasting and Plains Yam-daisy. • Suitable habitat for EPBC Act listed Growling Grass Frog and FFG Act listed Brown Toadlet.

Vegetation or habitat type	Description	Location	Significant values
			• Suitable habitat for EPBC Act listed migratory species Common Sandpiper and Latham's Snipe.
Tall Marsh EVC 821 **Bioregional Conservation Status: Depleted**	Closed to open grassland/sedgeland to 3 metres tall, dominated by Common Reed and Cumbungi. Small aquatic and semi-aquatic species occur amongst the reeds and include Water Ribbons, Finger Rush *Juncus subsecundus* and Pale Rush *Juncus pallidus* (Ecology & Heritage Partners 2020).	Small areas along the Merri Creek in the middle of the study area and within the rail corridor along the western boundary.	• Suitable habitat for EPBC Act listed Growling Grass Frog. • Suitable habitat for EPBC Act listed flora species River Swamp Wallaby-grass.
Plains Grassy Woodland EVC 55_61 **Bioregional Conservation Status: Endangered**	An open, eucalypt woodland to 15 metres tall. The canopy layer is characterised by River Red-gum, however some patches within the study area do not have a canopy. The midstory is dominated by Silver Wattle, Black Wattle and Tree Violet. Weed cover is moderate to high and includes Wimmera Rye-grass *Lolium rigidum* and Panic Veldt-grass *Ehrharta erecta.*	Western boundary (Figure 3)	• Provides habitat for common woodland birds.
Scattered trees	Small and large scattered trees occur within the study area. Species include River Red-gum and Manna Gum (Ecology & Heritage Partners 2020).	Scattered throughout (Figure 3)	• Low likelihood of providing habitat for threatened fauna species.
Merri Creek	Merri Creek flows from south of the Great Dividing Range, through to Melbourne northern suburbs.	Through the middle of the study area (Figure 3)	• There is a recorded population of EPBC Act listed Growling Grass Frog along the Merri Creek.
Herne Swamp, farm dams and associated drainage line to Merri Creek	Three permanent farm dams and Herne Swamp are connected to Merri Creek via a vegetated drainage line.	Throughout the study area	• Suitable habitat for EPBC Act listed Growling Grass Frog and FFG Act listed Brown Toadlet, Eastern Great Egret, Australasian Shoveler, Common Sandpiper, Musk Duck, Hardhead, and Blue-billed Duck. • Suitable habitat for EPBC Act listed migratory species Common Sandpiper and Latham's Snipe. • Provides habitat for other common frogs and waterbirds.

Vegetation or habitat type	Description	Location	Significant values
Planted Vegetation	Planted shrubs and tree species include Sugar Gum, Blackwood, Honey-myrtle and Sheoak (Arcadis 2022).	Southern half of the study area	• Provide habitat for small and medium-sized common woodland birds.
Predominantly Introduced Vegetation (PIV)	Predominantly introduced vegetation comprises of introduced grasses and herbs. Dominant species include Sweet Vernal Grass, Toowoomba Canary-grass, Rye Grass, Yorkshire Fog *Holcus lanatus* and Cocksfoot.	Throughout the study area	• FFG Act listed Tussock Skink may use these areas where they surround Plain Grassland EVC patches. • Provide habitat for other common reptiles, such as snakes and skinks.

3.3 Landscape context

The study area occurs within a largely cleared and relatively flat, rural landscape. The Merri Creek runs through the study area from the northern to the southern boundary. The Merri Creek provides connectivity between the study area and the surrounding landscape.

The northern extent of the study area contains a portion of Herne Swamp, a large DELWP mapped wetland that occurs to the west of Merri Creek and forms a significant part of the Merri Creek Catchment. The former extent of Herne Swamp has been substantially reduced as a result of historical drainage modifications in the wider area. Within the study area drainage modifications are in the form of a drainage channel running east to west across the site and several farm dams.

Private properties and roadsides to the east of the study area support a significant amount of remnant vegetation that connects (with minimal disruptions) to Kinglake National Park. There is no longer any direct connectivity between the study area and Kinglake National Park due to historical clearance of native vegetation.

3.4 Threatened species and ecological communities

Threatened species recorded or predicted to occur within 5 kilometres of the study area or from the relevant catchment (aquatic species) are listed in Appendix 1 (flora) and Appendix 2 (fauna). An assessment of the likelihood of these species occurring in the study area and an indication of where within the site (i.e. which habitats or features of relevance to the species) is included. A summary of those species recorded or with a medium or higher likelihood of occurring in the study area is provided in Table 5.

Table 5 Summary of EPBC and FFG Act listed species most likely to occur in the study area

Species name	Listing status	Area of value within the study area
Flora		
Matted Flax-lily ***Dianella amoena***	Endangered under EPBC Act Critically endangered under FFG Act	Plains Grassland rocky outcrops
River Swamp Wallaby-grass ***Amphibromus fluitans***	Vulnerable under EPBC Act	Plains Grassy Wetland
Swamp Fireweed ***Senecio psilocarpus***	Vulnerable under EPBC Act	Plains Grassy Wetland
Swamp Everlasting ***Xerochrysum palustre***	Vulnerable under EPBC Act Critically endangered under FFG Act	Plains Grassy Wetland
Pale Swamp Everlasting ***Coronidium gunnianum***	Critically endangered under FFG Act	Plains Grassy Wetland and other wet depressions
Plains Yam-daisy ***Microseris scapigera***	Critically endangered under FFG Act	Plains Grassland

Species name	Listing status	Area of value within the study area
Curly Sedge ***Carex tasmanica***	Endangered under FFG Act	Plains Grassy Wetland and drainage lines
Small Scurf-pea ***Cullen parvum***	Endangered under FFG Act	Plains Grassland
Tough Scurf-pea ***Cullen tenax***	Endangered under FFG Act	Plains Grassland
Austral Crane's-bill ***Geranium solanderi var. solanderi***	Endangered under FFG Act	Plains Grassland
Fauna		
White-throated Needletail ***Hirundapus caudacutus***	Vulnerable under EPBC Act Vulnerable under FFG Act	Aerial space above the study area
Growling Grass Frog ***Litoria raniformis***	Vulnerable under EPBC Act Vulnerable under FFG Act	Herne Swamp, Merri Creek, farm dams and associated drainage lines
Latham's Snipe ***Gallinago hardwickii***	EPBC Act Migratory species	Herne Swamp and farm dams
Common Sandpiper ***Actitis hypoleucos***	EPBC Act Migratory species Vulnerable under FFG Act	Herne Swamp and farm dams
Eastern Great Egret ***Ardea alba modesta***	Vulnerable under FFG Act	Herne Swamp and farm dams
Australasian Shoveler ***Spatula rhynchotis***	Vulnerable under FFG Act	Herne Swamp and farm dams
Hardhead ***Aythya australis***	Vulnerable under FFG Act	Herne Swamp and farm dams
Blue-billed Duck ***Oxyura australis***	Vulnerable under FFG Act	Herne Swamp and farm dams
Musk Duck ***Biziura lobata***	Vulnerable under FFG Act	Herne Swamp and farm dams
Tussock Skink ***Pseudemoia pagenstecheri***	Endangered under FFG Act	Plains Grassland and surrounding grasses
Brown Toadlet ***Pseudophryne bibronii***	Endangered under FFG Act	Herne Swamp, Merri Creek, farm dams and associated drainage lines

3.4.1 Threatened ecological communities

Five EPBC Act Threatened Ecological Communities are modelled to occur within 5 km of the study area. These include:

- Natural temperate Grassland of the Victorian Volcanic Plain (NTGVVP).
- Seasonal Herbaceous Wetland (Freshwater) of the Temperate Lowland Plain (SHWTLP).
- Grassy Eucalypt Woodland of the Victorian Volcanic Plain.
- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia.
- White Box Yellow Box Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

Four FFG Act listed Threatened Ecological Communities' are predicted to occur within the study area:

- Western (Basalt) Plains Grasslands (WBPG).
- Limestone Grassy Woodland Community.
- Sedge Rich *Eucalyptus camphora* Swamp community.
- Western Basalt Plains (River Red Gum) Grassy Woodland Floristic Community 55-04.

Seasonal Herbaceous Wetland (Freshwater) of the Temperate Lowland Plains was recorded within the study area (Figure 3). There are several other Plains Grassy Wetland patches within the study area that may also correspond to this community, and would require further survey for confirmation, however these areas are outside of the impact footprint and will not be impacted by development of the Beveridge Intermodal Precinct.

Natural Temperate Grassland of the Victorian Volcanic Plain was recorded by EHP (2020) in patches of Plains Grassland. This community was not observed during the current assessment as no patches met the 50% threshold cover of native tussock grass species. The current assessment was undertaken in May which is a sub-optimal time for grassland surveys.

No other EPBC Act or FFG Act listed communities were recorded within the study area.

3.4.2 Targeted flora survey results

Targeted survey for Swamp Fireweed, Swamp Everlasting and River Swamp Wallaby-grass was undertaken on 6 December 2023 and 29 November 2024 in suitable habitat within and adjacent to the impact area. No threatened species were recorded during the targeted survey. Swamp Wallaby-grass individuals were observed where the impact footprint crosses the watercourse, however, all individuals were identified as Common Swamp Wallaby-grass *Amphibromus nervosus.*

Significant Impact Criteria assessments are provided in Appendix 3 for each species.

3.4.3 Victorian Grassland Earless Dragon assessment results

At the time of original assessment, Victorian Grassland Earless Dragon was assessed as having a low likelihood of occurring in the study area (Appendix 2) due to its distance from the mapped distribution (modelled distribution for the species was in Melbourne's west extending eastward to Sunbury) and a lack of records in the area.

However, in February 2024 the modelled distribution of 'species or species habitat known or likely to occur' for VGED was expanded significantly eastward (DCCEEW, 2024) and the Study Area is now included in the outer reaches of the modelled distribution polygon. As such a habitat site assessment was undertaken for the species to review the likelihood assessment.

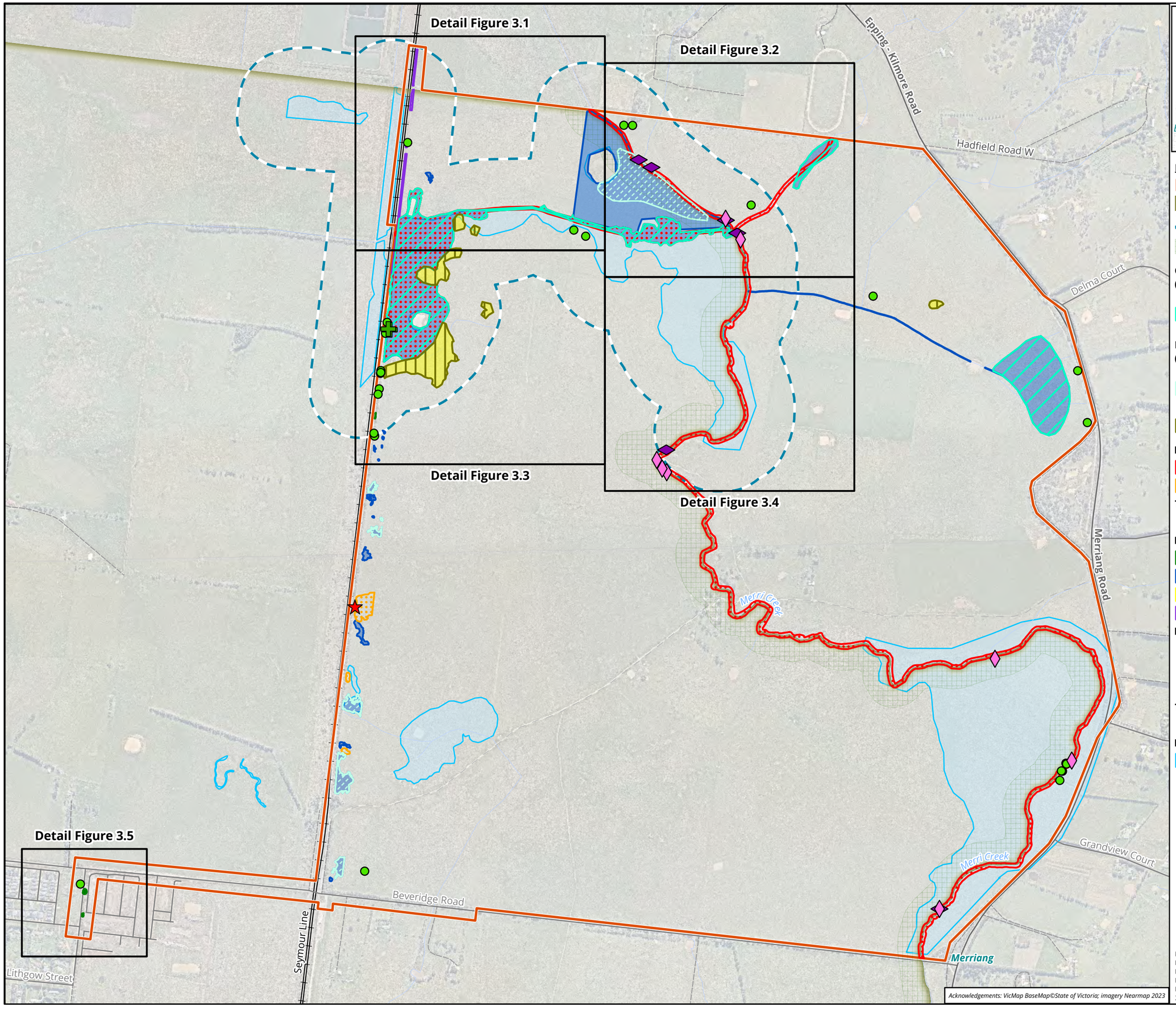
The habitat site assessment confirmed that the site is unlikely to support VGED. The results of the habitat site assessment are included in Appendix 9 of this report.

As detailed in the assessment, the lower elevation areas associated with Herne Swamp and the high biomass within the existing rail corridor are considered to have no capacity to support the species.

Higher elevation grassy areas are considered to have a low likelihood of supporting the species due to dominance of weedy pasture grasses, soil disturbance from cattle grazing and lack of soil cracks and invertebrate burrows.

Small, isolated stony rises have a low likelihood of supporting the species due to site context and the absence of key habitat features such as soil cracks and/or invertebrate burrows.

Based on the site assessment undertaken and the above assessment of negligible to low likelihood of occurrence, targeted surveys were not recommended for the study area.



Legend

- Biosis study area
- MSA approval extent
- Area excluded from MSA approval zone
- MSA Biodiversity Conservation Strategy Conservation Area - Growling Grass Frog

Confirmed threatened ecological communities (EPBC)

- Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains

Potential threatened ecological communities (EPBC)

- Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains
- Natural Temperate Grassland of the Victorian Volcanic Plain

Potential threatened fauna habitat

- Growling Grass Frog
- Tussock Skink

Threatened flora records

- Swamp Fireweed (*Senecio psilocarpus*)

Ecological vegetation classes (EVCs)

- VVP_0055_61 Plains Grassy Woodland
- VVP_0125 Plains Grassy Wetland
- VVP_0132 Plains Grassland
- VVP_0821 Tall Marsh

Fauna records

- Common Freshwater Shrimp
- Common Yabby
- Bougainvilles Skink

Trees

- Scattered tree

Hydrography

- Current wetland (DEECA)

Figure 3.0 Ecological values of the study area: overview

0 100 200 300 400 500

Metres

Scale: 1:14,000 @ A3

Coordinate System: GDA2020 MGA Zone 55

N

biosis

Matter: 39671,
Date: 24 October 2024,
P[redacted]
Layout: 39671_F3_EcoValues
Project: P:\39600s\39671\Mapping\
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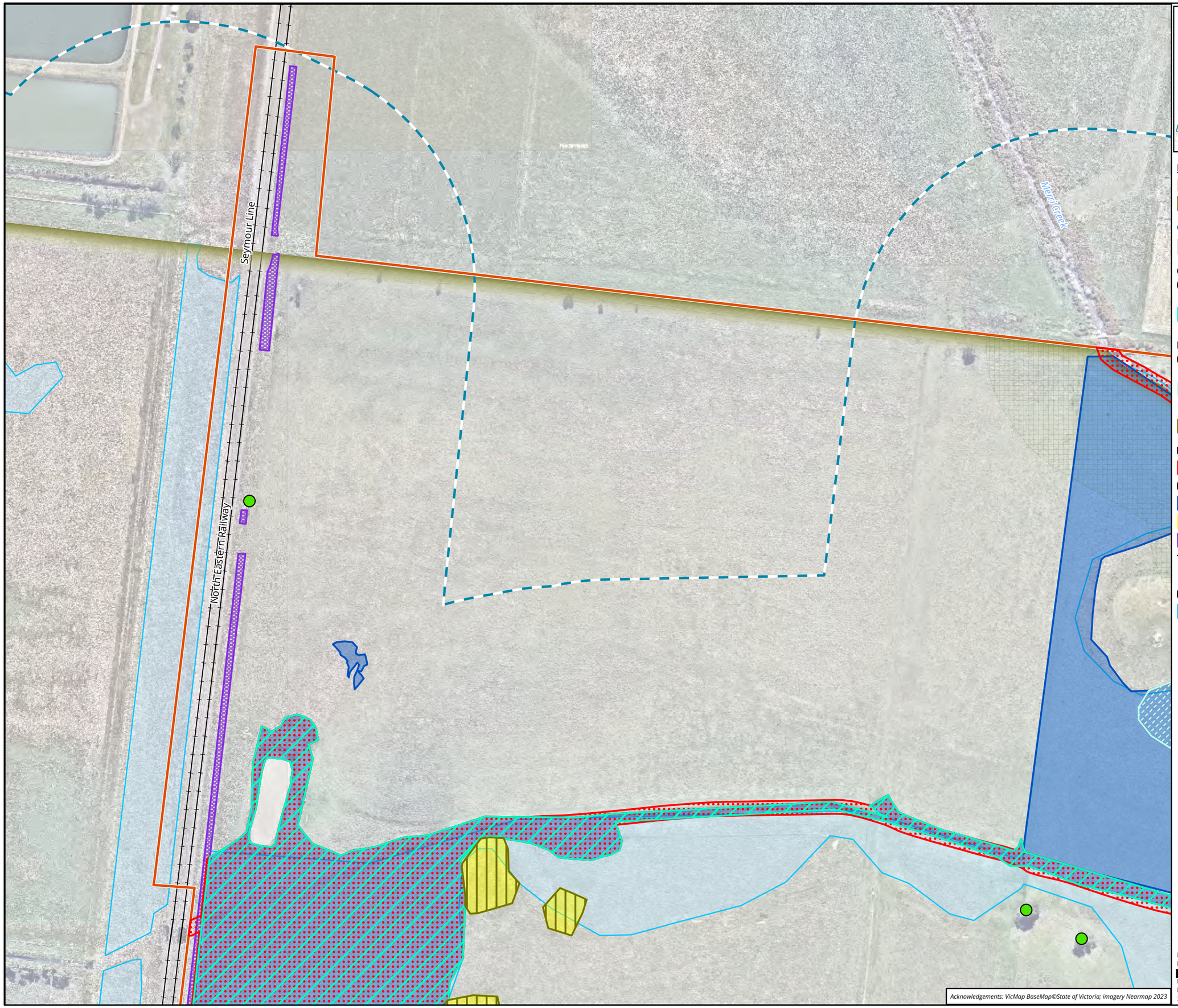

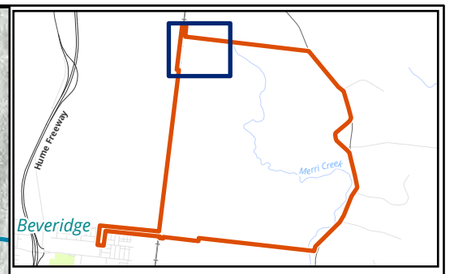

Legend

- Biosis study area
- MSA approval extent
- Area excluded from MSA approval zone
- MSA Biodiversity Conservation Strategy Conservation Area - Growling Grass Frog

Confirmed threatened ecological communities (EPBC)

- Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains

Potential threatened ecological communities (EPBC)

- Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains
- Natural Temperate Grassland of the Victorian Volcanic Plain

Potential threatened fauna habitat

- Growling Grass Frog

Ecological vegetation classes (EVCs)

- VVP_0125 Plains Grassy Wetland
- VVP_0132 Plains Grassland
- VVP_0821 Tall Marsh

Trees

- Scattered tree

Hydrography

- Current wetland (DEECA)

Figure 3.1 Ecological values of the study area: detail

0 20 40 60 80 100

Metres

Scale: 1:3,000 @ A3

Coordinate System: GDA2020 MGA Zone 55

N

biosis

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Date: 24 October 2024,

Layout: 39671_F3_EcoValues
Project: P:\39600s\39671\Mapping\
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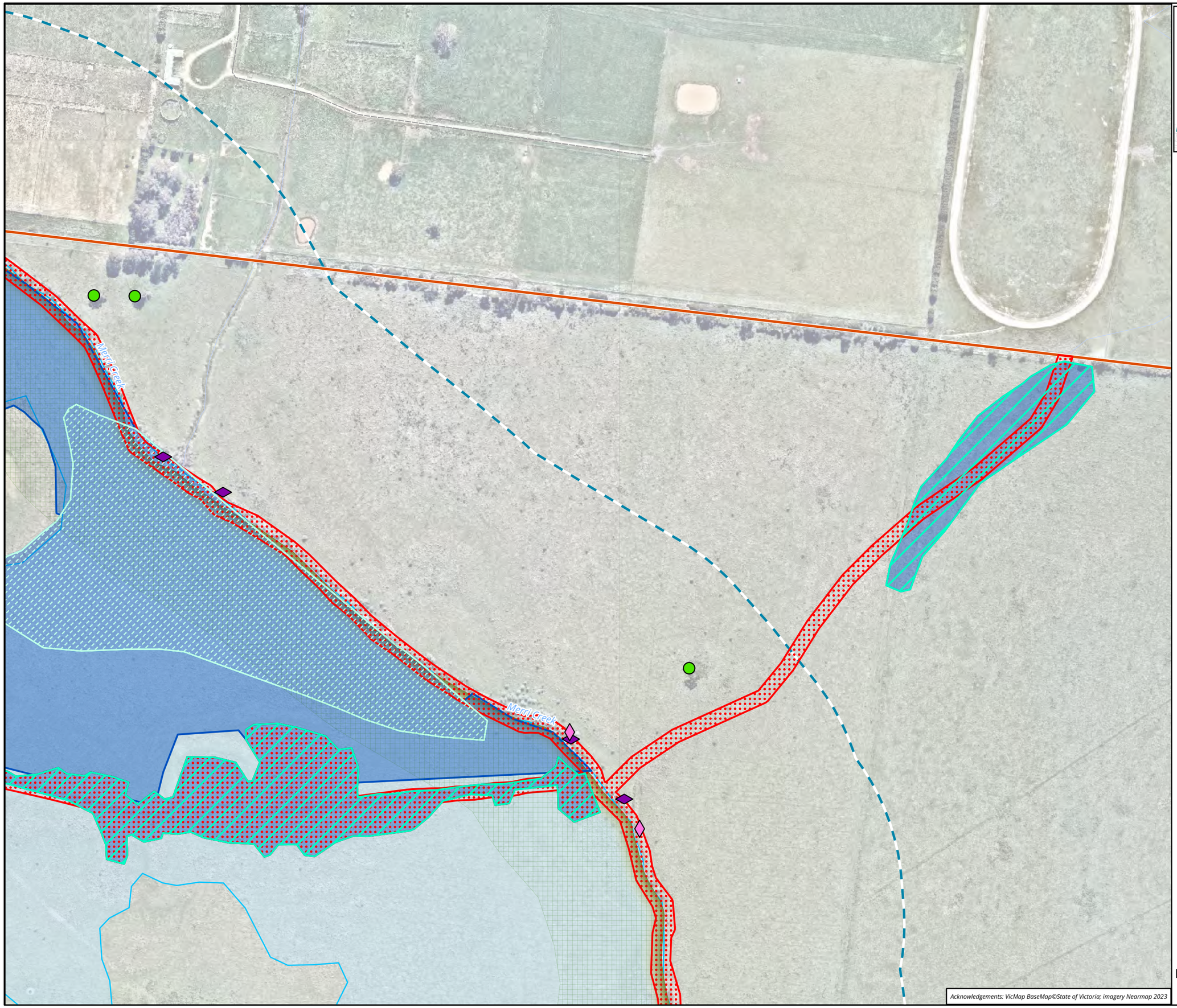

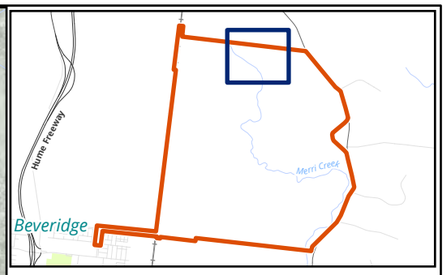

Legend

- Biosis study area
- MSA approval extent
- Area excluded from MSA approval zone
- MSA Biodiversity Conservation Strategy Conservation Area - Growling Grass Frog

Confirmed threatened ecological communities (EPBC)

- Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains

Potential threatened ecological communities (EPBC)

- Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains

Potential threatened fauna habitat

- Growling Grass Frog

Ecological vegetation classes (EVCs)

- VVP_0125 Plains Grassy Wetland

Fauna records

- Common Freshwater Shrimp
- Common Yabby

Hydrography

- Current wetland (DEECA)

Figure 3.2 Ecological values of the study area: detail

0 20 40 60 80 100

Metres

Scale: 1:3,000 @ A3

Coordinate System: GDA2020 MGA Zone 55

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biosis

Matter: 39671,
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Layout: 39671_F3_EcoValues
Project: P:\39600s\39671\Mapping\
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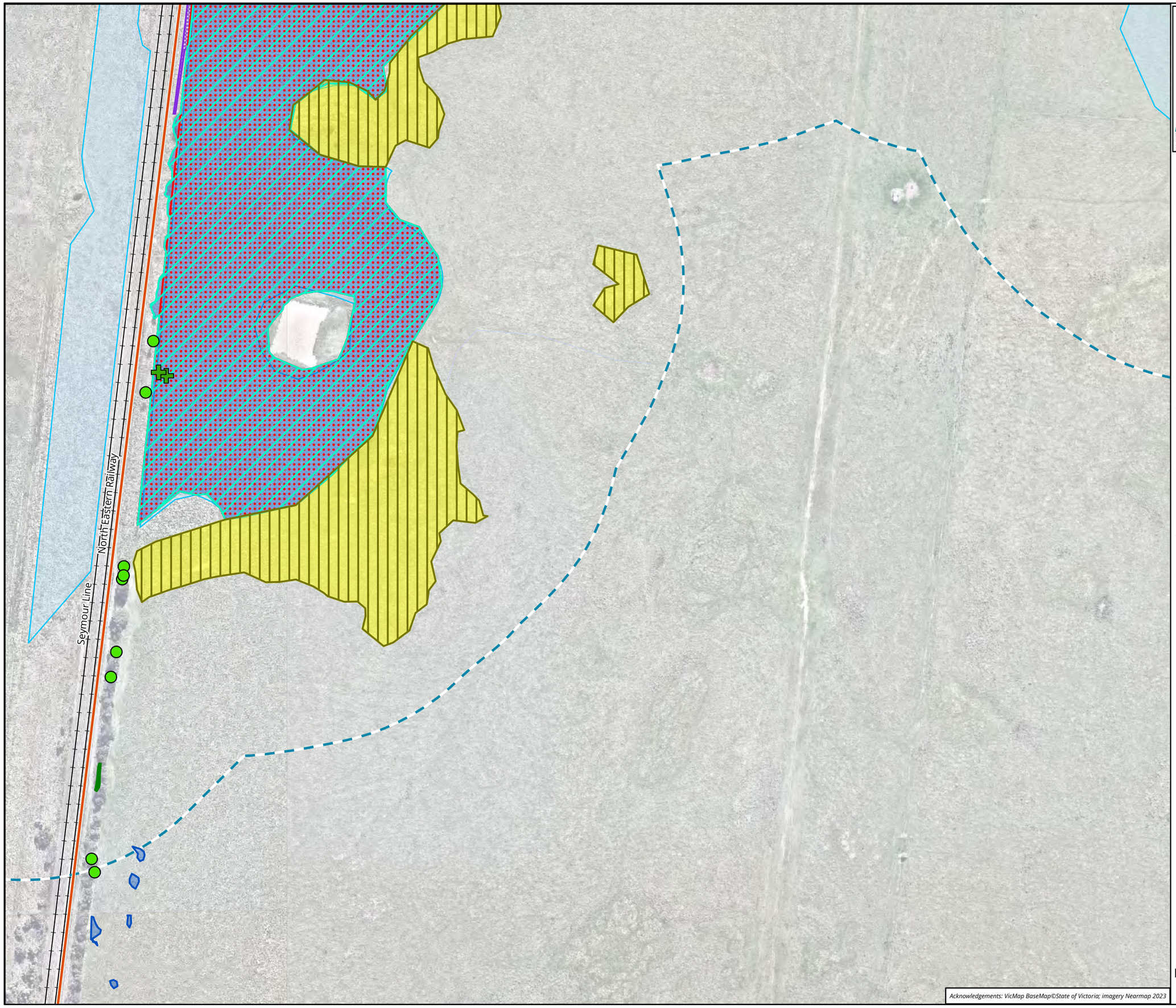
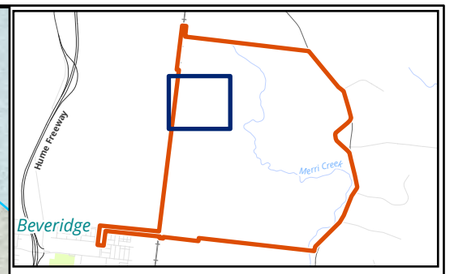




Legend

- Biosis study area
- MSA approval extent
- Area excluded from MSA approval zone

Confirmed threatened ecological communities (EPBC)

- Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains

Potential threatened ecological communities (EPBC)

- Natural Temperate Grassland of the Victorian Volcanic Plain

Potential threatened fauna habitat

- Growling Grass Frog

Threatened flora records

- Swamp Fireweed (*Senecio psilocarpus*)

Ecological vegetation classes (EVCs)

- VVP_0055_61 Plains Grassy Woodland
- VVP_0125 Plains Grassy Wetland
- VVP_0132 Plains Grassland
- VVP_0821 Tall Marsh

Trees

- Scattered tree

Hydrography

- Current wetland (DEECA)

Figure 3.3 Ecological values of the study area: detail

0 20 40 60 80 100

Metres

Scale: 1:3,000 @ A3

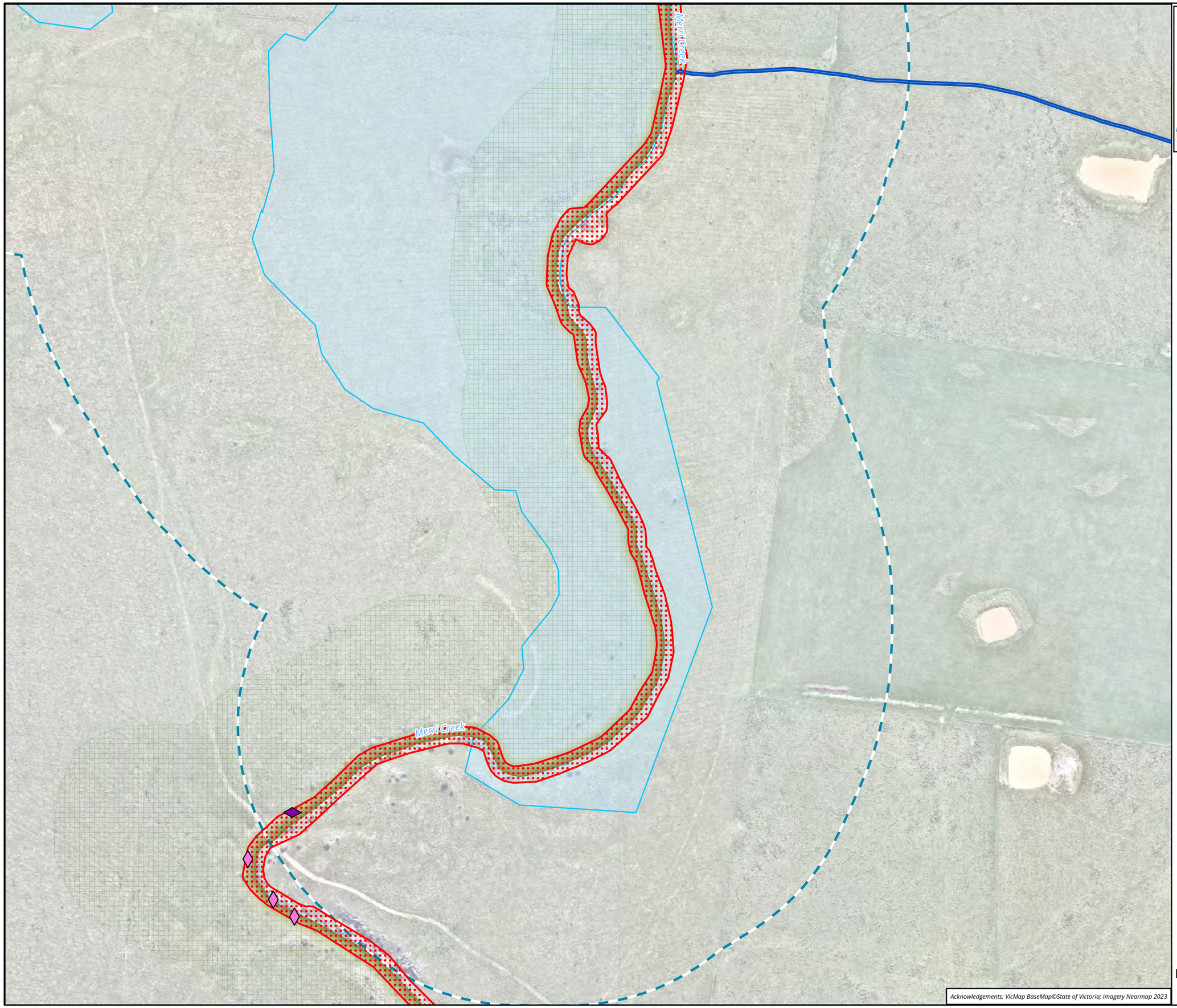
Coordinate System: GDA2020 MGA Zone 55

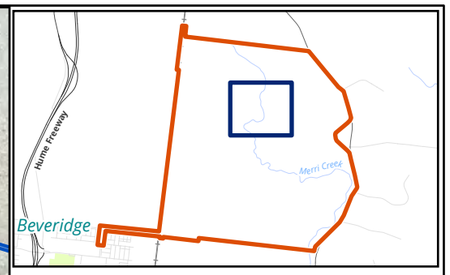
N

biosis

Matter: 39671,
Date: 24 October 2024,

Layout: 39671_F3_EcoValues
Project: P:\39600s\39671\Mapping\
39671_FFA_BIFT_1A.aprx





Legend

- Biosis study area
- MSA approval extent
- Area excluded from MSA approval zone
- MSA Biodiversity Conservation Strategy Conservation Area - Growling Grass Frog

Potential threatened fauna habitat

- Growling Grass Frog

Ecological vegetation classes (EVCs)

- VVP_0125 Plains Grassy Wetland

Fauna records

- Common Freshwater Shrimp
- Common Yabby

Hydrography

- Current wetland (DEECA)

Figure 3.4 Ecological values of the study area: detail

0 20 40 60 80 100

Metres

Scale: 1:3,000 @ A3

Coordinate System: GDA2020 MGA Zone 55

N

biosis

Matter: 39671,
Date: 24 October 2024,

Layout: 39671_F3_EcoValues
Project: P:\39600s\39671\Mapping\
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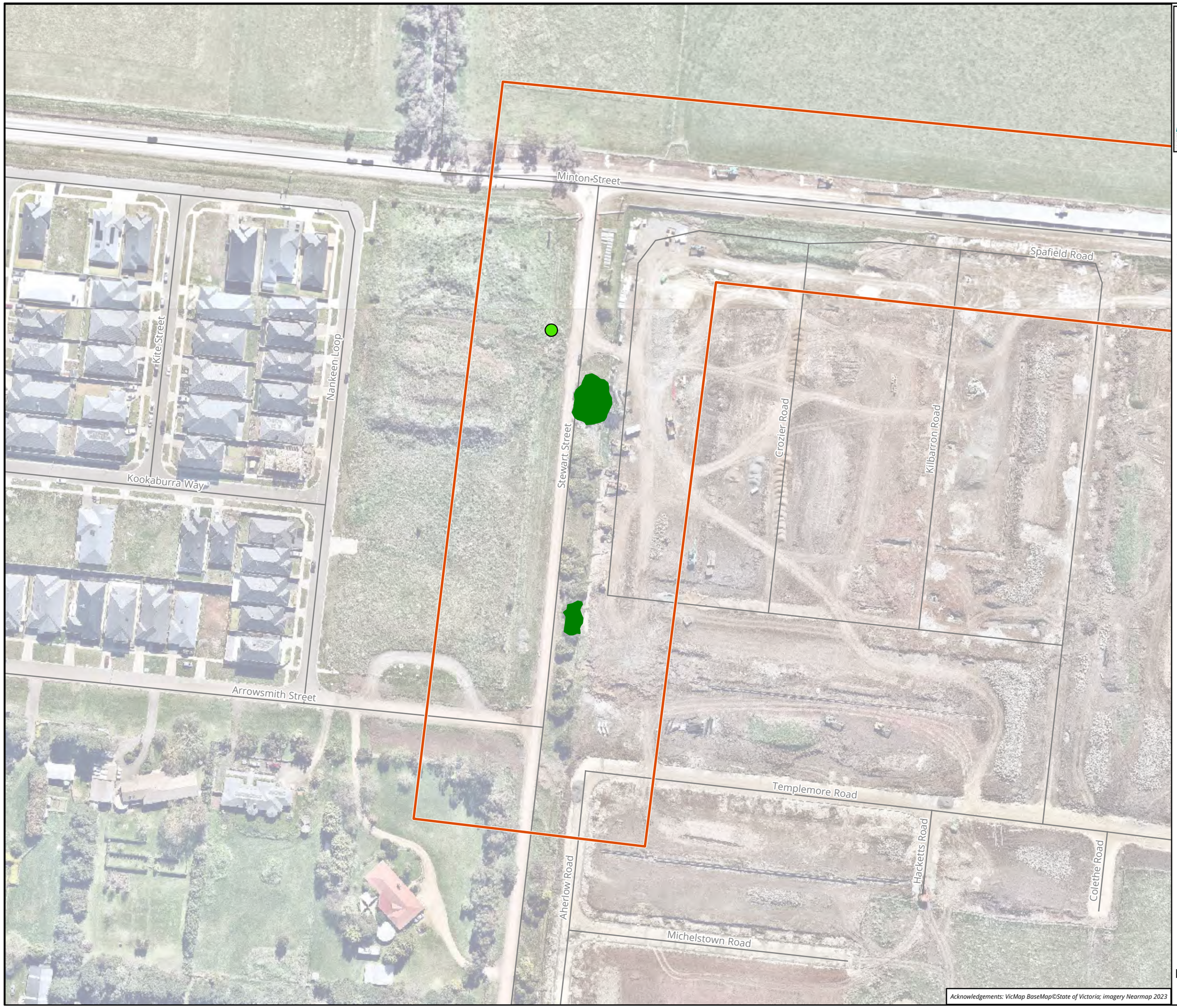
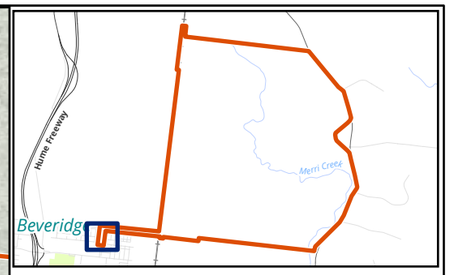




Legend

- Biosis study area
- MSA approval extent

Ecological vegetation classes (EVCs)

- VVP_0055_61 Plains Grassy Woodland

Trees

- Scattered tree

Figure 3.5 Ecological values of the study area: detail

0 10 20 30 40 50

Metres

Scale: 1:1,500 @ A3

Coordinate System: GDA2020 MGA Zone 55

N

biosis

Matter: 39671,
Date: 24 October 2024,

Layout: 39671_F3_EcoValues
Project: P:\39600s\39671\Mapping\
39671_FFA_BIFT_1A.aprx

4. Biodiversity legislation and government policy

This section provides an assessment of the project in relation to key biodiversity legislation and government policy. This section does not describe the legislation and policy in detail. Where available, links to further information are provided.

4.1 Commonwealth

4.1.1 Environment Protection and Biodiversity Conservation Act 1999

Portions of the study area have already been assessed and approved for urban development under Part 10 of the EPBC Act through the Melbourne Strategic Assessment (MSA) process. However, the area to the north of the study area surrounding Herne Swamp was excluded from the MSA process (noted on Figure 1 as "MSA Exclusion Area"). This means that the study area is divided into:

- Land that has been assessed and approved for urban development under Part 10 the EPBC Act (MSA land). Any urban development on this land must comply with the scope of the existing Part 10 approval and any conditions of that approval issued in September 2013; and
- Land that has not been assessed and approved under the EPBC Act. Impacts to MNES must therefore be considered under the standard EPBC Act assessment and approvals pathway.

These areas are addressed individually below.

Melbourne Strategic Assessment area

In 2009, the State of Victoria entered into an agreement with the Commonwealth Minister to conduct a strategic assessment of the program to expand Melbourne's Urban Growth Boundary (UGB) and associated infrastructure projects under Part 10 of the EPBC Act. In February 2010, the 'Program report' was endorsed and formed the basis for subsequent approval decisions.

Between June 2010 and September 2014, the Australian Government issued four approval decisions, allowing actions under the endorsed Program. The approvals related to three growth corridors and the Regional Rail Link and are all subject to conditions. Requirements to comply with the Biodiversity Conservation Strategy (BCS) and Habitat Compensation Obligations (HCOs) are examples of conditions of the approvals.

Relationship with State requirements

State assessment and approval processes under the Victorian *Planning and Environment Act 1987* and *Environment Effects Act 1978* (EE Act) occurred concurrently with the strategic assessment process under Part 10 of the EPBC Act. The State and Commonwealth processes are still separate from a legislative perspective. A proponent must comply with both State requirements and any conditions on a Part 10 approval decision.

Endorsed Program and approval decisions

Since endorsement of the Program, the Commonwealth Minister has had power to approve actions undertaken 'in accordance with' the endorsed Program under the EPBC Act. The Commonwealth Minister has issued the following approvals under Part 10 of the EPBC Act in accordance with the Program:

- Regional Rail Link Project

- 28 urban growth precincts
- Urban growth in the northern, western, north-western and south-east corridors.

The majority of the study area is located within the Northern Corridor approved by the Part 10 decision and as such, is considered to hold an Approval for EPBC matters.

Biodiversity Conservation Strategy (BCS)

The Biodiversity Conservation Strategy was prepared in response to obligations arising from the MSA. The BCS is the overarching strategy for the protection of biodiversity in the growth corridors. It sets out all the conservation measures required for matters of national environmental significance and state significance to satisfy the commitments to the Commonwealth Government and to meet state requirements within the MSA Area (DEPI 2013). The BCS Identifies 36 conservation areas across the growth corridors and removes the need to protect additional land during development approval stages.

Conservation Area 34 is approximately 1,000 hectares in size and protects the riparian border of the Merri Creek within the northern corridor. The key rationale for CA34 is to protect important populations of Growling Grass Frog and ensure connectivity between populations within the northern growth corridor. CA34 extends along the length of the portion of Merri Creek located within the Study Area.

The project has no direct impact within CA34, at it's closest point Stage 1a is approximately 300 metres from CA34, water quality and flows have been assessed in the Surface Water Assessment for the site (Aurecon 2025), no indirect impacts to CA34 are anticipated.

Environmental Mitigation Levy

The Victorian Melbourne Strategic Assessment *(Environment Mitigation Levy) Act 2020* (MSA Act) commenced on 1 July 2020. The MSA Act introduced an environmental mitigation levy scheme (Levy).

The MSA Act is relevant for this project. The study area is within land that has been declared as part of the 'levy area' under the MSA Act which means that National Intermodal will be liable to pay a levy, subject to a relevant Levy Event occurring.

The MSA Act specifies the following Levy Events:

- issue of a Statement of Compliance for a plan of subdivision (i.e. subdivision of land),
- application for a building permit,
- approval of a work plan or variation of a work plan under the Mineral Resources (Sustainable Development) Act 1990,
- construction of utility infrastructure on Crown land,
- construction of a road on Crown land.

For the Stage 1A project the application for a building permit is the most likely levy event that will trigger the requirement to pay the MSA levy.

Under the *Building Act 1993* the building surveyor is required to notify Department of Energy Environment and Climate Action (DEECA) of the application within 14 days. DEECA will calculate the applicable MSA levies for the land and send an assessment notice to the landowner. The building surveyor may not issue the building permit until the landowner has been issued a certificate from DEECA demonstrating that the relevant levies have been paid.

Upon a relevant Levy Event occurring on a particular parent title, the entire levy will be payable for that title. However, the obligations can generally be met in stages, subject to an application for staged payment being made to DEECA at the time of application for a building permit.

A summary of the MSA Levy obligation for the study area is included in Section 5.2 of this report.

The levy will be used to fund conservation outcomes required to mitigate the impacts on Matters of National Environmental Significance (MNES) as approved under Part 10 of the EPBC Act.

MSA Exclusion area

Land that was excluded from the Part 10 Melbourne Strategic Assessment approval needs to be considered under standard EPBC Act assessment and approvals protocols. Where the Stage 1A project is likely to have a significant impact to a MNES, referral to the Commonwealth Minister for the Environment and Water is required under Part 8 of the EPBC Act to determine if the project requires further assessment and approval under Part 9 of the Act.

MNES relevant to the project are summarised in Table 6. It includes an assessment against the EPBC Act policy statements published by the Australian Government which provide guidance on the practical application of EPBC Act.

Table 6 Assessment of project in relation to the EPBC Act

MNES	Project specifics	Assessment against significant impact guidelines
EPBC Act listed species	**Eighteen** EPBC Act listed flora species are predicted to occur within the study area. Of these, one EPBC Act listed flora species was recorded in the study area: • Swamp Fireweed An additional **three** species have a medium likelihood of occurrence within the study area: • Matted Flax-lily • River Swamp Wallaby-grass • Swamp Everlasting. No additional EPBC Act listed flora species were assessed as potentially occurring in the study area with a medium or high likelihood. **Three** EPBC Act listed fauna species were predicted to occur within the study area: • Golden Sun Moth (Ecology & Heritage Partners, 2020) • Growling Grass Frog • White-throated Needletail.	A targeted survey was undertaken for Swamp Everlasting, River Swamp Wallaby-grass and Swamp Fireweed in suitable habitat within and adjacent to the impact area. These EPBC Act listed species were not recorded during targeted surveys on 6 December 2023 and 29 November 2024. A SIC assessment is provided for these species in Appendix 3. Matted Flax-lily habitat is located outside of the impact footprint, thus no targeted surveys recommended. A SIC assessment has been completed for this species in Appendix 3. Targeted surveys for Golden Sun Moth by Ecology and Heritage Partners in 2020 did not record the species within the study area. Due to the lack of suitable food plants within the study area, Biosis agrees it is not likely that the development will have a significant impact on this species. Targeted surveys for Growling Grass Frog by Ecology and Heritage Partners in 2020 did not record the species, however due to the high rainfall in subsequent years it is possible this species is now using Herne Swamp, dams and associated drainage lines with Merri Creek. A

MNES	Project specifics	Assessment against significant impact guidelines
		SIC assessment has been completed for this species (Appendix 3). One additional listed fauna species, White-throated Needletail, has a medium likelihood of occurring in the airspace over the study area, but individuals are unlikely to use any terrestrial habitat within the study area. A SIC assessment has been completed for this species (Appendix 3). The remaining threatened species are not likely to occur and development is therefore unlikely to constitute a significant impact on them.
EPBC Act listed ecological communities	Two threatened Ecological Communities were recorded within the study area: • Seasonal Herbaceous Wetland (Freshwater) of the Temperate Lowland Plain (SHWTLP) • Natural Temperate grassland of the Victorian Volcanic Plain (NTGVVP).	The proposed works will impact 0.03 hectares of SHWTLP. A SIC assessment has been completed for this community in Appendix 3. Given the impact is less than 0.15% of the TEC on the site, we do not consider it to be a significant impact. Patches of NTGVVP were recorded by EHP in 2020 and 2022 within patches of Plains Grassland (Ecology & Heritage Partners 2020, 2021). At the time of the Biosis survey (May 2023) patches of Plains Grassland did not meet the definition of the threatened community, however, May is a sub-optimal time to undertake grassland surveys. As such, these patches of native vegetation have the potential to be the threatened community. This community occurs outside of the impact footprint. It is considered unlikely the proposed works will cause a significant impact to this community. A SIC assessment for NTGVVP has been completed in Appendix 3.
Migratory species	**Thirteen** migratory species have been recorded or predicted to occur in the project search area (Appendix 2).	There are recent records of Latham's Snipe, Common Sandpiper and White-throated Needletail in the local area and potential habitat within Herne Swamp, therefore a SIC assessment has been completed for these species (Appendix 3). While the remaining migratory species would be expected to use the study area on occasions, and some of them may do so regularly or may be resident, it does not provide important habitat for an ecologically significant proportion of any of these species

MNES	Project specifics	Assessment against significant impact guidelines
		and the project is not expected to result in a significant impact on them.
Wetlands of international importance (Ramsar sites).	The study area is not within the catchment of any Ramsar sites	The study area does not drain directly into a Ramsar site and the development is not likely to result in a significant impact on any Ramsar site.
Commonwealth Land	The study area is located on land defined as Commonwealth Land under the EPBC Act. Whole of environment considerations for the site are limited to Merri Creek and Herne Swamp.	Impacts to Herne Swamp and Merri Creek should be considered in a "whole of environment" Significant Impact Assessment as part of the EPBC referral for the project.

On the basis of potential for impacts on MNES Biosis recommends referral of the proposed action.

Based on the minimal area of direct impact to potential habitat and initial 'worst-case scenario' review of the Significant Impact Criteria (SIC) for vulnerable species it is considered unlikely that the proposed action would have a significant impact on Swamp Everlasting, River Swamp Wallaby-grass and Swamp Fireweed. These EPBC Act listed species were not recorded within the impact footprint during targeted surveys. Significant Impact Criteria assessments for these species is provided in Appendix 3.

4.2 State

4.2.1 Flora and Fauna Guarantee Act 1988 (FFG Act)

The FFG Act is the key piece of Victorian legislation for the conservation of threatened species and communities and for the management of potentially threatening processes. Under the FFG Act a permit is required from DEECA to 'take' protected flora species. Permit exemptions under the FFG Act generally apply to the non-commercial removal of protected flora from private land, unless there is 'critical habitat' that has been declared on the land. Authorisation under the FFG Act is required to collect, kill, injure or disturb listed fish on private or public land.

Link for further information: https://www.environment.vic.gov.au/conserving-threatened-species/victorias-framework-for-conserving-threatened-species

The FFG Act defines public land as Crown land or land owned by, or vested in, a public authority, while private land is defined as any land other than public land. A public authority is defined in the FFG Act as a body established for a public purpose by or under any Act and includes:

- an Administrative Office
- a Government Department
- a municipal council
- a public entity
- a State-owned enterprise.

Patches of Plains Grassland may correspond to the FFG Act listed community Western (Basalt) Plains Grasslands. The study area contains two species listed as threatened under the FFG Act (Ecology & Heritage Partners 2021); Austral Crane's-bill and Pale Swamp Everlasting. Austral Crane's-bill was recorded within a

patch of Plains Grassland near the western border of the study area which is not proposed to be impacted. Pale Swamp Everlasting were observed at a wetland near the eastern boundary of the study area, with no plants being recorded within or adjacent to Herne Swamp (Ecology & Heritage Partners 2021).

The following seven species listed as protected under the FFG Act (Appendix 1) were recorded by Biosis and/or EHP (2020):

- Milky Beauty-head *Calocephalus lacteus* (Ecology & Heritage Partners 2020 and Biosis)
- Pale Swamp Everlasting *Coronidium gunnianum* (Ecology & Heritage Partners 2020)
- Swamp Billy-buttons *Craspedia paludicola* (Ecology & Heritage Partners 2020 and Biosis)
- Black Wattle *Acacia mearnsii* (Biosis)
- Pacific Azolla *Azolla rubra* (Biosis)
- Green Rock-fern *Cheilanthes austrotenuifolia* (Biosis)
- Star Cudweed *Euchiton involucratus* (Biosis).

The study area is located primarily on private land, under the definition within the FFG Act, does not contain any declared 'critical habitat' for the purposes of the FFG Act and flora species are not being taken for the purpose of commercial sale.

A portion of the study area that enters the ARTC rail corridor which is classed as Public Land. A protected flora permit is required for this area prior to commencement of works.

Additionally, the presence of flora and habitat for threatened fauna listed under the FFG Act has been outlined below and will be considered by the Responsible Authority in determining its response to the planning scheme amendment process.

4.2.2 Catchment and Land Protection Act 1994 (CaLP Act)

The CaLP Act identifies and classifies certain species as noxious weeds or pest animals and provides a system of controls on noxious species.

Declared noxious weeds identified in the study area are listed in Appendix 1 and pest animals in Appendix 2.

The proponent must take all reasonable steps to eradicate regionally prohibited weeds, prevent the growth and spread of regionally controlled weeds, and prevent the spread of and as far as possible eradicate established pest animals. The State is responsible for eradicating State prohibited weeds from all land in Victoria.

Further information is at http://agriculture.vic.gov.au/agriculture/pests-diseases-and-weeds

4.2.3 Planning and Environment Act 1987 (incl. Planning Schemes)

The *Planning and Environment Act 1987* controls the planning and development of land in Victoria and provides for the development of planning schemes for all municipalities.

Of particular relevance to the project are controls relating to the removal, destruction or lopping of native vegetation contained within the Whittlesea Planning Scheme (the Scheme). The Scheme (Clause 73.01) defines 'native vegetation' as 'Plants that are indigenous to Victoria, including trees, shrubs, herbs, and grasses'.

It is Biosis' understanding that National Intermodal intends to lodge a Planning Scheme Amendment (PSA) which will seek to apply a 'Specific Control Overlay' to the Stage 1A land, that establishes planning consent for the narrow scope of early works of Stage 1A. National Intermodal will be requesting that the Planning Minister consider the PSA utilising their powers under Section 20(4) of the Planning and Environment Act 1987.

The outcome of the PSA process above will determine the implications for Native Vegetation removal. In any instance, the project is required to consider State Planning Policy Clause 12.01-2 and the Guidelines.

It is an objective of Clause 12.01-2 of the State Planning Policy Framework (Native Vegetation Management) that removal of native vegetation results in no net loss in the contribution made by native vegetation to Victoria's biodiversity.

The Guidelines are incorporated into the Victoria Planning Provisions and all planning schemes in Victoria (DELWP 2017c). The Guidelines replaced the previous incorporated document titled Permitted clearing of native vegetation – Biodiversity assessment guidelines (DEPI 2013) on 12 December 2017.

The purpose of the Guidelines is to guide how impacts to biodiversity should be considered when assessing a permit application to remove, destroy or lop native vegetation. The objective for the guidelines in Victoria is 'No net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation'.

A detailed assessment of the implications for the project under the Guidelines is provided in Section 5 of this report. Under the Guidelines, there are three assessment pathways for assessing an application for a permit to remove native vegetation: basic, intermediate and detailed.

4.2.4 Environment Effects Act 1978

A referral under the EE Act was made to the Victorian Minister for Planning in 2019 to seek a determination on whether an Environmental Effects Statement (EES) would be required for an intermodal freight terminal project on the site, as proposed by the previous project proponent. In July 2020, the Minister for Planning determined that no EES would be required for the proposed project, subject to various conditions being satisfied (Referral number 2020-R09). Confirmation has been received from the Victorian Department of Transport and Planning – Impact Assessment Unit that the no EES decision can be relied upon for the proposed action.

4.2.5 Fisheries Act 1995

The *Fisheries Act 1995* provides a legislative framework for the regulation, management and conservation of Victorian fisheries including aquatic habitats.

A person must not take, injure, damage, destroy or release any protected aquatic biota. Protected aquatic biota includes all species of the family Syngnathidae (seahorses, sea dragons and pipefish), and any fish or aquatic invertebrate or community that is listed under the FFG Act.

Providing mitigation measures outlined in this report are adhered to, the potential for protected aquatic biota as listed above, to be injured, damaged or destroyed is considered to be negligible and no permit is required from DEECA.

4.2.6 Environment Protection Act 2017: Environmental Reference Standards

The *Environment Protection Act 2017* (EP Act) provides a legal framework for the systematic and strategic management of potential and realised environmental impacts. The *Environment Protection Act 2017*, the Environment Protection Regulations 2021 and Environment Reference Standards (ERS) introduced from 1 July 2021 provide a regulatory framework designed to prevent harm by eliminating or minimising risks of harm to human health and the environment.

Under the regulatory changes, SEPP (Waters) will not continue as a subordinate instrument under the EP Act, and its formal statutory role ended on 1 July 2021. Much of the content of SEPP (Waters) has been saved under the Environment Protection Transitional Regulations 2021 for a period of 2 years after the commencement of the Environment Protection Regulations 2021. As SEPP (Waters) contributes to the state of knowledge and provides guidance on compliance with the General Environmental Duty (GED), the policy remains relevant to the protection and management of Victoria's water environments, including surface waters, estuarine and marine waters and groundwaters.

While not being saved under the Environment Protection Transitional Regulations 2021, the following clauses of SEPP (Waters) applicable to the project remain relevant as they provide guidance for compliance with the GED under the *Environment Protection Act 2017*:

Clause 42 – Construction activities:

- Minimise soil erosion, land disturbance and discharge of sediment and other pollutants to surface waters
- Where construction activities impinge on surface waters, construction managers need to monitor affected surface waters to assess whether beneficial uses are being protected

Clause 45 – Native vegetation protection and rehabilitation:

- Minimise the removal of and rehabilitate native vegetation within or adjacent to surface waters

The ERS requires that aquatic ecosystem values be protected. Environmental quality objectives and indicators are defined to protect beneficial uses (i.e. the uses and values of the water environment) and an attainment program provides guidance on protection of the beneficial uses. Impacts to surface water quality as a result of the project must not result in changes that exceed background levels and/or the water quality objectives to protect surface water uses and values.

To ensure that direct and indirect (e.g. runoff) impacts to surface water quality do not exceed the background levels and/or water quality objectives, it is recommended that National Intermodal prepare and implement a site-specific Constructional Environmental Management Plan, which includes all EPA approved erosion control measures. These temporary control measures should be inspected during rainfall events to ensure controls are able to prevent/minimize offsite discharges and longer term impacts. Sediment control measures selected should also reflect the level of protection required to protect the ecological values within Merri Creek, downstream of the project area.

Link to further information: http://www.gazette.vic.gov.au/gazette/Gazettes2021/GG2021S245.pdf

4.2.7 Water Act 1989

The primary purpose of the *Water Act 1989* is to provide a framework for the allocation and management of surface water and groundwater throughout Victoria. It provides a principal mechanism for maintenance of ecosystem functions including those of aquatic ecosystems. Under By-Laws created by the relevant Authority under the Act, the authorities regulate the works within and in the vicinity of waterways. In Melbourne Water's management area this applies to all waterways with a catchment area of 60ha or more. These waterways are deemed to be Melbourne Water assets, while all smaller watercourses are deemed the responsibility of the local government.

The proposed development will involve construction or maintenance activities that may affect beds and banks of Merri Creek.

Development within the study area will require a permit from Melbourne Water.

5. Offsets and Levies

5.1 Victoria's Guidelines for the removal, destruction or lopping of native vegetation (MSA exclusion zone only)

The Guidelines were introduced in December 2017. They set out and describe the application of Victoria's statewide policy in relation to assessing and compensating for the removal of native vegetation in order to achieve the objective of 'no net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation'.

This objective is to be achieved through Victoria's planning system using an assessment approach that relies on strategic planning and the permit and offset system. The key policy for achieving no net loss to biodiversity is the three-step approach of avoid, minimise and offset:

- **Avoid** the removal, destruction or lopping of native vegetation to ensure that the important biodiversity values of native vegetation continue to be delivered into the future.
- **Minimise** impacts resulting from the removal of native vegetation that cannot be avoided.
- Provide an **offset** to compensate for the biodiversity impact resulting from the removal of native vegetation.

Although the conditions of the planning control applied to Stage 1A through the planning scheme amendment are not yet finalised, the following section considers the assessment pathways that would apply through a typical planning permit process.

The steps that have been taken during the design of the development to ensure that impacts on biodiversity from the removal of native vegetation have been minimised include:

- Impacts to SHWTLP have been significantly reduced from the original Qube design. The original rail design was to impact 2.25 hectares of the threatened community. The current design has reduced impacts to a maximum of 0. 03 hectares of SHWTLP.
- National Intermodal undertook extensive design development to minimise impacts to hydrology. Based on feedback from relevant stakeholders, planned bridge and culvert designs have been replaced by an approximately 700m viaduct running from the rail connection to south of the mapped Herne Swamp area. The Beveridge Intermodal Precinct Stage 1A Surface Water Modelling and Assessment (Aurecon, 2025) has confirmed that the current design has negligible impacts to water quality and flows into Herne Swamp and Merri Creek.
- Incorporation of a viaduct in the northern section of the proposed rail connection will maintain the flow of water from Herne Swamp to Merri Creek and allow ongoing movement of Growling Grass Frog and other fauna with the potential to use these areas as habitat.
- Any culverts within the Herne Swamp Buffer area are to be designed with consideration of the GGF Crossing Design Standards from Department of Environment, Land, Water and Planning (DELWP, now DEECA) (DELWP 2017a).
- Avoid areas of potential EPBC Act listed community Natural Temperate Grassland of the Victorian Volcanic Plains (NTGVVP). This community may also provide habitat for the EPBC Act listed species Matted Flax-lily.

- Avoiding effects of lighting design on wildlife in line with the National Light Pollution Guidelines for Wildlife (DEE 2020).

DEECA has provided biodiversity information tools to assist with determining the assessment pathway associated with the removal of native vegetation and the contribution that native vegetation within the study area makes to Victoria's biodiversity.

All planning permit applications to remove native vegetation are assigned to an assessment pathway determined by the extent and location of proposed native vegetation removal. The assessment pathway will dictate the information to be provided in a planning permit application and the decision guidelines the responsible authority (e.g. Council) and/or DEECA as a referral authority will use to assess any permit application.

The biodiversity information tools have two components:

Site-based information

The site-based information is observable at a particular site. Biosis has collected the requisite site-based information for the assessment against the Guidelines.

Landscape scale information

Landscape scale information requires consideration of information beyond the site. This information is managed by DEECA and can be accessed via the NVIM.

The following section summarises the results of the site-based assessment and the outputs generated by the Native Vegetation Removal Report, which identifies the assessment pathway on which the planning application will be assessed. The full Native Vegetation Removal Report can be viewed in Appendix 6.

5.1.1 Proposed removal of native vegetation from MSA exclusion zone

The extent of native vegetation patches, the location of large trees within patches and any scattered trees were mapped within the study area (Figure 3) and the condition was assessed in relation to standard methods provided by DSE (2004) and pre-determined EVC benchmarks: https://www.environment.vic.gov.au/biodiversity/bioregions-and-evc-benchmarks. DEECA's Native Vegetation Information Management system was also used to determine vegetation extent and condition.

The development proposes to remove 0.52 hectares of native patch vegetation from the MSA exclusion zone (Figure 4). Spatial data (shapefiles) of proposed vegetation removal were submitted to DEECA's native vegetation support team, who provided a Native Vegetation Removal Report for the project. This is provided in Appendix 6 and summarised in the following sections.

Vegetation Quality Assessment within the MSA exclusion zone

A continuous area of the same EVC is termed a 'habitat zone'. Different habitat zones exists where there are different EVCs present and/or discrete (non-continuous) patches of the same EVC. A separate vegetation quality assessment was conducted for each habitat zone. The vegetation quality assessment score was multiplied by the extent of the habitat zone to give a value in habitat hectares.

The results of the vegetation quality assessment are provided in Table 7. The vegetation quality assessment is for habitat zones within the Herne Swamp buffer area only (Biosis survey area). This table includes only VQA scores from Biosis. Where DEECA mapped wetlands occur the modelled score was applied.

There are 12 small and 14 large scattered trees within the study area.

Table 7 Vegetation quality assessment of vegetation in the study area assessed by Biosis

Habitat Zone ID			1	2	3	4 to 8	9	10 to 13	14 & 15
EVC #: Name			PGW 125	PGW 125	PG 132_61	PG 132_61	PGW 55	TM 821	PGW 55
		Max Score	Score	Score	Score	Score	Score	Score	Score
Site Condition	Large Trees	10	NA	NA	NA	NA	0	NA	NA
	Tree Canopy Cover	5	NA	NA	NA	NA	0	NA	NA
	Lack of Weeds	15	7	0	4	4	6	0	6
	Understorey	25	15	5	5	5	5	10	5
	Recruitment	10	6	0	3	3	1	6	3
	Organic Matter	5	5	2	4	4	2	4	2
	Logs	5	NA	NA	NA	NA	4	NA	0
	Total Site Score		33	7	16	16	18	20	16
	EVC standardiser		1.36	1.36	1.36	1.36	1	1.36	1
	Adjusted Site Score		45	10	22	22	18	27.2	16
Landscape Value	Patch Size	10	8	1	2	1	1	1	1
	Neighbourhood	10	2	2	2	2	2	2	2
	Distance to Core Area	5	1	1	1	1	1	1	1
	Total Landscape Score		11	4	5	4	4	4	4
Habitat points = #/100		100	56	14	27	26	22	31.2	20
CONDITION SCORE		1	0.56	0.14	0.27	0.26	0.22	0.31	0.20

5.1.2 Determining the assessment pathway

Applications to remove native vegetation are categorised into one of three assessment pathways: basic, intermediate or detailed. Two factors are used to determine the assessment pathway for a permit application, the **location** and **extent** of the native vegetation proposed to be removed. Location has been divided into three possible categories by DEECA and has been pre-determined by DEECA for all locations in Victoria. The location of a particular site is determined using the location map available in the Native Vegetation Information Management (NVIM) system (http://nvim.depi.vic.gov.au).

The extent of native vegetation proposed to be removed determines the assessment pathway by considering the following:

- The total area (hectares) of native vegetation (including any patches and scattered trees) proposed to be removed
- Whether any large trees are proposed to be removed, either as scattered trees or occurring in patches.

It is proposed to remove **≥ 0.5 hectares and no large trees** of native vegetation from within location category **2**, therefore the application for removal of this native vegetation must meet the requirements of, and be assessed in, the **detailed** assessment pathway. These requirements are provided in Appendix 6.

Detail Figure 4.1

Detail Figure 4.2

Detail Figure 4.3

Epping - Kilmore Road

Hadfield Road W

Delma Court

Merriang Road

Grandview Court

Beveridge Road

Seymour Line

Lithgow Street

Merriang

Merri Creek

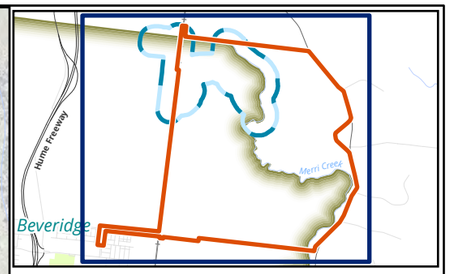
Merri Creek

Merri Creek

Merri Creek

Hume Freeway

Beveridge



Legend

- Biosis study area
- MSA approval extent
- Area excluded from MSA approval zone
- Stage 1A impact area
- Patch vegeation proposed to be removed
- MSA Biodiversity Conservation Strategy Conservation Area - Growling Grass Frog

Confirmed threatened ecological communities (EPBC)

- Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains

Potential threatened ecological communities (EPBC)

- Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains
- Natural Temperate Grassland of the Victorian Volcanic Plain

Scattered trees

- To be retained
- To be removed

Ecological vegetation classes (EVCs)

- VVP_0055_61 Plains Grassy Woodland
- VVP_0125 Plains Grassy Wetland
- VVP_0132 Plains Grassland
- VVP_0821 Tall Marsh

Hydrography

- Current wetland (DEECA)

Figure 4.0 Vegetation proposed to be removed: overview

0 100 200 300 400 500

Metres

Scale: 1:14,000 @ A3

Coordinate System: GDA2020 MGA Zone 55

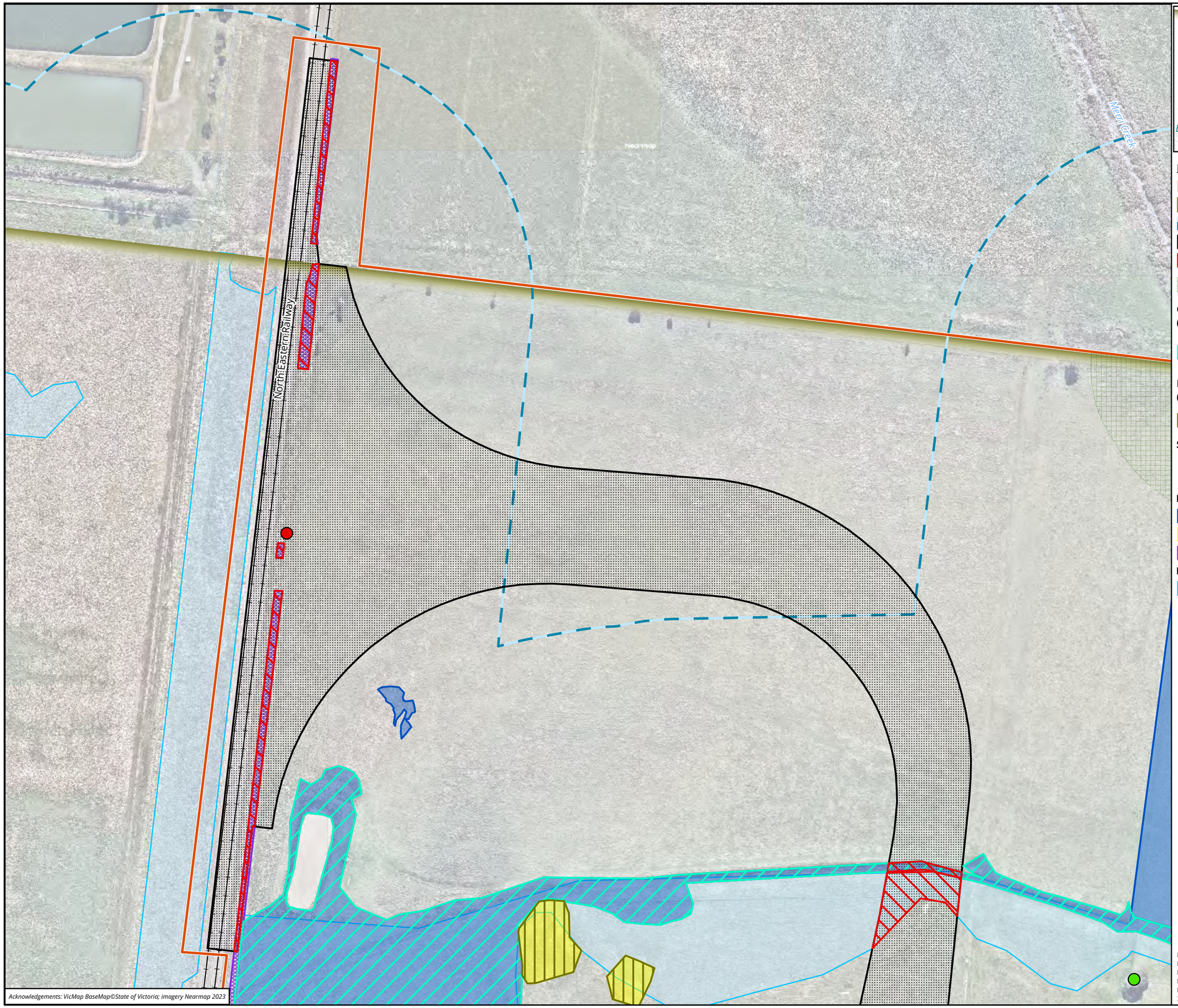
N

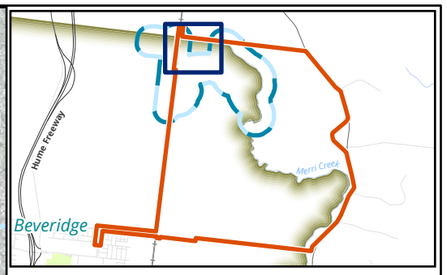
biosis

Matter: 39671,
Date: 27 February 2025,

Layout: 39671_F4_Veg_removal
Project: P:\39600s\39671\Mapping\
39671_FFA_BIFT_1A.aprx

Acknowledgements: VicMap BaseMap©State of Victoria; imagery Nearmap 2023





Legend

- Biosis study area
- MSA approval extent
- Area excluded from MSA approval zone
- Stage 1A impact area
- Patch vegetation proposed to be removed
- MSA Biodiversity Conservation Strategy Conservation Area - Growling Grass Frog

Confirmed threatened ecological communities (EPBC)

- Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains

Potential threatened ecological communities (EPBC)

- Natural Temperate Grassland of the Victorian Volcanic Plain

Scattered trees

- To be retained
- To be removed

Ecological vegetation classes (EVCs)

- VVP_0125 Plains Grassy Wetland
- VVP_0132 Plains Grassland
- VVP_0821 Tall Marsh

Hydrography

- Current wetland (DEECA)

Figure 4.1 Vegetation proposed to be removed: detail

0 20 40 60 80 100

Metres

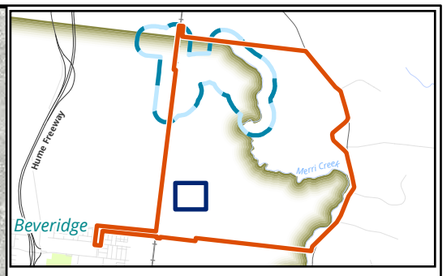
Scale: 1:2,750 @ A3

Coordinate System: GDA2020 MGA Zone 55

N

biosis

Matter: 39671,
Date: 27 February 2025,
[redacted]
Layout: 39671_F4_Veg_removal
Project: P:\39600s\39671\Mapping\
39671_FFA_BIFT_1A.aprx



Legend

- Biosis study area
- MSA approval extent
- Area excluded from MSA approval zone
- Stage 1A impact area
- Patch vegeation proposed to be removed

Hydrography

- Current wetland (DEECA)

Figure 4.2 Vegetation proposed to be removed: detail

0 10 20 30 40 50

Metres

Scale: 1:1,500 @ A3

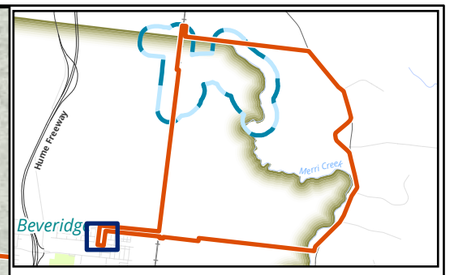
Coordinate System: GDA2020 MGA Zone 55

N

biosis

Matter: 39671,
Date: 27 February 2025,

Layout: 39671_F4_Veg_removal
Project: P:\39600s\39671\Mapping\
39671_FFA_BIFT_1A.aprx



Legend

- Biosis study area
- MSA approval extent
- Area excluded from MSA approval zone
- Stage 1A impact area
- Patch vegetation proposed to be removed

Scattered trees

- To be removed

Ecological vegetation classes (EVCs)

- VVP_0055_61 Plains Grassy Woodland

Figure 4.3 Vegetation proposed to be removed: detail

0 10 20 30 40 50

Metres

Scale: 1:1,500 @ A3

Coordinate System: GDA2020 MGA Zone 55

N

biosis

Matter: 39671,
Date: 27 February 2025,

Layout: 39671_F4_Veg_removal
Project: P:\39600s\39671\Mapping\
39671_FFA_BIFT_1A.aprx

5.1.3 Offset requirements for vegetation within the MSA exclusion zone

In order to ensure a gain to Victoria's biodiversity that is equivalent to the loss resulting from the proposed removal of native vegetation, compensatory offsets are required. Losses and gains are measured in general or species habitat scores or units. The offset must also include at least one large tree for every large tree removed.

For a detailed assessment pathway application, the species-general offset test will determine if a general offset, species offset or combination of both is required.

The results of the species-general offset test are provided in Appendix 6 and summarised in Table 8.

Table 8 Summary of DEECA Native Vegetation Removal Report

Attribute	Outcome	Notes
Location category	2	Medium risk Category.
Native vegetation removal extent	0.52 hectares	Five patches and 1 small scattered tree.
Assessment pathway	Detailed	Removal of >0.5 ha and no large trees.
Strategic Biodiversity Value (SBV) Score	0.325 – 0.495	NA
Modelled habitat for threatened species	There is mapped habitat for threatened species.	The species-general offset test was applied to the proposal. This test determined that the threshold of 0.005 per cent of the mapped habitat value impact for a species was not triggered. Therefore, a species offset is not required.
Offset type	General habitat units	General, below threshold to require species offsets.
Offset amount: general habitat units	0. 1520 units	General offset amount
General offset vicinity	Melbourne Water Catchment Management Authority (CMA) or Mitchell Shire, Whittlesea City Council.	The offset site must be located within the same Catchment Management Authority boundary or municipal district as the native vegetation to be removed.
General offset minimum Strategic Biodiversity Value Score	0.3121	Minimum SBV of general offset.

5.1.4 Proposed offset strategy

National Intermodal intends to purchase the offset credits from the Victorian native vegetation credit register.

The applicant may seek to purchase 'third party' specific offset credits via an accredited trading scheme. A search using the DEECA native vegetation credit register to purchase general habitat units that satisfy the offset requirements as specified above was undertaken. Seventeen sites and/or credits are available for purchase as of 12 February 2025 within the Melbourne Water CMA. These credit register outputs are available in Appendix 8.

5.2 MSA Habitat Compensation Levy

An estimate of the MSA levy payable for the study area has been retrieved from the DEECA MSA Mapshare tool. This levy is intended to compensate for removal of native vegetation and species habitat within the MSA area. As such offsets for Native Vegetation within this area are not included within the offset requirements outlined in 5.1.3, however total impacts to native vegetation are summarised in Table 9 below.

The estimated levy liability for the entire study area is **$10,434,630.33.** This is summarised in Table 7 and included in Appendix 7 of this report. This is an estimate only and is based on the rates for financial year FY24-25, the actual cost will depend on the financial year in which the levy is paid and needs to be confirmed by DEECA in the relevant FY that payment is being made. It will also be necessary for DEECA to calculate the levy amount applicable to Stage 1A. A staged payment option may be available and is discussed in Section 4.1.1 above.

Table 9 MSA Levy obligations

Habitat Type	Area	Applicable rate (FY23/34)	Estimated subtotal
Native Vegetation	0.030 ha	$258,531	$7,755.93
Scattered trees	1 tree	$35,935	$35,935.00
Golden Sun Moth	323.906 ha	$28,733	$9,306,791.10
Growling Grass Frog	104.146 ha	$10,406	$1,083,743.27
Matted Flax-Lily	0.030 ha	$13,501	$405.03

6. Key ecological values and recommendations

This section identifies the key ecological features of the study area, provides an outline of potential implications of Stage 1A works on those values and includes recommendations to assist National Intermodal to minimise impacts to biodiversity.

The primary measure to reduce impacts to biodiversity values within the study area is to avoid and minimise removal of native vegetation and terrestrial and aquatic habitat. This has been considered during the design phase of the project and options to retain vegetation and habitat have been implemented where possible.

A summary of potential implications of development of the study area and recommendations to minimise impacts of the project are provided in Table 10.

Table 10 Summary of key ecological values, potential implications of developing the study area and recommendations to minimise ecological impacts.

Ecological feature (Figure 3)	Potential implications of development	Recommendations
Native vegetation	The removal of native vegetation comprising: • 0.27 hectares of Tall Marsh (EVC 821) • 0.03 hectares of Plains Grassy Wetland (EVC 125) • 0.03 hectares Plains Grassy Woodland (EVC 55_61) • 2 small scattered trees • 5.46 hectares of DEECA Mapped Wetland.	Avoid and minimise removal of native vegetation, in accordance with the Guidelines. Refer to Section 5. All retained vegetation should be fenced off and treated as no-go zones. Identify and implement appropriate offsets for 0.52 hectares of vegetation losses outside the MSA as outlined in Section 5.3. The application will be assessed on the detailed assessment pathway. Proportional impacts to native vegetation are below the species offset threshold. Payment of MSA environmental compensation levy as outlined in Section 5.3 for the removal of native vegetation losses within the MSA area. Minimise direct and indirect impacts to DEECA mapped wetland associated with Herne Swamp.
Threatened species and ecological communities	Impacts on threatened species and communities and their habitat.	National Intermodal has replaced the original bank and culvert design of the rail connection within the Herne Swamp buffer area with a 700m long viaduct. The Surface Water Assessment for the project (Aurecon, 2025) has confirmed that this provides an appropriate design to avoid hydrological impacts to SHWTLP and the Herne Swamp. The following additional mitigation measures are recommended to avoid and minimise impacts to threatened ecological communities and species habitat: • Culverts within the Herne Swamp Buffer area are to be designed with consideration of the Growling Grass Frog Crossing Design Standards from *Department of Environment, Lane, Water and Planning* (DELWP, now *Department of Energy, Environment and Climate Action* (DEECA)) (DELWP 2017a).

Ecological feature (Figure 3)	Potential implications of development	Recommendations
		• Temporary exclusion fencing where the impact footprint crosses through potential Growling Grass Frog habitat. • Avoid areas of potential EPBC Act listed community Natural Temperate Grassland of the Victorian Volcanic Plains (NTGVVP). This community may also provide habitat for the EPBC Act listed species Matted Flax-lily. • Avoid areas of potential habitat for Swamp Everlasting, River Swamp Wallaby-grass and Swamp Fireweed outside the impact area, where targeted survey has not been undertaken. • Avoiding effects of lighting design on wildlife in line with the National Light Pollution Guidelines for Wildlife (DEE 2020). • Management of Herne Swamp during operation should be conducted under a Conservation Management Plan prepared in consultation with DCCEEW, in relation to: o Ecological Assessment and Monitoring o Habitat Restoration and Enhancement o Water Management o Invasive Species Management o Adaptive management o External audit.
Aquatic habitat features	Loss of, or alterations to, riparian and in-stream habitat within and in the vicinity of the study area (e.g. downstream) via: direct removal, notable hydrological changes, deterioration in water quality (including pollution event) and, sedimentation.	• Stormwater design to avoid impacts to water quality and flows to Herne Swamp. • Protect key values (including waterways) by retaining features and including appropriate buffers into design.
Habitat connectivity	Impacts to aquatic linkage between Merri Creek, Herne Swamp and farm dams.	• Maintenance of the flow of water from Herne Swamp to Merri Creek and incorporation of culverts, bridges or viaduct in the northern section of the proposed rail to allow ongoing movement of Growling Grass Frogs and other fauna with the potential to use these areas as habitat. • Culverts within the Herne Swamp Buffer area to be designed with consideration of the Growling Grass Frog Crossing Design Standards from *Department of Environment, Lane, Water and Planning* (DELWP, now *Department of Energy, Environment and Climate Action* (DEECA)) (DELWP 2017a). • Do not impact the flow of water at the culvert within the existing rail corridor. • Minimise impacts to drainage line through construction and SHWTLP environmental management measures

Ecological feature (Figure 3)	Potential implications of development	Recommendations
		during construction of rail connection and surrounding works.

Construction and post-construction management

Specific detail relating to preventing impacts to retained native vegetation and aquatic and terrestrial habitat should be addressed in a site-specific Construction Environmental Management Plan (CEMP) to be developed prior to commencement of works. This will include issues relating to contractors such as environmental inductions, installation of temporary fencing/signage, drainage and sediment control.

The CEMP should specifically outline how Biosis' recommendations around Growling Grass Frog, SHWTLP and waterways will be implemented. These specific recommendations can be found in Appendix 3.

All areas of vegetation and potential or recorded habitat nominated not to be impacted must be treated as no-go zones and are not to be encroached upon as works progress.

A Conservation Management Plan (CMP) will be developed for Herne Swamp. This CMP should provide a framework for the protection and management of Herne Swamp during the operational phase and should include:

- Ecological Assessment and Monitoring
- Habitat Restoration and Enhancement
- Water Management
- Community Engagement and Education
- Invasive Species Management
- Climate Change Adaptation
- Funding and Resource Management.

All mitigation measures need to be committed to by National Intermodal as planning and construction progresses to ensure impacts to protected species and communities are avoided.

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Appendices

Appendix 1 Flora

The following abbreviations and symbols are relevant to this Appendix.

Code	Meaning	Reference
National listings (EPBC Act)		
EX	Extinct	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
CR	Critically endangered	
EN	Endangered	
VU	Vulnerable	
PMST	Protected Matters Search Tool	
State listings (FFG Act)		
x	Extinct	Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act)
cr	Critically endangered	
e	Endangered	
v	Vulnerable	
t	Threatened	
P	Protected (public land only)	
Weed status (CaLP Act)		
SP	State prohibited species	Victorian *Catchment and Land Protection Act 1994* (CaLP Act)
RP	Regionally prohibited species	
RC	Regionally controlled species	
R	Restricted species	

Appendix 1.1 Flora species recorded from the study area

Table 11 Flora species recorded from the study area during the Biosis assessment

Status	Scientific Name	Common Name
Indigenous species		
	Acacia dealbata	Silver Wattle
P	*Acacia mearnsii*	Black Wattle
	Acacia melanoxylon	Blackwood
	Acaena novae-zelandiae	Bidgee-widgee
	Alisma plantago-aquatica	Water Plantain
	Amphibromus nervosus	Common Swamp Wallaby-grass
	Amyema pendula	Drooping Mistletoe
	Austrostipa spp.	Spear Grass
P	*Azolla rubra*	Pacific Azolla
P	*Calocephalus lacteus*	Milky Beauty-heads
	Carex tereticaulis	Poong'ort
P	*Cheilanthes austrotenuifolia*	Green Rock-fern
P	*Craspedia paludicola*	Swamp Billy-buttons
	Eleocharis acuta	Common Spike-sedge
	Eleocharis pusilla	Small Spike-sedge
	Epilobium billardiereanum	Variable Willow-herb
	Eryngium vesiculosum	Prickfoot
P	*Euchiton involucratus s.s.*	Star Cudweed
	Geranium spp.	Crane's Bill
	Juncus bufonius	Toad Rush
	Juncus flavidus	Gold Rush
	Juncus holoschoenus	Joint-leaf Rush
	Juncus semisolidus	Plains Rush
	Lachnagrostis spp.	Blown Grass
	Lemna disperma	Common Duckweed
	Lomandra filiformis	Wattle Mat-rush
	Lythrum hyssopifolia	Small Loosestrife
	Machaerina arthrophylla	Fine Twig-sedge
	Melicytus dentatus s.s.	Tree Violet
	Microlaena stipoides var. *stipoides*	Weeping Grass
	Montia australasica	White Purslane
	Phragmites australis	Common Reed
	Poa labillardierei	Common Tussock-grass
	Ranunculus inundatus	River Buttercup
	Rytidosperma duttonianum	Brown-back Wallaby-grass
	Stellaria angustifolia	Swamp Starwort
	Themeda triandra	Kangaroo Grass
	Veronica spp.	Speedwell

Status	Scientific Name	Common Name
Introduced species		
	Acetosella vulgaris	Sheep Sorrel
	Agrostis capillaris	Brown-top Bent
RC	*Cirsium vulgare*	Spear Thistle
RC	*Crataegus monogyna*	Hawthorn
	Ehrharta erecta	Panic Veldt-grass
	Holcus lanatus	Yorkshire Fog
	Hypochaeris radicata	Flatweed
	Leontodon spp.	Hawkbit
	Lolium rigidum	Wimmera Rye-grass
	Phalaris aquatica	Toowoomba Canary-grass
	Plantago lanceolata	Ribwort
RC	*Rosa rubiginosa*	Sweet Briar
RC	*Rubus anglocandicans*	Common Blackberry
	Rumex conglomeratus	Clustered Dock
	Rumex crispus	Curled Dock
	Trifolium spp.	Clover
RC	*Ulex europaeus*	Gorse

Appendix 1.2 Listed flora species

The following table includes threatened flora species that have potential to occur within the study area. The list of threatened species is sourced from the VBA and PMST (accessed on 25 August 2023). Where years are specified for the most recent database records, these refer to records from the VBA unless otherwise specified. Where no year is specified, the PMST has predicted that the species has potential to occur. A proportion of the flora habitat descriptions have been reproduced with permission from the Royal Botanic Gardens Victoria (RBGV 2020).

Table 12 Threatened flora species recorded or predicted to occur within 5 km of the study area

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	FFG					
National significance								
Amphibromus fluitans	River Swamp Wallaby-grass	VU			PMST	Swampy areas, mainly along the Murray River between Wodonga and Echuca with scattered records from southern Victoria.	**Medium**	Suitable habitat within SHBTLW study area. Records further then 10km, however all records are scattered
Dianella amoena	Matted Flax-lily	EN	cr	2022	PMST	Lowland grassland and grassy woodland, on well-drained to seasonally waterlogged fertile sandy loam soils to heavy cracking clays.	**Medium**	Suitable habitat in the Plains Grassland rocky habitat and records close to the study area.
Diuris fragrantissima	Sunshine Diuris	EN	cr		PMST	Grassland dominated by *Themeda triandra*, on plains with heavy basalt soils and embedded boulders; only known naturally occurring population is in Sunshine.	**Negligible**	No nearby records and no suitable habitat
Dodonaea procumbens	Trailing Hop-bush	VU			PMST	Sandy or clay soils in low-lying, winter-wet areas in grasslands, woodlands, and low-open forest.	**Low**	No nearby records and no suitable habitat
Glycine latrobeana	Clover Glycine	VU	v		PMST	Grasslands and grassy woodlands, particularly those dominated by Kangaroo Grass.	**Low**	No nearby records and limited suitable habitat

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	FFG					
Lachnagrostis adamsonii	Adamson's Blown-grass	EN	e	1990	PMST	Low-lying, seasonally wet or swampy areas of plains communities, often in slightly saline conditions.	**Low**	Potentially suitable habitat however no nearby records
Lepidium aschersonii	Spiny Peppercress	VU	e		PMST	Heavy clay soils near salt lakes on the volcanic plains; disjunct records near Lake Omeo.	**Low**	No nearby records and limited suitable habitat
Lepidium hyssopifolium	Basalt Pepper-cress	EN	e		PMST	Basalt plains grassland and woodland communities.	**Low**	Nearby records however almost 40 years old. Very limited suitable habitat.
Leucochrysum albicans subsp. *tricolor*	White Sunray	EN	e		PMST	Grasslands of the Victorian Volcanic Plains, primarily on acidic clay soils derived from basalt, with occasional occurrences on adjacent sedimentary, sandy-clay soils.	**Low**	No nearby records and limited suitable habitat
Pimelea spinescens subsp. *spinescens*	Spiny Rice-flower	CR	cr		PMST	Primarily grasslands featuring a moderate diversity of other native species and inter-tussock spaces, although also recorded in grassland dominated by introduced perennial grasses.	**Low**	No nearby records and limited suitable habitat
Pomaderris vacciniifolia	Round-leaf Pomaderris	CR	cr		PMST	Endemic in Victoria. Largely confined to moist forest and scrubs in the upper catchment of the Yarra, Plenty and Yea Rivers in an area bounded by Healesville, Marysville and Whittlesea, but also in the Tyers-Walhalla areas.	**Negligible**	No nearby records and no suitable habitat
Pterostylis chlorogramma	Green-striped Greenhood	VU	e		PMST	Heathy woodland; more specific habitat requirements are poorly known.	**Negligible**	No suitable habitat
Rutidosis leptorhynchoides	Button Wrinklewort	EN	e		PMST	Higher quality Plains Grassland and Grassy Woodland in Western Victoria, particularly those with fertile soil and light timber cover.	**Low**	No nearby records and no suitable habitat

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	FFG					
Senecio macrocarpus	Large-headed Fireweed	VU	cr		PMST	Grassland, shrubland and woodland habitats on heavy soils subject to waterlogging and/or drought conditions in summer.	**Low**	No nearby records and no suitable habitat
Senecio psilocarpus	Swamp Fireweed	VU		2002	PMST	Seasonally inundated herb-rich swamps, growing on peaty soils or volcanic clays.	**Recorded**	Species recorded in Herne Swamp during Arcadis (2022) targeted survey (Figure 3)
Thesium australe	Austral Toad-flax	VU	e		PMST	Most commonly in damp grassland and woodland, including subalpine grassy heathlands.	**Negligible**	No nearby records and no suitable habitat
Xerochrysum palustre	Swamp Everlasting	VU	cr	2018	PMST	Sedge-swamps and shallow freshwater marshes and swamps in lowlands, on black cracking clay soils.	**Medium**	Suitable habitat in SHWTLP and records close to the study area
State significance								
Austrostipa rudis subsp. *australis*	Veined Spear-grass		e	1974		Cooler areas of moderate altitude, in open-forest on sandy or sandstone derived soils.	**Low**	One record close to the study area, however from 1974. No suitable habitat.
Callitriche umbonata	Winged Water-starwort		e	1992		Damp, periodically waterlogged sites; swamps and shallow freshwater ponds.	**Low**	Suitable habitat however no records close to the study area.
Carex tasmanica	Curly Sedge		e	2005		Seasonally wet areas, such as around drainage lines and freshwater swamps, on fertile, clay soils derived from basalt.	**Medium**	Record close to the study area. Suitable habitat within SHWTLP.
Coronidium gunnianum	Pale Swamp Everlasting		cr	2018		Widespread and sometimes locally common, particularly in high-rainfall areas of Victoria; often in moist sites in open forests and woodlands.	**Recorded** (Ecology & Heritage partners 2020)	This species has been recorded just west of the train track.
Cullen parvum	Small Scurf-pea		e	2011		Lowland grasslands, including pastures and occasionally in otherwise disturbed grassy areas.	**Medium**	This species has been recorded just west of the train track.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	FFG					
Cullen tenax	Tough Scurf-pea		e	2011		Lowland grasslands, including pastures and occasionally in otherwise disturbed grassy areas.	**Medium**	Several records just south of the study area.
Geranium solanderi var. *solanderi s.s.*	Austral Crane's-bill		e	2008		Grasslands or grassy woodlands where hydrology is not a limiting factor.	**Recorded** (Ecology & Heritage partners 2020)	Recent record just south of the study area.
Microseris scapigera s.s.	Plains Yam-daisy		cr	2015		Damp depressions in grasslands, woodlands, stream banks, alpine herbfields and around the margins of saline lakes and flats.	**Medium**	Recent records north of the study area
Rytidosperma monticola	Small-flower Wallaby-grass		e	2005		Tablelands up to c. 1400m ASL, and common on heathlands with shallow soils over sandstone, and in grasslands with heavier, deep soils.	**Low**	Record close to the study area, however limited suitable habitat
Senecio campylocarpus	Floodplain Fireweed		e	1993		Clay loam soils in forests and woodlands, typically in areas that are seasonally inundated.	**Low**	Historical record nearby, however prefers forests and woodlands

Appendix 1.3 Threatened ecological communities

The following table includes the threatened ecological communities that have potential to occur within the project area. The list of threatened ecological communities has been compiled with reference to characteristics of FFG Act threatened communities (SAC 2013) and predictive output from the PMST (accessed on 25 August 2023).

Table 13 Threatened ecological communities predicted to occur within 5 km of the project area.

National significance			
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	PMST	**Not recorded –** Grey Box were not recorded within the study area
Grassy Eucalypt Woodland of the Victorian Volcanic Plain	Critically Endangered	PMST	**Not recorded –** Eucalypts associated with this community not recorded within the study area
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	Critically Endangered	PMST	**Recorded** within the study area (Figure 3)
Natural Temperate Grassland of the Victorian Volcanic Plain	Critically Endangered	PMST	**Potentially recorded** within the study area (Figure 3).
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	PMST	**Not recorded –** Eucalyptus associated with this community not recorded within the study area
State significance			
Limestone Grassy Woodland Community	Threatened		**Not recorded**
Sedge Rich Eucalyptus camphora Swamp Community	Threatened		**Not recorded**
Western (Basalt) Plains Grasslands Community	Threatened		**Potentially recorded** within the study area (Figure 3).
Western Basalt Plains (River Red Gum) Grassy Woodland Floristic Community 55-04	Threatened		**Not recorded**

Appendix 2 Fauna

The following abbreviations and symbols are relevant to this Appendix:

Code	Meaning	Reference
National listings (EPBC Act)		
EX	Extinct	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
CR	Critically endangered	
EN	Endangered	
VU	Vulnerable	
NT	Near threatened	
CD	Conservation dependent	
PMST	Protected Matters Search Tool	
State listings (FFG Act)		
x	Extinct	Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act)
cr	Critically endangered	
e	Endangered	
v	Vulnerable	
t	Threatened	
P	Protected (fish only)	
Pest animal status (CaLP Act)		
PS	Declared pest animal	Victorian *Catchment and Land Protection Act 1994* (CaLP Act)

Appendix 2.1 Fauna species recorded from the study area

Table 14 Vertebrate fauna recorded from the study area (present assessment)

Status	Scientific name	Common name
Indigenous species		
	Anthochaera carunculata	Red Wattlebird
	Anthus australis	Australian Pipit
	Ardea pacifica	White-necked Heron
	Circus approximans	Swamp Harrier
	Cisticola exilis	Golden-headed Cisticola
	Corvus mellori	Little Raven
	Crinia signifera	Common Froglet
	Egretta novaehollandiae	White-faced heron
	Gymnorhina tibicen	Australian Magpie
	Lerista bougainvillii	Bougainville's skink
	Limnodynastes tasmaniensis	Spotted Marsh Frog
	Malurus cyaneus	Superb Fairy-wren
	Parasuta flagellum	Little Whip Snake
	Rhipidura leucophrys	Willy Wagtail
Introduced species		
	Acridotheres tristis	Common Myna
PS	*Lepus europaeus*	European Hare

Note: Details on the location of species recorded during the aquatic surveys are provided in A2.2 below.

Appendix 2.2 Aquatic fauna species

Aquatic fauna species recorded within and in the vicinity of the study area are listed in Table 15.

Table 15 Aquatic fauna survey results

Status	Scientific name	Common name	Notes
	Paratya australiensis	Freshwater Shrimp	44 individuals recorded in baited fish traps
	Cherax destructor destructor	Common Yabby	12 individuals recorded in baited fish traps
	Engaeus sp.	Burrowing Crayfish	Burrows recorded at various locations along Merri Creek

Appendix 2.3 Listed fauna species

The following table includes a list of threatened fauna species that have potential to occur within the study area. The list of threatened species is sourced from the VBA and PMST (accessed on 25 August 2023). Where years are specified for the most recent database records, these refer to records from the VBA unless otherwise specified. Where no year is specified, the PMST has predicted that the species has potential to occur.

Table 16 Threatened fauna species recorded or predicted to occur within 5 km of the study area

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	FFG					
National significance								
Pedionomus torquatus	Plains-wanderer	CR	cr	1905	PMST	Native grassland with a sparse, open structure.	**Low**	Some suitable habitat, but no recent records in the local area.
Rostratula australis	Australian Painted-snipe	EN	cr		PMST	Shallows of well-vegetated freshwater wetlands.	**Low**	Some suitable habitat, but no records in local area.
Botaurus poiciloptilus	Australasian Bittern	EN	cr	1990	PMST	Shallow freshwater and brackish wetlands with abundant emergent aquatic vegetation.	**Low**	Some suitable habitat, but no recent records in local area.
Falco hypoleucos	Grey Falcon	VU	v		PMST	Lightly timbered plains and Acacia scrub.	**Low**	No suitable habitat present.
Callocephalon fimbriatum	Gang-gang Cockatoo	EN	e	1998	PMST	S Vic to E NSW. Forests and woodlands from coast to alpine areas. Autumn-winter dispersal from highlands to lower elevations. Forages in eucalypts, acacias and some exotic garden trees and shrubs.	**Low**	No suitable habitat present.
Neophema chrysostoma	Blue-winged Parrot	VU		1990	PMST	A range of coastal, sub-coastal and semi-arid regions throughout south-eastern Australia. Nests in tree hollows in coastal eucalypt forests and woodlands. Feeds on seeds of a range of native grasses and herbs.	**Low**	No suitable habitat present.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	FFG					
Lathamus discolor	Swift Parrot	CR	cr	1991	PMST	A range of forests and woodlands, especially those supporting nectar-producing tree species. Also well-treed urban areas.	**Low**	No suitable habitat present.
Hirundapus caudacutus	White-throated Needletail	VU	v	2018	PMST	An almost exclusively aerial species within Australia, occurring over most types of habitat, particularly wooded areas.	**Medium**	Recent record in local area. May use the airspace above the study area.
Numenius madagascariensis	Eastern Curlew	CR	cr		PMST	Large intertidal sandflats, banks, mudflats, estuaries, inlets, coastal lagoons and bays.	**Low**	No suitable habitat present.
Calidris ferruginea	Curlew Sandpiper	CR	cr		PMST	Large intertidal sandflats, banks, mudflats, estuaries, inlets, sewage farms, saltworks, harbours, coastal lagoons and bays.	**Low**	No suitable habitat present.
Melanodryas cucullata	Hooded Robin	EN	v		PMST	Woodlands of eucalypt, Mallee, semi-cleared farmland.	**Low**	No suitable habitat present.
Aphelocephala leucopsis	Southern Whiteface	VU		1976	PMST	Open forests and woodlands with a grassy and/or shrubby understorey.	**Low**	No suitable habitat present.
Pycnoptilus floccosus	Pilotbird	VU	v		PMST	E Vic to SE NSW. Largely ground-dwelling among leaf litter, logs and lower storey vegetation of wet sclerophyll forests and rainforest. Less often, alpine and coastal woodlands.	**Low**	No suitable habitat present.
Grantiella picta	Painted Honeyeater	VU	v		PMST	Dry open woodlands and forests. Typically forages for fruit and nectar in mistletoes and in tree canopies.	**Low**	No suitable habitat present.
Anthochaera phrygia	Regent Honeyeater	CR	cr		PMST	A range of dry woodlands and forests dominated by nectar-producing tree species.	**Negligible**	No suitable habitat present, and species is now largely restricted to NE Vic.
Stagonopleura guttata	Diamond Firetail	VU	v	1988	PMST	Open forests and woodlands with a grassy ground layer.	**Low**	No suitable habitat present.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	FFG					
Climacteris picumnus	Brown Treecreeper	VU		1988	PMST	Open eucalypt forests, woodlands and Mallee, often where there are stands of dead trees.	**Low**	No suitable habitat present.
Dasyurus maculatus maculatus (SE mainland population)	Spot-tailed Quoll	EN	e		PMST	Rainforest and wet and dry sclerophyll forests and woodlands.	**Negligible**	No suitable habitat present.
Petauroides volans	Southern Greater Glider	EN	e		PMST	Wet and damp sclerophyll forest with large hollow-bearing trees.	**Negligible**	No suitable habitat present.
Petaurus australis	Yellow-bellied Glider	VU	v		PMST	Sclerophyll forest with large hollow-bearing trees, prefers mature eucalypt dominated forest and woodland. Distributed along South-eastern Australia.	**Negligible**	No suitable habitat present.
Mastacomys fuscus mordicus	Broad-toothed Rat	VU	v		PMST	Sub-alpine Woodland, Heathland, Sedgeland, and sedge-dominated areas within forest.	**Negligible**	No suitable habitat present.
Pseudomys fumeus	Smoky Mouse	EN	e		PMST	Coastal heath and heathy woodland, wet forest, sub-alpine heath and dry sclerophyll forest.	**Negligible**	No suitable habitat present.
Isoodon obesulus obesulus	Southern Brown Bandicoot	EN	e	1968		Heathland, shrubland, sedgeland, heathy open forest and woodland; also exotic vegetation, such as blackberry thickets and rank grasses where native vegetation has been removed.	**Negligible**	No suitable habitat present.
Pteropus poliocephalus	Grey-headed Flying-fox	VU	v		PMST	Rainforest, wet and dry sclerophyll forest, woodland and urban areas.	**Low**	A small number of eucalypts present on site that this species may forage in on occasion.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	FFG					
Delma impar	Striped Legless Lizard	VU	e	1991	PMST	Natural temperate grassland, grassy woodland and exotic grassland.	**Low**	This species prefers soil with cracks and Herne Swamp area is too wet for this to occur, and there are no recent records in the local area. The ground is also highly impacted by cattle.
Lissolepis coventryi	Swamp Skink	EN	e		PMST	Densely vegetated swamps and associated watercourses, and adjacent wet heaths, sedgelands and saltmarshes.	**Low**	Some suitable habitat in study area, but no records in the local area.
Liopholis montana	Mountain Skink	EN	e		PMST	Alpine woodland and montane forest environments along the Great Dividing Range in Victoria to the upper Yarra River valley. An exceptionally low altitude population has also been recorded in the Wombat SF. Relatively little is known about the species' biology and ecology.	**Negligible**	No suitable habitat present.
Tympanocryptis pinguicolla	Grassland Earless Dragon	CR	cr	1988		Natural temperate grassland.	**Low**	Some suitable habitat, but outside of predicted range.
Litoria raniformis	Growling Grass Frog	VU	v	2009	PMST	Still or slow-flowing waterbodies and surrounding terrestrial vegetation.	**Medium**	Known populations in Merri Creek, which is linked by a drain to Herne Swamp. Targeted surveys by EHP did not find Growling Grass Frog present in 2019, however conditions were dry during this year. The subsequent wet years may have resulted in movement of this species back into Herne Swamp.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	FFG					
Prototroctes maraena	Australian Grayling	VU	e		PMST	Adults inhabit cool, clear, freshwater streams.	**Low**	No records in local waterways. Aquatic habitat is unlikely to be suitable.
Galaxiella pusilla	Dwarf Galaxias	VU	e		PMST	Slow-flowing or still freshwater wetlands such as swamps, drains and backwaters of streams.	**Low**	No records in local waterways. Aquatic habitat is unlikely to be suitable.
Maccullochella peelii	Murray Cod	VU	e	1970		A diverse range of stream habitats in the Murray-Darling basin; principally the main channels of rivers and their major tributaries.	**Low**	No recent records in local waterways.
Nannoperca obscura	Yarra Pygmy Perch	VU	v		PMST	Lakes, pools and slow-flowing streams with abundant aquatic vegetation.	**Low**	Nearest recent records are from Deep Creek but no apparent connectivity with waterways in the study area. Unlikely to be suitable refuge within aquatic habitat on site.
Synemon plana	Golden Sun Moth	VU	v	2019	PMST	Natural temperate grassland, grassy woodland and pasture supporting spear grasses and wallaby grasses and exotic grassland dominated by Chilean needle grass.	**Low**	Lack of feed plants within the study area. Targeted surveys by EHP in 2019 did not find the species present.
State significance								
Turnix pyrrhothorax	Red-chested Button-quail		e	1989		Grassland, grassy woodland and crops.	**Low**	Some suitable habitat in study area, but no recent records in local area.
Ardea alba modesta	Eastern Great Egret		v	2018		Flooded crops, pasture, swamps, lagoons, saltmarsh, sewage ponds, estuaries, dams, roadside ditches. Breeds in trees standing in water.	**Medium**	Suitable habitat in Herne Swamp, and recent records in local area. Species may also occasionally occur along creeks and drains within the study area.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	FFG					
Spatula rhynchotis	Australasian Shoveler		v	2019		Variety of wetlands, with a preference for large, permanent, freshwater lakes/swamps with dense fringing vegetation.	**Medium**	Some suitable habitat in Herne Swamp and may occasionally occur in paddock dams. Recent record in local area.
Aythya australis	Hardhead		v	2019		Deep freshwater swamps and wetlands, with abundant aquatic and terrestrial vegetation for roosting. Can occur in sheltered estuaries.	**Medium**	Some suitable habitat in Herne Swamp and may occasionally occur in paddock dams. Recent record in local area.
Oxyura australis	Blue-billed Duck		v	2019		Open or densely vegetated wetlands.	**Medium**	Some suitable habitat in Herne Swamp and may occasionally occur in paddock dams. Recent record in local area.
Biziura lobata	Musk Duck		v	2019		Deep, permanent freshwater wetlands with areas of open water and patches of dense aquatic vegetation.	**Medium**	Some suitable habitat in Herne Swamp and may occasionally occur in paddock dams. Recent record in local area.
Hieraaetus morphnoides	Little Eagle		v	2004		Woodland and open areas. Rabbits are a key component of their diet. Nesting occurs in mature trees in open woodland or riparian vegetation.	**Low**	No suitable habitat present.
Falco subniger	Black Falcon		cr	2007		Woodlands, open country and around terrestrial wetlands areas, including rivers and creeks. Primarily occurs in arid and semi-arid zones in the north, north-west and west of Victoria.	**Low**	No suitable habitat present.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	FFG					
Actitis hypoleucos	Common Sandpiper		v	2018	PMST	Migrates to Australia from Eurasia in August where it inhabits a wide variety of coastal and inland wetlands with muddy margins before departing north in March.	**Medium**	Suitable habitat in Herne Swamp and paddock dams, and recent record in local area.
Tringa nebularia	Common Greenshank		e		PMST	A variety of ephemeral and permanent inland wetlands and sheltered coastal wetlands.	**Low**	Suitable habitat in Herne Swamp and paddock dams, but no records in local area.
Pyrrholaemus sagittatus	Speckled Warbler		e	1991		Eucalypt woodland with rocky gullies, ridges, tussock grasses and a sparse shrub understorey.	**Low**	No suitable habitat present.
Phascogale tapoatafa	Brush-tailed Phascogale		v	2021		Drier sclerophyll forests and woodlands.	**Negligible**	No suitable habitat present.
Sminthopsis murina murina	Common Dunnart		v	1988		Found in heathland areas, open forests and woodlands that have structurally complex microhabitats. Common Dunnart prefer dry sclerophyll forest and Mallee heath with high rock and crevice density.	**Negligible**	No suitable habitat present.
Sminthopsis crassicaudata	Fat-tailed Dunnart		v	1991		Inhabits sparse grasslands and open shrubland habitats, usually where there is a significant component of bare ground and suitable refuge sites such as surface rocks or logs where it constructs nests of grass or other dried plant material.	**Low**	Some suitable rocks present in study area, but a lack of bare ground and soil cracks.
Pseudemoia pagenstecheri	Tussock Skink		e	1988		On the ground in a range of grasslands or sparse grassy woodlands from alps to coast.	**Medium**	Suitable habitat in study area. Has similar habitat requirements to *Lerista bougainvillii*, which was found on site during Biosis initial due diligence investigation.

Scientific name	Common name	Conservation status		Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	FFG					
Pseudophryne bibronii	Brown Toadlet		e	2005		A wide variety of woodland, forest and grassland habitats, where it shelters under leaf litter and other debris in moist soaks and depressions. Breeds in swamps and inundated habitats, and along creek lines.	**Medium**	Suitable habitat within Herne Swamp and associated drainage lines to Merri Creek.
Pseudophryne semimarmorata	Southern Toadlet		e	1969		A wide variety of woodland, forest and grassland habitats, where it shelters under leaf litter and other debris in moist soaks and depressions. Breeds in swamps and inundated habitats, and along creek lines.	**Low**	Some suitable habitat in study area, but no records in local area since 1969.

Appendix 2.4 Migratory species (EPBC Act listed)

Table 17 Migratory fauna species recorded or predicted to occur within 5 km of the study area

Scientific name	Common name	Most recent record
Migratory species		
Gallinago hardwickii	Latham's Snipe	2018
Hirundapus caudacutus	White-throated Needletail	2018
Apus pacificus	Fork-tailed Swift	PMST
Numenius madagascariensis	Eastern Curlew	PMST
Actitis hypoleucos	Common Sandpiper	2018
Tringa nebularia	Common Greenshank	PMST
Calidris ferruginea	Curlew Sandpiper	PMST
Calidris acuminata	Sharp-tailed Sandpiper	PMST
Calidris melanotos	Pectoral Sandpiper	PMST
Motacilla flava	Yellow Wagtail	PMST
Rhipidura rufifrons	Rufous Fantail	1988
Myiagra cyanoleuca	Satin Flycatcher	1991
Monarcha melanopsis	Black-faced Monarch	PMST

Appendix 3 SIC Assessments for threatened species and communities

Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains, critically endangered

The Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains (SHWTLP), is listed as Critically Endangered under the EPBC Act and occurs on the plains of Victoria, NSW and South Australia (TSSC 2012). The community is restricted to plains and lower slopes to 500 metres above sea level. The soils on which the community is found vary depending on the geographical location, but often consist of fertile poorly drained clays, silts and basalts. The wetlands occur on ephemeral drainage lines or depressions and are seasonally filled, often closed systems. That is the wetlands are not reliant on overbank flows from riverine systems. The Seasonal Herbaceous Wetlands community generally occurs on fertile or arable land that have been extensively modified for agricultural development including cropping, grazing and pasture development. More recently urban expansion has contributed further to losses in the community's former distribution. Identification of the community is often difficult due to its seasonal presence and the often-degraded nature of the agricultural lands it now occupies. The TSSC listing advice (2012) contains a range of contra indicators and condition thresholds that are used to positively identify the community.

Seasonal Herbaceous Wetlands within the subject land

21.91 hectares of SHWTLP have been mapped in Herne Swamp and there is an additional 6.27 hectares of potential SHWTLP. The proposed works will remove 0.03 hectares of SHWTLP, which equates to 0.15% of the confirmed community in Herne Swamp.

Table 18 Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains: Assessment against Significant Impact Criteria for critically endangered communities.

Significant Impact Criteria	Likelihood of significant impact	Justification
Reduce the extent of an ecological community	Unlikely	Seasonal Herbaceous Wetlands of the Temperate Lowland Plains is found in Victoria, NSW and South Australia, restricted to plains and lower slopes to 500 metres above sea level and often consist of fertile poorly drained clays, silts and basalts. 21.91 hectares of SHWTLP was recorded with Herne Swamp (Figure 3). The wetland within Herne Swamp is thought to be entirely reliant on rainfall catchment run off (RAIN 2023). The proposed works will result in the removal of up to 0.03 hectares of SHWTLP, which is a reduction of 0.15% of the wetland within Herne Swamp, however this will not reduce the geographic extent of the community. National Intermodal has undertaken design development which results in negligible impacts to hydrology, thus preventing any indirect impacts to the

Significant Impact Criteria	Likelihood of significant impact	Justification
		SHWTLP community. Mitigation measures include, but are not limited to: • Stormwater design to avoid impacts to water quality and flows to Herne Swamp. • 700m raised viaduct incorporated in the Herne Swamp area of the proposed rail line (for both inflow and outflow).
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines.	Unlikely	Construction of the rail line will involve the disturbance of up to 0.03 hectares of an area mapped as SHWTLP, however impacts occur on the periphery of the patch extent and thus the works are considered unlikely to fragment the ecological community. The disturbance along the western boundary of the study area occurs within the western extent of the community and thus will not cause fragmentation. The disturbance associated with the drainage line running east to west facilitates movement of water around Herne Swamp and the SHWTLP community. However, vegetation around the drainage line is not indicative of plant species associated with SHWTLP. National Intermodal has undertaken design development which results in negligible impacts to hydrology. With the proposed mitigation measures in place, it is considered unlikely the proposed works will fragment the SHWTLP community.
Adversely affect habitat critical to the survival of an ecological community.	Unlikely	The approved conservation advice for SHWTLP does not formerly identify the minimum condition thresholds for habitat considered critical to the survival of the threatened community (DSEWPC 2012). Nevertheless, the project will impact on up to 0.03 hectares of the community. 0.03 hectares equates to 0.15% of the mapped extent of SHWTLP within Herne Swamp. Given the proposed impacts will occur on the edges of the patch and National Intermodal has undertaken design development which results in negligible impacts to hydrology, it is considered unlikely the proposed works will adversely affect habitat critical to the survival of the TEC.

Significant Impact Criteria	Likelihood of significant impact	Justification
Modify or destroy abiotic factors necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns.	Unlikely	Construction could result in indirect impacts to the SHWTLP community. Given the sensitive nature of wetlands, these local scale changes may lead to a broader decline in the ecological community in adjacent and surrounding areas through changed abiotic interactions. Mitigation measures will be implemented to prevent changes to hydrologic conditions and thus abiotic factors across the community. These include: • Stormwater design to avoid impacts to water quality and flows to Herne Swamp. • 700m raised viaduct incorporated in the Herne Swamp area of the proposed rail line (for both inflow and outflow). With these mitigation measures applied it is considered unlikely that the proposed rail line will modify or destroy abiotic factors necessary for the SHWTLP community.
Cause a substantial change in the species composition of an occurrence of an ecological community, including a decline or loss of functionally important species, for example through regular burning or flora and fauna harvesting.	Unlikely	The occurrence of SHWTLP is defined as the patch of the community that occurs within the subject land and extends into an adjacent area in a contiguous manner without major breaks in connectivity. The community occurs in a landscape where introduced vegetation cover is significant and intensive land clearing has taken place over the past 150 years. Land use impacts from drainage works, clearing, cropping and grazing have reduced the community integrity and functionality (e.g. loss of hydrological functioning, reduced flora species richness, reduced genetic exchange across the community due to fragmentation). Given the total disturbance footprint equates to 0.15% of the patch of SHWTLP, the proposed works are unlikely to further reduce species diversity and simplify community structure. Mitigation measures, as listed above will prevent changes to the hydrology of the community, preventing any additional disturbance through indirect impacts.

Significant Impact Criteria	Likelihood of significant impact	Justification
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including but not limited to: - ***Assisting invasive species establishment*** ***- Causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community.***	Unlikely	The SHWTLP community within the subject land are subject to existing weed invasion, pest animals, erosion and chemical inputs as a result of surrounding agricultural land use. Nonetheless, the proposed works are not considered to increase weed or pest invasion, or cause mobilisation of fertilisers, herbicides or other chemical within the threatened community. Construction activities can be managed through standard practices to avoid further sedimentation and pollution.
Interfere with the recovery of a community	Unlikely	The SHWTLP does not currently have an adopted recovery plan. However, recovery and threat abatement actions to support the recovery of SHWTLP has been described in the conservation advice (DSEWPC 2012). Some of the high priority conservation actions significant to the proposed works are: • Avoid clearance of native vegetation within the ecological community and its surrounds (at least within a buffer zone of 50 m from the wetland edge). • Prevent and manage any changes to hydrology that may result in changes to natural patterns of inundation and overland flows, water table levels, salinity, algal blooms, sedimentation/turbidity or pollution. • Ensure that development activities minimise direct impacts to the ecological community and indirect effects on its ecological function. Interference with the commonwealth conservation advice can be minimised by implementing the proposed management strategies and the Conservation Management Plan for SHWTLP.

Conclusion

Based on the factors above, it is concluded that the proposed works will not have a significant impact on SHWTLP.

Natural Temperate Grassland of the Victorian Volcanic Plain, critically endangered

Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP) is listed as a critically endangered ecological community under the EPBC Act. This community is endemic to south-west Victoria and is limited mostly to a ground layer of grasses and herbs, with large shrubs and trees absent to sparse (CoA 2011). Within the study area, NTGVVP was mapped by EHP in areas on rocky outcrop areas of Plains Grassland (Figure 3). The Biosis 2023 assessment did not record NTGVVP in areas of Plains Grassland, however the Biosis assessment was undertake in May, which is a sub-optimal time for grassland surveys.

The impact footprint does not disturb any areas of potential NTGVVP.

Significant impact assessment

There is a potential 4.57 hectares of NTGVVP within the study area. Based on a reasonable understanding of the extent and condition of NTGVVP in the study area it is concluded that proposed rail line is unlikely to lead to a significant impact to the community as all works associated with the rail line avoid patches of NTGVVP.

Table 19 Natural Temperate Grassland of the Victorian Volcanic Plain: Assessment against Significant Impact Criteria for critically endangered communities.

Significant Impact Criteria (critically endangered / endangered community)	Likelihood of significant impact	Justification
Reduce the extent of an ecological community.	**Unlikely**	It is inherently difficult to estimate the extent of treeless threatened ecological communities at landscape scales. Nevertheless, it is generally accepted that Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP) has declined in extent by more than 98% since European arrival in Victoria (TSSC 2008). In the early 2000s, it was estimated that 5000 ha of NTGVVP remained (Barlow and Ross 2002). However, as some level of clearing still occurs the extent of this TEC is likely to be less now. The proposed works will not impact patches of NTGVVP within the study area. Patches of NTGVVP occur around rocky outcrops on higher ground outside of the construction footprint. Thus, the proposed works are unlikely to reduce the extent of an ecological community.
Fragment or increase fragmentation of an ecological community.	**Unlikely**	It is estimated that more than 95% of known patches of NTGVVP are less than 10 ha in size, as a result of fragmentation by clearing and modification of the TEC over time (TSSC 2008). All proposed works occur outside of the NTGVVP patches and it is considered unlikely that the construction of the rail line will fragment the ecological community.
Adversely affect habitat critical to the survival of an ecological community.	**Unlikely**	No Recovery Plan has been prepared or adopted for this TEC and no critical habitats have been formerly identified by the Australian Government. However, given that less than 2% of the TEC is estimated to still exist, most areas that continue to support the TEC are likely to be considered critical habitat, particularly if those areas support moderate to high quality examples of the TEC.

Significant Impact Criteria (critically endangered / endangered community)	Likelihood of significant impact	Justification
		The study area currently supports approximately 4.57 hectares of NTGVVP. It is not part of a broader area of grassland and supports low species diversity. All proposed works occur outside of the NTGVVP patches and it is considered unlikely that the construction of the rail line will adversely affect habitat critical to the survival of the ecological community.
Modify or destroy abiotic factors necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns.	**Unlikely**	Construction of the rail line will not impact NTGVVP within the study area and is unlikely to result in long term disturbance to soil, topography and hydrology necessary for persistence of the TEC outside the study area.
Cause a substantial change in the species composition of an occurrence of an ecological community, including a decline or loss of functionally important species, for example through regular burning or flora and fauna harvesting.	**Unlikely**	Decline of NTGVVP typically involves the sequential loss of the following functionally important species or floristic groups: loss of warm-season grasses (e.g. Kangaroo Grass), followed by decline in native forb diversity, followed by loss of cool-season grasses (e.g. Tussock Grass, Wallaby Grass and Spear Grass). The proposed rail line will not impact NTGVVP within the study area and is therefore not likely to result in further loss of functionally important species from the broader national occurrence of the TEC. All NTGVVP within the study area has limited species composition and is subject to intensive edge effect pressures from the surrounding farm land.
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including but not limited to: ***- Assisting invasive species establishment*** ***- Causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community.***	**Unlikely**	The NTGVVP community within the subject land are subject to existing weed invasion, pest animals, erosion and chemical inputs as a result of surrounding agricultural land use. Nonetheless, the proposed works are not considered to increase weed or pest invasion, or cause mobilisation of fertilisers, herbicides or other chemical within the threatened community. Construction activities can be managed through standard practices to avoid further sedimentation and pollution.

Significant Impact Criteria (critically endangered / endangered community)	Likelihood of significant impact	Justification
Interfere with the recovery of an ecological community.	**Unlikely**	No Recovery Plan has been prepared or adopted for this TEC and therefore recovery priorities (actions and locations) have not been formerly articulated by the Australian Government. The proposed rail line will not impact NTGVVP within the study area and is therefore not likely to interfere with the recovery of the ecological community.

Conclusion

It is considered unlikely the proposed Stage 1A will result in a significant impact to NTGVVP. All areas of potential NTGVVP within the study area are not being impacted by the proposed works.

Growling Grass Frog *Litoria raniformis* – Vulnerable species under EPBC Act

The Growling Grass Frog is a large frog listed as vulnerable under the EPBC Act. The main threats to Growling Grass Frog include habitat loss, degradation and modification, fragmentation and isolation of populations, and introduced predators and disease (DEWHA 2009).

Growling Grass Frogs are dependent on aquatic habitats, and appropriate hydrological regimes for breeding and dispersal, and terrestrial habitat for foraging, shelter and local movement. Adult frogs move across open ground (for example grasslands) to access local foraging resources and breeding sites. Terrestrial vegetation, fallen logs and ground debris surrounding water bodies provide essential shelter and hibernation (over-wintering) sites for adult frogs. Movement between breeding sites (water bodies) is crucial, allowing temporal variation in habitat use and/or recolonisation of sites following local extinction, and maintains genetic diversity (DEWHA 2009).

Despite a lack of records during targeted surveys, maintenance of the flow of water from Herne Swamp to Merri Creek and incorporation of appropriate structures in the Herne Swamp buffer area have been incorporated to allow ongoing movement of Growling Grass Frogs through areas of potential habitat and minimise any potential impacts to Growling Grass Frog which may be using the area.

Biosis recommends the following additional mitigation measures be taken to avoid significant impacts to Growling Grass Frog:

- Avoid and minimise impacts to Herne Swamp, Merri Creek, farm dams and associated drainage lines.
- Appropriate design of rail connection to minimise hydrological impacts to Herne Swamp.
- Stormwater design to minimise impacts to water quality and flows to Herne Swamp.
- Bridge/culvert/viaduct in Herne Swamp area to be designed with consideration of the Growling Grass Frog Crossing Design Standards from *Department of Environment, Land, Water and Planning* (DELWP, now *Department of Energy, Environment and Climate Action* (DEECA)) (DELWP 2017a).
- Temporary exclusion fencing where the impact footprint crosses through Growling Grass Frog habitat.

- Avoid impacts to culvert in existing rail line.
- Avoiding effects of lighting design on wildlife in line with *Department of Climate Change, Energy, the Environment and Water* (DCCEEW) guidelines (DEE 2020).

These recommendations must be addressed in the Construction Environmental Management Plan, with specific detail on how they will be implemented throughout the construction period. The following Significant Impact Criteria have been assessed on the assumption that the above recommendations will be followed, deviations from these recommendations may void the assessment.

Table 20 Assessment of Growling Grass Frog (listed vulnerable species) in relation to Significant Impact Criteria for vulnerable species

Significant Impact Criteria	Likelihood of significant impact	Notes
Significant Impact Criteria 1.1 (vulnerable species)		
Lead to a long-term decrease in the size of an important population	Unlikely	The Significant Impact Guidelines for Growling Grass Frog (DEWHA 2009) state that: *'Any viable population is considered to be an important population for the persistence and recovery of the Growling Grass Frog. For this species, a viable population is one which is not isolated from other populations or water bodies, such that it has the opportunity to interact with other nearby populations or has the ability to establish new populations when water bodies fill and become available'.* The Growling Grass Frog population along Merri Creek is considered a viable population and therefore is an important population for the purposes of assessment under the EPBC Act. Despite the presence of suitable habitat, the species was not detected during targeted surveys by Ecology and Heritage Partners in 2020. However, the species is highly mobile and thus a lack of empirical data from within the project area does not specifically exclude potential for the species to occur, particularly considering the high rainfall in years since surveys. As a result, the impact area has been moved further north to avoid major impacts to Herne Swamp, and design will minimise changes to hydrology by inclusion of a culvert along the drainage between Herne Swamp and Merri Creek. Biosis recommends inclusion of culvert/s in the northern section of the swamp to allow movement into terrestrial habitat in the north. As there are no proposed impacts of the project to Merri Creek, and minimal impacts to Herne Swamp, dams and associated drainage lines, it is unlikely that the proposed action would lead to a long-term decrease in the size of the Merri Creek population of Growling Grass Frog.
Reduce the area of occupancy of an important population	Unlikely	There is a low likelihood that the proposed action would reduce the area of occupancy for an important population of Growling Grass Frog as all suitable wetland habitat and low-lying areas with potential for seasonal inundation have been excluded from development areas by design and impacts to

Significant Impact Criteria	Likelihood of significant impact	Notes
		hydrology have been minimised and habitat connectivity maintained through inclusion of a viaduct in the Herne Swamp buffer area.
Fragment an existing population into two or more populations	Unlikely	The Growling Grass Frog is a highly mobile species that is dependent on the migration of adults between water bodies, and between breeding and non-breeding habitats (DSE 2012). It is unlikely for the proposed action to fragment an existing population into two or more populations, as all suitable wetland habitat and low-lying areas with potential for seasonal inundation have been excluded from development areas by design and impacts to hydrology have been minimised and habitat connectivity maintained through inclusion of a viaduct in the Herne Swamp buffer area.
Adversely affect habitat critical to the survival of a species	Unlikely	It is unlikely the proposed action will adversely affect habitat critical to the survival of the species within the project area, as all suitable aquatic environments and associated low-lying areas that would support foraging, breeding, roosting and dispersal will be avoided by the impact area.
Disrupt the breeding cycle of an important population	Unlikely	The Growling Grass Frog is reliant on aquatic and riparian habitats for breeding and the subsequent development of the larval stage (DSE 2012). The impact area has been moved north of the swamp to minimise direct impact to the swamp, dams and associated drainage lines, as well as immediate terrestrial habitat surrounding the swamp. Therefore, it is unlikely the project will disrupt the breeding cycle of the Merri Creek population.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Unlikely	It is unlikely that the proposed action will modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. The impact area has been moved north of the mapped swamp to minimise direct impact to the swamp, dams and associated drainage lines, as well as immediate terrestrial habitat surrounding the swamp and impacts to hydrology have been minimised and habitat connectivity maintained through inclusion of a viaduct in the Herne Swamp buffer area.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the vulnerable species' habitat	Unlikely	The proposed action does not include any known mechanism that would result in the establishment of invasive species harmful to Growling Grass Frog that are not already present in the study area.

Significant Impact Criteria	Likelihood of significant impact	Notes
Introduce disease that may cause the species to decline	Unlikely	The proposed action does not include any known mechanism that would result in the introduction of a disease that is harmful to the species that is not already present in the study area.
Interfere with the recovery of the species	Unlikely	The proposed action will not interfere with the recovery of the species in respect to the specific objectives for recovery outlined in the in the *National Recovery Plan for Growling Grass Frog*

A further assessment of impacts to Growling Grass Frog *Litoria raniformis*, against the *Significant Impact Guidelines* (Commonwealth of Australia 2009), is presented in Table 20 following.

Table 21 Assessment of Growling Grass Frog in relation to Significant Impact Guidelines for the Vulnerable Growling Grass Frog *Litoria raniformis*

Impact threshold	Likelihood of significant impact	Notes
Habitat degradation in area supporting an important population		
Permanent removal or degradation of terrestrial habitat (for example between ponds, drainage lines or other temporary/permanent habitat) within 200 m of a water body in temperate regions, or 350 m in semi-arid regions, that results in the loss of overwintering opportunities for an important population	High	There is a high likelihood for the proposed action to result in the permanent removal or degradation of terrestrial habitat resulting in the loss of over-wintering opportunities, as the proposed rail construction is within 200 m of Herne Swamp and Merri Creek. The impact area has been moved north of the swamp to minimise direct impacts to the swamp, dams and associated drainage lines, as well as immediate terrestrial habitat surrounding the swamp. Impacts to hydrology have been minimised and habitat connectivity maintained through inclusion of a viaduct in the Herne Swamp buffer area.
Alteration of aquatic vegetation diversity or structure that leads to a decrease in habitat quality?	Low	It is considered a low likelihood that the proposed action would alter the current hydrological regime to the extent that it would significantly alter the overall structure and ecological function of the species critical habitat.
Alterations to wetland hydrology, diversity and structure (for example any changes to timing, duration or frequency of flood events	Low	It is considered a low likelihood that the proposed action would alter the current hydrological regime to the extent that it would significantly alter the timing and duration of wetting cycles required to maintain the species habitats and associated dispersal corridors.

Impact threshold	Likelihood of significant impact	Notes
that leads to a decrease in habitat quality		
Introduction of predatory fish or disease agents	Negligible	The proposed action does not include any known mechanism that would result in the introduction of a disease or predatory fish that is harmful to the species that is not already present in Merri Creek.
Isolation and fragmentation of populations		
Net reduction in the number and/or diversity of water bodies available to an important population.	Low	There is a low likelihood for the proposed action to result in a net reduction in the number and diversity of suitable wetland environments as all suitable habitats have been identified and purposely excluded in the project's design.
Construction of physical barriers to movement between water bodies, such as roads or buildings?	Low	There is a low likelihood that the proposed action would result in the construction of physical barrier to movement between water bodies as suitable wetland environments and associated low-lying areas have been identified and appropriate crossings have been implemented into the design.
Removal or alteration of terrestrial or aquatic habitat corridors (including alteration of connectivity during flood events)?	Low	There is a low likelihood for the proposed action to impact on Herne Swamp's hydrological regime, and the implementation of an appropriate crossing design will allow continued habitat connectivity for the species.

Conclusions for Growling Grass Frog

Although the proposed project will alter terrestrial habitat within 200 m of Herne Swamp, dams and Merri Creek, there should be minimal impacts to the swamp, hydrology and connectivity between the water bodies provided all the recommendations made by Biosis are implemented. We have taken a very conservative approach to defining an important population because there have been no records within the local area for more than 20 years and the previous site survey did not record the species. Regardless, the above recommendations must be addressed in the CEMP, with specific detail on how they will be implemented throughout the construction period. If these measures are implemented, the proposed works are unlikely to have a significant impact on this species.

White-throated Needletail *Hirundapus caudacutus* - vulnerable and migratory species under EPBC Act

The White-throated Needletail occurs over most habitats in Australia. The species is listed as vulnerable under the EPBC Act and FFG Act, and is also listed as a migratory species under the EPBC Act. White-throated Needletails breed in a number of locations throughout Asia and spend the non-breeding portion of the year in Australia and occasionally Papua New Guinea and New Zealand (Cth DCCEEW 2024a). The species is

present in Australia between roughly October and March, during which time it is likely to be almost exclusively aerial, however the species has occasionally been recorded roosting in the canopy foliage or within hollows of tall trees (Cth DCCEEW 2024a). There are several records of this species located within the local area.

Table 22 White-throated Needletail: Assessment against Significant Impact Criteria for vulnerable species (DoE 2013)

Significant impact criteria	Likelihood of significant impact	Justification
Lead to a long-term decrease in the size of an important population of a species	Unlikely	White-throated Needletails are considered to function as one single migratory population when present in Australia, therefore the entire population is considered to be an important population for the purpose of this assessment. White-throated Needletails are almost exclusively aerial when present in Australia, however some birds have been recorded roosting in hollows and canopy foliage of tall trees in forest and woodland (Cth DCCEEW 2024a). The species may therefore occasionally utilise tall trees in the project area for roosting. The use of roosting habitat in Australia is not well understood. Despite this, there are very few tall trees within the study area, therefore the project is highly unlikely to result in a decrease in size of the population, nor reduce the area of occupancy for the species.
Reduce the area of occupancy of an important population	Unlikely	
Fragment an existing important population into two or more populations	Unlikely	The White-throated Needletail occurs as a single, migratory non-breeding population when present in Australia, and as such the project has no capacity to result in fragmentation of the population.
Adversely affect habitat critical to the survival of the species	Unlikely	White-throated Needletails are almost exclusively aerial when present in Australia, however they may utilise tall trees for roosting on occasions. There are very few tall trees present within the study area, therefore the project has no capacity to affect habitat critical to the survival of the species.
Disrupt the breeding cycle of an important population	Unlikely	White-throated Needletails do not breed in Australia, and the project will not result in impacts (e.g. via impacts to migration or mortality of adults) that could affect breeding success elsewhere. The project therefore has no capacity to disrupt the breeding cycle of White-throated Needletails.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Unlikely	The study area contains very few tall trees that White-throated Needletails may use for roosting. It is therefore considered highly unlikely that the project will result in any changes to availability or quality of habitat that could result in species decline.

Significant impact criteria	Likelihood of significant impact	Justification
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Unlikely	The project will not result in the establishment or introduction of an invasive species or disease that could cause the species to decline.
Introduce disease that may cause the species to decline	Unlikely	
Interfere substantially with the recovery of a species	Unlikely	The project does not conflict with information regarding key threats to the species (TSSC 2019). The species is described as having few threats in Australia or elsewhere. Collisions with tall structures such as overhead wires, buildings and wind farms are the only listed threats in Australia (TSSC 2019) and are not applicable to this project.

White-throated Needletail is also listed as a migratory species under the EPBC Act, therefore a further assessment of impacts to this species against the Significant Impact Guidelines for migratory species (DoE 2013) is presented in Table 19 below.

Table 23 White-throated Needletail: Assessment against Significant Impact Criteria for migratory species (DoE 2013)

Significant impact criteria	Likelihood of significant impact	Justification
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species	Unlikely	The White-throated Needletail are almost exclusively aerial when in Australia, however they may utilise tall trees for roosting on occasions. There are very few tall trees present within the study area, therefore the project will not impact any areas of important habitat for this species.
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species	Unlikely	The project will not result in the establishment or introduction of an invasive species that could cause the species to decline.
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.	Unlikely	White-throated Needletails are almost exclusively aerial and do not breed when in Australia, and the project will not result in impacts (e.g. via impacts to migration or mortality of adults) that could affect breeding success elsewhere. Therefore the project therefore has no capacity to disrupt the lifecycle of White-throated Needletails.

Conclusion for White-throated Needletail

White-throated Needle-tail has high likelihood to fly over the assessment corridor on occasion. There is also potential for individuals to roost within the assessment corridor on some occasions. However, as the species is predominantly considered an aerial species within Australia, ground-based activities proposed by the project are considered unlikely to have any impact on this species.

Common Sandpiper *Actitis hypoleucos* - Migratory species under EPBC Act

The Common Sandpiper is a small shorebird usually occurring singly or in small groups, and avoids areas with congregations of more gregarious waders. They are widespread in small numbers along all coastlines of Australia and in many inland areas. Common Sandpiper are a non-breeding migrant, with the population that migrates to Australia breeding in far east Russia (Cth DCCEEW 2024b).

The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. This species generally forages in shallow water and at the edge of wetlands, and roost typically on rocks or in roots and branches of vegetation (Cth DCCEEW 2024b).

Table 24 Common Sandpiper: Assessment against Significant Impact Criteria for migratory shorebirds (DoEE 2017)

Significant impact criteria	Likelihood of significant impact	Justification
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species	Unlikely	Potential habitat for Common Sandpiper was identified in Herne Swamp, which is not listed as nationally or internationally 'important habitat' for Common Sandpiper (Cth DCCEEW 2024b). Biosis has recommended measures to be taken to avoid and minimise impacts to the swamp area, including movement of the impact footprint to avoid the majority of the swamp, no impacts to hydrology and implementation of an appropriate crossing design between the swamp and Merri Creek. Therefore, the rail construction will not isolate or fragment habitat for the species, nor alter current nutrient cycles. The species is highly mobile, and individuals can move freely through areas of unsuitable and marginal habitat to seek out and exploit favourable habitat patches.
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species	Unlikely	The project does not include any known mechanism that would result in establishment of invasive species that is harmful to migratory species becoming established that are not already present in any important habitat for Common Sandpiper.
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.	Unlikely	The proposed action is unlikely to significantly result in disruption to the life cycle of Common Sandpiper as the species breeds in the northern hemisphere. Further, the proposed development would not result in the disruption of an ecologically significant proportion of Common Sandpiper, as the

Significant impact criteria	Likelihood of significant impact	Justification
		study area land does not contain an ecologically significant proportion of the species. Thus, its feeding, migration and resting behaviour is not dependent upon the habitat within the study area land. There has been a limited number of records near the study area, and provided the recommendations by Biosis on minimising impacts to Herne Swamp are followed, there will not be a significant impact to the potential habitat in the study area for this species.

Conclusions for Common Sandpiper

Based on the assessment above, it is concluded the rail development is unlikely to lead to a significant impact to Common Sandpiper. This is based on:

- Habitat in the subject land is not considered 'important habitat' for the species.
- The proposal is unlikely to impact on the migratory, feeding and resting of nearby individuals of the population.
- The proposal would not result in the disruption of an ecologically significant proportion of Common Sandpiper.
- The project will not facilitate the establishment of an invasive species in an area of 'important habitat' for the migratory species.

Latham's Snipe *Gallinago hardwickii* - Migratory species under EPBC Act

Latham's Snipe is a medium-sized wader, usually occurring singly or in small, loose groups. They are a non-breeding migrant visitor to south-eastern Australia and the species occurs as a single dispersed population that breed in northern Japan and the east Asian mainland, migrating south to avoid the northern hemisphere winter. They occur throughout south-eastern Australia, and into Tasmania and South Australia, arriving in Australia as early as mid-August and departing in March the following year (Cth DCCEEW 2024c).

When in Australia, the species occurs in a wide variety of open permanent and ephemeral wetlands and are regularly recorded in or around modified or artificial habitats including pasture, ploughed paddocks and irrigation channels. Habitat for Latham's Snipe includes low dense vegetation such as swamps, flooded grasslands, in and around bogs and other water bodies. Foraging areas are usually associated with areas of mud with some form of cover. They often roost on the ground near their foraging areas.

Table 25 Latham's Snipe: Assessment against Significant Impact Criteria for migratory shorebirds (DoEE 2017)

Significant impact criteria	Likelihood of significant impact	Justification
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of	Unlikely	Important habitat for Latham's Snipe is described as areas that have previously been identified as internationally important for the species, or areas that support at least 18 individuals of the species. Although foraging habitat has been identified within the

Significant impact criteria	Likelihood of significant impact	Justification
important habitat for a migratory species		study area land, this habitat is unlikely to constitute 'important habitat', given that there have been a limited number of sightings recorded near the study area. Potential habitat for Latham's Snipe was identified in Herne Swamp. Biosis has recommended measures to be taken to avoid and minimise impacts to the swamp area, including movement of the impact footprint to avoid the majority of the swamp, no impacts to hydrology and implementation an appropriate crossing design between the swamp and Merri Creek. Therefore, the rail construction will not isolate or fragment habitat for the species, nor alter current nutrient cycles. The species is highly mobile, and individuals can move freely through areas of unsuitable and marginal habitat to seek out and exploit favourable habitat patches. The proposed action is unlikely to significantly impact Latham's Snipe as the potential habitat identified is not critical to the breeding cycle of the species, is not located at the limit of the species range in eastern Australia and is not habitat where the species is declining.
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species	Unlikely	The project does not include any known mechanism that would result in establishment of invasive species that is harmful to migratory species becoming established that are not already present in any important habitat for Common Sandpiper.
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.	Unlikely	When in Australia, Latham's Snipe is considered one large, dispersed population across eastern Australia extending into South Australia. The proposed action is unlikely to significantly result in disruption to the life cycle of Latham's Snipe as the species breeds in the northern hemisphere. Further, the proposed development would not result in the disruption of an ecologically significant proportion of Latham's Snipe, as the study area land does not contain an ecologically significant proportion of the species. Thus, its feeding, migration and resting behaviour is not dependent upon the habitat within the study area land. There has been a limited number of records near the study area, and provided the recommendations by Biosis on minimising impacts to Herne Swamp are followed, there will not be a significant impact to the potential habitat in the study area for this species.

Conclusion for Latham's Snipe

Based on the assessment above, it is concluded the Stage 1A development is unlikely to lead to a significant impact to Latham's Snipe. This is based on:

- Habitat in the subject land is not considered 'important habitat' for the species.
- The proposal is unlikely to impact on the migratory, feeding and resting of nearby individuals of the population.
- The proposal would not result in the disruption of an ecologically significant proportion of Latham's Snipe.
- The project will not facilitate the establishment of an invasive species in an area of 'important habitat' for the migratory species.

Matted Flax-lily *Dianella amoena*, endangered

An assessment of impacts to Matted Flax-lily against the *Significant Impact Criteria 1.1* (Commonwealth of Australia 2013) is presented in Table 26 below. Targeted surveys have been undertaken for this species, however, all suitable habitat is being avoided during construction.

Table 26 Matted Flax-lily: Assessment against significant impact criteria for endangered species.

Significant Impact Criteria	Likelihood of significant impact	Justification
Lead to a long-term decrease in the size of a population	Unlikely	It is not known if Matted Flax-lily is present within the study area, however the proposed impact footprint does not disturb suitable habitat for the species. Due to this, it is considered unlikely the proposed works will lead to a long-term decrease in the size of a MFL population or reduce the area of occupancy of the specie.
Reduce the area of occupancy of the species		
Fragment an existing population into two or more populations	Unlikely	There are records of Matted Flax-lily north of the study area within the rail corridor. Suitable habitat within the study area for Matted Flax-lily is limited to rocky outcrops of Plains Grassland. While no targeted survey for Matted Flax-lily has been undertaken, the proposed works avoid all areas of suitable habitat. These areas will be treated as 'No-go zones' during construction. Thus, it is considered unlikely that the proposed development will fragment an existing population of Matted Flax-lily.
Adversely affect habitat critical to the survival of a species	Unlikely	Habitat critical to the survival of the species has not been identified within the *National Recovery Plan for the Matted Flax-lily* (Carter 2010) however 21 of 120 known sites are listed as significant for MFLs. No significant sites are within the study area and there is a low likelihood for the proposed action to adversely affect habitat critical to the survival of the species. All areas of potential habitat should be identified, buffered and excluded (either by design or by fencing signed as 'No Go' zones during the construction phase).

Significant Impact Criteria	Likelihood of significant impact	Justification
Disrupt the breeding cycle of a population	Unlikely	MFL are 'buzz pollinated' by native bees. The proposed action is not expected to impact on the breeding cycle of the species on the basis that suitable habitat is identified, buffered and excluded (either by design or by fencing signed as 'No Go' zones during the construction phase).
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Unlikely	Potentially suitable habitat for Matted Flax-lily occurs within rocky outcrop of Plains Grassland. These areas are all being avoided during the construction of the (either by design or by fencing signed as 'No Go' zones during the construction phase) to ensure that no temporary or permanent ground disturbance could occur to its habitat.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the critically endangered species' habitat	Unlikely	It is unlikely that the proposed action will result in the establishment of invasive species that are not already present in the local area. A detailed CEMP for the project area will ensure that all inductions highlighting the conservation value of native vegetation are undertaken prior to works and that all vehicles, machinery, equipment and PPE travelling on and off the site are washed and blown down to remove soil and invasive soil propagules to avoid the introduction and spread of new invasive weeds.
Introduce disease that may cause the species to decline	Unlikely	It is unlikely that the proposed action will result in the introduction of a disease that is not already present in the relevant environment. A detailed CEMP for the project area will ensure that all vehicles, machinery, equipment and PPE travelling on and off the site are washed and blown down to remove soil and invasive soil propagules to avoid the introduction and spread of new invasive weeds.
Interfere with the recovery of the species	Unlikely	It is considered unlikely that the proposed action would interfere with the recovery of the species in respect to the specific objectives for recovery outlined in the *National Recovery Plan for Matted Flax-lily* (Carter 2010). This is on the basis that all potential habitat of the species will is retained through the project's design and use of fencing signed as 'No Go' zones and the implementation of a site-specific CEMP.

Conclusion for Matted Flax-lily

It is considered unlikely the proposed rail line will lead to a significant impact to Matted Flax-lily. No individuals or populations have been recorded during the site assessment and no suitable habitat is being impacted by the proposed works.

Swamp Fireweed *Senecio psilocarpus*, vulnerable

An assessment of impacts to Swamp Fireweed against the *Significant Impact Criteria 1.1* (Commonwealth of Australia 2013) is presented in Table 27 below. A targeted survey was undertaken for this species within the proposed impact footprint on 6 December 2023. No individuals were recorded.

Table 27 Swamp Fireweed: Assessment against significant impact criteria for vulnerable species.

Significant Impact Criteria	Likelihood of significant impact	Justification
Lead to a long-term decrease in the size of an important population	Unlikely	The proposed action is not expected to lead to a long-term decrease in the size of an important population of Swamp Fireweed. While Commonwealth policy documents for the species do not identify important populations, Swamp Fireweed was recorded by Arcadis (2022) within the study area. This population will not be impacted by the proposed action. A targeted survey was undertaken on 6 December 2023 in suitable habitat within the proposed impact area and no Swamp Fireweed individuals were recorded. To ensure no encroachment of suitable habitat for this species during the construction phase, a detailed CEMP for the project area will be implemented to ensure that: • All potential habitat outside the impact area is fenced and appropriately signed as 'No Go' zones • All staff are inducted to understand the conservation values of native vegetation and threatened flora on site • All earth moving vehicles, machinery, equipment and PPE travelling on and off the site are washed and blown down to remove soil and invasive soil propagules to avoid the introduction and spread of new invasive weeds • All indirect impacts such as sediments and pollutants will be managed to EPA-approved measures to ensure that the proposed action does not compromise surrounding water quality which, in turn, could impact on the species habitat.
Reduce the area of occupancy of an important population	Unlikely	Swamp Fireweed is known from high-quality, herb-rich wetlands on plains. Records of this species occur within the study area; along the western border adjacent to the rail line (Figure 3). This population will not be impacted by the proposed action. A targeted survey was undertaken on 6 December 2023 in suitable habitat within the proposed impact area and no Swamp Fireweed individuals were recorded. Thus, it is considered unlikely the proposed action would reduce the area of occupancy of this species. All suitable habitat within the wider study area, including low-lying areas, have been buffered and excluded from the impact area, by both design and fencing signed as 'No Go' zones. National Intermodal has also undertaken design development which results in negligible impacts to hydrology, further preventing any indirect impacts to the species.

Significant Impact Criteria	Likelihood of significant impact	Justification
Fragment an existing population into two or more populations	Unlikely	It is unlikely the proposed action would fragment an existing population into two or more populations as the species was not identified within the impact area. All areas of low-lying, herb-rich habitat within the wider study area have been identified, buffered and excluded (either by design or by fencing signed as 'No Go' zones).
Adversely affect habitat critical to the survival of a species	Unlikely	Habitat critical to the survival of the species has not been identified within Commonwealth policy documents. However, given its restricted occurrence to seasonally wet, low-lying areas that are increasingly threatened by changes in hydrological regimes as a result of changes in land use and climate variability, it may be considered that all suitable habitat is ecologically significant to the species in this regard. It is unlikely the proposed action would adversely affect habitat critical to the survival of the species. No individuals were recorded in suitable habitat within the impact area during targeted survey. All other suitable habitat within the study area has been buffered and excluded (either by design or by fencing signed as 'No Go' zones during the construction phase).
Disrupt the breeding cycle of an important population	Unlikely	Within occupied sites, a hydrological regime is required which allows the retention of shallow and relatively still water during spring, so that pollination and seed dispersal can take place. It is unlikely the proposed action would impact on the breeding cycle of the species as it was not recorded within the impact area during targeted surveys. Additionally, National Intermodal has undertaken design development which results in negligible impacts to hydrology, thus preventing any indirect impacts to the species.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Unlikely	It is unlikely the proposed action would have any measurable effect on the viability of the species. No individuals were recorded in suitable habitat within the impact area during targeted survey. All other suitable habitat within the study area has been buffered and excluded (either by design or by fencing signed as 'No Go' zones during the construction phase) to ensure that no temporary or permanent ground disturbance causes impacts to its habitat. Additionally National Intermodal has undertaken design development which results in negligible change to hydrology, thus preventing any indirect impacts to the species.
Result in invasive species that are harmful to a	Unlikely	It is considered unlikely the proposed action would result in the establishment of invasive species that are not already present in the study area. A detailed CEMP for the project area will ensure that all inductions highlighting the conservation value of native vegetation are undertaken prior to works and that all vehicles, machinery,

critically endangered or endangered species becoming established in the vulnerable species' habitat		equipment and PPE travelling on and off the site are washed and blown down to remove soil and invasive soil propagules to avoid the introduction and spread of new invasive weeds.
Introduce disease that may cause the species to decline	Unlikely	It is considered unlikely the proposed action would result in the introduction of a disease that is not already present in the relevant environment. A detailed CEMP for the project area will ensure that all vehicles, machinery, equipment and PPE travelling on and off the site are washed and blown down to remove soil and invasive soil propagules to avoid the introduction and spread of new invasive weeds.
Interfere substantially with the recovery of the species	Unlikely	This species does not have a National Recovery Plan. No individuals were recorded in suitable habitat within the impact area during targeted survey. All other suitable habitat within the study area has been buffered and excluded (either by design or by fencing signed as 'No Go' zones during the construction phase). Thus, it is considered unlikely the proposed action will interfere with the recovery of the species.

Conclusion for Swamp Fireweed

It is considered unlikely the proposed rail line will lead to a significant impact to Swamp Fireweed. It is considered unlikely the project will lead to a significant impact to Swamp Everlasting. No individuals or populations have been recorded during the targeted surveys within the impact area. Additionally, National Intermodal has undertaken design development which results in negligible change to hydrology, thus preventing any indirect impacts to any potential habitat outside the impact area.

Swamp Everlasting *Xerochrysum palustre*, vulnerable

An assessment of impacts to Swamp Everlasting against the *Significant Impact Criteria 1.1* (Commonwealth of Australia 2013) is presented in Table 28 below. A targeted survey was undertaken for this species within the proposed impact footprint on 6 December 2023. No individuals were recorded.

Table 28 Swamp Everlasting: Assessment against significant impact criteria for vulnerable species.

Significant Impact Criteria	Likelihood of significant impact	Justification
Lead to a long-term decrease in the size of an important population	Unlikely	The proposed action is unlikely to lead to a long-term decrease in the size of an important population of Swamp Everlasting. The National Recovery Plan for the species lists important populations of the Swamp Everlasting. These important populations do not include the location of the proposed action (Carter and Walsh 2011).

Significant Impact Criteria	Likelihood of significant impact	Justification
		This species was not recorded within the impact footprint during targeted surveys on 6 December 2023 and is not known to occur within the wider study area.
Reduce the area of occupancy of an important population	Unlikely	Swamp Everlasting is known from sedge swamps and shallow freshwater marshes, often on heavy black clay soils. This species was not recorded within the impact footprint during targeted surveys on 6 December 2023 and is not known to occur within the wider study area. Thus, the proposed action is unlikely to lead to a long-term decrease in the size of an important population of the species.
Fragment an existing population into two or more populations	Unlikely	Approximately 35 populations of Swamp Everlasting are known, constituting to ~10,000 plants, however the species was not recorded within the impact footprint during the targeted survey on 6 December 2023 and is not known to occur within the wider study area. Thus, the proposed action is unlikely to lead to a long-term decrease in the size of an important population of Swamp Everlasting.
Adversely affect habitat critical to the survival of a species	Unlikely	Habitat critical to the survival of the species has not been identified within the *National Recovery Plan for Swamp Everlasting* (Carter and Walsh 2011). However, given its restricted occurrence to seasonally wet, low-lying areas that are increasingly threatened by changes in hydrological regimes as a result of changes in land use and climate variability, it may be considered that all suitable habitat is ecologically significant to the species in this regard. This species was not recorded within the impact footprint during the targeted survey on 6 December 2023 and is not known to occur within the wider study area. National Intermodal has undertaken design development which results in negligible change to hydrology, thus preventing any indirect impacts to the species. The proposed action is unlikely to adversely affect habitat critical to the survival of the species.
Disrupt the breeding cycle of an important population	Unlikely	Flowering for the species occurs from November to March. The proposed action is unlikely lead to a long-term decrease in the size of an important population of Swamp Everlasting as the action would not occur in the location of an important population.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that	Unlikely	It is considered unlikely the proposed action would have any measurable effect on the viability of the species as the species was not detected during targeted surveys within the impact area. All other suitable habitat within the study area has been buffered and excluded (either by design or by fencing signed as 'No Go' zones during the construction phase) to ensure that no temporary or permanent ground disturbance causes impacts to its habitat.

Significant Impact Criteria	Likelihood of significant impact	Justification
the species is likely to decline		
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the vulnerable species' habitat	Unlikely	It is considered unlikely the proposed action would result in the establishment of invasive species that are not already present in the study area. A detailed CEMP for the study area will ensure that all inductions highlighting the conservation value of native vegetation are undertaken prior to works and that all vehicles, machinery, equipment and PPE travelling on and off the site are washed and blown down to remove soil and invasive soil propagules to avoid the introduction and spread of new invasive weeds.
Introduce disease that may cause the species to decline	Unlikely	It is considered unlikely the proposed action will result in the introduction of a disease that is not already present in the relevant environment. A detailed CEMP for the study area will ensure that all vehicles, machinery, equipment and PPE travelling on and off the site are washed and blown down to remove soil and invasive soil propagules to avoid the introduction and spread of new invasive weeds.
Interfere substantially with the recovery of the species	Unlikely	It is considered unlikely the proposed action will interfere with the recovery of the species in respect to the specific objectives for recovery outlined in the *National Recovery Plan for Swamp Everlasting* (Carter and Walsh 2011). Swamp Everlasting was not recorded during targeted surveys within the impact area. All other suitable habitat within the study area has been buffered and excluded (either by design or by fencing signed as 'No Go' zones during the construction phase) to ensure that no temporary or permanent ground disturbance causes impacts to its habitat.

Conclusion for Swamp Everlasting

It is considered unlikely the project will lead to a significant impact to Swamp Everlasting. No individuals or populations have been recorded during the targeted surveys within the impact area. Additionally, National Intermodal has undertaken design development which results in negligible change to hydrology, thus preventing any indirect impacts to any potential habitat outside the impact area.

River Swamp Wallaby-grass *Amphibromus fluitans,* vulnerable

An assessment of impacts to River Swamp Wallaby-grass against the *Significant Impact Criteria 1.1* (Commonwealth of Australia 2013) is presented in Table 29 below. A Targeted survey was undertaken for this species within the proposed impact footprint on 6 December 2023. No individuals were recorded.

Table 29 River Swamp Wallaby-grass: Assessment against significant impact criteria for vulnerable species

Significant impact criteria	Likelihood of significant impact	Justification
Lead to a long-term decrease in the size of an important population	Unlikely	No important populations have been identified for River Swamp Wallaby-grass, however the proposed action is unlikely to lead to a long-term decrease in the size of an important population of River Swamp Wallaby-grass; This species was not recorded within the impact footprint during targeted surveys on 6 December 2023 and is not known to occur within the wider study area.
Reduce the area of occupancy of an important population	Unlikely	River Swamp Wallaby-grass was not recorded within the impact footprint during targeted surveys on 6 December 2023 and is not known to occur within the wider study area. Thus, the proposed action is unlikely to lead to a long-term decrease in the size of an important population of the species.
Fragment an existing population into two or more populations	Unlikely	River Swamp Wallaby-grass was not recorded within the impact footprint during targeted surveys on 6 December 2023 and is not known to occur within the wider study area. Thus, the proposed action is unlikely to lead to fragment a population into two or more populations.
Adversely affect habitat critical to the survival of a species	Unlikely	No habitat critical to the survival of the species has been identified for River Swamp Wallaby-grass, however this species is known to inhibit both man made and natural water bodies. River Swamp Wallaby-grass was not recorded within the impact footprint during targeted surveys in December 2023 and is not known to occur within the wider study area. Thus, the proposed action is unlikely to adversely affect habitat critical to the survival of the species.
Disrupt the breeding cycle of an important population	Unlikely	Flowering for the species occurs from November to March. The proposed action is unlikely lead to a long-term decrease in the size of an important population of River Swamp Wallaby-grass as this species is not known to occur within the impact footprint or wider study area.
Modify, destroy, remove, isolate or	Unlikely	It is considered unlikely the proposed action would have any measurable effect on the viability of River Swamp Wallaby-grass as the species was not detected during targeted surveys within the impact area. All other suitable habitat within the study area has been buffered and excluded (either by design or by fencing signed as 'No Go' zones

Significant impact criteria	Likelihood of significant impact	Justification
decrease the availability or quality of habitat to the extent that the species is likely to decline		during the construction phase) to ensure that no temporary or permanent ground disturbance causes impacts to its habitat.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the vulnerable species' habitat	Unlikely	It is considered unlikely the proposed action would result in the establishment of invasive species that are not already present in the study area. A detailed CEMP for the study area will ensure that all inductions highlighting the conservation value of native vegetation are undertaken prior to works and that all vehicles, machinery, equipment and PPE travelling on and off the site are washed and blown down to remove soil and invasive soil propagules to avoid the introduction and spread of new invasive weeds.
Introduce disease that may cause the species to decline	Unlikely	It is considered unlikely the proposed action will result in the introduction of a disease that is not already present in the relevant environment. A detailed CEMP for the study area will ensure that all vehicles, machinery, equipment and PPE travelling on and off the site are washed and blown down to remove soil and invasive soil propagules to avoid the introduction and spread of new invasive weeds.
Interfere substantially with the recovery of the species	Unlikely	River Swamp Wallaby-grass was not detected during targeted surveys within the impact area. All other suitable habitat within the study area has been buffered and excluded (either by design or by fencing signed as 'No Go' zones during the construction phase) to ensure that no temporary or permanent ground disturbance causes impacts to its habitat. Thus, it is considered unlikely the proposed works will interfere with the recovery of the species.

Conclusion for River Swamp Wallaby-grass

It is considered unlikely the proposed rail line will lead to a significant impact to River Swamp Wallaby-grass. No individuals or populations have been recorded during the targeted surveys within the impact area. Additionally, National Intermodal has undertaken design development which results in negligible change to hydrology, thus preventing any indirect impacts to any potential habitat outside the impact area.

Appendix 4 Photos of the study area

Photo 1 Plains Grassland – looking approximately north-east, 4 May 2023 (Figure 3)

Photo 2 Plains Grassy Wetland and SHWTLP – looking approximately north-west, 4 May 2023 (Figure 3)

Photo 3 **Plains Grassy Wetland and SHWTLP – looking approximately south-west, 4 May 2023 (Figure 3).**

Photo 4 **Drainage line connected to SHWTLP – looking approximately northeast, 4 May 2023 (Figure 3)**

Photo 5 Merri Creek – looking approximately east, 4 May 2023 (Figure 3)

Photo 6 Tall Marsh EVC, rail corridor – 21 September 2023 (Figure 3)

Photo 7 Plains Grassy Woodland (derived) EVC, rail corridor – 21 September 2023 (Figure 3)

Photo 8 Planted vegetation, Stuart Street – 21 September 2023

Photo 9 Typical aquatic habitat survey within Merri Creek – looking approximately south 11 September 2023

Photo 10 Burrowing Crayfish (*Engaeus* spp.) burrows observed along Merri Creek 11 September 2023

Photo 11 Common Yabby *Cherax destructor destructor* captured in baited fish traps 12 September 2023

Photo 12 Common Freshwater Shrimp *Paratya australiensis* captured in baited fish traps 12 September 2023

Appendix 5 Tree data

Table 30 Scattered trees within the study area

Tree #	Scientific name	Common name	DBH (cm)	Consultancy	Large Tree
1	***Eucalyptus* sp.**	NA	129	EHP	Yes
2	***Eucalyptus ovata***	Swamp Gum	127	EHP	Yes
3	***Eucalyptus ovata***	Swamp Gum	88	EHP	Yes
4	***Eucalyptus ovata***	Swamp Gum	86	EHP	Yes
5	***Eucalyptus ovata***	Swamp Gum	116	EHP	Yes
6	***Eucalyptus ovata***	Swamp Gum	86	EHP	Yes
7	***Eucalyptus camaldulensis***	River Red-gum	94	EHP	Yes
8	***Eucalyptus camaldulensis***	River Red-gum	154	EHP	Yes
9	***Eucalyptus camaldulensis***	River Red-gum	12	EHP	No
10	***Eucalyptus camaldulensis***	River Red-gum	224	EHP	Yes
11	***Eucalyptus camaldulensis***	River Red-gum	67	EHP	No
12	***Eucalyptus camaldulensis***	River Red-gum	128	EHP	Yes
13	***Eucalyptus camaldulensis***	River Red-gum	115	EHP	Yes
14	***Eucalyptus ovata***	Swamp Gum	98	EHP	Yes
15	***Eucalyptus viminalis* subsp. *viminalis***	Manna Gum	128	EHP	Yes
16	***Eucalyptus camaldulensis***	River Red-gum	20	Biosis	No
17	***Eucalyptus camaldulensis***	River Red-gum	20	Biosis	No
18	***Eucalyptus viminalis* subsp. *viminalis***	Manna Gum	60	Biosis	No
19	***Eucalyptus camaldulensis***	River Red-gum	5	Biosis	No
20	***Eucalyptus camaldulensis***	River Red-gum	20	Biosis	No

Tree #	Scientific name	Common name	DBH (cm)	Consultancy	Large Tree
21	***Eucalyptus viminalis* subsp. *viminalis***	Manna Gum	80	Biosis	Yes
22	***Eucalyptus camaldulensis***	River Red-gum	32	Biosis	No
23	***Eucalyptus camaldulensis***	River Red-gum	20	Biosis	No
24	***Eucalyptus camaldulensis***	River Red-gum	36	Biosis	No
25	***Eucalyptus camaldulensis***	River Red-gum	26	Biosis	No
26	***Eucalyptus camaldulensis***	River Red-gum	38	Biosis	No

Appendix 6 Native vegetation removal report

Native Vegetation Removal Report

NVRR ID: 373_20250206_E49

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

Report details

Date created: 06/02/2025

Local Government Area:
MITCHELL SHIRE
WHITTLESEA CITY

Shapefile name:
39671_removal_20250206_Patches.shp
39671_removal_20250206_Trees.shp

Site assessor name:
Jane Kenny
Sarah Hilliar
DEECA wetland

Registered Aboriginal Party: Wurundjeri

Coordinates: 145.00632, -37.44692

Address:
2330 EPPING-KILMORE ROAD WALLAN 3756
256 BEVERIDGE ROAD BEVERIDGE 3753
WOODSTOCK ROAD WALLAN 3756
2025 MERRIANG ROAD BEVERIDGE 3753
EPPING-KILMORE ROAD WALLAN 3756

Regulator Notes

Removal polygons are located:

- Within a DEECA Mapped Wetland area
- On Crown Land

Summary of native vegetation to be removed

Assessment pathway	**Detailed Assessment Pathway**		
Location category	Location 2 The native vegetation extent map indicates that this area is typically characterised as supporting native vegetation. Additionally, it is modelled as encompassing an endangered Ecological Vegetation Class, sensitive wetland or sensitive coastal area. The removal of less than 0.5 hectares of native vegetation in this area will not require a Species Offset.		
Total extent including past and proposed removal (ha) *Includes endangered EVCs (ha): 0.065*	**0.52**	*Extent of past removal (ha)*	*0*
		Extent of proposed removal - Patches (ha)	*0.490*
		Extent of proposed removal - Scattered Trees (ha)	*0.031*
No. Large Trees proposed to be removed	**0**	*No. Large Patch Trees*	*0*
		No. Large Scattered Trees	*0*
No. Small Scattered Trees	1		

Offset requirements if approval is granted

Any approval granted will include a condition to obtain an offset, before the removal of native vegetation, that meets the following requirements:

General Offset amount [1]	**0.1520 General Habitat Units**
Vicinity	Melbourne Water CMA or MITCHELL SHIRE LGA, WHITTLESEA CITY LGA
Minimum strategic biodiversity value score [2]	0.3121
Large Trees*	0
***The total number of Large Trees that the offset must protect**	**0** Large Trees to be protected in either the General, Species or combination across all habitat units protected

NB: values within tables in this document may not add to the totals shown above due to rounding
Appendix 1 includes information about the native vegetation to be removed
Appendix 2 includes information about the rare or threatened species with mapped habitat at the site
Appendix 3 includes the following figures

- Location map
- Strategic Biodiversity Value map
- Condition map
- Endangered EVCs map
- Aerial photograph showing mapped native vegetation
- Property in context
- Habitat Importance maps

1. The General Offset amount required is the sum of all General Habitat Units in Appendix 1.
2. Minimum strategic biodiversity value score is 80 per cent of the weighted average score across habitat zones where a General Offset is required.
3. The Species Offset amount(s) required is the sum of all Species Habitat Units in Appendix 1.

Next steps

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

If you wish to remove the mapped native vegetation you are required to apply for approval from the responsible authority. The responsible authority will refer your application to DEECA for assessment, as required. **This report is not a referral assessment by DEECA.**

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

Refer to the Guidelines for a full list of application requirements This report provides information that meets the following application requirements:

- The assessment pathway and reason for the assessment pathway.
- A description of the native vegetation to be removed (partly met).
- Maps showing the native vegetation and property (partly met).
- Information about the impacts on rare or threatened species.
- The offset requirements determined in accordance with Section 5 of the Guidelines that apply if approval is granted to remove native vegetation.

Additional application requirements must be met including:

- Topographical and land information
- Recent dated photographs.
- Details of past native vegetation removal.
- An avoid and minimise statement.
- A copy of any Property Vegetation Plan as applicable.
- A defendable space statement as applicable.
- A statement about the Native Vegetation Precinct Plan (NVPP) as applicable.
- A site assessment report including a habitat hectare assessment of any patches of native vegetation and details of trees.
- An offset statement that explains that an offset has been identified and how it will be secured.

Appendix 1: Description of native vegetation to be removed

The Species-General Offset Test was applied to your proposal. This test determines if the proposed removal of native vegetation has a proportional impact on any rare or threatened species habitats above the Species Offset threshold. The threshold is set at 0.005 per cent of the mapped habitat value for a species. When the proportional impact meets or exceeds the Species Offset threshold, a Species Offset is required. This test is completed for all species with mapped habitat at the site. Multiple Species Offsets will be required if the Species Offset threshold is exceeded for multiple species.

Where a zone requires Species Offset(s), the Species Habitat Units for each species in that zone are calculated by the following equation in accordance with the Guidelines: ***Species Habitat Units = extent without overlap x condition score x species landscape factor x 2, where the species landscape factor = 0.5 + (habitat importance score/2)***

The Species Offset amount(s) required is the sum of all Species Habitat Units per zone.

Where a zone does not require a Species Offset, the General Habitat Units in that zone are calculated by the following equation in accordance with the Guidelines: ***General Habitat Units = extent without overlap x condition score x general landscape factor x 1.5, where the general landscape factor = 0.5 + (strategic biodiversity value score/2)***

The General Offset amount required is the sum of all General Habitat Units per zone.

Native vegetation to be removed

Information provided by or on behalf of the applicant							Information calculated by NVR Map						
Zone	**Type**	**DBH (cm)**	**EVC code**	**Bioregional conservation status**	**Partial Removal**	**Condition score**	**Large Tree(s)**	**Polygon extent (ha)**	**Extent without overlap (ha)**	**SBV score**	**HI Score**	**Habitat Units**	**Offset Type**
1-a	Patch	-	VVP_0125	Endangered	no	0.560	-	0.034	0.034	0.340	-	0.019	General
2-a	Patch	-	VVP_0821	not applicable	no	0.310	-	0.132	0.132	0.427	-	0.044	General
7-a	Patch	-	VVP_0821	not applicable	no	0.310	-	0.064	0.064	0.495	-	0.022	General
8-a	Patch	-	VVP_0821	not applicable	no	0.310	-	0.065	0.065	0.400	-	0.021	General

Information provided by or on behalf of the applicant							Information calculated by NVR Map						
Zone	**Type**	**DBH (cm)**	**EVC code**	**Bioregional conservation status**	**Partial Removal**	**Condition score**	**Large Tree(s)**	**Polygon extent (ha)**	**Extent without overlap (ha)**	**SBV score**	**HI Score**	**Habitat Units**	**Offset Type**
9-a	Patch	-	VVP_0821	not applicable	no	0.310	-	0.006	0.006	0.360	-	0.002	General
WL-a	Patch	-	Wetland	not applicable	no	0.200	-	0.188	0.188	0.340	-	0.038	General
ST-a	Scattered Tree	20	VVP_0680	Endangered	no	0.200	-	0.031	0.031	0.360	-	0.006	General

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

This table identifies all rare or threatened species with mapped habitat at the site and the proportional impact associated with the proposed native vegetation removal.

Species common name	Species scientific name	Taxon ID	Conservation status	Group	Habitat impacted	Proportional impact (%)
Lewin's Rail	Lewinia pectoralis pectoralis	10045	Vulnerable	Dispersed	Habitat importance map	0.0000
Australian Little Bittern	Ixobrychus dubius	10195	Endangered	Dispersed	Habitat importance map	0.0000
Australasian Bittern	Botaurus poiciloptilus	10197	Endangered	Dispersed	Habitat importance map	0.0000
Australasian Shoveler	Anas rhynchotis	10212	Vulnerable	Dispersed	Habitat importance map	0.0000
Hardhead	Aythya australis	10215	Vulnerable	Dispersed	Habitat importance map	0.0000
Musk Duck	Biziura lobata	10217	Vulnerable	Dispersed	Habitat importance map	0.0000
Black Falcon	Falco subniger	10238	Vulnerable	Dispersed	Habitat importance map	0.0000
Barking Owl	Ninox connivens connivens	10246	Endangered	Dispersed	Habitat importance map	0.0000
Speckled Warbler	Chthonicola sagittatus	10504	Vulnerable	Dispersed	Habitat importance map	0.0000
Striped Legless Lizard	Delma impar	12159	Endangered	Dispersed	Habitat importance map	0.0000
Bearded Dragon	Pogona barbata	12177	Vulnerable	Dispersed	Habitat importance map	0.0000
Tussock Skink	Pseudemoia pagenstecheri	12993	Vulnerable	Dispersed	Habitat importance map	0.0000
Brown Toadlet	Pseudophryne bibronii	13117	Endangered	Dispersed	Habitat importance map	0.0000
Growling Grass Frog	Litoria raniformis	13207	Endangered	Dispersed	Habitat importance map	0.0000
Golden Sun Moth	Synemon plana	15021	Critically endangered	Dispersed	Habitat importance map	0.0000

Species common name	Species scientific name	Taxon ID	Conservation status	Group	Habitat impacted	Proportional impact (%)
Curly Sedge	Carex tasmanica	500650	Vulnerable	Dispersed	Habitat importance map	0.0000
Small Milkwort	Comesperma polygaloides	500798	Vulnerable	Dispersed	Habitat importance map	0.0000
Clover Glycine	Glycine latrobeana	501456	Vulnerable	Dispersed	Habitat importance map	0.0000
Western Golden-tip	Goodia medicaginea	501518	Rare	Dispersed	Habitat importance map	0.0000
Small Scurf-pea	Cullen parvum	502773	Endangered	Dispersed	Habitat importance map	0.0000
Tough Scurf-pea	Cullen tenax	502776	Endangered	Dispersed	Habitat importance map	0.0000
Large-headed Fireweed	Senecio macrocarpus	503116	Endangered	Dispersed	Habitat importance map	0.0000
Plump Swamp Wallaby-grass	Amphibromus pithogastrus	503624	Endangered	Dispersed	Habitat importance map	0.0000
Swamp Everlasting	Xerochrysum palustre	503763	Vulnerable	Dispersed	Habitat importance map	0.0000
Purple Blown-grass	Lachnagrostis punicea subsp. punicea	504206	Rare	Dispersed	Habitat importance map	0.0000
Brackish Plains Buttercup	Ranunculus diminutus	504314	Rare	Dispersed	Habitat importance map	0.0000
Pale Swamp Everlasting	Coronidium gunnianum	504655	Vulnerable	Dispersed	Habitat importance map	0.0000
Plains Yam-daisy	Microseris scapigera s.s.	504657	Vulnerable	Dispersed	Habitat importance map	0.0000
Matted Flax-lily	Dianella amoena	505084	Endangered	Dispersed	Habitat importance map	0.0000
Large-flower Crane's-bill	Geranium sp. 1	505342	Endangered	Dispersed	Habitat importance map	0.0000
Pale-flower Crane's-bill	Geranium sp. 3	505344	Rare	Dispersed	Habitat importance map	0.0000
Arching Flax-lily	Dianella sp. aff. longifolia (Benambra)	505560	Vulnerable	Dispersed	Habitat importance map	0.0000

Habitat Group

- Highly localised habitat means there is 2,000 hectares or less mapped habitat for the species.

- Dispersed habitat means there is more than 2,000 hectares of mapped habitat for the species.

Habitat Impacted

The Species General Offset test, as described in Section 5.3.1 of the Guidelines, is used to determine if proposed native vegetation removal will result in a proportionally significant impact on the habitat value of rare or threatened species. The test is applied where the native vegetation proposed for removal:

- Intersects the Habitat Importance Map for a rare or threatened species; or
- Intersects the 'top ranking' modelled habitat for a rare or threatened species with dispersed habitat, as identified in its Top Ranking Habitat Importance Map.

Top Ranking Maps consist of the 2,000 hectares of habitat with the highest Habitat Importance Scores for each dispersed species.

The 'Habitat impacted' column identifies whether the Habitat Importance Map or its Top Ranking Map was used to determine the proportional impact for a species with dispersed habitat.

Appendix 3: Images of mapped native vegetation

1. Property in context

Proposed Removal
Past Removal
Partial Removal
Property Boundaries

N

350 m

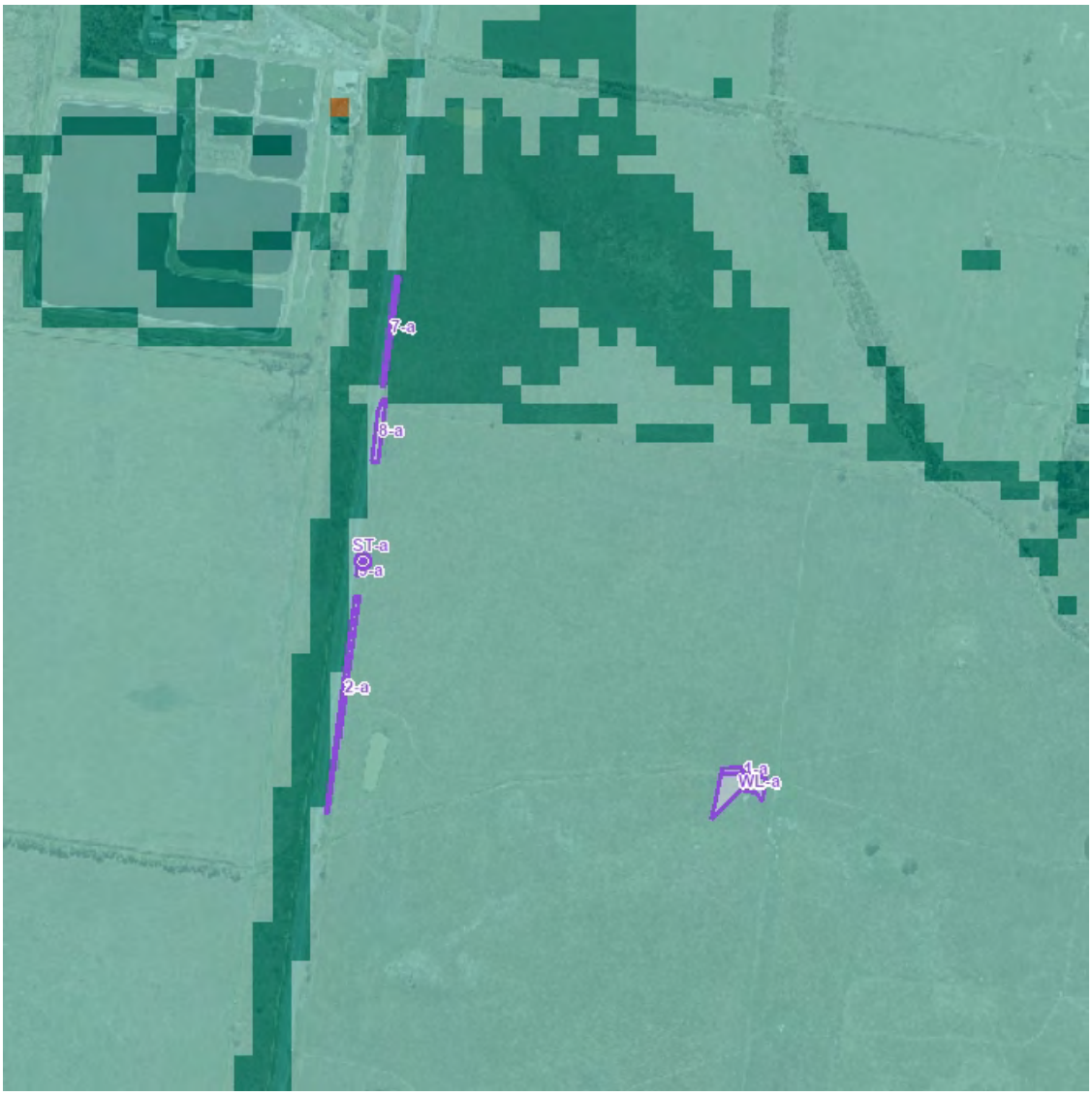
2. Aerial photograph showing mapped native vegetation

Proposed Removal
Past Removal
Partial Removal

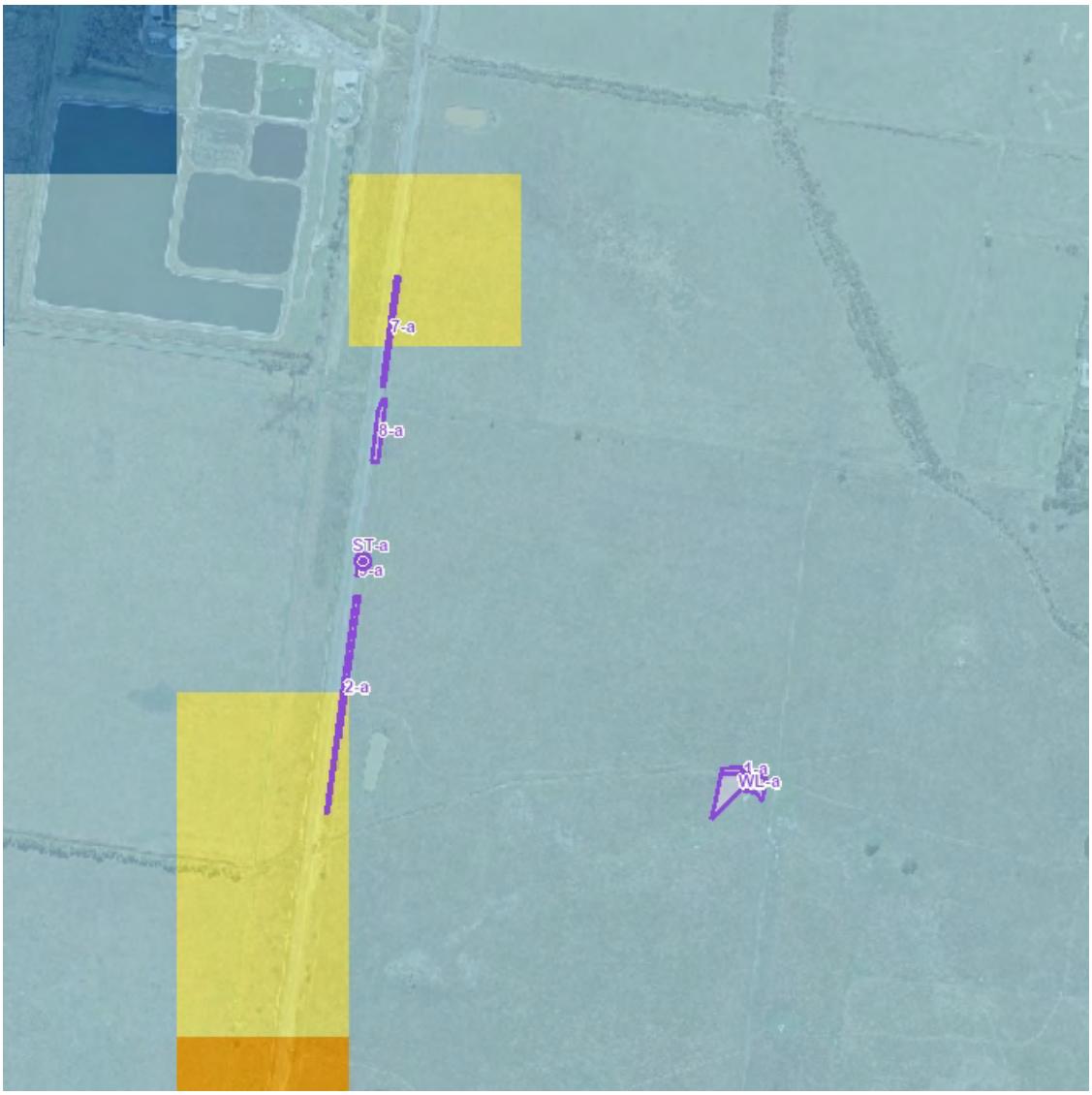
N

200 m

3. Location Risk Map



4. Strategic Biodiversity Value Score Map



5. Modelled Condition Score Map

6. Modelled Endangered EVCs

Proposed Removal
Past Removal
Partial Removal
Endangered 1750 Ecological Vegetation Classes

N

200 m

7. Habitat Importance maps

Not Applicable

Appendix 7 MSA Levy Estimate

Estimate of Melbourne Strategic Assessment Environment Mitigation Levy

Energy, Environment and Climate Action

Generated at Tue 22 Oct 2024 02:52:58 AM UTC

https://www.msa.vic.gov.au

Summary of Obligations

Total levy liability estimate: $10,434,630.33

This total levy liability estimate and the following summary of obligations are provided as estimates for indicative purposes only. The obligations stated may be incomplete. The levy liability is calculated as at the date of this document, and is subject to change.

Levy liability (2 parcels)

Habitat Type	Area/locations	Applicable rate	Estimated subtotal
Native Vegetation	0.030 ha	$258,531	$7,755.93
Scattered trees	1 trees	$35,935	$35,935
Golden Sun Moth	323.906 ha	$28,733	$9,306,791.10
Growling Grass Frog	104.146 ha	$10,406	$1,083,743.27
Matted Flax-Lily	0.030 ha	$13,501	$405.03
Southern Brown Bandicoot	0 ha	$5,260	$0
Spiny Rice Flower	0 ha	$12,757	$0

Conservation Areas

One or more parcels contain conservation areas.

ID	Type	Area
34A	Growling Grass Frog	62.051 ha

Salvage and Translocation

Parcel(s) are not labelled as 'Potential Salvage Operations' and salvage is therefore not required.

Next Steps

The Biodiversity Conservation Strategy and a number of approvals under section 146B of the Environment Protection and Biodiversity Conservation Act 1999 (Cth), and the *Melbourne Strategic Assessment (Environment Mitigation Levy) Act 2020* form part of the Melbourne Strategic Assessment (MSA) program.

For information about how to meet a levy liability under the Melbourne Strategic Assessment (Environment Mitigation Levy) Act 2020, or how conservation areas are treated and secured under the Melbourne Strategic Assessment (MSA) program, please refer to the MSA website.

Estimate of Melbourne Strategic Assessment Environment Mitigation Levy

Energy, Environment and Climate Action

Generated at Tue 22 Oct 2024 02:52:58 AM UTC

https://www.msa.vic.gov.au

Parcel Details (1\TP710781)

Standard Parcel Identifier (SPI): 1\TP710781

Address: 2025 MERRIANG ROAD BEVERIDGE 3753

Parcel levy liability estimate: $8,384,850.28

This parcel levy liability estimate and the following summary of obligations are provided as estimates for indicative purposes only. The obligations stated may be incomplete. The levy liability is calculated as at the date of this document, and is subject to change.

Levy liability

Habitat Type	Area/locations	Applicable rate	Estimated subtotal
Native Vegetation	0 ha	$258,531	$0
Scattered trees	1 trees	$35,935	$35,935
Golden Sun Moth	255.031 ha	$28,733	$7,327,805.72
Growling Grass Frog	98.127 ha	$10,406	$1,021,109.56
Matted Flax-Lily	0 ha	$13,501	$0
Southern Brown Bandicoot	0 ha	$5,260	$0
Spiny Rice Flower	0 ha	$12,757	$0

Conservation Areas

This parcel contains conservation areas.

ID	Type	Area
34A	Growling Grass Frog	36.148 ha

Salvage and Translocation

This parcel is not labelled as 'Potential Salvage Operations' and salvage is therefore not required.

Estimate of Melbourne Strategic Assessment Environment Mitigation Levy

Energy, Environment and Climate Action

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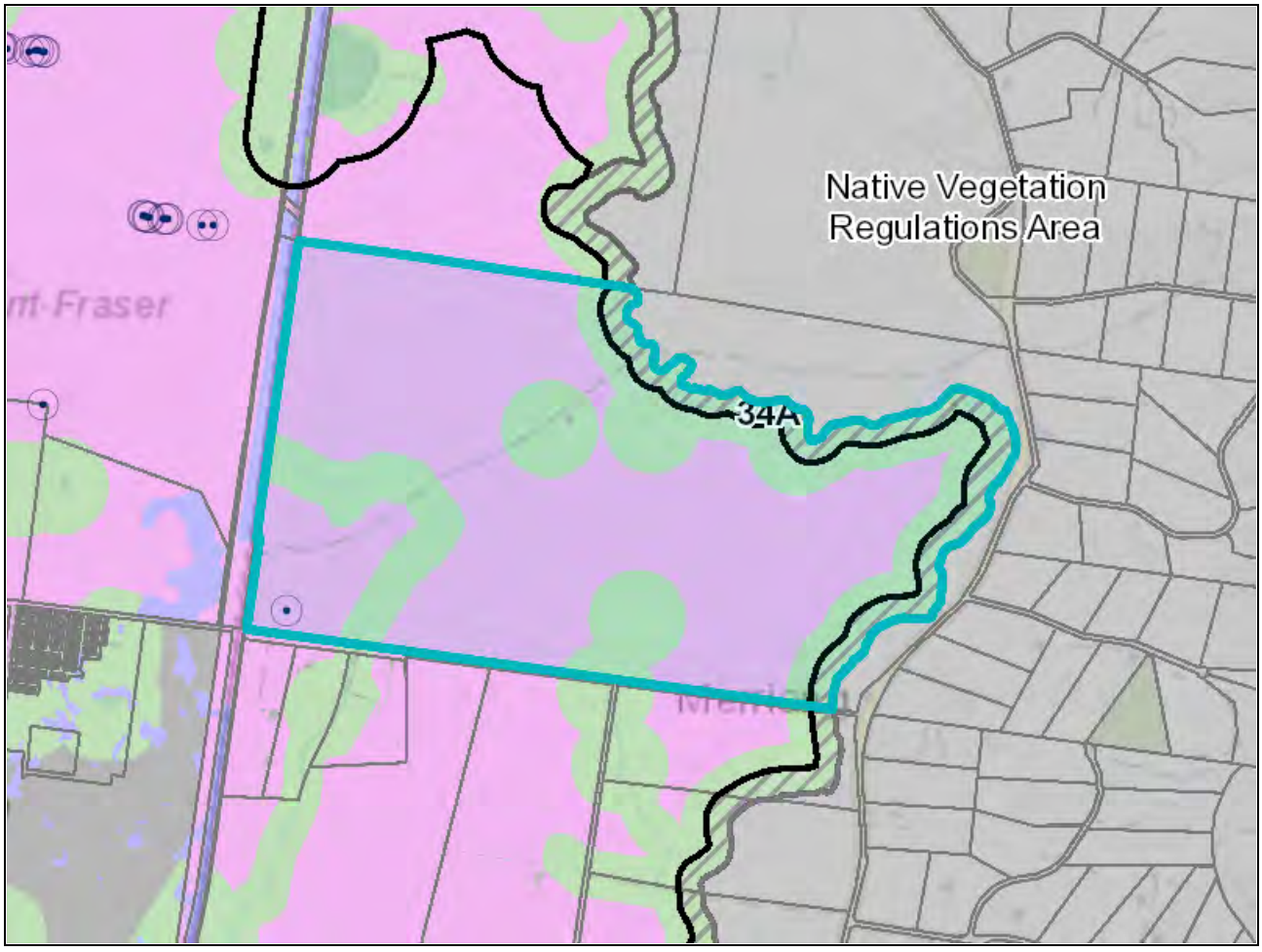
Parcel Map (1\TP710781)



0 750 m

N

- None applicable
- Growling Grass Frog
- Growling Grass Frog and Southern Brown Bandicoot
- Golden Sun Moth
- Native vegetation area
- Native vegetation area and Matted Flax-lily
- Native vegetation area and Southern Brown Bandicoot
- Native vegetation area and Spiny Rice-flower
- Southern Brown Bandicoot
- Scattered tree
- MSA Levy Area Boundary
- Parcels
- MSA Conservation Area
- Native Vegetation Regulations Area

Estimate of Melbourne Strategic Assessment Environment Mitigation Levy

Energy, Environment and Climate Action

Generated at Tue 22 Oct 2024 02:52:58 AM UTC

https://www.msa.vic.gov.au

Parcel Details (1\TP95683)

Standard Parcel Identifier (SPI): 1\TP95683

Address: 2025 MERRIANG ROAD BEVERIDGE 3753

Parcel levy liability estimate: $2,049,780.05

This parcel levy liability estimate and the following summary of obligations are provided as estimates for indicative purposes only. The obligations stated may be incomplete. The levy liability is calculated as at the date of this document, and is subject to change.

Levy liability

Habitat Type	Area/locations	Applicable rate	Estimated subtotal
Native Vegetation	0.030 ha	$258,531	$7,755.93
Scattered trees	0 trees	$35,935	$0
Golden Sun Moth	68.875 ha	$28,733	$1,978,985.38
Growling Grass Frog	6.019 ha	$10,406	$62,633.71
Matted Flax-Lily	0.030 ha	$13,501	$405.03
Southern Brown Bandicoot	0 ha	$5,260	$0
Spiny Rice Flower	0 ha	$12,757	$0

Conservation Areas

This parcel contains conservation areas.

ID	Type	Area
34A	Growling Grass Frog	25.903 ha

Salvage and Translocation

This parcel is not labelled as 'Potential Salvage Operations' and salvage is therefore not required.

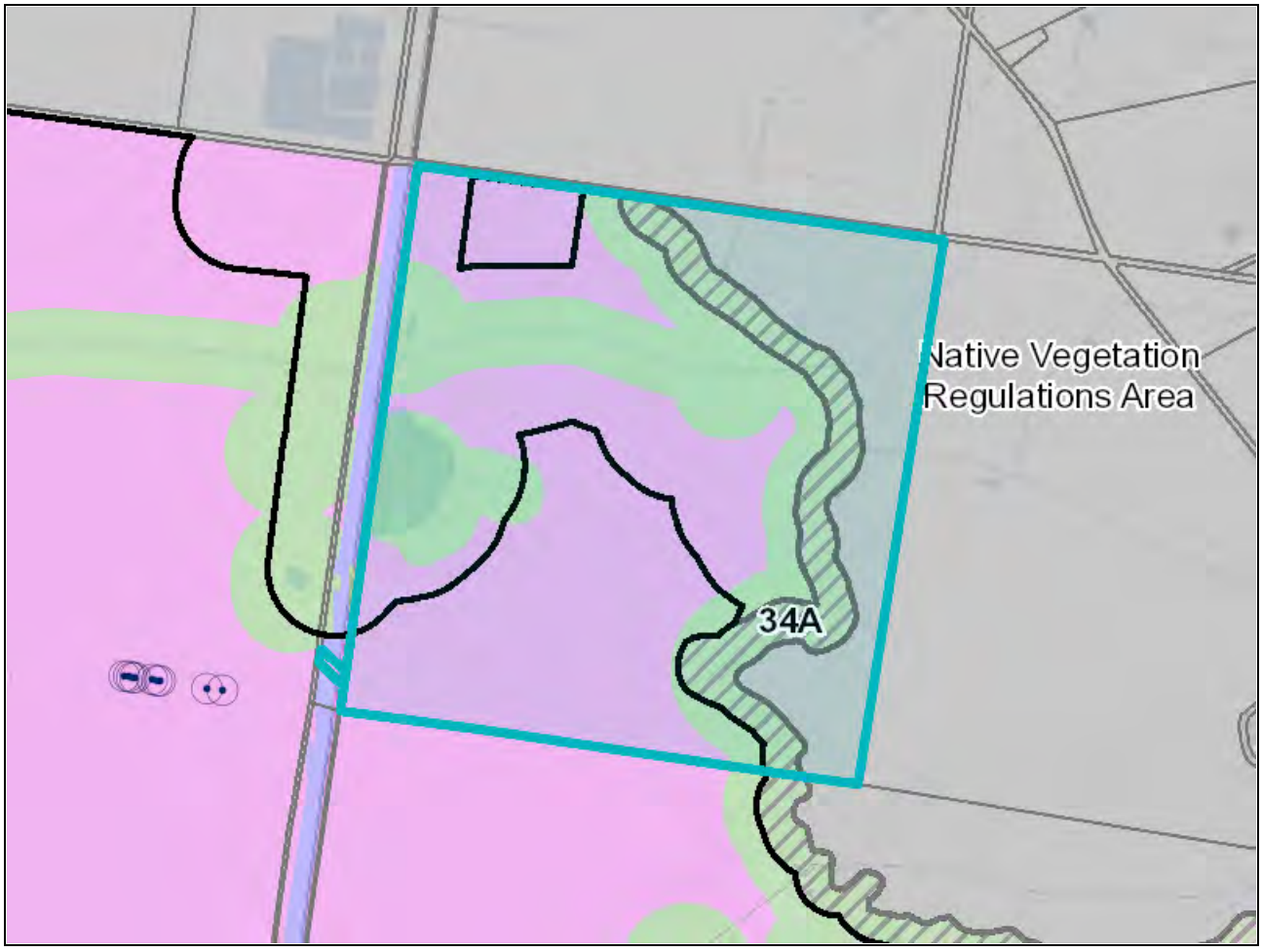
Estimate of Melbourne Strategic Assessment Environment Mitigation Levy

Energy, Environment and Climate Action

Generated at Tue 22 Oct 2024 02:52:58 AM UTC

https://www.msa.vic.gov.au

Parcel Map (1\TP95683)



0 550 m

N

- None applicable
- Growling Grass Frog
- Growling Grass Frog and Southern Brown Bandicoot
- Golden Sun Moth
- Native vegetation area
- Native vegetation area and Matted Flax-lily
- Native vegetation area and Southern Brown Bandicoot
- Native vegetation area and Spiny Rice-flower
- Southern Brown Bandicoot
- Scattered tree
- MSA Levy Area Boundary
- Parcels
- MSA Conservation Area
- Native Vegetation Regulations Area

Appendix 8 Native vegetation offsets credit availability

Report of available native vegetation credits

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

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

Date and time: 12/02/2025 10:04 **Report ID: 28316**

What was searched for?

General offset

General habitat units	Strategic biodiversity value	Large trees	Vicinity (Catchment Management Authority or Municipal district)	
0.152	0.3121	0	CMA	Melbourne Water

Details of available native vegetation credits on 12 February 2025 10:04

These sites meet your requirements for general offsets.

Credit Site ID	GHU	LT	CMA	LGA	Land owner	Trader	Fixed price	Broker(s)
BBA-0277	1.272	439	Melbourne Water	Mornington Peninsula Shire	No	Yes	No	Abezco, Ethos, VegLink
BBA-0670	13.726	72	Melbourne Water	Cardinia Shire	No	Yes	No	Abezco, VegLink
BBA-0677	5.436	1411	Melbourne Water	Whittlesea City	No	Yes	No	Abezco, VegLink
BBA-0678	40.066	2549	Melbourne Water	Nillumbik Shire	No	Yes	No	Abezco, VegLink
BBA-0678_02	0.562	58	Melbourne Water	Nillumbik Shire	No	Yes	No	Abezco, VegLink
BBA-2870	2.544	431	Melbourne Water	Yarra Ranges Shire	Yes	Yes	No	VegLink
BBA-2871	13.917	1623	Melbourne Water	Yarra Ranges Shire	Yes	Yes	No	VegLink
TFN-C1763_3	3.790	0	Melbourne Water	Mornington Peninsula Shire	Yes	Yes	No	Ecocentric, VegLink
VC_CFL-0838_01	0.183	644	Melbourne Water	Yarra Ranges Shire	Yes	Yes	No	VegLink
VC_CFL-3682_01	1.834	0	Melbourne Water	Nillumbik Shire	Yes	Yes	No	Abezco
VC_CFL-3687_01	0.250	58	Melbourne Water	Baw Baw Shire	Yes	Yes	No	Baw Baw SC
VC_CFL-3708_01	0.187	472	Melbourne Water	Yarra Ranges Shire	Yes	Yes	No	VegLink
VC_CFL-3710_01	6.238	322	Melbourne Water	Yarra Ranges Shire	Yes	Yes	No	VegLink

VC_CFL-3744_01	1.164	349	Melbourne Water	Macedon Ranges Shire	Yes	Yes	No	VegLink
VC_CFL-3764_01	4.268	0	Melbourne Water	Yarra Ranges Shire	Yes	Yes	No	VegLink
VC_CFL-3805_01	3.289	802	Melbourne Water	Yarra Ranges Shire	Yes	Yes	No	VegLink

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

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

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

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

Credit Site ID	GHU	LT	CMA	LGA	Land owner	Trader	Fixed price	Broker(s)
VC_CFL-3746_01	4.962	563	Melbourne Water	Macedon Ranges Shire	Yes	Yes	No	VegLink
VC_CFL-3792_01	14.025	1235	Melbourne Water	Macedon Ranges Shire	Yes	Yes	No	VegLink

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

Next steps

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

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

Broker contact details

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

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

Appendix 9 VGED Habitat Assessment

Species background

The VGED had been presumed extinct in Victoria, with the last confirmed sighting in 1969, prior to the species being rediscovered west of Melbourne in early 2023. Since the rediscovery of the species it has been listed as Critically Endangered under the EPBC Act and the Commonwealth and Victorian Governments have been working with species experts to confirm the best approach to the ongoing conservation of the species. At this stage, any guidance regarding the assessment requirements for potential habitat and significant impacts are still in their infancy.

The Conservation Advice confirms that prior to the development of greater Melbourne that heavily impacted the species, the VGED was common on the plains near Sunbury and around the Melbourne CBD, with additional validated records from Sunbury, Maribyrnong River, the mouth of the Yarra River and Coode Island, Essendon, Moonee Ponds and Prahran.

Review of the DEECA NatureKit tool confirms that only one record has been documented within the vicinity of the Study Area, which occurs approximately 4 kilometres south of the southern boundary of the Beveridge Intermodal Precinct site on Merri Creek. While this sighting is documented in the Victorian Biodiversity Atlas as having an 'acceptable' reliability, the Conservation Advice for VGED states that this and four other records remain unvalidated, despite intensive survey effort immediately following the sightings and during subsequent years (DCCEEW 2023a). The next closest sightings include another unconfirmed sighting from Sunbury in 1990 and an 1884 record from Essendon.

At the time of original assessment, the modelled distribution for the species extended to Sunbury in Melbourne's west and as such although the species was considered in Biosis' assessment, it was concluded to have a low likelihood of occurrence in the Study Area due to its distance from the mapped distribution and a lack of records in the area.

However, in February 2024 the modelled distribution of 'species or species habitat known or likely to occur' for VGED was expanded significantly eastward (DCCEEW, 2024) and the Study Area is now included in the north eastern extent of the modelled distribution polygon. As such a habitat site assessment was undertaken to meet requirements of the projects EPBC controlled action decision.

VGED habitat values

The Conservation Advice (DCCEEW 2023a) and Draft National Recovery Plan (DCCEEW 2023b) outline that grasslands with the greatest likelihood of containing a remnant VGED population are likely to have:

- Native vegetation cover with open patches of bare earth and/or naturally short open swards due to low-level disturbance (e.g. managed fire, grazing);
- Presence of suitable refugia, particularly invertebrate burrows, surface rock cover and/or soil cracks;
- A functioning invertebrate community to provide appropriate prey, as well as invertebrates that engineer burrows for refuge, particularly araneae (spiders), coleoptera (beetles) and orthoptera (grasshoppers and crickets) order fauna;

- Minimal weed cover;
- Not been de-rocked, ploughed or fertilized to improve pasture quality.

The habitat assessment of the study area considered these documented habitat requirements.

Habitat assessment

Method

To assess and document the habitat within the study area in relation to the key VGED habitat values summarised above and within the Conservation Advice, a site-based qualitative habitat assessment was undertaken on Friday 14 June 2024 by two experienced ecologists, including a Senior Zoologist (Clare McCutcheon) and a Senior Botanist (Sarah Hilliar). A second site assessment was undertaken on 14 and 15 August 2024 by two experienced ecologists, including a Principal Zoologist (Mark Venosta) and a Senior Botanist (Sarah Hilliar). The ecologists spent three full days undertaking an on foot and vehicle survey of the study area.

Location and extent of habitat features relevant to VGED were assessed and noted during the site assessment, in particular; habitat structure, floristics, biomass levels, land management, previous evidence of disturbance, presence of invertebrate burrows, soil cracks and broader site context. Habitat features were described in a qualitative manner as there are currently no standard quantitative habitat assessment guidelines for the species. Geo-referenced note points and photographs were recorded using hand-held GPS-enabled tablets.

Table 31 contains further details regarding the habitat categories and guidance utilised by Biosis in defining habitat suitability for VGED, and how these inform our assessment of the likelihood of the species occurring within the study area. This qualitative habitat assessment guide has been developed using information provided in the Conservation Advice (DCCEEW 2023a) and Draft National Recovery Plan (DCCEEW 2023b) for VGED.

Table 31 Categories and guidance used for defining habitat suitability for Victorian Grassland Earless Dragon

VGED Habitat suitability category	Description	Likelihood of occurrence
Unsuitable	Areas that are clearly unsuitable as habitat for VGED as they do not support grassland habitat. • Paddocks currently subject to intensive ploughing and cropping. • Dams, wetlands, waterways, and extensive areas prone to periods of inundation. • Roads, buildings, and other permanent infrastructure. • Areas with high tree cover that do not support grasslands, including remnant woodlands, windbreaks, plantations, and orchards.	Negligible

VGED Habitat suitability category	Description	Likelihood of occurrence
Negligible	Grassy habitat that is unlikely to support VGED due to significant previous disturbance and absence of key habitat attributes as described in DCCEEW (2023a) and (2023b). • Evidence of historical mechanical soil disturbance such as ploughing, grading and/or cropping. • Evidence of ongoing disturbance from agricultural land use, such as stock tracks, vehicle tracks, stock pugging or soil compaction. • High cover of tall or dense exotic grass or weeds, such Toowoomba Canary-grass *Phalaris aquatica* and/or Serrated Tussock *Nassella trichotoma* • Negligible areas of bare ground and/or surface rock between grass tussocks. • High cover of shrubs or scattered trees, which shade grasslands and provide perches for predatory birds. • Negligible rock coverage, including evidence of de-rocking.	Negligible
Low	Areas of grassland that lack key habitat attributes as described in DCCEEW (2023a) and (2023b) and/or are significantly fragmented or degraded. This can include small patches which would be unlikely to support VGED due to their size, context and fragmentation. • Consistently high biomass (density and height of vegetation). • High weed cover, and/or low proportion of native vegetation. • Minimal areas of bare ground and/or surface rock between grass tussocks. • Areas has been subject to rock removal, may still contain low coverage of embedded rock, surface rock mostly absent. • Soil cracks and spider burrows absent, or very low numbers. • Relatively small and disconnected from larger areas that support medium or higher quality habitat.	Low
Medium	Areas of mostly natural grassland that contain all or most of the key habitat attributes described in DCCEEW (2023a) and (2023b), but do not occur in the vicinity or adjacent to the known location of a population (i.e. either the rediscovery site or any additional species detections since rediscovery). Key features might include: • Moderate proportion of native grassland vegetation. Any weeds present are not significantly altering the habitat structure. • Low to moderate biomass and areas of bare ground and/or surface rock between grass tussocks. • No significant rock removal. Some surface and embedded rock present. • Spider burrows and/or cracking soil present. • Diverse invertebrate community present.	Medium. Further assessment required.
High	Areas of natural grassland that have a high likelihood of supporting VGED by containing all identified key habitat attributes as described in DCCEEW	High. Further assessment

VGED Habitat suitability category	Description	Likelihood of occurrence
	(2023a) and (2023b) and occurring within the vicinity or adjacent to the known location of a population (i.e. either the rediscovery site or any additional species detections since rediscovery). Key features: • Native grassland with a diverse structure, supporting low biomass and areas of bare ground and/or surface rock. • Consistent long-term land management, no history of mechanical soil disturbance or rock removal. • Spider burrows and/or cracking soil present. • Diverse invertebrate community present. • Good landscape connectivity and proximity to known population/s.	required.

Findings

The features and habitat values documented within the study area during the habitat assessment were found to largely be influenced by topography, hydrology and land use.

The low-lying areas prone to inundation within or adjacent to Herne Swamp were either inundated or had been recently inundated, which was evidenced by the presence of standing water or from heavily pugged black soils and the presence of flora species associated with wetlands (e.g. Plains Rush *Juncus semisolidus*, Water Plantain *Alisma Plantago-aquatica* and Swamp Billy-buttons *Craspedia paludicola*). While it is noted that areas of historic records across the Keilor Plains may have been similarly waterlogged in winter, whilst dry and cracked in summer (DCCEEW 2023a), Biosis staff have visited the site several times over both summer and winter and whilst the area is dry in summer it is subject to heavy pugging from cattle grazing, resulting in soil compaction and a consequent lack of suitable refugia for VGED. The site has been used for grazing over the past 10+ years and it is likely it has been subject to the same level of grazing pressure through this time. Whilst the area may be used as dispersal habitat during drier periods (Stephens et al, 2010), the lack of suitable habitat in the surrounding area means that these areas are still considered to have a negligible likelihood of supporting VGED.

The vegetation within the existing rail corridor consisted of extremely high biomass levels dominated by Common Reed *Phragmites australis* and Toowoomba Canary-grass *Phalaris aquatica* and was therefore assessed as having a negligible likelihood of supporting VGED. Areas supporting a high biomass of exotic grasses, such as areas of Toowoomba Canary-grass and Common Reed found dominating the rail corridor, significantly alter grassland structure and function, smothering native species and reducing sunlight reaching the soil surface (Williams et al. 2015). Dense swards are typically sub-optimal for grassland fauna species that utilise bare ground for movement, foraging and basking (Williams et al. 2015) and this is believed to be the case for VGED, which are believed to be associated with more open and diverse grassland structure (DCCEEW 2023a; 2023b).

Areas immediately to the south and east of the Herne Swamp consists of slightly higher elevation grassy habitat that supports isolated stony rises and grassland habitat dominated by introduced vegetation with some scattered native grasses. These areas are heavily grazed by cattle and pugging is evident, with no cracks or invertebrate burrows observed. The likelihood of VGED occurrence is considered to be low due to

dominance of weedy pasture grasses, soil disturbance from cattle grazing and lack of soil cracks and invertebrate burrows.

Stony rises are scattered across the study area and support a high cover of embedded rock. Introduced herb and grass species including Capeweed *Arctotheca calendula* and Onion-grass *Romulea rosea* var. *australis* dominate the stony rises along with scattered native grassland vegetation, however there is evidence of significant disturbance from rabbits and cattle grazing. No soil cracks or invertebrate burrows occur. Relatively, the stony rises represent the best potential VGED habitat within the study area, however they lack soil cracks and/or invertebrate burrows and exist as relatively small, isolated occurrences within a broader extent of habitat that has been assessed as having negligible to low likelihood of supporting VGED, and for this reason they have also been assessed as having a low likelihood of supporting VGED.

Elevated Plateaus occur within the study area and are often associated with stony rises These areas have maintained scattered embedded rock, vegetation is predominantly introduced, and biomass is high. Dominant species include Brown-top Bent, Toowoomba Canary Grass and a range of introduced herb species. No soil cracks and two invertebrate burrows, likely formed by native crayfish were observed, indicating very low density of this important habitat feature. Based on proximity to the stony rises, they have a low likelihood of supporting VGED.

The Low-lying areas of floodplain running adjacent to Merri Creek and the Volcanic plateau are dominated by Couch *Cyndon dactylon* var. *dactylon*, Brown Top-bent *Agrostis capillaris* and Toowoomba Canary-grass *phalarais aquatica*. Wetter areas were evident by the presence of Plains Rush *Juncus semisolidus* and Common Tussock-grass *Poa labillardierei*. There is evidence of man-made drainage lines within the floodplain paddocks directing water to the Merri Creek. These areas are heavily grazed by cattle and pugging is evident. The floodplain and volcanic plateaus contained no soil cracks, rocks or burrows and are considered to have a negligible likelihood of supporting VGED.

Several tracks and a pipeline run through the study area. Vegetation in these areas is predominantly introduced and all rocks have been removed. Vehicle movement creates constant disturbance and no cracks or burrows were observed, thus there is a negligible likelihood these areas would provide VGED habitat.

There were only two burrows observed throughout the site assessment that were likely formed by invertebrates, possibly native crayfish. These were the only invertebrate burrows recorded during the site assessment that could provide shelter opportunities for VGED. Opportunistic active searching was undertaken to locate burrow-forming invertebrates of the Araneae, Coleoptera and Orthoptera orders. No burrowing invertebrates were recorded. While survey coverage, vegetation cover and season may affect the detection of these features, the results of the assessment indicate that burrows and soil cracks are unlikely to occur at sufficient densities to support a population of VGED within the study area.

Table 32 Summary of habitat types occurring within, and in the vicinity of, the Stage 1A footprint.Table 32 contains a summary of the different habitat types occurring within the study area, along with representative photos. These areas are mapped in Figure 5.

Table 32 Summary of habitat types occurring within, and in the vicinity of, the Stage 1A footprint.

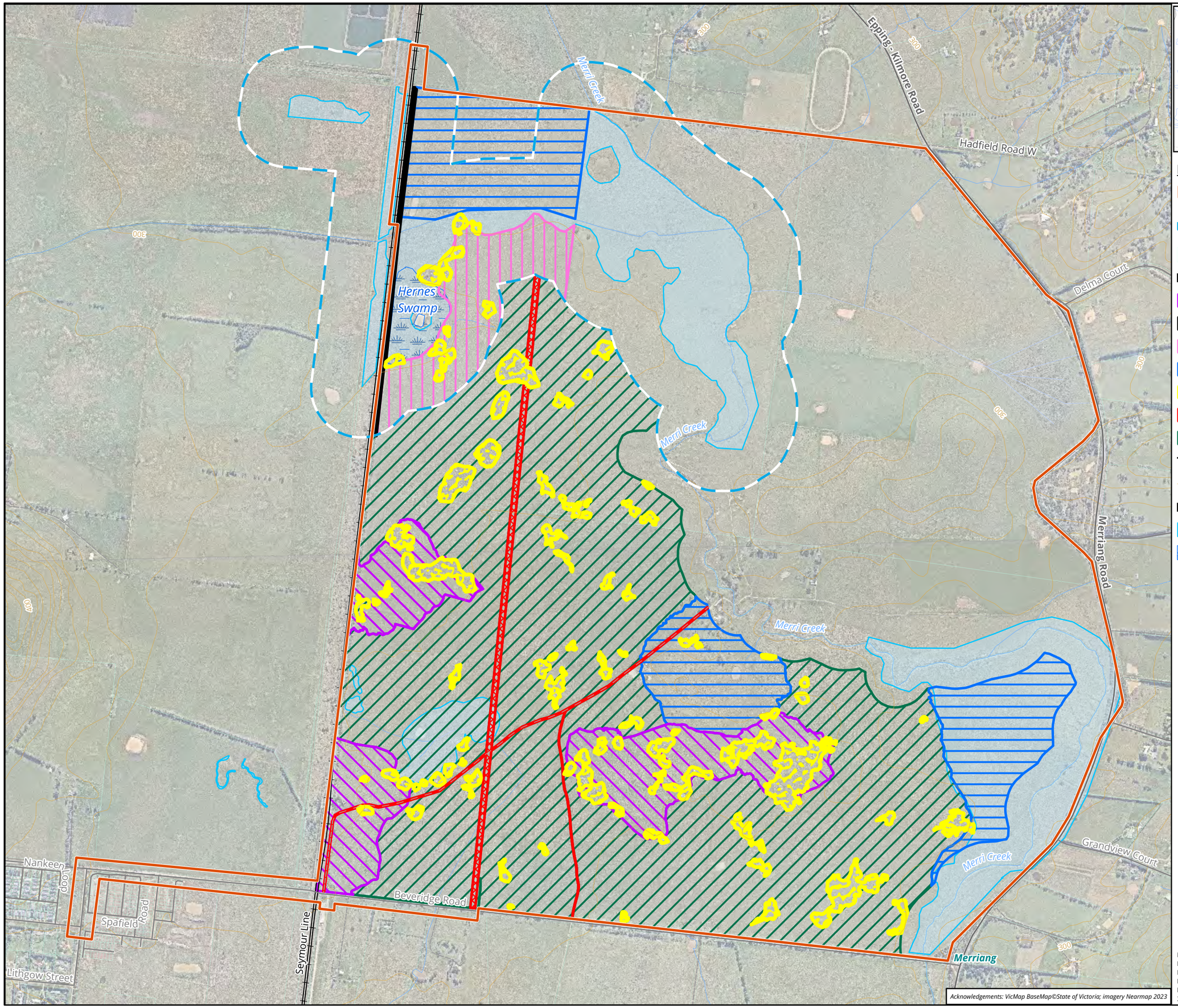
Habitat type	Description (see also Figure 5)	Representative photo
Existing rail corridor	The existing rail corridor within, and in the vicinity of, the proposed Stage 1A footprint is dominated by tall and dense swards dominated by Common Reed and Toowoomba Canary-grass. These areas were viewed from the adjacent paddock, as access within the rail corridor itself was not permitted. It is noted that the entirety of the rail corridor impact footprint was previously surveyed by Biosis in November 2023 and the vegetation observed throughout the corridor was as described above. Biomass levels are extremely high and for this reason these areas are considered to have a **negligible** likelihood of supporting VGED.	

Habitat type	Description (see also Figure 5)	Representative photo
Herne Swamp and adjacent water-logged and inundated areas (shown as DEECA current wetland on Figure 5)	Herne Swamp is a large DELWP wetland that occurs to the west of Merri Creek and forms a significant part of the Merri Creek Catchment. Its former extent has been substantially reduced. At the time of assessment, these areas were inundated and dominated by Common Tussock-grass *Poa labillardierei,* Poong'ort *Carex tereticaulis,* Knob Sedge *Carex inversa*, Brown-back Wallaby Grass *Rytidosperma duttonianum* and Spike Rush *Eleocharis acuta* Two farm dams and an east-west drainage channel have been cut into the extent of Herne Swamp at this location, affecting the hydrology of the site. The floristics, soil moisture and extensive areas of standing water suggest that this broad area is subject to significant and extensive seasonal inundation. Likelihood of VGED occurrence is considered **negligible** due to inundation and/or water-logged soils, soil disturbance from cattle grazing, dense wetland-associated vegetation and absence of soil cracks or invertebrate burrow refugia.	

Habitat type	Description (see also Figure 5)	Representative photo
Low-lying areas prone to inundation (Flood plain)	These areas did not support standing water at the time of assessment, however they are at a relatively low elevation and comprised of black soils that showed evidence of deep pugging from cattle grazing, indicating that they were once inundated or saturated. The presence of wetland-associated plants such as *Juncus* spp. also indicate that these areas are seasonally inundated, and form part of the broader Herne Swamp system. Vegetation is dense and largely dominated by introduced species. No VGED refugia (soil cracks/invertebrate burrows) were recorded. Likelihood of VGED occurrence is considered **negligible** due to evidence of seasonal inundation, soil disturbance from cattle grazing, weeds and lack of refuge.	
High elevation grassy habitat and Elevated Plateaus	Elevated Plateaus occur within the study area and are often associated with stony rises. Some scattered embedded rock is present, with no clear evidence of rock removal observed (e.g. no rock piles or rock walls present). Soil disturbance is evident in the form of cattle grazing, pugging and soil compaction. Vegetation is dominated by introduced pasture species and weeds such as Toowoomba Canary-grass, Couch *Cynodon dactylon* subsp. *dactylon* and Brown-top Bent *Agrostis capillaris.* Scattered native vegetation occurs in some parts of this habitat including Wallaby Grass *Rytidosperma* sp. and Spear Grass *Austrostipa* sp.	

Habitat type	Description (see also Figure 5)	Representative photo
	No soil cracks and two invertebrate burrows, likely formed by native crayfish were observed, indicating very low density of this important habitat feature. Soils were dark brown in colour. The likelihood of VGED occurrence is considered to be **low** due to dominance of weedy pasture grasses, soil disturbance from cattle grazing and lack of soil cracks and invertebrate burrows.	
Stony rises	Several stony rises occur throughout the study area. The stony rises present were found to support a very high cover of embedded rock, though very little loose surface rock was noted. Scattered occurrences of native grasses and herbs were found to be present in these areas, including Kangaroo Grass *Themeda triandra* and Weeping Grass *Microlaena stipoides* var. *stipoides,* however in general these areas are dominated by introduced herbs. Disturbance as a result of cattle grazing and rabbit activity was noted, and no soil cracks or invertebrate burrows were recorded. Compared to other habitat types within the study area, the stony rises represent relatively higher habitat value for VGED due to rock cover, structure and floristics, however they exist as small, isolated occurrences in areas assessed as otherwise unlikely to support VGED. The likelihood of VGED occurrence is considered to be **low** due to small size and isolation within the broader site context, as well as lack of soil cracks, invertebrate burrows or loose surface rock.	

Habitat type	Description (see also Figure 5)	Representative photo
Volcanic Plateau	These areas did not support standing water at the time of assessment; however they are at a relatively low elevation and comprised of black soils that showed evidence of deep pugging from cattle grazing, indicating that they were once inundated or saturated. The presence of wetland-associated plants such as *Juncus* spp. And Common Tussock Grass also indicates that these areas are seasonally inundated. Gilgai occur in some sections of the Volcanic Plateau, again indicating periods of inundation. No VGED refugia (soil cracks/invertebrate burrows) were recorded. Likelihood of VGED occurrence is considered **negligible** due to evidence of seasonal inundation, soil disturbance from cattle grazing, weeds and lack of refuge.	



Legend

- Biosis study area
- Area excluded from MSA approval zone
- Current parcel boundary

Habitat type

- Elevated plateau
- Existing rail corridor
- High-elevation grassy habitat
- Low-lying area prone to inundation
- Stony rise
- Tracks; pipeline
- Volcanic plateau

Topography

- Contour 10 m interval

Hydrography

- Current wetland (DEECA)
- Swamp

Figure 5 VGED habitat assessment

0 100 200 300 400 500

Metres

Scale: 1:14,000 @ A3

Coordinate System: GDA2020 MGA Zone 55

N

biosis

Matter: 39671,
Date: 25 October 2024,
Prepared for: CE, Prepared by: SP, Last edited by: spanter
Layout: 39671_F5_Habitat_assessment
Project: P:\39600s\39671\Mapping\
39671_FFA_BIFT_1A.aprx

Summary of habitat assessment

The field-based habitat assessment confirms that the site is unlikely to support VGED. The study area occurs at the edge of the VGED predicted habitat distribution, with no confirmed records of the species within the broader area.

As detailed in this assessment, the lower elevation areas associated with Herne Swamp and the high biomass within the existing rail corridor are considered to have no capacity to support the species.

Higher elevation grassy areas are also considered to have a low likelihood of supporting the species due to dominance of weedy pasture grasses, soil disturbance from cattle grazing and lack of soil cracks and invertebrate burrows. Small, isolated stony rises have a low likelihood of supporting the species due to site context and the absence of key habitat features such as soil cracks and/or invertebrate burrows.

Based on the site assessment undertaken and the above assessment of negligible to low likelihood of occurrence, targeted surveys are not recommended for the study area.