ecology & heritage partners

Final Report

Existing Ecological Conditions Report, Ballarat Line Upgrade

Prepared for

Melbourne Metro Rail Authority

June 2017

Ecology and Heritage Partners Pty Ltd

MELBOURNE: 292 Mt Alexander Road, Ascot Vale VIC 3032 **GEELONG:** 230 Latrobe Terrace, Geelong West Vic 3218
BRISBANE: Level 22, 127 Creek Street, Brisbane QLD 4000 **ADELAIDE:** 22 Greenhill Road, Wayville SA 5034
CANBERRA: PO Box 6067, O'Connor ACT 2602 **SYDNEY:** Level 5, 616 Harris Street, Ultimo, NSW, 2007
www.ehpartners.com.au | (03) 9377 0100

DOCUMENT CONTROL

Assessment	Existing Ecological Conditions Report, Ballarat Line Upgrade
Project number	8442
Project manager	Aaron Organ (Director / Principal Ecologist)
Report reviewer	Andrew Hill (Director / Principal Ecologist)
Other EHP staff	Clare Kenny (Senior Project Manager/Botanist), Chelsy Maloney (Zoologist), Lyndsey Vivian (Consultant Botanist), Jennifer Sarantopoulos (Consultant Botanist), Chad Browning (Senior Zoologist), Andrew Taylor (Consultant Zoologist), Brigette Gwynne (Consultant Zoologist).
Mapping	Monique Elsley (GIS Coordinator)
File name	8442_BLU_Existing Ecological Conditions_EHP_FINAL_26062017
Client	Melbourne Metro Rail Authority
Bioregion	Victorian Volcanic Plain
CMA	Port Philip and Westernport
Councils	Melton City Council, Moorabool Shire Council, and Ballarat City Council

Report versions	Comments	Comments updated by	Date submitted
Draft 1	Preliminary advice draft		06/12/2016
Draft 2	Revised preliminary advice draft	AO, ME, CM	23/12/2016
Draft 3	Final Draft. Targeted surveys moved to Addenda	CM, CK, SLB, AO	13/02/2017
Draft 4	Clarification on permit recommendations, revision of figures to remove outdated laydown areas.	CK, AO	23/03/2017
Draft 5	Updated made in response to Legal Review Comments dated 01/05/2017	AO, CM	20/06/2017
Final	Addition of information on Small Golden Moths and species information	CM, AO	26/06/2017

Acknowledgements

We thank the following people for their contribution to the project:

- Marisa Feher (Melbourne Metro Rail Authority), Carolyn Maes (Public Transport Victoria) for project information.
- The Victorian Department of Environment, Land, Water and Planning for access to ecological databases.

GLOSSARY

Acronym	Description
BCS	Biodiversity Conservation Strategy
BIOR	Biodiversity Impact and Offset Requirements
CALP Act	Catchment and Land Protection Act 1994
CMA	Catchment Management Authority
DELWP	Department of Environment, Land, Water and Planning (formerly DEPI)
DEPI	(former) Department of Environment and Primary Industries (formerly DSE)
DoEE	Department of the Environment and Energy (formally DoE)
EES	Environment Effects Statement
EPA	Environment Protection Authority
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
EVC	Ecological Vegetation Class
FFG Act	Flora and Fauna Guarantee Act 1988
FIS	Flora Information System
HZ	Habitat Zone
LOT	Large Old Tree
MSA	Melbourne Strategic Assessment
NES	National Environmental Significance
NVIM	Native Vegetation Information Management (Tool)
NVPP	Native Vegetation Precinct Plan
PSP	Precinct Structure Plan
UGB	Urban Growth Boundary
VBA	Victorian Biodiversity Atlas
VFD	Victorian Fauna Database

SUMMARY

Introduction

Ecology and Heritage Partners Pty Ltd was commissioned by Public Transport Victoria in 2016 to conduct detailed ecological investigations for the upgrade of the Ballarat railway line (the Ballarat Line Upgrade [BLU]). Melbourne Metro Rail Authority is now responsible for the delivery of the BLU, and for obtaining all the relevant approvals.

These assessments were undertaken using a combination of desktop and field based surveys to identify the extent and quality of remnant native vegetation, to determine the presence (or likelihood thereof) of any significant flora and fauna species and/or ecological communities, and to provide an overview of the implications under Commonwealth and State environmental legislation and policy. The results of the assessments will be used to inform the BLU's Planning Approvals Strategy.

The study area for the ecological assessment described in this report is limited to the six discrete work areas, or "Elements" located between Deer Park West to the east and Warrenheip to the west, as defined by MMRA in January 2017. These Elements mostly comprise VicTrack rail corridor, and in some areas extend into private land. At the eastern extent of the study area, Elements 1a and 1b are located within the Urban Growth Boundary (UGB) and are subject to the Melbourne Strategic Assessment (MSA). It should be noted that as of June 2017, Element 2 as defined in this assessment (Melton Stabling) has been removed from the project, and all other Elements have been renamed chronologically (i.e. Element 3 has been redefined as Element 2, Element 4 as Element 3, and so on).

The proposed BLU is subject to Commonwealth and State assessment and approval requirements. Based on the January 2017 development footprint, the BLU will generate habitat compensation obligations under the Melbourne Strategic Assessment's (MSA) *Biodiversity Conservation Strategy* (BCS), biodiversity offsets under the MSA's Prescriptions as detailed in the *Toolern Precinct Structure Plan* and associated *Native Vegetation Precinct Plan* (NVPP), and offset obligations under *Victoria's Permitted clearing of native vegetation: Biodiversity assessment guidelines* (the Guidelines).

Methods

A desktop review of biological databases and previous reports was undertaken, together with extensive field assessments over several days between 18 October 2016 and 15 February 2017 to obtain information on flora and fauna values within the study area. Field surveys were undertaken in two phases; Phase one focused on conducting the Permitted Clearing Assessment and identifying potential habitat for significant flora and fauna species; and, Phase two targeted significant species surveys across areas that provide potential habitat. Targeted significant flora and fauna surveys were undertaken in accordance with relevant guidelines, where they are available (refer to Section 2, and Appendices 2.1 and 3.1 for detailed descriptions of survey methods and results).

For the portions of the study area located outside of the UGB, proposed impacts to remnant native vegetation and associated offset requirements were assessed in accordance with the Guidelines, while areas within the UGB are covered by the MSA's Prescriptions and habitat compensation obligations under the BCS.

Results

Flora

Desktop and site assessments identified potential habitat within the study area for national and State significant species. Targeted flora surveys recorded the presence of the nationally-listed Matted Flax-lily *Dianella amoena,* and FFG Act Protected (although not listed as threatened) Cotton Fireweed *Senecio quadridentatus,* and Slender Onion-orchid *Microtis parviflora*, within the portion of the study area located outside of the UGB. Within the BCS area, a population of Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens* and Large-fruit Groundsel *Senecio macrocarpus* are present.

Fauna

Desktop and site assessments identified potential habitat within the study area for nationally significant fauna species (Growling Grass Frog *Litoria raniformis*, Striped Legless Lizard *Delmar impar*, Golden Sun Moth *Synemon plana*, Dwarf Galaxias *Galaxias pusilla*). However, none of these species were detected during targeted surveys. Although the study area supports some characteristics of these significant species' preferred habitat, it is considered unlikely that the study area would provide important or limiting habitat for any of these fauna species (Section 3.2.4.2). Consequently, the project is unlikely to impact any nationally significant fauna species.

The study area contains suitable habitat for at least eight State listed species, including Yellow-bellied Sheathtail Bat *Saccolaimus flaviventris*, Australian Shoveler *Anas rhynchotis*, Hardhead *Hirundapus caudacutus*, White-throated Needletail Hirundapus caudacutus, Eastern Great Egret *Ardea modesta*, Black Falcon *Falco subniger*, Tussock Skink *Pseudemoia pagenstecheri* and Brown Toadlet *Pseudophryne bibronii*. Many of these species have a low to moderate likelihood of occurrence and may either temporarily reside within the study area (e.g. for foraging activities) or flyover during dispersal across the landscape. All other State listed species are considered unlikely to occur within or directly adjacent to the study area due to a lack of suitable habitats.

The study area contains potentially suitable habitat for at least four regionally listed species, including Fat-tailed Dunnart *Sminthopsis crassicaudata*, Nankeen Night Heron *Nycticorax caledonicus hillii*, Spotted Harrier *Circus assimilis* and Lathams Snipe *Gallinago hardwickii*. All other regionally listed species are considered unlikely to occur due to a lack of suitable habitat within the study area.

Native Vegetation and Scattered Trees

Approximately 35.43 hectares of remnant native vegetation occurs within the study area, including approximately 0.21 hectares located in Elements 1c and 4 that meet the condition threshold to qualify as the EPBC Act-listed Natural Temperate Grassland of the Victoria Volcanic Plains (NTGVVP). All areas supporting NTGVVP are not proposed to be impacted by the development. A total of 44 scattered remnant trees also occur within the study area (Elements 1b, and 1c – 6).

The proposed development is likely to result in the removal of approximately 18.947 hectares of native vegetation and 32 scattered remnant trees. This total includes seven trees identified in the Native Vegetation Precinct Plan for the Toolern Precinct Structure Plan (PSP).

Melbourne Strategic Assessment's Biodiversity Conservation Strategy (Element 1a)

A total of approximately 11.561 hectares of remnant (time-stamped) vegetation is proposed to be impacted within areas covered by the BCS. This proposed removal generates habitat compensation obligations for Native Vegetation (11.326 hectares), Spiny Rice-flower (11.326 hectares), Golden Sun Moth (9.532 hectares), and Growling Grass Frog (0.370 hectares).

Melbourne Strategic Assessment's Prescriptions (Toolern Precinct Structure Plan) (Element 1b)

Based on the vegetation mapping provided in the Toolern *Native Vegetation Precinct Plan* (MPA 2011) and the proposed impact area of the BLU, a total of approximately 5.557 hectares of remnant (time-stamped) vegetation is proposed to be impacted within areas covered by the Toolern PSP. It is noted that the proposed removal of native vegetation marked as 'to be retained' under the NVPP falls under the Guidelines, and is therefore included DELWP's Biodiversity Impacts and Offset Requirements (BIOR) report.

Permitted Clearing Assessment (the Guidelines) (Element 1c – 6)

The study area is within modelled Location Risk C, with approximately 7.386 hectares of remnant native vegetation and 25 scattered remnant trees are proposed to be removed within Elements 1c - 6. As such, the planning permit application(s) will be assessed under the High Risk-based pathway. The Guidelines require that the risk-based pathway assessment also consider vegetation removal covered by the MSA and BCS. Therefore, the proposed removal of approximately 11.561 hectares of native vegetation in the MSA and BCS is treated by DELWP as 'past removal' when calculating offset requirements for BLU.

Legislative and Policy Implications and Further Action

A summary of the approval requirements associated with the BLU is provided below (Table S1, 13) (Section 4.9).

Table S1. Recommendations associated with the BLU development.

Relevant Legislation	Implications	Further Action
Environment Protection and Biodiversity Conservation Act 1999	The proposed development will not result in the removal of the documented Matted Flax-lily and NTGVVP community.	Elements 1a and 1b: Although matters of NES are present within these Elements, this part of the project is subject to the MSA which has previously been assessed and approved under Part 10 of the Act. As such, works within Element 1a and 1b do not need to be referred under the EPBC Act for assessment and determination under the Act. However, to ensure compliance with the approval under the MSA, the BLU will need to consult with DELWP regarding the salvage and translocation of the two EPBC Act-listed flora species (Spiny Rice-flower and Large-headed Groundsel) within Element 1a.
		Elements 1c – 6: Matters of NES identified within this section of the study area will be avoided by the proposed impact area. Therefore, based on the results of this assessments, the proposed development will not trigger the significant impact thresholds under the Act and an EPBC Act referral is not required. However, given the size and complexity of the project it is recommended the MMRA refer this part of the project under the EPBC Act as a risk minimisation strategy and for legislative certainty. The EPBC Act referral can exclude Elements 1a and 1b.

Relevant Legislation	Implications	Further Action
Flora and Fauna Guarantee Act 1988	There is suitable habitat within the study area for several species listed or protected under the FFG Act. The FFG Act Listed Western Basalt Plains community is also present. A permit under the FFG Act will be required as the study area is located on public land.	Elements 1a and 1b: Prepare and submit a project-wide FFG Act permit application to DELWP, as relevant state assessment and approval requirements still apply within the MSA (Geoff Ralphs, DELWP, pers. comm, 2017) Elements 1c – 6: Prepare and submit a project-wide FFG Act permit application to DELWP.
Environment Effects Act 1978	Proposed removal of more than 10 hectares of native vegetation and the potential for impacts to Western Basalt Plains community which is listed under the FFG Act	Entire project: Although an Environmental Effects Statement is not likely to be required for the project, given the size and complexity of the project it is recommended the MMRA refer the project as a risk minimisation strategy and for project certainty.
Planning and Environment Act 1987	Element 1a: Approved under BCS and therefore all proposed vegetation removal is subject to the habitat compensation obligations. Element 1b: Approved under MSA as the Toolern Precinct Structure Plan (PSP) - for native vegetation and scattered trees identified as "to be removed". Additionally, all proposed removal of vegetation and scattered trees marked as 'to be retained' or 'protected' is subject to Clause 52.16 of the City of Melton planning scheme and the required offsets are included in the combined BIOR report.	Element 1b: Seek Planning Scheme Amendment to remove remnant native vegetation and submit to Melton Council. The incorporated document is likely to include a requirement for: • Demonstration of impact minimisation. • Identification of a compliant offset, as detailed in Section 3.2.2 (see Appendix 4.2 for Element 1a, and appendix 4.1 and 4.3 for Element 1b). • A Construction Environment Management Plan (CEMP). • A Significant Species CMP, including a Salvage and Translocation Plan for significant flora species.
	Elements 1c – 6: 7.386 hectares of remnant native vegetation and 25 scattered remnant trees within Modelled Location Risk C is proposed to be removed. As such, a permit application falls under the High Risk-based pathway under the Melton, Moorabool Council planning schemes. The combined total offset requirement for native vegetation removal is 0.456 General Biodiversity Equivalence Units (BEU), along with Specific units for 3 species: Red-chested Button-quail (2.339 specific BEUs), Rye Beetle-grass (2.711 specific BEUs), and Spiny Rice-flower (2.355 specific BEUs).	Elements 1c – 6: Request separate BIOR Reports that provide offset requirements for each council area bisected by the project. Seek Planning Scheme Amendments to remove native vegetation within the Melton and Moorabool municipalities. The Planning Scheme Amendment Incorporated Document is likely to include a requirement for: • Demonstration of impact minimisation. • Identification of a compliant offset, as detailed in Section 3.2.2. • A Construction Environment Management Plan (CEMP).
Catchment and Land Protection Act 1994	Several weed species listed under the CaLP Act were recorded within the study area. To meet requirements under the CaLP Act, listed noxious weeds should be appropriately controlled throughout the study area.	Elements 1a and 1b: Approved under Part 10 which is an overarching Commonwealth and State approval. As such, there are no specific approval requirements under the CALP Act relating to the project. Elements 1c – 6: The Incorporated Document likely to include a requirement for a Weed Management Plan to control and prevent the spread of weeds during and after construction.

Relevant Legislation	Implications	Further Action
Water Act 1989	A 'works on waterways' permit may be required from the relevant CMA where any action impacts on waterways within the study area.	Elements 1a and 1b: Approved under Part 10 which is an overarching Commonwealth and State approval. As such, there are no specific approval requirements under the *Water Act 1989* relating to the project.
		Elements 1c – 6: Obtain a project-wide 'works on waterways' permit from the relevant CMAs.
Wildlife Act 1975	Any persons engaged to conduct salvage and translocation or general handling of terrestrial fauna species must hold a current Management Authorisation.	Elements 1a and 1b: Approved under Part 10 which is an overarching Commonwealth and State approval. As such, there are no specific approval requirements under the *Wildlife Act 1975* Act relating to the project.
		Elements 1c – 6: The Incorporated Document may require engagement of a qualified zoologist to supervise the clearing of vegetation and capture and relocate any displaced animals. If this requirement applies, ensure that the engaged wildlife specialists hold a current Management Authorisation under the Act.

CONTENTS

1 INTRODUCTION

1.1 Background

Ecology and Heritage Partners Pty Ltd was commissioned by Public Transport Victoria in 2016 to conduct detailed ecological investigations for the upgrade of the Ballarat railway line (the Ballarat Line Upgrade [BLU]). Melbourne Metro Rail Authority is now responsible for the delivery of the BLU, and for obtaining all the relevant approvals.

The 2016/17 Victorian State Budget included $518 million allocated over four years to address capacity constraints on the Ballarat rail line. Three central benefits have been identified for the project; increased service punctuality and travel time reductions, increased number of services on the Ballarat line, and an increase in consistency and reliability.

Several environmental approval and offset requirements under Commonwealth and State Government legislation and policy relate to sections of the project. These include:

- Melbourne's Strategic Assessment's (MSA);
- Biodiversity Conservation Strategy (BCS);
- Melbourne Strategic Assessment's Prescriptions as detailed in the Toolern Native Vegetation Precinct Plan (NVPP); and,
- Victoria's Permitted clearing of native vegetation: Biodiversity assessment guidelines (the Guidelines) (DEPI 2013a).

1.2 Study Area

The study area for the ecological assessment described in this report is limited to the six discrete work areas, or "Elements" located between Deer Park West to the east and Warrenheip to the west, as defined by MMRA in October 2016. These Elements mostly comprise VicTrack rail corridor, and in some areas extend into private land. At the eastern extent of the study area, Elements 1a and 1b are located within the Urban Growth Boundary (UGB) and are subject to the Melbourne Strategic Assessment (MSA).

The study area for this assessment covers approximately 152 hectares and mostly is owned by the Victorian Government, principally located within the VicTrack rail corridor. Some relatively small areas of privately-owned land may require acquisition. Approximately 44 hectares of the study area is within the MSA's BCS (Element 1a), approximately 23 hectares within the MSA's prescriptions (Element 1b), and approximately 84 hectares within the Permitted Clearing Assessment area (Element 1c – 6). The study area is generally flat, with no ridges or crests within or immediately adjacent the study area. There are two main waterways intersecting the study area, including the Toolern Creek (between Element 1b and Element 1c) and the Bostock Reservoir (Element 4). There are a number of waterbodies and waterways located within close proximity to the study area, including farm dams, drainage lines, and wetlands.

According to the Department of Land Water and Planning (DELWP) Biodiversity Interactive Maps (DELWP 2016a), the study area occurs within the Victorian Volcanic Plain bioregion. It is located within the jurisdiction of the Port Philip and Westernport Catchment Management Authority (CMA) and the City of Melton City Council, Moorabool Shire Council, and Ballarat City Council municipalities. Parts of the study area are also within the Toolern Precinct Structure Plan (PSP) area.

Details relating to the location and proposed works within each Element are summarised below (

Table 1) and detailed in Figure 1.

1.3 Objectives

The objectives of the ecological investigations were to:

- Review the relevant flora and fauna databases and available literature;
- Conduct field assessments along sections of the study area to identify flora and fauna values ;
- Provide maps that show areas of remnant native vegetation and locations of any significant flora and fauna species, and/or fauna habitat;
- Classify any flora and fauna species and vegetation communities identified or considered likely to occur within the study area in accordance with Commonwealth and State legislation;
- Document relevant environmental legislation and policy;
- Document the likely or potential impacts to ecological values (proposed by the January 2017 footprint), and to provide advice to avoid and minimise impact to ecological values; and,
- Advise whether any additional flora and/or fauna surveys are required prior to works commencing.

1.3.1 Inside the Urban Growth Boundary / MSA (Element 1a – 1b)

In areas covered by the MSA, including the BCS and Prescriptions, the following were completed:

- The calculation of vegetation offsets and habitat contribution fees associated with removal of native vegetation and fauna habitat under the BCS (DSE 2013b) and associated sub-regional species' strategies (DEPI 2013c, 2013d).
- The calculation of vegetation offsets associated with the removal of native vegetation under the Toolern Native Vegetation Precinct Plan (MPA 2011); and,
- Targeted surveys for nationally significant flora and fauna species (i.e. Striped Legless Lizard, Spiny Rice-flower, Large-fruit Groundsel).

1.3.2 Outside the Urban Growth Boundary MSA (Element 1c – 6)

The following tasks were undertaken in areas outside of the MSA:

- A habitat hectare assessment of any areas of remnant native vegetation in accordance with the Guidelines (DEPI 2013a);
- Recommendations to address requirements under the Guidelines to minimise impacts to remnant vegetation;
- Targeted surveys for nationally significant flora and fauna species (i.e. Spiny Rice-flower, Matted Flax-lily *Dianella amoena*, Growling Grass Frog *Litoria raniformis*, Golden Sun Moth *Synemon plana*, and Dwarf Galaxias *Galaxia pusilla*); and,
- Provision of offset targets for any native vegetation, scattered trees and habitat for rare or threatened species proposed to be lost as a result of the proposed works.

Table 1. Ballarat Line Upgrade works area and proposed works

Survey Area Element	Native Vegetation Policy	Indicative description of study area*
Element 1a Duplication between Deer Park West and Melton	Melbourne Strategic Assessment's Biodiversity Conservation Strategy	Western Freeway, Ravenhall west to Paynes Road, Rockbank; Surveyed rail reserve, potential laydown areas outside of corridor, and proposed Rockbank station footprint.
Element 1b Duplication between Deer Park West and Melton	Melbourne Strategic Assessment's Prescriptions as detailed in the Toolern Native Vegetation Precinct Plan	Paynes Road, Rockbank to east bank of Toolern Creek, Melton; Surveyed rail reserve, and additional footprint east of Ferris Road.
Element 1c Duplication between Deer Park West and Melton	Victoria's Permitted clearing of native vegetation: Biodiversity assessment guidelines (the Guidelines)	West bank of Toolern Creek to Coburns Road, Melton; Surveyed rail corridor and Melton station footprint
Element 2 Melton stabling		Footprint of potential stabling facility, west of Melton Station. ***Eliminated from project after January 2017.***
Element 3 Bacchus Marsh Second platform		Fisken Street to Parwan Road; Rail corridor, footprint of second platform, footprint of potential stabling facility. ***Bacchus Marsh stabling eliminated from project after January 2017. Element 3 renamed Element 2 after January 2017***.
Element 4 Ballan Loop		Ballan Station to Bostock Reservoir (approximately); Surveyed rail corridor, second platform footprint, crossing loop, small laydown areas east of Old Geelong Rd. ***Element 4 renamed Element 3 after January 2017***.
Element 5 Spreadeagle Loop		West of McGuigans Road to approximately 2.7 kilometres east of Bungaree Loop rail line split; Surveyed rail corridor only. ***Element 5 renamed Element 4 after January 2017***.
Element 6 Warrenheip Duplication		West side of Tierneys Road to approximately 75 meters west of Warrenheip Road. Surveyed rail corridor and potential laydown areas. ***Element 6 renamed Element 5 after January 2017***.

(*) Where project design refinements have been made, the study area addressed in this assessment is larger than the project area footprint. This study area does not address changes made to the project subsequent to January 2017.

2 METHODS

This section describes the methods that were employed in the collection and processing of data and information in order to determine the presence and distribution of ecological values within the study area, and to determine the potential impacts and legislative implications associated with the proposed development.

2.1 Desktop Assessment

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

- The Victorian Biodiversity Atlas (VBA) for previously documented flora and fauna records within the project locality (DELWP 2017a);
- The DELWP Native Vegetation Information Management (NVIM) Tool (DELWP 2017b) and Biodiversity Interactive Map (DELWP 2017c) for:
    - Modelled data for location risk (Section 2.4.1.1), remnant vegetation patches, scattered trees and habitat for rare or threatened species;
    - Areas subject to habitat compensation obligations within the BCS; and,
    - The extent of historic and current EVCs.
- The Flora Information System (FIS) (Viridans 2014a) and Atlas of Victorian Wildlife (AVW) (Viridans 2014b) for assistance with the distribution and identification of flora and fauna species;
- The Commonwealth Department of the Environment and Energy (DoEE) Protected Matters Search Tool (PMST) for matters of National Environmental Significance (NES) protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (DoEE 2017);
- Relevant listings under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act), including the latest Threatened and Protected Lists (DELWP 2017d, 2016);
- Planning Maps Online (DELWP 2017e) resource to ascertain current zoning and environmental overlays,
- Other relevant environmental legislation and policies as required; and
- Previous ecological or other relevant assessments of the study area, including:
    - Ecology Partners 2008. Native Vegetation Precinct Plan Background Report for the Toolern Precinct, Melton South – Rockbank, Victoria.
    - Ecology Partners 2009. Toolern Precinct Structure Plain: Targeted Striped Legless Lizard and Golden Sun Moth Surveys, Melton South, Victoria. Prepared for Melton Shire Council.
    - Ecology Partners 2011. Melton Line Upgrade Project: Flora and Fauna Assessment, and Net Gain Analysis, Melton to Sunshine, Victoria. Prepared for the Department of Transport.
    - Ecology and Heritage Partners 2016. Targeted Spiny Rice-flower Survey for V/Line Rail Corridor, Caroline Springs, Victoria;

- Biosis 2012. Rowsley Crossing Loop: Flora and Fauna Assessment; and,
- Biosis 2016. Ballarat Amplification Project: Due Diligence Biodiversity Assessment.

2.2 Site Assessments

Field surveys were undertaken between 18 October 2016 and 10 February 2017 and a summary of the type of survey, respective dates, and locations are provided below (Table 2, Figure 3).

The scope of targeted surveys conducted within Elements 1a was limited to informing avoidance, minimisation and mitigation measures relating to matters of NES (for example salvage and translocation where necessary).

These results do not influence offsets required under the MSA's prescriptions, nor do they inform a new assessment of the significance of proposed impacts to matters of NES within the MSA area, as this assessment was previously conducted as part of the MSA (DSE 2009a).

Table 2 Terrestrial and aquatic surveys undertaken for the Ballarat Line Upgrade.

Survey Type		Dates	Elements							
			1a	1b	1c	2	3	4	5	6
			MSA's BCS	MSA's Prescriptions	Permitted Clearing Assessment					
Flora and fauna survey, habitat hectare assessment		18, 19 October, 2, 3, 7, 9 November 2016, 15 February 2017		x *	x	x	x	x	x	x
Targeted Flora Surveys	Winter Flora Survey targeting Spiny Rice-flower	23, 24 and 25 August 2016	x *	x *	x					
	Spring/summer flora survey targeting Matted Flax-lily, Large-fruit Groundsel and other significant flora species	17, 21 November, 15, 20, 22 December 2016	x *	x *	x	x		x	x	x
Targeted Fauna Surveys	Striped Legless Lizard Survey	14, 21 October, 4, 11, 18, 21 November 2016		x*						
	Growling Grass Frog survey	20 December 2016, 11 January 2017			x			x		x
	Golden Sun Moth Survey	19, 23 December 2016, 6, 17 January 2017			x		x	x	x	
	Aquatic Surveys	8, 9, 10 February, 2017			x			x		

Note: *denotes surveys that were conducted within the MSA area to determine the presence of Matters of NES to inform avoidance, minimisation, and where necessary, salvage and translocation requirements, principally for significant flora.

2.3 Inside the Urban Growth Boundary (Elements 1a – 1b)

2.3.1 Melbourne Strategic Assessment

Element 1a of the study area is covered by the MSA and the BCS as approved in 2012 (Section 2.3.1.1) (Figure 1), and Element 1b of the study area is subject to the MSA Prescriptions (and not the BCS) that were enacted in 2009 (Section 2.3.1.2) (Figure 1).

In June 2009 the Victorian Government entered into an agreement with the Commonwealth Government to conduct a strategic assessment of the potential impact of the Program 'Delivering Melbourne's newest sustainable communities' on matters of NES under the EPBC Act, otherwise known as the Melbourne Strategic Assessment (MSA) (DSE 2009a). The Prescriptions derived from the MSA are documented in the Strategic Impact Assessment Report (DSE 2009a), and the MSA is the primary document identifying potential impacts of the proposed program of urban development on matters of NES. The MSA also included a commitment to develop and implement a BCS for Melbourne's Growth Areas which would inform the preparation of Growth Corridor Plans and PSP's during all stages of future development.

Actions or developments that gained their approval after March 2013 follow the BCS. The BCS does not apply to actions that gained approval between June 2009 and March 2013, any actions or developments within this period follow the overarching MSA Prescriptions.

2.3.1.1 Biodiversity Conservation Strategy (BCS) Area (Element 1a)

Based on the incorporation of the MSA's Prescriptions within the BCS, the scope of this ecological assessment has been limited to the calculation of offsets and habitat compensation obligations under the BCS, not a detailed analysis of the significance of the impacts proposed within the BCS as this is not required. A summary of the site assessments conducted throughout Element 1a is provided (Table 2).

The BCS covers Melbourne's four growth areas within the expanded 2010 Urban Growth Boundary, as well as the previous 28 precincts, except where a planning scheme amendment to introduce a PSP has been approved prior to 1 March 2012.

The MSA area covered by the BCS (DEPI 2013b) and associated sub-regional species' strategies (DEPI 2013d; 2013e) identify conservation outcomes and offset consolidation strategies for Victoria's native vegetation and matters of NES, including mechanisms for how these outcomes will be delivered.

To facilitate the planning approvals process for Melbourne's growth areas, the Victorian Government introduced the native vegetation 'Time Stamping' project (DSE 2009a) to capture and time stamp native vegetation data within the new urban growth areas, and allow for a streamlined calculation of native vegetation offsets as part of future development. This data is also being used to prepare NVPPs.

Offsets under the Biodiversity Conservation Strategy

Offsets and habitat compensation fees associated with the proposed removal of native vegetation and significant species (i.e. Spiny Rice-flower, Growling Grass Frog and Golden Sun Moth) habitat under the BCS are calculated based on the offset requirements outlined in the various State Government strategies. These strategies include the Biodiversity Conservation Strategy for Melbourne's Growth Corridors (DEPI 2013b), Sub-regional Species Strategy for the Growling Grass Frog DEPI 2013c) and Sub-Regional Species Strategy for the Golden Sun Moth (DEPI 2013d).

Significant Flora Surveys

Targeted surveys were undertaken within the MSA in areas of potentially suitable habitat for Spiny Rice-flower (winter), Matted Flax-lily and Large-fruit Groundsel (spring / summer) to inform avoidance, minimisation and mitigation measures (e.g. salvage and translocation). A detailed summary of the methods undertaken for targeted flora surveys is provided in Appendix 2.1.

Although the results of the targeted significant flora surveys were undertaken to inform avoidance and minimisation measures, they were not required to obtain approval to impact matters of NES within the BCS area, as this area is subject to the previous MSA approval (DSE 2009a). In addition, the results do not influence the habitat compensation obligations required under the BCS.

2.3.1.2 Toolern Precinct Structure Plan (PSP) – (Element 1b)

Offsets under the MSA's Prescriptions

Offsets and habitat compensation fees associated with removal of native vegetation and fauna habitat under the MSA Prescriptions are calculated with the following considerations:

Native vegetation (DEPI 2013a; 2013e):

- Clearing of native vegetation must occur in accordance with the offset requirements of the Native Vegetation Management Framework specified in the NVPP. Offsets are required for all native vegetation and Modified Treeless Vegetation;
- Extent and condition of vegetation is based on that outlined within the NVPP; and,
- Clearance of native vegetation patches and scattered trees will require an offset fee (DSE 2011; DSE 2013b).

The Toolern PSP was one of the 12 approved PSPs prior to approval of the BCS. Therefore, vegetation mapped as 'to be retained' or 'protected' in the NVPP and that are proposed to be removed as part of the project will need to be offset in accordance with the State Biodiversity Assessment Guidelines [i.e. offsets outlined in the Biodiversity Impact and Offset Requirements (BIOR) Report] . However, for vegetation identified as 'to be removed' in the NVPP, habitat compensation obligations apply under the approved MSA.

Significant Flora and Fauna Surveys

To inform avoidance, minimisation and mitigation measures relating to matters of NES, targeted surveys were undertaken within the MSA in areas of potentially suitable habitat for Spiny Rice-flower (winter), Matted Flax-lily and Large-fruited Groundsel (spring / summer), and Striped Legless Lizard (spring / early summer). A detailed summary of the methods employed for targeted flora surveys is provided in Appendix 2.1, while information relating to the targeted Striped Legless Lizard surveys is outlined in Addendum 3.1.

Although the results of the targeted significant flora surveys were undertaken to inform avoidance and minimisation measures, they were not required to obtain approval to impact matters of NES within the MSA area, as this area is subject to the previous MSA approval (DSE 2009a). In addition, the results do not influence the offsets required under the MSA's prescriptions.

2.4 Outside the Urban Growth Boundary (Element 1c – 6)

Field surveys were undertaken in two phases; phase one (1) focused on conducting the Permitted Clearing Assessment (Section 2.4.1), and identifying potential habitat for significant flora and fauna species; and, phase two (2) targeted significant species surveys across areas that provide potential habitat (Section 2.4.2). Targeted significant flora and fauna surveys were undertaken in accordance with relevant guidelines, where they are available (refer to Section 2 and Appendices 2.1 and 3.1 for detailed descriptions of survey methods).

2.4.1 Permitted Clearing Assessment (the Guidelines)

During field assessment of Elements 1c-6, all vascular plant species were documented and a species list collated (Appendix 2.2), including common and significant species. The type and general condition of all vegetation was assessed and a determination made as to whether it qualifies for further consideration under local, State or national legislation and policy. Element 1a in the BCS is subject to time stamped vegetation mapping and was therefore excluded from this level of field assessment.

Ecological Vegetation Classes (EVCs) were determined with reference to DELWP pre-1750 and extant EVC mapping and their published descriptions (DELWP 2017b). Where remnant vegetation was identified a habitat hectare assessment was undertaken following the method described in the Vegetation Quality Assessment Manual (DSE 2004) (Section 2.4.2).

Outside the MSA areas, the assessment process for the clearing of vegetation follows the Guidelines (DEPI 2013a). Areas within the study area where the Guidelines apply are shown below (Figure 1).

2.4.1.1 Risk-based pathway

The Guidelines manage the impacts on biodiversity from native vegetation removal using a risk-based approach. Two factors – extent risk and location risk – are used to determine the risk associated with an application for a permit to remove native vegetation. The location risk (A, B or C) has been determined for all areas in Victoria and is available on DELWP's Native Vegetation Information Management (NVIM) Tool (DELWP 2016a). Determination of risk-based pathway is summarised below (Table 3).

Table 3 Risk-based pathways for applications to remove native vegetation (DEPI 2013a)

Extent		Location		
		A	B	C
Native Vegetation	< 0.5 hectares	Low	Low	High
	≥ 0.5 hectares and < 1 hectare	Low	Moderate	High
	≥ 1 hectare	Moderate	High	High
Scattered Trees	< 15 scattered trees	Low	Moderate	High
	≥ 15 scattered trees	Moderate	High	High

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

2.4.1.2 *Vegetation Assessment*

Native vegetation (as defined in Table 4) is assessed using two key parameters: extent (in hectares) and condition. Extent is determined through a site assessment. The condition score for High Risk-based pathways must be assessed through a Habitat Hectare[1] assessment conducted by a qualified ecologist. The condition score for was assessed using the Habitat Hectare assessment method (DSE 2004).

Table 4 Determination of remnant native vegetation (DEPI 2013a)

Category	Definition	Extent	Condition
Remnant patch of native vegetation	An area of vegetation where at least 25 per cent of the total perennial understorey plant cover is native. OR An area with three or more native canopy trees where the canopy foliage cover is at least 20 per cent of the area.	Measured in hectares. Based on hectare area of the remnant patch.	Vegetation Quality Assessment Manual (DSE 2004).
Scattered tree	A native canopy tree that does not form part of a remnant patch.	Measured in hectares. Each scattered tree is assigned an extent of 0.071 hectares (30m diameter).	Scattered trees are assigned a default condition score of 0.2.

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

2.4.1.3 *Impact Minimisation*

Applications under the Moderate and High risk-based pathways must include a statement outlining steps taken to minimise the impact of the removal of native vegetation on Victoria's biodiversity, along with an assessment of whether the proposed removal of native vegetation will have a significant impact on Victoria's biodiversity (DEPI 2013a). The impact minimisation statement is provided in Section 6.

2.4.1.4 *Offsets*

Offsets are required to compensate for the permitted removal of native vegetation. Offsets are divided into two categories: General and Specific. Offset obligations and offset site criteria are determined in accordance with the Guidelines (DEPI 2013a) and summarised in Appendix 1.5.

The offset requirements for native vegetation removal are calculated by DELWP, based on the vegetation condition scores determined during the biodiversity assessment. The resulting Biodiversity Impact and Offset Requirements report (BIOR) produced by DELWP is presented in Appendix 4.

2.4.2 Significant Flora and Fauna Surveys

In order to inform approval requirements, and to advise on avoidance and minimisation measures, targeted surveys for significant species were undertaken in areas of potentially suitable habitat within the study area.

[1] A 'habitat hectare' is a unit of measurement which combines the condition and extent of native vegetation.

2.4.2.1 *Targeted Flora Survey*

Desktop assessment results identified eight EPBC Act-listed species with known, high or moderate likelihood of occurrence (Appendix 2.3). Field assessments undertaking during October and November 2016 identified the extent of potentially suitable habitat for significant flora. The results of these field assessments were used to inform the requirement, location, and timing for targeted flora surveys.

Targeted flora surveys were conducted within all areas of potentially suitable habitat throughout the project area. Potentially suitable habitat included native vegetation patches mapped during the initial ecological survey effort, as well as degraded areas, along fence lines and beneath trees where significant flora species may persist. The exact survey locations for the targeted surveys are provided in Table 2 and shown on Figure 2.

Targeted surveys were undertaken during winter to coincide with the flowering period of Spiny Rice-flower, and during spring/summer to coincide with the flowering period for Matted Flax-lily and Large-fruit Groundsel (Table 2). These species, along with all other significant flora species identified through the desktop search (Appendix 2.3), were searched for during targeted surveys, and all surveyors were familiar with the identification of each species (Appendix 2.3).

Targeted surveys involved traversing the area on foot at five to ten metre intervals. If discovered, handheld GPS units were used to record the location of the targeted species, while the location of any other incidental records of National, State, or regionally significant flora species was also recorded.

A detailed summary of the methods employed for the winter and spring/summer targeted flora surveys is provided in Appendix 2.1.

2.4.2.2 *Targeted Fauna Survey*

Desktop assessment identified seven EPBC Act-listed species with known, high or moderate likelihood of occurrence (Appendix 3.2). General ecological field assessments undertaken following the desktop assessment identified potentially suitable habitat for some of these significant fauna. The results of the field assessments were used to inform the need, location, and timing for targeted fauna surveys.

Targeted surveys were conducted for three of the seven species listed in Table 5 (Dwarf Galaxias, Golden Sun Moth and Growling Grass Frog) within potentially suitable habitat throughout the project area. In addition, waterbodies in close proximity to the project were subject to targeted Growling Grass Frog survey.

Several fauna survey techniques were undertaken during the survey (Appendix 3.1) at various locations within the study area (Table 2).

Golden Sun Moth Survey

The targeted Golden Sun Moth surveys were undertaken in areas of potential habitat identified during the earlier vegetation assessments. Survey locations are provided above (Table 2) and shown in Figure 2.

Surveys were undertaken in accordance with the Golden Sun Moth Policy Statement (DEWHA 2009a), and involved observers driving or walking through suitable habitat and searching for males flying above the vegetation. Zoologists that undertook the surveys are experienced in the identification of Golden Sun Moth.

Golden Sun Moth was confirmed flying at a known reference site in the vicinity (outside of the study area) prior to undertaking surveys within the study area.

A summary of the methods used for the targeted Golden Sun Moth survey is provided in Appendix 3.1.

Growling Grass Frog Survey

Targeted surveys were undertaken in areas of potential habitat for the species within Elements 1c and 4 (as determined during the earlier vegetation assessment). Detailed active surveys were conducted at two railway bridge crossings, Toolern Creek, Melton (between Element 1c), and Bostock Reservoir (Element 4).

Auditory surveys were conducted at waterbodies and watercourses located immediately adjacent to the study area, and within the local area at a number of locations in Element 6 (Table 2, Figure 3).

The targeted surveys were broadly consistent with the Growling Grass Frog Policy Statement (DEWHA 2009b). A summary of the methods used for the targeted Growling Grass Frog surveys is provided in Appendix 3.1.

Targeted Aquatic Survey

A targeted aquatic survey was carried out at the following to two railway bridge crossings:

- Toolern Creek, Melton (between Element 1b and 1c); and,
- Bostock Reservoir on the Moorabool River (Element 4).

The methods, location and intensity of the survey were designed to maximise the detection of significant species 3.1.

2.5 Significance Assessment

The ecological significance of flora and fauna species for areas subject to the Permitted Clearing Guidelines, ecological communities and overall site significance was assessed on a geographic scale with four levels: **national**, **state**, **regional** and **local**. This is not a significant impact assessment against the Significant Impact Guidelines 1.1 for matters of NES (DoE 2013); rather it is an overall assessment of the presence of suitable habitat and likelihood of occurrence of significant species and communities. The definition and application of the criteria are detailed in Appendix 1.1 - Rare or Threatened Categories for listed Victorian taxa (Species), Appendix 1.2 - Defining Ecological Significance (Species and Communities) and Appendix 1.3 - Defining Site Significance (Overall Significance of Site).

2.6 Assessment Qualifications and Limitations

The assessment does not address variations made to the project area after January 2017.

Data and information held within the ecological databases and mapping programs reviewed in the desktop assessment (e.g. VBA, PMST, Biodiversity Interactive Maps etc.) are unlikely to represent all flora and fauna observations within, and surrounding, the study area. It is therefore important to acknowledge that a lack of documented records does not necessarily indicate that a species or community is absent.

Ecological values identified on site are recorded using a hand-held GPS or tablet with an accuracy of +/-5 metres. This level of accuracy is considered adequate to provide an accurate assessment of the ecological values present within the study area; however this data should not be used for detailed surveying purposes.

The various field surveys were undertaken during the optimal season for the identification of flora and fauna species (spring and summer). The 'snap shot' nature of a standard biodiversity assessment means that migratory, transitory or uncommon fauna species may have been absent from typically occupied habitats at the time of the field assessment. In addition, annual or cryptic flora species such as those that persist via underground tubers may also be absent. High abundance and cover of annual grasses also have the potential to reduce survey visibility.

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

Notwithstanding the aforementioned, it is considered that the survey effort, timing and results presented meet the objectives of the survey and provide sufficient information to support the approvals processes.

Fauna surveys were conducted under the Ecology and Heritage Partners Pty Ltd Research Permit (#10006893) issued by DELWP under the *Wildlife Act 1975*.

3 RESULTS

3.1 Inside the Urban Growth Boundary (Elements 1a – b)

3.1.1 Biodiversity Conservation Strategy (BCS) Area (Element 1a)

Approximately 11.561 hectares of remnant (time-stamped) vegetation is proposed to be impacted within areas covered by the BCS. This proposed removal generates habitat compensation obligations for Native Vegetation (11.326 hectares), Spiny Rice-flower (11.326 hectares), Golden Sun Moth (9.532 hectares), and Growling Grass Frog (0.370 hectares). The habitat compensation fees applicable to the impacts proposed within the BCS area is estimated at **$1,369,429.00** (incl. GST) (Table 5, Appendix 4.2).

The extent of native vegetation within the BCS area is not depicted in Figures 3a – 3i, as offsets have been calculated by DELWP using modelled data associated with the BCS program.

Table 5. Habitat compensation fees for the project area under the Biodiversity Conservation Strategy

Habitat Type	Area (hectares)	Habitat compensation fee per hectare (ex. GST)	Habitat compensation fee for project area (ex GST)
Native Vegetation	11.326	$95,075.00	$1,076,819.40
Spiny Rice-flower	11.326	$7,937.00	$89,894.46
Golden Sun Moth	9.532	$7,914.00	$75,436.25
Growling Grass Frog	0.370	$7,529.00	$2,785.73
Total (excl. GST)			**$1,244,935.50**
Total (incl. GST)			**$1,369,429.00**

3.1.1.1 Targeted Flora Surveys

A total of 194 Spiny Rice-flower and 33 Large-fruit Groundsel were recorded within Element 1a during the targeted surveys (Figure 3, Appendix 2.1).

3.1.2 Toolern Precinct Structure Plan (PSP) – (Element 1b)

Native vegetation extent and condition is detailed in the Toolern NVPP (MPA 2011), in accordance with time-stamped mapping data (DSE 2009a). As such, patches of remnant native vegetation presented in Figures 3i – 3n are derived from the Toolern NVPP.

Remnant native vegetation within Element 1b comprises approximately; 0.24 hectares of Lignum Swamp (EVC 104), 0.16 hectares of Plains Grassy Woodland (EVC 55), 2.25 hectares of Plains Woodland (EVC 803), 7.83 hectares of Plains Grassland (EVC 132), and nine scattered trees. Of this, the January 2017 development footprint intersects approximately 5.557 hectares of mapped remnant native vegetation, comprising 0.0005 hectares of Plains Grassy Woodland, 2.193 hectares of Plains Woodland, 3.364 hectares of Plains Grassland, and five scattered remnant trees. The impact area also intersects an additional two Tree Retention Zones (TRZ's) (Figures 3j – 3n).

Biodiversity offset requirements for the proposed removal of remnant native vegetation and scattered remnant trees that are identified as 'can be removed' in the Toolern NVPP can either be met under *Victoria's Native Vegetation Management: A Framework for Action* (Native Vegetation Management Framework) (DNRE

2002) through an Allocated Credit Extract(s), or in accordance with the endorsed habitat compensation obligation program, subject to conditions, including the Prescriptions and payment of biodiversity offset fees (Chris Johnston, DELWP, pers. comm.).

The offset requirements for the proposed removal of remnant native vegetation and scattered trees marked as 'to be retained' or 'to be protected' in the NVPP are not presented in this section, and offsets are in accordance with the BIOR report under the Guidelines (Section 3.2.3).

The Biodiversity Offset Statement for remnant native vegetation and scattered trees proposed to be removed and marked as 'to be removed' in the Toolern NVPP requires an offset obligation of **0.01 habitat hectares** (Appendix 4.3). As such, the, with a required biodiversity offset fee of approximately **$1,250.00** (excl. GST).

3.1.2.1 Targeted Flora Survey

No nationally significant flora species were recorded within Element 1b during the targeted surveys (Appendix 2.1).

3.1.2.2 Targeted Fauna Survey

Despite detailed targeted surveys being undertaken in the higher quality grassland remnants, Striped Legless Lizard was not detected within Element 1b (Appendix 3.1). Additionally, no State or regionally significant species (e.g. Tussock Skink *Pseudemoia pagenstecheri* and Fat-tailed Dunnart) were detected from Plains Grassland habitat in Element 1b (Appendix 3.1).

3.2 Elements 1c – 6

Two hundred and nine (209) flora species (88 indigenous and 121 non-indigenous or introduced) were recorded within the study area during the field assessment (Appendix 2.2).

3.2.1 Vegetation Condition

Remnant native vegetation in the study area is representative of five EVCs: Creekline Grassy Woodland (EVC 68), Plains Grassland (Heavier Soils) (EVC 132), Plains Woodland (EVC 803), Tall Marsh (EVC 821) and Plains Grassy Woodland (EVC 55). Most remnant patches are small and fragmented, and surrounded by extensive areas dominated by introduced vegetation. Due to past land disturbance, some Elements only contain very small isolated patches of remnant native vegetation. The presence of EVCs within the study area is generally consistent with the modelled pre-1750s native vegetation mapping, particularly the extent of Plains Grassland in east of the study area (DELWP 2016c). Descriptions of each EVC are provided below for each Element located outside the MSA area (Table 6 and 7).

Table 6. Overview of EVCs recorded within the study area, outside of the Urban Growth Boundary.

Location	EVCs present	Description of Condition	Patch Condition Scores
Element 1c Duplication between Deer Park West and Melton (west of Toolern Creek, Melton)	- Plains Grassland - Plains Woodland - Creekline Grassy Woodland (on boundary of 1b and 1c)	This Element contains a mix of remnant vegetation interspersed with areas of introduced vegetation. In many cases, areas of introduced vegetation contain scattered native species, particularly native grasses, but do not have the required 25% to form a remnant patch. Remnant vegetation ranges from highly degraded and modified patches, such as Plains Grassy Woodland patches lacking a canopy and containing over 70% cover of weeds, to higher quality patches of Plains Grassland with a relatively diverse understorey and weed cover of less than 30-40%. This Element has the largest area of moderate to high quality Plains Grassland in the study area, including a patch of NTGVVP.	0.16 – 0.38
Element 2 Stabling at Melton Station	- Plains Woodland (on boundary of 1c and 2)	This area is highly modified. It does contain a small area of Plains Woodland on its eastern extent, and one scattered indigenous tree is present.	N/A
Element 3 Bacchus Marsh Second platform / Rowsley Stabling	- None	The area is highly modified, and is dominated by introduced and planted vegetation, with two scattered indigenous trees.	N/A
Element 4 Ballan Loop	- Plains Grassland - Plains Grassy Woodland	This Element is dominated by introduced vegetation. Most of the Plains Grassy Woodland remnant patches are degraded, lacking a canopy and consisting largely of understorey shrubs such as Black Wattle. One relatively high quality Plains Grassland patch is present on the south side of Ballan Station, with smaller more degraded patches closer to western edge of the element. One scattered indigenous tree is located in this Element.	0.16 – 0.34
Element 5 Spreadeagle (new Bungaree) Loop	- Plains Grassy Woodland - Tall Marsh	This Element is dominated by introduced vegetation. Plains Grassy Woodland patches are of low to moderate quality. Tall Marsh present in the east of the element is species-poor and largely dominated by Cumbungi *Typha* spp. Sixteen scattered indigenous trees are located in this Element.	0.16 – 0.33
Element 6 Warrenheip Duplication	- Plains Grassland - Plains Grassy Woodland	This area is highly degraded and disturbed, and contains extensive areas of introduced pasture grasses. Very small and degraded patches of Plains Grassland are present, along with highly modified and small Plains Grassy Woodland patches that lack a tree canopy, and are generally dominated by Black Wattle. Four scattered indigenous trees are located within this Element.	0.17 – 0.28

Table 7. Total area (in hectares) of each EVC within each Element of the study area, outside of the Urban Growth Boundary.

Location	Creekline Grassy Woodland	Plains Grassland	Plains Woodland	Plains Grassy Woodland	Tall Marsh	Total
Element 1c	0.02	0.13	0.06	0	0	0.21
Element 2	0	0	0.01	0	0	0.01
Element 3	0	0	0	0	0	0
Element 4	0	0.17	0	2.50	0	2.67
Element 5	0	0	0	0.61	0.08	0.69
Element 6	0	0.06	0	0.11	0	0.17
Total (hectares)	**0.02**	**0.36**	**0.07**	**3.22**	**0.08**	**3.75**

Plains Grassland

Approximately 0.36 hectares of Plains Grassland occurs across Elements 1c, 4, and 6. These patches largely differed on understorey lifeform diversity, weed cover and recruitment space (Appendix 2.4). The highest quality patches (i.e. habitat zone labelled PG3) contain a diversity of native grasses and forbs, broadly dominated by including Kangaroo Grass *Themeda triandra*, Kneed Spear-grass *Austrostipa bigeniculata*, Common Wallaby-grass *Rytidosperma caespitosum*, Berry Saltbush *Atriplex semibaccata*, Common Everlasting *Chrysocephalum apiculatum* s.l, and Wattle Mat-rush *Lomandra filiformis*.

Some patches are dominated by Common Tussock-grass *Poa labillardierei* and Grey Tussock-grass *Poa sieberiana*, rather than wallaby-grasses or spear-grasses, particularly further west of the study area. The PG3 habitat zone generally has at least 60-70% cover of indigenous perennial grasses, with many patches also meeting the condition thresholds that define the nationally significant ecological community NTGVVP (Plate 2).

Plate 1. High quality Plains Grassland (PG3) within Element 1c, showing a diversity of native grasses and forbs, such as Common Everlasting and Cut-leaf Goodenia (Ecology and Heritage Partners Pty Ltd 2/11/2016).

Plate 2. Plains Grassland (PG1) within the study area located to the south of Ballan Station, dominated by native grasses such as spear grass with common native forbs such as Bluebell and Chocolate Lily (Ecology and Heritage Partners Pty Ltd 7/02/2016).

Plains Grassy Woodland

Plains Grassy Woodland is the dominant EVC type present as remnant vegetation in the study area. Approximately 3.22 hectares of Plains Grassy Woodland was mapped across Elements 4, 5, and 6 in the study area. Very few Large Old Trees are present throughout the mapped patches; therefore most patches did not receive canopy scores using the Habitat Hectares assessment. Where an overstorey is present, it is generally dominated by River Red-gum *Eucalyptus camaldulensis*, and some patches also contain Hedge Wattle *Acacia paradoxa* and Drooping Sheoak *Allocasuarina verticillata*.

The understory of these patches is generally degraded and dominated by introduced grasses such as Sweet Vernal Grass *Anthoxanthum odoratum.* Additionally, some areas exhibit a high cover of introduced woody weeds such as Broom *Cytisus scoparius*, Gorse *Ulex europaeus*, and Blackberry *Rubus fruticosus.*

Observed scattered native forbs are present throughout these patches areas and include Bulbine Lily *Bulbine bulbosa*, Black-anther Flax-lily *Dianella admixta*, Kangaroo Grass, Spear grasses *Austrostipa spp.*, Tussock grasses *Poa spp.*, Nodding Saltbush *Einadia nutans ssp. nutans*, New Holland Daisy *Vittadinia* spp., and Wallaby grasses *Rytidosperma* spp.

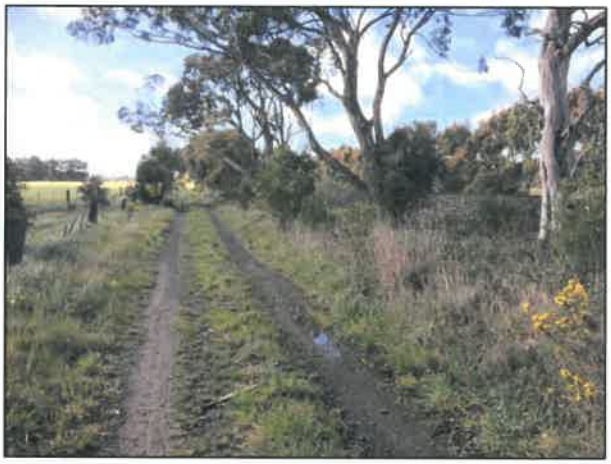

Plate 3. Example of a narrow strip of Plains Grassy Woodland within the study area, containing River Red-gum in the overstorey (Ecology and Heritage Partners Pty Ltd 19/10/2016).

Plate 4. Plains Grassy Woodland within the study area, lacking a tree canopy and dominated by shrubs such as Hedge Wattle (Ecology and Heritage Partners Pty Ltd 9/11/2016).

Plains Woodland

Approximately 0.07 hectare of the Plains Woodland EVC occurs within Element 2 (Figure 3). River Red-gum is absent at this location, and Grey Box *Eucalyptus microcarpa* is the primary canopy species. The understorey is dominated by annual introduced grasses. Observed native species include Kangaroo Grass, Wallaby grasses, and Tussock grasses. The shrub layer includes Hedge Wattle and occasional Gold Dust-wattle *Acacia acinacea*.

Plate 5. Plains Woodland containing Grey Box (Ecology and Heritage Partners Pty Ltd 3/11/2016).

Plate 6. Plains Woodland within the study area (Ecology and Heritage Partners Pty Ltd 22/02/2016).

Creekline Grassy Woodland

A total of 0.02 hectare of Creekline Grassy Woodland occurs in Element 1c (Figure 3) along Toolern Creek where some planting has occurred and indigenous River Red-gum is also present. The patch is characterised by a highly disturbed weedy understorey.

Tall Marsh

A total of 0.08 hectare of Tall Marsh is present in Element 5. A series of small, simplified patches occur in a drainage line along the bottom of a steep slope and are dominated by Cumbungi *Typha* spp., and Rush *Juncus* spp., species.

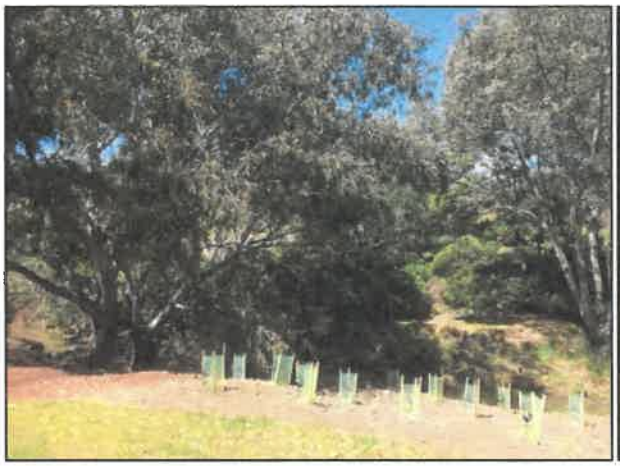

Plate 7. Creekline Grassy Woodland within the study area, on the banks of Toolern Creek (Ecology and Heritage Partners Pty Ltd 3/11/2016).

Plate 8. Tall Marsh within the Element 5 of the study area (Ecology and Heritage Partners Pty Ltd 2/11/2016).

Scattered Remnant Trees

Thirty-five scattered trees occur within Element 1c – 6 of the study area: 11 within Element 1c, one (1) in Element 2, two in Element 3, one in Element 4, 16 in Element 5, and four in Element 6 (Tables A2.1 and A2.2).

The majority of these are Grey Box. These trees would once have been part of the Plains Grassy Woodland or Plains Woodland EVC, however the understorey vegetation now predominantly comprises introduced species (mainly exotic pasture grasses), and the trees no longer form a patch of native vegetation.

Plate 9. Example of a scattered tree within the study area (Ecology and Heritage Partners Pty Ltd 2/11/2016).

Plate 7. Example of a scattered tree within the study area (Ecology and Heritage Partners Pty Ltd 2/11/2016).

3.2.1.1 Introduced and Planted Vegetation

Areas not supporting remnant native vegetation have a high cover (>90%) of exotic grass species, many of which have been direct-seeded for use as pasture. Scattered native grasses are generally present in these areas, although they did not meet the 25% cover threshold to constitute a remnant patch. Disturbed areas are dominated by environmental weeds such as Toowoomba Canary-grass *Phalaris aquatica*, Rye-grass *Lolium* spp., Meadow Fox-tail *Alopecurus pratensis*, Galenia *Galenia pubescens* var. *pubescens*, Ribwort *Plantago lanceolata*, Couch *Cynodon dactylon* var. *dactylon* and Wild Oat *Avena fatua*.

Some garden escapee and ornamental species occur along the study area, especially where houses are located nearby. These include Hawthorne *Cretaegus momgyna*, Agapanthus *Agapanthus africanus*, Fir *Abies* spp., Ash *Fraxinus* spp., Cootamundra Wattle *Acacia baileyana*, Iris *Iris* spp., and agave *Agave* spp. Refer to the species list provided in Appendix 2.3 for a list of noxious weeds present in the study area.

Planted species observed in the study area include Sugar Gum *Eucalyptus cladocalyx*, Lemon-scented Gum *Corymbia citriodora* subsp. *citriodora* and Spotted Gum *Corymbia maculata*. Trees were mostly planted in the vicinity of existing train stations and include Pepper Tree *Schinus molle*.

Plate 11. Planted vegetation around Bacchus Marsh Station (Element 3a) (Ecology and Heritage Partners Pty Ltd 19/10/2016).

Plate 12. Planted vegetation within the study area (Ecology and Heritage Partners Pty Ltd 11/02/2016).

3.2.2 Fauna Species and Habitat

Targeted fauna survey results are presented in detail in Appendix 3.1, and a complete list of all fauna recorded within the study area is provided in Appendix 3.2. The study area supports four main habitat types: Native and introduced grasslands, modified woodland and scattered trees, planted trees and shrubs, and waterways and waterbodies.

3.2.2.1 Native and introduced grasslands

The majority of the study area (i.e. present in Elements 1b – 6) consists of rail reserve dominated by exotic pasture grasses, and interspersed with varying densities of native grassland species. The quality and floristic composition of the grasslands vary according to ongoing disturbance and historical clearing regimes. Overall, remnant modified grasslands in the study area are of **low to moderate** habitat value for fauna. Habitat attributes of the grasslands are suitable for an array of common native fauna, including snakes, lizards and skinks, and common generalist bird species which are tolerant of modified open areas. While the majority of the grassland present in the study area are floristically and structurally deficient, lacking key habitat components such as a diversity of flora species and suitable refuge sites, they are likely to act as important linear habitats that facilitate fauna movement between sites of higher value throughout the landscape.

Species observed in this habitat included Australasian Pipit *Anthus novaeseelandiae*, Noisy Miner *Manorina melanocephala*, and Common Bronzewing *Phaps chalcoptera,* along with reptiles such as Common Blue-tongued Lizard *Tiliqua scincoides,* Eastern Brown Snake *Pseudonaja textilis*, and Southern Grass Skink *Pseudemoia entrecasteauxii*. Diurnal and nocturnal raptors are also likely to forage across these areas, with Nankeen Kestrel *Falco cenchroides*, Black Kite *Milvus migrans* and Black-shouldered Kite *Elanus axillaris* observed flying over the site.

3.2.2.2 Modified woodland and scattered remnant trees

Woodland habitat occurs throughout much of Element 4 (approximately 2.5 ha) and in small scattered patches throughout the remaining Elements.

Overall, the remnant woodland patches are of **low to moderate** habitat value for fauna. While the majority of the remnants within the study area are structurally deficient, lacking hollows and other key structural components, they are likely to act as 'stepping stone' habitats for mobile species (principally birds). Patches

of habitat are also likely to facilitate fauna movement between habitats throughout the otherwise cleared landscape.

The grassy understorey, which comprises a mix of native and exotic grass species, provides habitat suitable for an array of common native fauna, including mammals (macropods), reptiles and frogs. Scattered native trees (mostly eucalypts) are present in low numbers throughout Elements 1c – 6 of the study area, ranging in maturity (some at hollow bearing age). Eucalypts provide nectar resources that attract native birds. The trees also support several small and medium hollows, bark fissures, and crevices that are likely to be used for shelter and nesting by a range of small hollow-dependent fauna including possums, microbats and birds. Scattered trees provide habitat for more mobile fauna species, vantage points and nesting areas for diurnal and nocturnal raptors, as well as stepping stones for more mobile fauna moving through the study area, enhancing landscape permeability for native fauna.

Species observed utilising woodland and scattered trees within the study area included White-plumed Honeyeater *Lichenostomus penicillatus,* Red Wattlebird *Anthochaera carunculata,* Rainbow Lorikeet *Trichoglossus haematodus,* Crimson Rosella *Platycercus elegans,* Yellow-rumped Thornbill *Acanthiza chrysorrhoa*, Eastern Yellow Robin *Eopsaltria australis*, Little Raven *Corvus mellori*, Australian Magpie *Cracticus tibicen* and Grey Shrike-thrush *Colluricincla harmonica*, and introduced species, including Common Blackbird *Turdus merula* and House Sparrow *Passer domesticus.*

3.2.2.3 Planted trees and shrubs

Planted trees and shrubs occur in several areas along the rail reserve. Habitat value for planted vegetation ranges from **low** for juvenile or immature plantings, to **moderate** for mature plantings. This habitat provides a foraging resource for nectivorous birds, with some larger trees (e.g. Sugar Gums), potentially used as roost sites for birds and microchiropteran bats. Fallen bark and ground debris around the base of such trees provides habitat for reptiles and small mammals.

Species observed utilising planted trees and shrubs included White-plumed Honeyeater, Superb Fairy-wren *Malurus cyaneus,* Sulphur-crested Cockatoo *Cacatua galerit,* and New Holland Honeyeater *Phylidonyris novaehollandiae*.

3.2.2.4 Waterways and waterbodies

Species recorded utilising creeks, farms damns and wetlands included birds such as Australian Wood Duck *Chenonetta jubata,* Golden-headed Cisticola *Cisticola exilis,* Black-fronted Dotterel *Elseyornis melanop,* and amphibians, including Common Froglet *Crinia signifera*, Eastern Banjo Frog *Limnodynastes dumerilii*, and Brown Tree Frog *Litoria ewingii.*

Moderate to high quality waterbodies in the study area, in particular those located at the rail crossing at Toolern Creek (Element 1c) and Bostock Reservoir (Element 4), and a number of farm dams and wetlands in proximity to Element 6 of the study area, provides suitable habitat for the nationally significant Growling Grass Frog.

The section of Toolern Creek within the study area (Element 1c) is highly modified. The banks are steep and at the time of assessment the water was shallow, slow-flowing, and discoloured. The creek banks are dominated by exotic grasses, overshadowed by scattered native and exotic trees. The creek provides habitat for several native fish, frogs and waterbird species, although the overall habitat quality within and directly adjacent to the study area is considered low.

The section of the Bostock Reservoir within the study area (Element 4) comprises shallow slow flowing water, with some small open water pools, bounded by large rocks, open banks, and fringing vegetation, with no trees or shrubs shading the creeks edge. The creek supports a range of fringing, floating and emergent vegetation, including native sedges *Eleocharis* sp. and *Carex* spp., rushes *Juncus* spp., and Cumbungi *Typha* sp. and. Instream vegetation including Parrots feather *Myriophyllum* sp., Arrowgrass *Triglochin* sp., and invasive Waterweed *Elodea* sp. The water quality is in good condition. The creek is likely to provide habitat for a range of native fish, frogs, and waterbirds.

There are farm dams and wetlands located immediately adjacent to the study area and within close proximity to the study area (in particular, several farm dams occur nearby and adjacent to Element 6 of the study area). These waterbodies support moderate quality habitat (based on visual inspections and aerial imagery) and have the potential to provide suitable habitat for the nationally significant Growling Grass Frog, as well as a range of other native frogs and waterbirds. Several common frog species were heard calling from these waterbodies, including Common Froglet, Easter Banjo Frog, and Southern Brown Tree Frog.

3.2.3 Permitted Clearing Assessment (the Guidelines)

3.2.3.1 Vegetation proposed to be removed

Based on the proposed extent of native vegetation removal within the proposed impact area (as of January 2017) (within Location Risk C), permit applications for the BLU will fall under the High Risk-based pathway. The total area of native vegetation removal that is subject to the Guidelines for the BLU is approximately 18.947 hectares. Per the risk-based assessment prescriptions, this total includes the proposed native vegetation clearing for within the BCS area (as 'past removal'), and as discussed in Section 3.1.2, the NVPP vegetation marked 'to be retained'.

As the application falls under the High Risk-based pathway, a Habitat Hectare assessment was completed to determine condition scores of vegetation proposed to be removed, with condition scores provided in Appendix 2.4.

Table 8. Permitted Clearing Assessment (the Guidelines) – Total for all Elements*

Risk-based pathway	High
Total Extent	21.196
Remnant Patch (ha)	18.947
Scattered Trees (no.)	32
Location Risk	C
Strategic Biodiversity Score	0.635

(*) Note "all Elements" = 1a, 1c – 6, and "to be retained" vegetation within 1b / NVPP.

3.2.3.2 Offset Targets

The offset requirement for native vegetation removal is **0.456 General Biodiversity Equivalence Units (BEU)**, along with Specific units for Red-chested Button-quail (2.339 specific BEUs), Rye Beetle-grass (2.711 specific BEUs), and Spiny Rice-flower (2.355 specific BEUs).

A summary of proposed vegetation losses and associated offset requirements is presented in Table 9, and the Biodiversity Impact and Offset Requirements (BIOR) Report is presented in Appendix 4.1.

Table 9. Offset targets – Elements 1c - 6

General Offsets Required	0.456 General BEUs
Specific Offsets Required	Red-chested Button-quail (2.339 specific BEUs), Rye Beetle-grass (2.711 specific BEUs), and Spiny Rice-flower (2.355 specific BEUs)
Vicinity (catchment / LGA)	Port Philip and Westernport CMA / Melton City Council, Moorabool Shire Council, and Ballarat City Council
Minimum Strategic Biodiversity Score*	0.263

Note: BEU = Biodiversity Equivalence Units

3.2.4 Significant species and communities

3.2.4.1 Flora

A total of 209 flora species (88 indigenous and 121 non-indigenous or introduced) were recorded within the study area during the field assessments. The VBA contains records of 16 nationally significant and 90 State significant flora species previously recorded within 10 kilometres of the study area (DELWP 2016a) (Appendix 2.3). The PMST nominated an additional three nationally significant species which have not been previously recorded but have the potential to occur in the locality (DoEE 2017).

Desktop and site assessments identified potential habitat within the study area for species of national and State conservation significance. Targeted flora surveys recorded the presence of one nationally-listed flora species (Matted Flax-lily) within Elements 1c – 6. No other nationally significant flora species were recorded within Elements 1c – 6 of the study area.

Significant flora documented within five kilometres of each Element located outside the Urban Growth Boundary is depicted in Figures 4-E1c, 4-E2, 4-E3, 4-E4, 4-E5, and 4-E6, contained in Appendix 2.3.

Nationally significant flora

Given that the study area supports potentially suitable habitat for a small number of nationally listed flora species, targeted surveys were undertaken at appropriate times of the year to determine the presence or absence of these species within the study area. A brief summary of the results of the targeted flora surveys is provided below, with detailed information on each of the species provided in Appendix 2.1.

Matted Flax-lily

Matted Flax-lily has previously been recorded within one kilometre of the study area (DELWP 2017a). Three Matted Flax-lily patches were detected in Element 4 – Ballan Loop. These patches are located outside of the proposed impact area and will therefore not be impacted by the BLU.

No individuals were detected within the proposed impact area, and therefore given the extensive survey effort undertaken, the favourable seasonal conditions (i.e. surveys were undertaken when the species was known to be flowering and readily detected), and lack of suitable habitat across the majority of the study area, there is a low likelihood that Matted Flax-lily plants will be impacted by the project.

Spiny Rice-flower and Large-fruit Groundsel

Spiny Rice-flower and Large-fruit Groundsel have been previously recorded within one kilometre of the study area (DELWP 2017a). Although targeted surveys for Spiny Rice-flower and Large-fruit Groundsel were undertaken within potentially suitable habitat, at an appropriate time of year when the species were known to be flowering, neither of these species were detected within Elements 1c – 6. Given these results, and the

highly modified nature of the vegetation proposed to be disturbed, there is a low likelihood that either of these species will be impacted within Elements 1c – 6 of the project.

Small Golden Moths

Small Golden Moths *Diuris basaltica* have been recently recorded west of Ferris Road and to the immediate north of the study area (Figure 4 EC-1). Two plants were identified in 2012 by Biosis, while 14 plants were positively identified at this site in October 2016 by Melton City Council (Sjaan Bidwell pers. comm.). At the time of the Council survey, one additional plant was also observed within the adjacent rail corridor (i.e. within Element 1b of the study area inside the Toolern PSP), although this area was not formally surveyed and the plant's identity could not be confirmed (Sjaan Bidwell pers. comm.). These records have not yet been included within the Victorian Biodiversity Atlas.

The peak flowering period for this population in 2016 appeared to occur on October 7th (Sjaan Bidwell pers. comm.). During the flora and fauna surveys and habitat hectare assessments conducted on October 18-19 2016, the plants were not observed within the study area.

Other Significant Species

All other nationally listed species are considered either unlikely or to have a low likelihood of occurrence based on the following reasons:

- The species has not been recorded within the study area previously or during comprehensive surveys within the study area;
- Very few documented records within the local area; and/or,
- The lack of suitable habitat where these species are known to occur.

Further detail is provided below (Appendix 2.3).

State significant and FFG-Act Protected flora

There is suitable habitat within the study area for several State significant flora species (e.g. Black Roly-poly *Sclerolaena muricata* var. *muricata*, Slender Tick-trefoil *Desmodium varians*, Austral Crane's-bill *Geranium solanderi* var. *solanderi* s.s., Pale-flower Crane's-bill *Geranium* sp. 3 and Rye Beetle-grass *Tripogon loliiformis*).

Suitable habitat is also present for Protected Flora under the FFG Act, including Slender Onion-orchid *Microtis parviflora* and Cotton Fireweed *Senecio quadridentatus*.

Five patches of approximately 20 Slender Onion-orchids were recorded in Element 5 – Spreadeagle loop. One patch of approximately 20 Cotton Fireweed plants was also recorded in Element 5 – Spreadeagle loop, and an additional individual was recorded in Element 6 – Warrenheip Duplication.

3.2.4.2 Fauna

The study area currently supports habitat for a range of native fauna species, predominantly those adapted to modified landscapes. Sixty terrestrial fauna species were recorded during field assessment, including two native mammals, 46 birds (40 native, six introduced), seven native reptile and five native frogs (Appendix 3.1 and 3.2).

The VBA and the Protected Matters Search Tool contains records of 26 nationally significant, 52 State significant and 17 regionally significant fauna species previously recorded within 10 kilometres of the study area (DELWP 2017a; DoEE 2017) (Appendix 3.3).

Significant fauna documented within five kilometres of each Element located outside the Urban Growth Boundary is depicted in Figures 5-E1c, 5-E2, 5-E3, 5-E4, 5-E5, and 5-E6.

Nationally Significant Fauna

Three species (Grey-headed Flying Fox, Swift Parrot and Growling Grass Frog) have a moderate likelihood of occurrence within the study area (Appendix 3.3). A brief summary of the targeted survey results relating to each species is provided below, with detailed information on each of the species provided in Appendix 3.1.

Growling Grass Frog

A total of 311 records exist within 10 kilometres of Elements 1c – 6 of the study area (DELWP 2017a). Potentially suitable habitat was identified within the project alignment at Toolern Creek, Bostock Reservoir, and at large permanent waterbodies adjacent to and within close proximity to the study area. While detailed targeted surveys were undertaken (in accordance with the minimum survey requirements) during the 2016/17 active period, Growling Grass Frog was not detected (visually or audibly). Given these results, the modified nature of the study area, and the absence of important habitat variables required to support a breeding population of the species, Growling Grass Frog is considered to have a low likelihood of occurrence within the study area, and is highly unlikely to be impacted by the project (Appendix 3.1). It is possible that Growling Grass Frog are present elsewhere within the Toolern Creek waterway where potentially suitable habitat is available. For any proposed works that may occur within or in the vicinity of these waterbodies, best practice construction procedures should be outlined in the project Environment Management Plan to ensure impacts to the creeks crossed by the project are minimised.

Golden Sun Moth

Although there is a total of 1091 documented Golden Sun Moth records within 10 kilometres of Elements 1a – 3 of the study area (DELWP 2017a), the species has not previously been recorded within the study area. During the preliminary fauna assessments potentially suitable grassland habitat (native and modified) for the species was identified within Elements 1c, 3–5. As a result of this, targeted surveys were conducted across areas of potentially suitable habitat in Element 1c, 3, 4 and 5 during the species' flight period, at a time when moths were known to be flying at nearby reference sites.

Despite surveys being undertaken over multiple days during optimal surveys conditions when detection was high, Golden Sun Moth was not detected within Elements 1c, 3, 4 and 5. Given the species was not detected during the targeted surveys, and the fact that the study area only supports small isolated patches of grassland (i.e. not connected to high quality habitat adjoining the linear study area), there is a high level of confidence that a resident population of the species does not exist within the study area (Appendix 3.1). Consequently, the project is unlikely to impact this species.

Dwarf Galaxias

There are no records of Dwarf Galaxias within 10 kilometres of the study area (DELWP 2017a), and targeted surveys undertaken during February 2017 did not detect the species. It is considered highly unlikely that Dwarf Galaxias occurs in Toolern creek or upstream of the Bostock Reservoir (Appendix 3.1). It is possible that Dwarf Galaxias are present elsewhere within the Bostock Reservoir waterway where potentially suitable habitat is available.

Given the low likelihood of the species occurring in these waterbodies it is highly unlikely that the project will impact Dwarf Galaxias. For any proposed works that may occur within or in the vicinity of these waterbodies, best practice construction procedures should be outlined in the project Environment Management Plan to ensure impacts to the creeks crossed by the project are minimised.

Other Significant Species

An additional four nationally listed species are considered to have a low to moderate likelihood of occurring in the study area. These are:

Grey-headed Flying Fox

There are 11 documented records of Grey-headed Flying Fox *Pteropus poliocephalus* within 10 kilometres Elements 1c -3 (DELWP 2017a). This species has a moderate likelihood of occurrence within the study area and a small number of individuals may occasionally forage in planted trees (e.g. eucalypts) within the study area, although there is no important or limiting habitat present for this species (e.g. roost or feed sites). The project is unlikely impact this species.

Striped Legless Lizard

There are 458 documented records within 10 kilometres of Elements 1c – 2 of the study area, and no documented records of the species within or immediately surrounding Elements 3 – 6 (DELWP 2017a). Due to the highly modified nature of the study area and the lack of suitable grassland and/or grassy woodland habitat (i.e. large, connected areas), the species is considered to have a low likelihood of occurrence within Elements 2 – 6 (Appendix 3.1). The project is unlikely to impact this species.

Plains-wanderer

Twenty-five documented records of Plains-wanderer Pedionomus *torquatus* exist within 10 kilometres of Elements 1c – 3 and Elements 4 – 5 (DELWP 2017a). This species is a vagrant visit to the Basalt Plains of Melbourne (its stronghold in Victoria is in grassland areas throughout the northern Riverina), where there have been very few recent sightings (i.e. over the past 20 years) of the species across grassland areas west of Melbourne. Given the lack of extensive grassland habitat supporting the required floristic and structural diversity, there is a very low likelihood that the species would use habitat resources within the study area. Consequently, the project is unlikely to impact this species.

Swift Parrot

There are 48 documented records of Swift Parrot *Lathamus discolor* within 10 kilometres of Elements 1c – 6 of the study area (DELWP 2017a). Individuals of this species may temporarily reside (e.g. feed on flowering eucalypts) within the study area on route to important over-wintering foraging habitat through central and northern eastern Victoria, up through the eastern coast of NSW. However, due to the limited woodland habitat and preferred feed trees present within the study area, the species is not likely to make significant year-round use of the study area (i.e. no important or limiting habitat present). The project is unlikely to impact on this species.

State Significant Fauna

The study area contains suitable habitat for at least eight State listed species, including Yellow-bellied Sheathtail Bat, Australian Shoveler, Hardhead, White-throated Needletail, Eastern Great Egret, Black Falcon, Tussock Skink and Brown Toadlet. There are documented records of these species either within the study area (e.g. Diamond Firetail, Figure 5-E2), or within a 10 kilometre radius of the study area (Appendix 3.3).

Many of these species have a low to moderate likelihood of occurrence and may either temporarily reside within the study area (e.g. for foraging activities) or flyover during dispersal across the landscape. All other State listed species are considered unlikely to occur within or directly adjacent to the study area due to a lack of suitable habitats.

Regionally Significant Fauna

The study area contains potentially suitable habitat for four regionally listed species, including Fat-tailed Dunnart, Nankeen Night Heron, Spotted Harrier and Lathams Snipe (Appendix 3.3). All other regionally listed species are considered unlikely to occur due to a lack of suitable habitat within the study area.

3.2.4.3 Communities

Nationally Significant Communities

Five nationally listed ecological communities are predicted to occur within 10 kilometres of Elements 1c – 6 (DoEE 2017). These are:

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

The NTGVVP community is the only nationally listed community recorded within the study area, as its diagnostic characteristics generally correlate with the Plains Grassland EVC description (DSEWPC 2011d). Approximately 2.5% (less than 0.2 ha) of the Plains Grassland EVC that was recorded within the study area met the condition thresholds that define NTGVVP, broadly based on a high (more than 50%) cover of native grass cover. These patches of NTGVVP occur in Element 1c – Melton Station Upgrade (Figure 3; 0.13 ha), and Element 4 – Ballan Loop (Figure 3; 0.05 ha), and will be avoided by the proposed impact area.

Most areas of Plains Grassland recorded during the field surveys do not meet the condition thresholds that define NTGVVP. The other listed significant communities were not recorded in Elements 1c – 6.

State Significant Communities

Two FFG Act-listed ecological communities are present within Element 1c – 6:

- Western (Basalt) Plains Grassland Community and Western Basalt Plains (River Red-gum) Grassy Woodland Floristic Community; and,
- Grey Box – Buloke Grassy Woodland.

All recorded patches of the Plains Grassland EVC are synonymous with the Western (Basalt) Plains Grassland FFG Act ecological community. The Grey Box – Buloke Grassy Woodland community was not recorded within Elements 1c – 6.

4 LEGISLATIVE AND POLICY IMPLICATIONS

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

The EPBC Act applies to developments and associated activities that have the potential to significantly impact on matters of NES protected under that Act, or that are being undertaken on Commonwealth land.

Within the MSA area (i.e. Elements 1a and 1b), matters of NES have been considered under the MSA Prescriptions (DSE 2009a) (Section 2.3.1), and approved for development under Part 10 of the EPBC Act. To ensure compliance with the approval in place under the MSA, the BLU should consult with DELWP. This consultation should seek to address the recorded presence of the two EPBC Act-listed flora species (194 Spiny Rice-flower and 33 Large-fruit Groundsel) within Element 1a of the study area.

Potential impacts to matters of NES outside of the MSA area (Element 1c – 6) are described below (Table 10).

Table 10. Potential impacts to matters of National Environmental Significance (NES) outside of the MSA

Matter of NES	Potential Impacts
World Heritage properties	The proposed action will not impact any properties listed for World Heritage.
National heritage places	The proposed action will not impact any places listed for national heritage.
Ramsar wetlands of international significance	The study area occurs upstream of the same catchment as one Ramsar wetland (DoEE 2017). The proposed action is highly unlikely to impact the ecological character of any Ramsar wetland.
Threatened species and ecological communities	Ecological assessment results indicate that impacts to matters of NES are highly unlikely. Known occurrences of Matted Flax-lily and NTGVVP community near Elements 1c and 4 will be avoided by the project. Impacts to potential Growling Grass Frog and Dwarf Galaxias habitat will be minimised through the implementation best practice construction procedures for any proposed in water works at Toolern Creek and the Bostock Reservoir creek. All mitigation measures will be included in the project Environment Management Plan.
Migratory and marine species	Several Migratory and/or Marine species were either recorded during the site assessment or have been recorded within 10 kilometres of the study area (DELWP 2016a; Appendix 3.3). However, the study area would not be classed as an 'important habitat' as defined under the EPBC Act Policy Statement 1.1 Principal Significant Impact Guidelines (DoE 2013).
Commonwealth marine area	The proposed action will not impact any Commonwealth marine areas.
Nuclear actions (including uranium mining)	The proposed action is not a nuclear action.
Great Barrier Reef Marine Park	The proposed action will not impact the Great Barrier Reef Marine Park.
Water resources impacted by coal seam gas or mining development	The proposed action is not a coal seam gas or mining development.

One significant flora species (Matted Flax-lily) which is listed under the EPBC Act was recorded in Element 4 on the southern boundary of the impact area at Ballan Station, and north of the impact area approximately 350 metres west of Geelong-Ballan Road (Figure 3, Appendix 2.1). Matted Flax-lily will not be impacted by works associated with the BLU and therefore, based on the study area assessed as part of this report, the proposed

action will not trigger the need for an assessment against the significant impact guidelines for the species (DoE 2013) (Table 7).

Based on the results of the targeted Matted Flax-lily surveys and the poor condition of habitat proposed to be removed as part of the BLU, there is a low likelihood that Elements 1c – 6 of the study area support an 'important population' of the species as defined under the EPBC Act.

Potentially suitable habitat for Growling Grass Frog was identified within the project alignment at Toolern Creek, Bostock Reservoir, and at large permanent waterbodies adjacent to and within close proximity to the study area. While detailed targeted surveys were undertaken (in accordance with the minimum survey requirements) during the 2016/17 active period, Growling Grass Frog was not detected (visually or audibly). Due to the lack of important habitat variables required to support a breeding population of the species (i.e. with the exception of Toolern Creek there is an absence of suitable breeding habitat), the species is considered to have a moderate likelihood of occurrence within the study area, and is highly unlikely to be significantly impacted by the project (Appendix 3.1).

Despite targeted Dwarf Galaxias surveys not detecting the species, there is a low likelihood that the species may occur upstream of the study area (specifically upstream of the railway bridge crossing at Bostock Reservoir [Element 4]). However, given the low likelihood of the species occurring in these waterbodies it is highly unlikely that the project will impact Dwarf Galaxias. For any proposed works that may occur within or in the vicinity of waterbodies within the study area, best practice construction procedures should be included in the project Environment Management Plan to ensure impacts to the creeks crossed by the project are minimised.

Grey-headed Flying Fox and Swift Parrot may fly over the study area on occasions, although there is no important or limiting habitat within the study area for either of these species (i.e. at best, a small number of individuals may flyover or temporality reside within the study area for foraging).

One ecological community (NTGVVP) listed under the EPBC Act was recorded within Element 1c and 4 of the study area (Figure 3). Areas supporting NTGVVP will be avoided by works associated with the project, therefore there will not be any reduction in extent of the ecological community within Elements 1c - 6. Fencing and signage will ensure impacts to NTGVVP are avoided during construction.

Based on the results of the detailed ecological assessment and targeted flora and fauna surveys, consideration for all other species (i.e. Spiny Rice-flower, Large-fruit Groundsel, Golden Sun Moth, Growling Grass Frog, and Dwarf Galaxias) under the EPBC Act for the proposed BLU works is not required.

4.1.1 Implications

There are two matters of NES (i.e. Matted Flax-lily and NTGVVP) that were confirmed to be present within the study area during the current surveys. Both of these matters of NES are proposed to be avoided. In addition, there is a moderate likelihood that four fauna species (Grey-headed Flying Fox, Swift Parrot, Growling Grass Frog, Dwarf Galaxias) could occur within the study area.

While it is highly unlikely that the project will significantly impact any matters of NES listed under the EPBC Act, it is recommended that for legislative certainty and as a risk mitigation measure, an EPBC Act referral be prepared and submitted to DoEE for assessment and determination under the Act. The referral should seek a non-controlled action decision.

From 1 October 2014 the Australian Government commenced cost recovery arrangements for environmental assessments under the EPBC Act. A referral fee of **$7,352.00** at the time of submitting an EPBC referral form

applies in addition to a cost recovery based on a case by case basis and the level of review required by DoEE, noting this is likely to be a low amount given the simplicity of the project on matters of NES.

4.2 Melbourne Strategic Assessment

4.2.1 Biodiversity Conservation Strategy

This proposed removal of native vegetation within the BCS generates habitat compensation obligations for Native Vegetation (11.326 hectares), Spiny Rice-flower (11.326 hectares), Golden Sun Moth (9.532 hectares), and Growling Grass Frog (0.370 hectares).

4.2.2 Implications

The habitat compensation fee applicable for the proposed clearing within the BCS is estimated at **$1,369,429.30** (incl. GST) (Table 11).

Offsets are payable to DELWP prior to removal of vegetation or habitats. Furthermore, as requested by DoEE and DELWP, where impacts cannot be avoided, salvage and translocation of Spiny Rice-flower and Large-fruit Groundsel located within Element 1a must be implemented. Translocation activities are to be outlined in a Salvage and Translocation Plan that will be developed in consultation with the Spiny Rice-flower Recovery Team (PsRT), consistent with the Spiny Rice-flower translocation protocol (PsRT 2013) and relevant current translocation techniques. Conservation Areas 5 (Ravenhall North Grassland) and 6 (Deer Park Quarry Grassland), located adjacent to Element 1a (Figures 3a - 3c), provide suitable habitat to sustain translocated individuals. Approval of the Salvage and Translocation Plan will be required by DELWP prior to works commencing in Element 1a where impacts to either of these species is likely to occur. Consistent with the HCO statement (Appendix 4.2), it states that salvage and translation will be undertaken by DELWP on the proponent's behalf.

Table 11. Habitat compensation fees under the BCS, May 2013 (DEPI 2013e) (GST inclusive)

Matter of NES	Habitat Compensation (per hectare)	Hectares / No.	Offset cost
Native vegetation	$104,582.50	11.326	$1,184,501.3
Scattered Trees (no. trees)	$14,539.80	0	N/A
Matted Flax-lily	$12,315.60	0	N/A
Spiny Rice-flower	$8,730.70	11.326	$98,883.91
Golden Sun Moth	$8,705.40	9.532	$82,979.87
Growling Grass Frog	$8,281.90	0.370	$3,064.30
		Total (incl. GST)	$1,369,429.30

4.2.3 Toolern PSP Area

The proposed removal of vegetation within the Toolern PSP will affect vegetation marked as "to be removed" and "to be retained" in the NVPP (MPA 2011). A planning permit is not required to remove the "to be removed" vegetation, and a planning permit is required to remove the "to be retained" vegetation.

The total offset target to be achieved within the Toolern PSP is **0.01 Habitat Hectares**. The current Native Vegetation price per Habitat Hectare applied to the precinct is $125,000.00 (excl. GST). Therefore, the biodiversity offset fee is **$1,250.00** (excl. GST) (Appendix 4.2).

4.3 Environment Effects Act 1978 (Victoria)

The *Environment Effects Act 1978* provides for assessment of proposed actions that are capable of having a significant effect on the environment via the preparation of an EES. A project with potential adverse environmental effects that, individually or in combination, could be significant in a regional or State context should be referred. An action may be referred for an EES decision if the project meets specific criteria, including (but not limited to):

One of the following occurs (DEPI 2006):

- Potential clearing of 10 hectares or more of native vegetation from an area that:
    - Is of an EVC identified as endangered by DELWP;
    - Is of Very High conservation significance; or,
    - Is not authorised under an approved Forest Management Plan or Fire Protection Plan.
- Potential long-term loss of a significant proportion (1-5% depending on conservation status of species) of known remaining habitat or population of a threatened species within Victoria.

Or where two or more of the following occur:

- Potential clearing of 10 hectares or more of native vegetation, unless authorised under an approved Forest Management Act or Fire Protection Plan;
- Matters listed under the FFG Act:
    - Potential loss of a significant area of a listed ecological community;
    - Potential loss of a genetically important population of an endangered or threatened species;
    - Potential loss of critical habitat; or,
    - Potential significant effects on habitat values of a wetland supporting migratory birds.

Approximately 1.8 hectares of remnant native vegetation is proposed to be impacted through Elements 1c – 6, comprising:

- 0.18 hectares Plains Grassland / Western Basalt Plains FFG-Act Listed community
- 1.60 hectares Plains Grassy Woodland
- 0.06 hectares Plains Woodland

In addition, approximately 11.6 hectares of time-stamped vegetation within the BCS (including Western Basalt Plains FFG-Act Listed community) and approximately 5.6 hectares of time-stamped vegetation under the BCS and Toolern PSP (under the MSA) is proposed to be impacted.

4.3.1 Implications

The native vegetation referral criteria listed in the EEA Ministerial Guidelines (DEPI 2006) refer to any native vegetation that may be cleared as a result of the project. Therefore the proposed project-wide removal of approximately 18.9 hectares of remnant native vegetation, (including potentially more than 10 hectares of

endangered EVCs) will warrant referral of the project to determine whether an EES is be required, as confirmed through consultation with DELWP. The referral will address matters beyond the scope of this ecological assessment, and will include a discussion of the following:

- The project is not likely to lead to the potential long-term loss of a significant proportion (1-5% depending on conservation status of species) of known remaining habitat or population of a threatened species within Victoria.
- The project will ***not*** lead to the loss of the following:
    - Matters listed under the FFG Act (only small localised impacts are likely to occur):
    - A significant area of a listed ecological community (the NTGVVP listed ecological community is not proposed to be impacted);
    - A genetically important population of an endangered or threatened species;
    - A critical habitat
    - Significant effects on habitat values of a wetland supporting migratory birds.

Based on the above-listed considerations it is unlikely that Environmental Effects Statement for the project will be triggered.

4.4 Flora and Fauna Guarantee Act 1988 (Victoria)

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

While the FFG Act-listed Matted Flax-lily was recorded within Elements 1b – 6, the BLU will avoid impacts to these individuals. Additionally, the FFG Act-protected Slender Onion-orchid and Cotton Fireweed were recorded within Elements 1b - 6. There is suitable habitat within the study area for several additional 'protected' flora species and potentially additional 'listed' flora species. Furthermore, there is suitable habitat within the study area for a small number of fauna species listed under the FFG Act (e.g. Yellow-bellied Sheathtail Bat, Black Falcon, Diamond Firetail, Tussock Skink and Brown Toadlet) (Section 3.2.4.2).

One ecological community *Western Basalt Plains Grassland Community,* listed as threatened under the FFG Act is present within the study area, correlating with all areas of Plains Grassland (Figure 3).

The FFG Act also lists potentially threatening processes, some of which may be relevant to the proposed project:

- Increase in sediment input into Victorian rivers and streams due to human activities;
- Input of toxic substances into Victorian rivers and streams; and,
- The invasion of native vegetation by environmental weeds.

4.4.1 Implications

The proposed development will result in impacts to the FFG Act-listed *Western Basalt Plains Grassland community* (within Element 1c – 6) and 'protected' flora listed under the FFG Act. As such, a permit under the

FFG Act will be required. Whilst FFG Act permit triggers occur in only some of the Elements, it would be prudent for MMRA to obtain a single FFG Act permit from DELWP for the entire project, as the growth areas assessment specifies that relevant state assessment and approval requirements still apply within the MSA (DELWP, pers. comm).

4.5 *Planning and Environment Act 1987* (Victoria)

The *Planning and Environment Act 1987* outlines the legislative framework for planning in Victoria and for the development and administration of planning schemes. All planning schemes contain native vegetation provisions at Clause 52.17 which require a planning permit from the relevant local Council to remove, destroy or lop native vegetation on a site of more than 0.4 hectares, unless an exemption under clause 52.17-7 of the Victorian Planning Schemes applies (Appendix 1.5.3). Local planning schemes may contain other provisions in relation to the removal of native vegetation.

4.5.1 Local Planning Schemes

The study area dissects three municipalities (Table 1). A breakdown of the relevant overlays is provided below. Elements 1a, 1b, 1c, and 2 are located within the City of Melton municipality. The following overlays apply:

- ESO - Environmental Significance Overlay, Schedules 1 and 2
- DCO – Development Contributions Plan, Schedules 3, 7 and 8
- DDO – Design and Development Overlay, Schedule 1
- EAO – Environmental Audit Overlay
- HO – Heritage Overlay 93
- PAO – Public Acquisition Overlay, Schedule 1, 3 and 6

Elements 3, 4, 5, and a portion of 6 are located within the Moorabool Shire Council municipality. The following overlays apply:

- ESO - Environmental Significance Overlay, Schedule 1
- DDO – Design and Development Overlay, Schedule 2 and 8
- HO – Heritage Overlay 18 and 168

A portion of Element 6 is located within the Ballarat City Council. The following overlays apply:

- ESO - Environmental Significance Overlay, Schedule 1 and 3
- DDO – Design and Development Overlay, Schedule 2
- VPO – Vegetation Protection Overlay, Schedule 1

4.5.2 Implications

As outlined in the Planning and Approvals Strategy for the BLU, the project will seek Planning Scheme Amendments from the City of Melton, Moorabool Shire Council and Ballarat City Council. The resulting Incorporated Documents will address the approval requirements for the proposed removal, destruction or lopping of any native vegetation outside the BCS (Element 1a) and any vegetation within the MSA (Element 1b), and the objectives of the above listed overlays will be addressed in the resulting incorporated document.

4.5.3 The Guidelines

The State Planning Policy Framework and the decision guidelines at Clause 52.17 (Native Vegetation) and Clause 12.01 require Planning and Responsible Authorities to have regard for 'Permitted clearing of native vegetation - Biodiversity assessment guidelines' (the Guidelines) (DEPI 2013a). Where the clearing of native vegetation is permitted, the quantity and type of vegetation to be offset is determined using methods specified in the Guidelines. The primary objective of the regulations is "no net loss in the contribution made by native vegetation to Victoria's biodiversity".

A planning permit application will be referred to DELWP as a 'recommending authority' if vegetation removal meets one or more of the below thresholds (Table 12).

Table 12. Permit to remove native vegetation – application referral triggers (Clause 66, Referral and Notice Provisions)

Native Vegetation	• Remove, destroy or lop native vegetation where the area to be cleared is 0.5 hectares or more
	• Remove, destroy or lop native vegetation which is to be considered under the High Risk-based pathway
Other Circumstances	• Remove, destroy or lop native vegetation if a property vegetation plan applies to the site
	• Remove, destroy or lop native vegetation on Crown land which is occupied or managed by the responsible authority

4.5.4 Implications

The study area is within Modelled Location Risk C, with 7.386 hectares of remnant native vegetation and 25 scattered remnant trees proposed to be removed within Elements 1c - 6. As such, the planning scheme amendment will be assessed under the High Risk-based pathway. The Guidelines require that the risk-based pathway assessment also consider vegetation removal covered by the MSA BCS. Therefore, the proposed removal of 11.561 hectares of native vegetation in the MSA BCS area is treated by DELWP as 'past removal' when calculating offset requirements for BLU. Also addressed by the high-risk assessment was the vegetation marked as 'to be retained' under the Toolern NVPP (Element 1b).

The total offset requirements generated by the proposed combined total of vegetation removal (18.947 hectares) is **0.456 General Biodiversity Equivalence Units (BEU)** and Specific Offset Units for Red-chested Button-quail (2.339 units), Rye Beetle-grass (2.711 units), and Spiny Rice-flower (2.355 units). Offset targets must be met, as specified in Section 3. Options for fulfilling these State offset requirements are discussed in Section 6.2.

4.6 Wildlife Act 1975 and Wildlife Regulations 2013 (Victoria)

The *Wildlife Act 1975* is the primary legislation in Victoria providing for protection and management of wildlife. The Act requires people engaged in wildlife research (e.g. fauna surveys, salvage and translocation activities) to obtain a permit under the Act to ensure that these activities are undertaken in a manner consistent with the appropriate controls.

The Wildlife Act has the following objectives:

- To establish procedures for the promotion of protection and conservation of wildlife, the prevention of species extinctions, and the sustainable use and access to wildlife; and,
- To prohibit and regulate the conduct of those involved in wildlife related activities.

The objectives of the Wildlife Regulations 2002 are:

- For further provisions in relation to licensing system established by section 22 of the Wildlife Act;
- To prescribe fees, offences, royalties and various matters for the purposes of the Wildlife Act; and,
- To provide for exemptions from certain provisions of the *Wildlife Act 1975*.

Councils often stipulate as conditions of a planning permit that qualified zoologists supervise the clearing of vegetation and capture/relocate any displaced native animals (e.g. possums, gliders, microbats etc.). The proposed development has the potential to impact hollow-bearing trees and should this condition be required, any persons engaged to remove, salvage, hold or relocate native fauna during vegetation removal must hold a current Management Authorisation under the *Wildlife Act 1975*.

4.6.1 Implications

Authorisation for habitat removal may be obtained under the *Wildlife Act 1975* through a licence granted under the *Forests Act 1958*, or under any other Act such as the *Planning and Environment Act 1987*. Any persons engaged to remove, salvage, hold or relocate native fauna during construction must hold a current Management Authorisation under the *Wildlife Act 1975*. However, for this project it is unlikely that salvage of fauna will be required and therefore Management Authorisation under the Wildlife Act 1975 is not required.

4.7 Catchment and Land Protection Act 1994 (Victoria)

The *Catchment and Land Protection Act 1994* (CALP Act) contains provisions relating to catchment planning, land management, noxious weeds and pest animals.

This Act provides a legislative framework for the management of private and public land and sets out the responsibilities of land managers, stating that they must take all reasonable steps to:

Avoid causing or contributing to land degradation which causes or may cause damage to land of another land owner;

- Protect water resources;
- Conserve soil;
- 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.

Essentially the CALP Act establishes a framework for the integrated management and protection of catchments, and provides a framework for the integrated and coordinated management, which aims to ensure that the quality of the State's land and water resources and their associated plant and animal life are maintained and enhanced. It is implemented by the responsible CMA.

4.7.1 Implications

A number of weeds listed as noxious under the CaLP Act were recorded during the assessment (including Chilean Needle grass). Similarly, there is evidence that the study area is currently occupied by several pest fauna species listed under the CaLP Act (Red Fox, European Rabbit). The spread of weeds should be prevented during the construction stages of the project.

4.8 *Water Act 1989* (Victoria)

The purposes of the *Water Act 1989* are manifold but (in part) relate to the orderly, equitable, efficient and sustainable use of water resources within Victoria. This includes the provision of a formal means of protecting and enhancing environmental qualities of waterways and their in-stream uses as well as catchment conditions that may affect water quality and the ecological environments within them.

4.8.1 Implications

A 'works on waterways' permit from the CMA is likely to be required where any action impacts on waterways within the study area. Additionally, where structures are installed within or across waterways that potentially interfere with the passage of fish or the quality of aquatic habitat, these activities should be referred to DELWP with the CMA included for comment.

4.9 Summary of Statutory Approval Requirements

A summary of the relevant statutory approval requirements are outlined below (Table 13).

Table 13. Summary of approval requirements associated with the Ballarat Line Upgrade.

Element	Catchment Management Authority (CMA), Local Government Area (LGA)	Ecological Values (remnant vegetation, significant flora and fauna)	Proposed impacts as per the proposed project area provided in March 2017	*Environment Protection and Biodiversity Conservation Act 1999*	*Environment Effects Act 1978*	*Flora and Fauna Guarantee Act 1988*	*Planning and Environment Act 1987*[2]	Offsets and Recommendations for Further Actions	Summary of recommendations for further actions
Element 1a **Duplication between Deer Park West and Melton** Chainage: <22025 31300	Port Phillip and Westernport CMA, City of Melton	11.561 hectares of time-stamped vegetation. Nationally listed Spiny Rice-flower (194 individuals) and Large-fruit Groundsel (33 individuals).	11.326 hectares of time-stamped vegetation. Number of nationally listed Spiny Rice-flower and Large-fruit Groundsel individuals to be determined.	No approval required under the EPBC Act as the Elements have been subject to the Part 10 Approval under the EPBC Act.	Prepare and submit an EES referral. However, given the extent of proposed impacts an EES is not likely to be triggered for the project.	FFG Act permit required for the project-wide removal of 'protected flora' listed under the Act.	Planning Scheme Amendment to remove remnant native vegetation.	Secure HCO's outlined in Appendix 4.2, and prepare a Salvage and Translocation Plan for Spiny Rice-flower and Large-fruit Groundsel where avoidance is not possible. Native Vegetation 11.326 hectares Spiny Rice-flower 11.326 hectares Golden Sun Moth 9.532 hectares Growling Grass Frog 0.370 hectares	Approved under BCS and therefore all proposed vegetation removal is subject to the habitat compensation obligations. Prepare Salvage and Translocation Plan if avoidance of Spiny Rice-flower and, if detected, Large-headed Groundsel cannot be achieved.
Element 1b **Duplication between Deer Park West and Melton** Chainage: 31300 - 36700	Port Phillip and Westernport CMA, City of Melton	5.557 hectares of native vegetation (per the Toolern Native Vegetation Precinct Plan, 1.417 ha of this vegetation is marked as "to be retained", and 4.14 ha is marked as 'to be removed') 9 scattered trees	3.364 ha Plains Grassland 2.192 ha Plains Woodland 0.0005 Plains Grassy Woodland 7 scattered trees (marked as "to be retained" therefore covered by BIOR report)					Trees and native vegetation identified as "to be removed" in the Toolern NVPP generate 0.01 Habitat Hectare of Obligations ($1,250.00 excl. GST, Appendix 4.3) Vegetation marked as 'to be removed' was approved under the Melbourne Strategic Assessment as the Toolern Precinct Structure Plan (PSP). Secure the Biodiversity Offsets specified in Appendix 4.3. Native vegetation and Scattered Trees marked as "to be retained" or "to be protected" are subject to the offset requirements outlined in the BIOR Report (Appendix 4.1) Request an itemised BIOR Report to determine offsets required for the Melton portion of the BLU (based on combined report provided in Appendix 4.1). All proposed removal of vegetation in this element that is marked as 'to be retained' is subject to Clause 52.16 and offsets will be in accordance with the vegetation mapped in the NVPP.	Prepare Salvage and Translocation Plan if avoidance of Spiny Rice-flower and Large-headed Groundsel cannot be achieved.

Element	Catchment Management Authority (CMA), Local Government Area (LGA)	Ecological Values (remnant vegetation, significant flora and fauna)	Proposed impacts as per the proposed project area provided in March 2017	*Environment Protection and Biodiversity Conservation Act 1999*	*Environment Effects Act 1978*	*Flora and Fauna Guarantee Act 1988*	*Planning and Environment Act 1987*[2]	Offsets and Recommendations for Further Actions	Summary of recommendations for further actions
Element 1c ***Melton Station Upgrade*** Chainage: 36700 - 39373	Port Phillip and Westernport CMA, City of Melton	0.203 hectare of native vegetation, including 0.129 hectare of the nationally significant NTGVVP. 11 scattered trees	0.005 ha Creekline Grassy Woodland, 0.051 ha Plains Woodland No proposed impacts to NTGVVP. Removal of 8 scattered trees	Prepare and submit an EPBC Act referral for assessment and determination under the Act. Provided the NTGVVP will not be impacted, the EPBC Act will not likely be considered a controlled action.	Prepare and submit an EES referral. However, given the extent of proposed impacts an EES is not likely to be triggered for the project.	No FFG Act-listed threatened species recorded. FFG Act permit required for the project-wide removal of 'protected flora' listed under the Act.	Planning Scheme Amendment to remove remnant native vegetation.	As per the Biodiversity Impact Offset Requirements (BIOR) Report[1]	EPBC: Prepare and submit an EPBC Act referral for assessment and determination under the Act. Prepare Planning Scheme Amendment to removal or disturb remnant native vegetation and submit to the relevant local councils. Conditions are likely to include a requirement for: • Demonstration of impact minimisation. • Identification of a compliant offset. • A Construction Environmental Management Plan (CEMP). Prepare and submit an EES referral. FFG Act permit for protected flora.
Element 2 **Stabling at Melton Station**[3] Chainage: Segment west of 37700	Port Phillip and Westernport CMA, City of Melton	0.012 hectare of native vegetation. 1 scattered tree.	0.012 ha Plains Woodland 1 scattered tree	There are no MNES in Element 2, however it is advised to prepare and submit an EPBC Act referral for the complete project, for assessment and determination under the Act.	Prepare and submit an EES referral. However, given the extent of proposed impacts an EES is not likely to be triggered for the project.	No FFG Act-listed threatened species recorded. FFG Act permit required for the removal of 'protected flora' listed under the Act.	Planning Scheme Amendment to remove remnant native vegetation.	As per the Biodiversity Impact Offset Requirements (BIOR) Report[1]	Prepare and submit an EPBC Act referral for assessment and determination under the Act. Prepare Planning Scheme Amendment. This will include the following information: • Extent of the proposed removal of remnant native vegetation. • Demonstration of impact minimisation. • Identification of a compliant offset. Prepare a Construction Environmental Management Plan (CEMP). Prepare and submit an EES referral. FFG Act permit for protected flora.
Element 3 **Bacchus Marsh Second platform (3a) / Rowsley Stabling** (3) Chainage: 50400 - 51300	Port Phillip and Westernport CMA, Moorabool Shire Council	No native vegetation patches. 2 scattered trees.	No impact on remnant native vegetation 2 scattered trees	There are no MNES in Element 3, however it is advised to prepare and submit an EPBC Act referral for the complete project, for assessment and determination under the Act.	Prepare and submit an EES referral. However, given the extent of proposed impacts an EES is not likely to be triggered for the project.	No FFG Act-listed threatened species recorded. FFG Act permit required for the removal of 'protected flora' listed under the Act.	Planning Scheme Amendment to remove remnant native vegetation.	As per the Biodiversity Impact Offset Requirements (BIOR) Report[1]	Prepare and submit an EPBC Act referral for assessment and determination under the Act. Prepare Planning Scheme Amendment. This will include the following information: • Extent of the proposed removal of remnant native vegetation. • Demonstration of impact minimisation. • Identification of a compliant

Element	Catchment Management Authority (CMA), Local Government Area (LGA)	Ecological Values (remnant vegetation, significant flora and fauna)	Proposed impacts as per the proposed project area provided in March 2017	*Environment Protection and Biodiversity Conservation Act 1999*	*Environment Effects Act 1978*	*Flora and Fauna Guarantee Act 1988*	*Planning and Environment Act 1987*[2]	Offsets and Recommendations for Further Actions	Summary of recommendations for further actions
									offset. Prepare a Construction Environmental Management Plan (CEMP). Prepare and submit an EES referral. FFG Act permit for protected flora.
Element 4 **Ballan Loop** Chainage: 79334 - 84300	Crosses Port Phillip and Westernport CMA and Corangamite CMA, Moorabool Shire Council	2.646 hectares of native vegetation. Of which, 0.051 hectares is the nationally significant NTGVVP. 1 scattered tree. 3 patches of Nationally significant Matted Flax-lily.	0.079 ha Plains Grassland 1.619 ha Plains Grassy Woodland No proposed impacts to Matted Flax-lily or NTGVVP 0 scattered trees	Prepare and submit an EPBC Act referral for assessment and determination under the Act Provided Matted Flax-lily and the NTGVVP community will not be impacted, the EPBC Act will not likely be considered a controlled action.	Prepare and submit an EES referral. However, given the extent of proposed impacts an EES is not likely to be triggered for the project.	No FFG Act-listed threatened species recorded. FFG Act permit required for the removal of 'protected flora' listed under the Act.	Planning Scheme Amendment to remove remnant native vegetation.	As per the Biodiversity Impact Offset Requirements (BIOR) Report1	Prepare and submit an EPBC Act referral for assessment and determination under the Act. Prepare Planning Scheme Amendment. This will include the following information: • Extent of the proposed removal of remnant native vegetation. • Demonstration of impact minimisation. • Identification of a compliant offset. Prepare a Construction Environmental Management Plan (CEMP). Prepare and submit an EES referral. FFG Act permit for protected flora.
Element 5 **Spreadeagle (new Bungaree) Loop** Chainage: <94900 98900	Corangamite CMA, Moorabool Shire Council	0.696 hectare of native vegetation. 16 scattered trees.	0.047 ha Plains Grassy Woodland 12 scattered trees	There are not MNES in Element 2, however it is advised to prepare and submit an EPBC Act referral for the complete project, for assessment and determination under the Act. Provided the NTGVVP will not be impacted in 1c and 4 (or impacts are not significant), the EPBC Act will not likely be considered a controlled action.	Prepare and submit an EES referral. However, given the extent of proposed impacts an EES is not likely to be triggered for the project.	No FFG Act-listed threatened species recorded. FFG Act permit required for the removal of 'protected flora' listed under the Act.	Planning Scheme Amendment to remove remnant native vegetation.	As per the Biodiversity Impact Offset Requirements (BIOR) Report[1]	Prepare and submit a FFG Act permit application to DELWP. Prepare Planning Scheme Amendment. This will include the following information: • Extent of the proposed removal of remnant native vegetation. • Demonstration of impact minimisation. • Identification of a compliant offset. Prepare a Construction Environmental Management Plan (CEMP). Prepare and submit an EES referral. FFG Act permit for protected flora.
Element 6 **Warrenheip Duplication** Chainage:	Corangamite CMA, Moorabool Shire Council and Ballarat	0.171 hectare of native vegetation. 4 scattered trees.	0.023 ha Plains Grassland 0.031 ha Plains Grassy Woodland 2 scattered trees	There are not MNES in Element 2, however it is advised to prepare and submit an EPBC Act referral for the	Prepare and submit an EES referral. However, given the extent of proposed impacts an EES is not likely to be triggered	No FFG Act-listed threatened species recorded. FFG Act permit required for the removal of 'protected flora'	Planning Scheme Amendment to remove remnant native vegetation.	As per the Biodiversity Impact Offset Requirements (BIOR) Report[1]	Prepare Planning Scheme Amendment. This will include the following information: • Extent of the proposed removal

Element	Catchment Management Authority (CMA), Local Government Area (LGA)	Ecological Values (remnant vegetation, significant flora and fauna)	Proposed impacts as per the proposed project area provided in March 2017	*Environment Protection and Biodiversity Conservation Act 1999*	*Environment Effects Act 1978*	*Flora and Fauna Guarantee Act 1988*	*Planning and Environment Act 1987*[1]	Offsets and Recommendations for Further Actions	Summary of recommendations for further actions
104200 107453	City Council			complete project, for assessment and determination under the Act. Provided the NTGVVP will not be impacted in 1c and 4 (or impacts are not significant), the EPBC Act will not likely be considered a controlled action.	for the project.	listed under the Act.			of remnant native vegetation. • Demonstration of impact minimisation. • Identification of a compliant offset. Prepare a Construction Environmental Management Plan (CEMP). Prepare and submit an EES referral. FFG Act permit for protected flora.

(1) The BIOR Report provided in Appendix 4.1 presents offsets for the complete project. A breakdown per Council area may be requested at a later date, when the total proposed native vegetation removal has been finalised for the project.

(2) DCO = Development Contributions Plan Overlay; DDO = Design and Development Overlay; PAO = Public Acquisition Overlay; EAO = Environmental Audit Overlay; ESO = Environmental Significance Overlay; UGZ = Urban Growth Zone; GRZ = General Residential Zone; RGZ = Residential Growth Zone; CZ = Commercial Zone; INZ = Industrial Zone; FZ = Farming Zone; PPRZ = Public Park and Recreation Zone; SUZ = Special Use Zone; PUZ = Public Use Zone; RDZ = Road Zone; PPRZ = Public Park and Recreation Zone; RLZ = Rural Living Zone.

(3) Stabling removed from project subsequent to this assessment

5 POTENTIAL IMPACTS

Any loss of ecological values should be viewed in the overall context of on-going loss, fragmentation, and deterioration in the quality of remnant vegetation throughout the greater Victorian Volcanic Plain bioregion. The proposed action is likely to directly impact on several indigenous flora and fauna species, and communities recorded within the study area.

These impacts may include:

- Loss of low to moderate quality habitat and potential mortality for locally common fauna species dependent on grassland and woodland habitats for foraging, shelter or nesting;
- Potential for the spread of weeds and soil pathogens due to on-site activities;
- Disturbance to wildlife from increased human activity and noise during construction;
- Indirect impacts on adjacent areas if construction activities and drainage are not appropriately managed; and,
- Decreased habitat quality downstream of the study area due to improper sedimentation controls and subsequent deterioration of water quality.

Potential impacts **limited to within the UGB (Elements 1a and 1b)** may include:

- The removal of varying quality of remnant native vegetation (e.g. Plains Grassland);
- Direct loss of habitat for three EPBC Act-listed flora species, including Matted Flax-lily, Spiny Rice-flower and Large-fruit Groundsel;
- Potential loss of known habitat for national (Striped Legless Lizard);
- The removal of State significant ecological community: Plains Grassland/ Western Basalt Plains Grassland Community; and,
- Loss of suitable habitat for state and regionally significant flora and fauna species (Appendix 2.3 and 3.3).

Potential impacts **limited to within the within Elements 1c – 6** may include:

- The removal of 7.386 hectares of remnant native vegetation and 25 scattered remnant trees.
- Loss of potential habitat for one EPBC-Act-listed flora species, Small Golden Moths;
- Loss of potential habitat for FFG Act-listed flora and fauna species (Appendix 2.3 and 3.3);
- The removal of approximately 0.18 hectares of a State significant ecological community: Plains Grassland/ Western Basalt Plains Grassland Community;
- Disturbance of aquatic and terrestrial habitat along Toolern Creek that may occasionally be used by Growling Grass Frog; and,
- Loss of suitable habitat for regionally significant flora and fauna species (Appendix 2.3 and 3.3).

In summary, the nature, extent and significance of all predicted impacts of the Project can be appropriately managed/mitigated and offset.

6 MITIGATION AND MINIMISATION

6.1 Mitigation in Accordance With the Guidelines

Given that the proposed removal of vegetation in Elements 1c – 6 falls under the High Risk-based pathway, the Guidelines (DEPI 2013a) require the responsible authority consider whether reasonable steps have been taken to ensure that impacts of the proposed removal of native vegetation on biodiversity have been minimised. Minimisation effort should be commensurate with the contribution that the native vegetation makes to Victoria's biodiversity (DELWP 2016c).

Contribution to Victoria's Biodiversity

The *Biodiversity assessment handbook, Permitted clearing of native vegetation* (DELWP 2015) describes the relevant information to consider when determining the contribution native vegetation makes to Victoria's biodiversity (Table 14). Based on available information it is determined that the native vegetation proposed to be removed that is subject to the Guidelines (DEPI 2013a) as part of the current application has a Moderate contribution to Victoria's biodiversity.

Table 14. Assessment of the contribution the native vegetation makes to Victoria's biodiversity (as per Table 3 of the Handbook [DELWP 2015])

Criteria	Assessment	Contribution
What is the extent and condition of native vegetation?		
Habitat Hectare assessment • The higher the value, the greater the contribution to Victoria's biodiversity. • Scores above 0.8 indicate very good condition.	Total extent: 35.43 hectares (21.196 hectares of remnant patch and 32 scattered trees)[1]. Only a portion of this is proposed to be impact (i.e. 7.386 hectares and 25 scattered remnant trees) Habitat scores: 0.19 to 0.34	Moderate
What is the landscape biodiversity value of the native vegetation?		
Strategic Biodiversity Score • The higher the value, the greater the contribution to Victoria's biodiversity. • Scores above 0.8 are very important sites.	0.635	High
Is the native vegetation important habitat for rare or threatened species?		
Number of Rare or Threatened species habitats impacted • The more species listed, the greater the contribution the native vegetation makes to Victoria's biodiversity. • Site observations may also be considered.	48 species	Based on overall impacts to habitat for rare or threatened species the overall impact is considered to be Moderate.

Criteria	Assessment	Contribution
Number of Rare or Threatened species habitats impacted above the specific offset threshold • The more species requiring a specific offset, the greater the contribution the native vegetation makes to Victoria's biodiversity.	3 species: Red-chested Button-quail (2.339 specific BEUs), Rye Beetle-grass (2.711 specific BEUs), and Spiny Rice-flower (2.355 specific BEUs)	
The proportional impact for species requiring a specific offset • The higher the proportional impacts, the more important that site is for that particular species.	Red-chested Button-quail 0.008% Rye Beetle-grass 0.005% Spiny Rice-flower 0.010%	
Habitat importance score for impacted species • The higher the habitat importance score, the more important that site is for that particular species.	0.566 – 0.745	
Impact on highly localised habitat • Native vegetation that provides habitat for species with highly localised habitat is very important vegetation as it is limited and any loss needs to be carefully considered.	All species – Dispersed habitat	

[1] *For the purpose of the assessment provided in Table 14, this extent includes areas of native vegetation to be removed in the MSA program area.*

Minimisation Statement[2]

Preliminary results obtained during the ecological investigation were reviewed at an ecological constraints workshop held by MMRA on December 7 2016 and January 17 2017. The objectives of these workshops were to review and alter design plans to avoid impacts to ecological values as much as possible, and to prioritise

[2] Section 5.2 (page 20) of the Handbook (DELWP 2015) states:

> *"Minimisation should target native vegetation that makes the greatest contribution to Victoria's biodiversity - that is, areas of better condition, higher strategic biodiversity score, and/or higher habitat importance scores.*
>
> *The minimisation statement could state that minimisation was achieved by a past strategic planning exercise or by site interventions, or that it is not achievable or desirable on site for specific reasons."*

Section 6.3.2 (page 26) of the Handbook (DELWP 2015) states:

> *"Minimisation should be commensurate with the contribution that the native vegetation makes to Victoria's biodiversity. Minimum effort can be considered reasonable when the native vegetation contributes lower value to Victoria's biodiversity – for example, only general offsets are required, strategic biodiversity score is low, the native vegetation is limited in extent and isolated from other patches of remnant vegetation."*

Section 6.5, Table 4 (page 29) of the Handbook (DELWP 2015) states:

> *"Statement can describe that minimisation is unreasonable at the site level because the native vegetation makes a very low contribution to biodiversity (such as no species offset requires, low strategic biodiversity score) or because retained native vegetation would have limited long term prospect of retaining biodiversity value."*

related planning actions. Where possible, the BLU will avoid and minimise the removal of remnant native vegetation and EPBC Act-listed listed species and communities. Where practicable, the BLU impact footprint will be sited in areas devoid of ecological values (e.g. exotic vegetation).

For the portion of the project that intersects with the MSA program area, minimisation has been achieved by the strategic planning exercise undertaken as part of the MSA.

For unavoidable impacts, it is recommended that appropriate mitigation measures be implemented during the construction phase of the project to ensure impacts to remnant vegetation and waterways are minimised. Furthermore, avoidance and minimisation measures relating to the management of significant fauna species should be incorporated into a Construction Environmental Management Plan (CEMP). The following measures are recommended to minimise the impacts of the proposed removal of native vegetation on biodiversity:

- Implement appropriate contingency measures to relocate a fauna species if detected during construction works (include in CEMP);
- Signage and fencing to ensure avoidance of impacts to the two patches of NTGVVP community and Matted Flax-lily in vicinity;
- Minimising access tracks within native vegetation, where practicable;
- Storing equipment within disturbed areas, or, during construction, on adjacent plants confined to the road and/or road shoulder; and,
- Pre-clearance surveys will be conducted for Matted Flax-lily, Spiny Rice-flower and Large-fruit Groundsel to ensure impacts to individuals and/or populations will be avoided.

6.2 Offset Impacts

6.2.1 State (The Guidelines)

6.2.1.1 Offset Options

The Guidelines (DEPI 2013a) require offsetting as the final step in considering the impacts of development on native vegetation. Offset targets must be met, as specified in Section 4.5.4. Potential offsets may be sourced using the following.

- BushBroker: BushBroker maintains a register of landowners who are willing to sell offset credits. Offsets secured by Bushbroker are done so via a Section 69 Agreement under the *Conservation, Forest and Lands Act 1987*.
- Trust for Nature: Trust for Nature holds a list of landowners who are willing to sell vegetation offsets. Offsets secured by Trust for Nature are done so under the Victorian *Conservation Trust Act 1972*.
- Local Councils: The proponent may contact local councils to seek availability of offsets.
- Over-the-Counter Offsets Scheme: The Guidelines include the expansion of the 'Over-the-Counter' (OTC) Offsets Scheme, allowing non-government agencies to establish themselves as OTC Facilities. OTC Facilities will broker native vegetation offsets (credits) between landholders (with offset sites) and permit holders (with offset requirements).

7 APPROVAL REQUIREMENTS

Further requirements associated with development of the study area, along with additional investigations or reporting that may be required, are provided below (Table 15).

Table 15. Recommendations associated with development of the study area

Relevant Legislation	Implications	Further Action
Environment Protection and Biodiversity Conservation Act 1999	The proposed development will not result in the removal of the documented Matted Flax-lily and NTGVVP community.	Elements 1a and 1b: Although matters of NES are present within these Elements, this part of the project is subject to the MSA which has previously been assessed and approved under Part 10 of the Act. As such, works within Element 1a and 1b do not need to be referred under the EPBC Act for assessment and determination under the Act. ·However, to ensure compliance with the approval under the MSA, the BLU will need to consult with DELWP regarding the salvage and translocation of the two EPBC Act-listed flora species (Spiny Rice-flower and Large-headed Groundsel) within Element 1a.
		Elements 1c – 6: Matters of NES identified within this section of the study area will be avoided by the proposed impact area. Therefore, based on the results of this assessment alone, the proposed development will not trigger the significant impact thresholds under the Act and an EPBC Act referral is not required. However, given the size and complexity of the project it is recommended the MMRA refer this part of the project under the EPBC Act as a risk minimisation strategy and for legislative certainty. The EPBC Act referral can exclude Elements 1a and 1b.
Flora and Fauna Guarantee Act 1988	There is suitable habitat within the study area for several species listed or protected under the FFG Act. The FFG Act Listed Western Basalt Plains community is also present. A permit under the FFG Act will be required as the study area is located on public land.	Elements 1a and 1b: Prepare and submit a project-wide FFG Act permit application to DELWP, as relevant state assessment and approval requirements still apply within the MSA (Geoff Ralphs, DELWP, pers. comm, 2017)
		Elements 1c – 6: Prepare and submit a project-wide FFG Act permit application to DELWP.
Environment Effects Act 1978	Proposed removal of more than 10 hectares of native vegetation and the potential for impacts to Western Basalt Plains community which is listed under the FFG Act	Entire project: Although an Environmental Effects Statement is not likely to be required for the project, given the size and complexity of the project it is recommended the MMRA refer the project as a risk minimisation strategy and for project certainty.
Planning and Environment Act 1987	Element 1a: Approved under BCS and therefore all proposed vegetation removal is subject to the habitat compensation obligations. Element 1b: Approved under MSA as the Toolern Precinct Structure Plan (PSP) - for native vegetation and scattered trees identified as "to be removed". Additionally, all proposed removal of vegetation and scattered trees marked as 'to be retained' or 'protected' is	Element 1b: Seek Planning Scheme Amendment to remove remnant native vegetation and submit to Melton Council. The incorporated document is likely to include a requirement for: • Demonstration of impact minimisation. • Identification of a compliant offset, as detailed in Section 3.2.2 (See Appendix 4.2 for Element 1a, and appendix 4.1 and 4.3 for Element 1b). • A Construction Environment Management Plan (CEMP). • A Significant Species CMP, including a Salvage and

Relevant Legislation	Implications	Further Action
	subject to Clause 52.16 of the City of Melton planning scheme and the required offsets are included in the combined BIOR report.	Translocation Plan for significant flora species.
	Elements 1c – 6: 7.386 hectares of remnant native vegetation and 25 scattered remnant trees within Modelled Location Risk C is proposed to be removed. As such, a permit application falls under the High Risk-based pathway under the Melton, Moorabool Council planning schemes. The combined total offset requirement for native vegetation removal is 0.456 General Biodiversity Equivalence Units (BEU), along with Specific units for 3 species: Red-chested Button-quail (2.339 specific BEUs), Rye Beetle-grass (2.711 specific BEUs), and Spiny Rice-flower (2.355 specific BEUs).	Elements 1c – 6: Request separate BIOR Reports that provide offset requirements for each council area bisected by the project. Seek Planning Scheme Amendments to remove native vegetation within the Melton and Moorabool municipalities. The Planning Scheme Amendment Incorporated Document is likely to include a requirement for: • Demonstration of impact minimisation. • Identification of a compliant offset, as detailed in Section 3.2.2. • A Construction Environment Management Plan (CEMP).
Catchment and Land Protection Act 1994	Several weed species listed under the CaLP Act were recorded within the study area. To meet requirements under the CaLP Act, listed noxious weeds should be appropriately controlled throughout the study area.	Elements 1a and 1b: Approved under Part 10 which is an overarching Commonwealth and State approval. As such, there are no specific approval requirements under the CALP Act relating to the project.
		Elements 1c – 6: The Incorporated Document likely to include a requirement for a Weed Management Plan to control and prevent the spread of weeds during and after construction.
Water Act 1989	A 'works on waterways' permit may be required from the relevant CMA where any action impacts on waterways within the study area.	Elements 1a and 1b: Approved under Part 10 which is an overarching Commonwealth and State approval. As such, there are no specific approval requirements under the *Water Act 1989* relating to the project.
		Elements 1c – 6: Obtain a project-wide 'works on waterways' permit from the relevant CMAs.
Wildlife Act 1975	Any persons engaged to conduct salvage and translocation or general handling of terrestrial fauna species must hold a current Management Authorisation.	Elements 1a and 1b: Approved under Part 10 which is an overarching Commonwealth and State approval. As such, there are no specific approval requirements under the *Wildlife Act 1975* Act relating to the project.
		Elements 1c – 6: The Incorporated Document may require engagement of a qualified zoologist to supervise the clearing of vegetation and capture and relocate any displaced animals. If this requirement applies, ensure that the engaged wildlife specialists hold a current Management Authorisation under the Act.

REFERENCES

Ashworth, J.M. 1998. An appraisal of the Conservation of *Litoria raniformis* (Kefferstein) in Tasmania. University of Tasmania March 1998. Unpublished Masters thesis.

Barker, J., Grigg, G.C. & Tyler, M.J. 1995. A Field Guide to Australian Frogs. Surrey Beatty & Sons. New South Wales.

Biosis 2012. Rowsley Crossing Loop: Flora and Fauna Assessment. Unpublished report prepared for Public Transport Victoria. Authors: K. Payza & T Shell, Biosis Pty Ltd, Melbourne.

Biosis 2016. Ballarat Amplification Project: Due Diligence Biodiversity Assessment. Unpublished report for Arup. Authors: Mueck, S., Gibson, M., Biosis Pty Ltd, Melbourne.

Christidis, L. & Boles, W.E 2008. Systematics and Taxonomy of Australian Birds. CSIRO Publishing, Collingwood, Victoria.

Clarke, G.M. & C. O'Dwyer 1999. Further survey in southeastern New South Wales for the endangered golden sun moth, Synemon plana. Pg 77. CSIRO Entomology, Canberra.

Cogger, H. 1996. Reptiles and Amphibians of Australia. Reed Books, Sydney.

Cogger, H. G (Ed). 1996. Reptiles and Amphibians of Australia. 5th Edition. Reed Books Australia, Victoria.

Cogger, H. G., Cameron, E. E. And Cogger, H. M. 1983. *Volume 1 of Zoological Catalogue of Australia: Amphibia and Reptilia*. Australian Government Publishing Service, Canberra, ACT.

Cogger, H.G., Cameron, E.E., Sadlier, R.A. and Eggler P., 1993. The Action Plan for Australian Reptiles. Australian Nature conservation Agency, Canberra, ACT.

Dear, C. 1996. Distribution of Synemon plana: a new encounter. Victorian Entomologist 26: 26-28.

DELWP 2015. Biodiversity assessment handbook, Permitted clearing of native vegetation – Version 1.0. Victorian Department of Environment, Land, Water and Planning, Melbourne, Victoria.

DELWP 2016. *Flora and Fauna Guarantee Act 1988* Protected Flora List – December 2016. Victorian Department of Environment, Land, Water and Planning. Melbourne, Victoria.

DELWP 2017. Personal Communication. Email transmittal 21/03/2017, Geoff Ralphs, Principal Advisor, Impact Assessment. Victorian Department of Environment, Land, Water and Planning. Melbourne, Victoria.

DELWP 2017a. Victorian Biodiversity Atlas. Sourced from GIS layers: "VBA_FLORA25", "VBA_FLORA100", "VBA_FAUNA25", "VBA_FAUNA100", February 2017. Victorian Department of Environment, Land, Water and Planning, Melbourne, Victoria.

DELWP 2017b. Native Vegetation Information Management Tool [www Document]. URL: <http://nvim.depi.vic.gov.au/>. Victorian Department of Environment, Land, Water and Planning, Melbourne, Victoria.

DELWP 2017c. Biodiversity Interactive Map [www Document]. URL: <http://www.depi.vic.gov.au/environment-and-wildlife/biodiversity/biodiversity-interactive-map>. Victorian Department of Environment, Land, Water and Planning, Melbourne, Victoria.

DELWP 2017d. *Flora and Fauna Guarantee Act 1988* Threatened List – March 2017. Victorian Department of Environment, Land, Water and Planning, Melbourne, Victoria.

DELWP 2017e. Planning Maps Online [www Document]. URL: <http://services.land.vic.gov.au/maps/pmo.jsp>. Victorian Department of Environment, Land, Water and Planning, Melbourne, Victoria.

DEPI 2006. Ministerial Guidelines for Assessment of Environmental Effects Under the Environmental Effects Act 1978. Victorian Government Department of Environment and Primary Industries, Melbourne, Victoria.

DEPI 2013a. Permitted clearing of native vegetation - Biodiversity assessment guidelines (the Guidelines). Victorian Government Department of Environment and Primary Industries, Melbourne, Victoria.

DEPI 2013b. *Biodiversity Conservation Strategy for Melbourne's Growth Corridors*. Victorian Government Department of Environment and Primary Industries, Melbourne, May 2013.

DEPI 2013c. *Sub-Regional Species Strategy for the Growling Grass Frog*. Victorian Government Department of Environment and Primary Industries, Melbourne, May 2013.

DEPI 2013d. *Sub-Regional Species Strategy for the Golden Sun Moth*. Victorian Government Department of Environment and Primary Industries, Melbourne, May 2013.

DEPI 2013e. *Habitat Compensation under the Biodiversity Conservation Strategy: Melbourne Strategic Assessment*. Victorian Government Department of Environment and Primary Industries, Melbourne, August 2013.

DEPI 2014. Advisory List of Rare or Threatened Plants in Victoria. Victorian Department of Environment and Primary Industries, Melbourne, Victoria.

DEWHA 2009a. Significant impact guidelines for the vulnerable Growling Grass Frog *Litoria raniformis*. EPBC Act Policy Statement 3.14. Department of the Environment, Water, Heritage and the Arts, Australia.

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

DEWHA 2009c, Background Paper to EPBC Act Policy Statement 3.11 – Nationally Threatened Species and Ecological Communities: Significant Impact Guidelines for the Critically Endangered Spiny Rice-flower (*Pimelea spinescens* subsp. *spinescens*), Department of Environment, Water, Heritage and the Arts, Australian Government, Canberra.

DoE 2013. Significant Impact Guidelines 1.1. Matters of National Environmental Significance. Commonwealth Department of the Environment, Canberra, ACT.

DoEE 2017. Protected Matters Search Tool: Interactive Map [www Document]. URL: <http://www.environment.gov.au/epbc/pmst/>. Commonwealth Department of the Environment, Canberra, ACT.

DoEE 2017b. Diuris basaltica in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat.

Dorrough, J. 1995. Past and present habitat of the Striped Legless Lizard, *Delma impar* (Pygopodidae), in the Australian Capital Territory. An unpublished report to the Wildlife Research Unit, ACT Parks and Conservation Service.

DSE 2003. Flora and Fauna Guarantee Act Action Statement #17: Striped Legless Lizard *Delma impar*. Department of Sustainability and Environment, Victoria.

DSE 2004. Vegetation quality assessment manual: Guidelines for applying the Habitat Hectares scoring method. Version 1.3. Victorian Department of Sustainability and Environment, Melbourne Victoria

DSE 2009a. *Delivering Melbourne's Newest Sustainable Communities. Strategic Impact Assessment Report for the Environment Protection and Biodiversity Conservation Act 1999*. Victorian Government Department of Sustainability and Environment, October 2009.

DSE 2009b. Advisory list of Threatened Invertebrate Fauna in Victoria – 2009. Victorian Department of Sustainability and Environment, Melbourne, Victoria.

DSE 2011a. Native Vegetation Technical information sheet: Defining an acceptable distance for tree retention during construction works. Victorian Department of Sustainability and Environment, Melbourne, Victoria.

DSE 2011b. A New Approach to Biodiversity in Melbourne's Growth Areas. Victorian Department of Sustainability and Environment, Melbourne, Victoria.

DSE 2013a. Advisory List of Threatened Vertebrate Fauna in Victoria. Victorian Department of Sustainability and Environment, Melbourne, Victoria.

DSE 2013b. Habitat Compensation Under the Biodiversity Conservation Strategy; Melbourne Strategic Assessment. Victorian Department of Sustainability and Environment, Melbourne, Victoria.

Duncan, A., Baker, G.B. and Montgomery, N. (Eds) 1999. The Action Plan for Australian Bats. Environment Australia. Canberra, ACT.

Ecology and Heritage Partners 2016. Targeted Spiny Rice-flower Survey for V/Line Rail Corridor, Caroline Springs, Victoria. Unpublished report for V/Line.

Ecology Partners 2008. Toolern Precinct Structure Plan: Flora and Fauna Assessment and Habitat Hectare Analysis, Melton South, Victoria. Unpublished report for MacroPlan Australia.

Ecology Partners 2009. Toolern Precinct Structure Plain: Targeted Striped Legless Lizard and Golden Sun Moth Surveys, Melton South, Victoria. Prepared for Melton Shire Council.

Ecology Partners 2011. Melton Line Upgrade Project: Flora and Fauna Assessment, and Net Gain Analysis, Melton to Sunshine, Victoria. Unpublished report for Department of Transport.

EPA 1991. Construction Techniques for Sediment Pollution Control. Published document prepared by the Victorian Environment Protection Authority, Melbourne, Victoria.

EPA 1996. Environmental Guidelines for Major Construction Sites. Published document prepared by the Victorian Environmental Protection Authority, Melbourne, Victoria.

Garnett, S., J. Szabo and G. Dutson 2011. The Action Plan for Australian Birds 2010. CSIRO Publishing, Collingwood, Victoria.

Hadden, S. 1995. Distribution, Status and Habitat Requirements of the Striped Legless Lizard *Delma impar* (Fischer). Final Report to the Australian Nature Conservation Agency. Department of Conservation and Natural Resources, Melbourne.

Heard, G. Scroggie, M. and Clemann, N. 2010. Guidelines for managing the endangered Growling Grass Frog in urbanising landscapes. Arthur Rylah Institute for Environmental Research, Department of Sustainability and Environment. Victoria.

Hero, J-M., Littlejohn, M., & Marantelli, G. 1991. Frogwatch field guide to Victorian frogs. Department of Conservation and Environment, East Melbourne.

Kukolic, K. 1991. Report on the vertebrate fauna surveys at Gunghalin. pp. 12–19 in, The ACT's Native Grasslands. Conservation Council of the South-East Region and Canberra, Canberra.

Kukolic, K. and Osborne, W.S. 1993. Striped Legless Lizard (*Delma impar*). pp. 17–21 in, Sharp, S. (ed.). Lowland Native Grasslands in the Australian Capital Territory: Survey of sites and assessment of the conservation status, habitat and management requirements for species of concern. ACT Parks and Conservation Service, Conservation Series Report 6/93.

Littlejohn, M.J. 1963. *Frogs of the Melbourne area.* Victorian Naturalist **79**: 296-304.

Littlejohn, M.J. 1982. *Amphibians of Victoria.* Victorian, Yearbook **85**: 1-11

Mahony, M.J. 1999. Review of the declines and disappearances within the bell frog species group (*Litoria aurea* species group) in Australia. In: Declines and Disappearances of Australian Frogs. Ed. by A. Campbell, Environment Australia, Canberra

Menkhorst, P. and Knight, F. 2004. A Field Guide to the Mammals of Australia . 2nd Edition. Oxford University Press, Victoria.

MPA 2011. Toolern Precinct Structure Plan (Including Toolern Native Vegetation Precinct Plan). July 2011, Amended July 2015. Melbourne Planning Authority.

Nelson, J. S. 1994. Fishes of the World, 3rd Edition. John Wiley & Sons, New York, USA.

NRE 2002. Native Vegetation Management: A Framework for Action. Department of Natural Resources and Environment, Melbourne, Victoria.

O'Shea, M. 2005. Methods for assessment and techniques for management of striped legless lizard *Delma impar* populations in south-eastern Australia. PhD thesis, Victorian University, Melbourne.

Organ, A. 2003. Growling Grass Frog *Litoria raniformis* monitoring over the 2002/03 breeding period, Western Treatment Plant, Werribee, Victoria. Biosis Research Pty. Ltd. unpublished report for Melbourne Water Corporation.

PsRT 2013, Translocation Protocol *Pimelea spinescens* Recovery Team; Available http://www.swifft.net.au/resources/Pimelea%20spinescens%20Translocation%20Protocol%20March%202013(F1).pdf (Accessed 21/03/2017)

Robertson, P. 2003. Draft Flora and Fauna Guarantee Action Statement for the Growling Grass Frog *Litoria* raniformis. Department of Sustainability and Environment, Victoria.

Rohr, D.H. and Peterson, G.N.L. 2003. The Striped Legless Lizard in the Western District of Victoria: New Insights. Technical Report to the Glenelg Hopkins Catchment Management Authority. Ecology Research Group: RMIT University, Melbourne.

Sands, D.P.A. and New, T.R. 2002. The Action Plan for Australian Butterflies, Environment Australia, Canberra, ACT.

DSEWPaC 2011a. *Environment Protection and Biodiversity Conservation Act 1999* referral guidelines for the vulnerable Striped Legless Lizard Delma impar. Department of Sustainability, Environment, Water, Population and Communities, Canberra. EPBC Act Policy Statement.

DSEWPaC 2011b. Survey Guidelines for Australia's Threatened Reptiles: Guidelines for detecting reptiles listed as threatened under the EPBC Act. Department of Sustainability, Environment, Water, Population and Communities, Canberra. EPBC Act Policy Statement.

DSEWPaC 2011c. Survey guidelines for Australia's threatened fish. Guidelines for detecting fish listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999*. Department of Sustainability, Environment, Water, Population and Communities, 2011. EPBC Act Policy Statement.

DSEWPaC 2011d. Nationally Threatened Ecological Communities of the Victorian Volcanic Plain: Natural Temperate Grassland & Grassy Eucalypt Woodland. Department of Sustainability, Environment, Water, Population and Communities, Canberra. EPBC Act Policy Statement.

DSEWPaC 2012. *Environment Protection and Biodiversity Conservation Act 1999* Environmental Offsets Policy. Commonwealth Department of Environment, Water, Population and Communities, Canberra, ACT.

Strahan, R. (Ed) 1995. The Mammals of Australia. Reed Books, Sydney, NSW.

Survey guidelines for Australia's threatened fish. Guidelines for detecting fish listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999.

Tyler, M.J. 1997. The Action Plan for Australian Frogs. Wildlife Australia: Canberra, ACT.

Victorian Urban Stormwater Committee 1999. Urban Stormwater: Best Practice Environmental Management Guidelines. CSIRO, Collingwood, Victoria.

Viridans 2014a. Flora Information System. Viridans Biological Databases, Bentleigh East Victoria.

Viridans 2014b. Victorian Fauna Database. Viridans Biological Databases, Bentleigh East Victoria.

Walsh, N.G., Stajsic, V. 2007. A census of the vascular plants of Victoria, 8th ed. ed. Royal Botanic Gardens Melbourne, Victoria.

Werribee, Victoria. Biosis Research Pty. Ltd. unpublished report for Melbourne Water Corporation.

Woinarski J. C. Z., Burbidge A. A. & Harrison P. 2014. The action plan for Australian mammals 2012. CSIRO Publishing, Collingwood, Victoria.