Proposed Central Victorian Livestock Exchange

Statement of Expert Evidence – Native Vegetation, Flora and Fauna

Matthew Shane Gibson - Senior Consultant Botanist
Biosis Pty. Ltd. - 506 Macarthur Street, Ballarat, Victoria 3350
Date of statement: 11/06/2015

City of Ballarat Planning Scheme Amendment C185
EPA Works Approval Application – Service Order Ref: 1001580

Section 1: Introduction

I was engaged by Spiire on 21/11/2013, on behalf of RLX Investment Company, to undertake a flora and fauna assessment of the site proposed for development of the Central Victorian Livestock Exchange.

The site assessment was undertaken on 3/12/2013 and the final report submitted on 29/01/2014. The report quantified impacts to native vegetation according to the Net Gain Framework (DNRE 2002). On 20/12/2013, planning scheme amendment VC105 was gazetted, giving effect to *the Permitted clearing of native vegetation – Biodiversity assessment guidelines* (the Guidelines) (DEPI 2013), and an additional report was submitted on 14/01/2014 to quantify impacts to native vegetation under the new system.

On 23/4/2015 Biosis was engaged by Harwood Andrews, on behalf of RLX Investment Company, to provide advice regarding the potential for the water treatment facilities associated with the Livestock Exchange development to attract birds that might present a risk to aviation using the Ballarat Airport. The airport is located approximately three kilometres to the south of the site. My colleague Ian Smales, Biosis Principal Zoologist, and I provided our assessment of this risk in a letter to Greg Tobin of Harwood Andrews on 2/06/2015.

I was instructed to prepare this expert witness statement on 4/5/2015 by John Hannagan of Harwood Andrews, on behalf of RLX Investment Company Pty Ltd.

This expert witness statement focusses on the flora and fauna assessment, including quantification of impacts to native vegetation, as required under the City of Ballarat Planning Scheme. The report also addresses the issues raised concerning bird strike.

The three reports mentioned above are attached, specifically:

- Central Victorian Livestock Exchange: Flora and Fauna Assessment. Report for RLMC Investment Company Pty Ltd. Author: Gibson, M. Biosis Pty Ltd, Ballarat. Project no. 16029. Date of issue 29/01/2014.
- Central Victorian livestock Exchange – Permitted clearing of native vegetation. Report for RLX Investment Company Pty Ltd. Author: Gibson, M. Biosis Pty Ltd, Ballarat. Project no. 16029. Date of issue 14/01/2014. This additional report was prepared to document the native vegetation offset requirements as specified by the Biodiversity assessment guidelines, which were introduced into the planning scheme after the commencement of the flora and fauna study.

- Advice regarding potential response of birds to the proposed Ballarat Livestock Exchange. Letter to Mr Greg Tobin, Harwood Andrews, dated 2/06/2015.

Section 2: Qualifications and experience

I am employed by Biosis Pty. Ltd as a senior consultant botanist within the Ballarat Resource Group. I hold a Bachelor of Applied Science Degree (University of Ballarat). I have been working as an ecologist for over 18 years.

I have extensive knowledge and understanding of environmental issues and conservation management with skills in project management, plant identification, monitoring, habitat hectare assessments, habitat condition assessment, mapping, analysis of biodiversity data and targeted searching for rare and threatened species in a wide range of environments. I have excellent plant identification skills and have worked in a range of vegetation communities across Victoria, South Australia and Western New South Wales. I have extensive experience as a Consultant in natural resource management projects involving stakeholder consultation and interactions between managing authorities.

My full curriculum vitae is attached as Appendix 1.

Section 3: Summary of findings

Study area

The study area is 45.6 ha in size and consists of the following parcels: Lot 1 – TP840697, Lot 2 – TP840697 and Lot 1 – TP915649. The study area also includes two areas of road reserve (crown land) including a fenced un-used road reserve bordering the site to the west, and an un-fenced road reserve running in a north-south direction near the eastern edge of the site. The un-fenced road reserve near the eastern edge of the site is now owned by RLX Investment Company, and is no-longer a road reserve.

Ecological values

The vegetation and fauna habitat throughout the majority of the study area has been highly modified by past disturbances which have included cattle grazing, hay cutting and fertiliser application. Most of the study area has been significantly modified and now supports predominantly introduced vegetation that is of limited value for native flora or fauna.

The study area supports introduced grassland (improved pasture), planted trees, a remnant indigenous tree, farm dams and vegetated drains. The Department of Environment, Land, Water and Planning (DELWP) modelling predicts that the study area was once covered by Plains Grassy Woodland Ecological Vegetation Class (EVC) 55, and that patches of this EVC are still present within the study area. No areas of Plains Grassy Woodland are currently present within the study area.

Ecological values identified within the study area are as follows:

- 0.01 ha of remnant vegetation - Plains Grassy Wetland EVC (located in the road reserve to the west of the property).
- One remnant indigenous tree.

It is my understanding that clearance of the remnant patch mapped in the road reserve to the west of the property will not be required, and hence the only native vegetation on the site requiring clearance is the scattered tree towards the eastern end of the property. The approval requirements to remove the tree, should this be necessary for the development, are specified in the following section.

The site does not provide significant habitat for any threatened species or threatened ecological communities listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) of the *Flora and Fauna Guarantee Act 1988 (*Vic.).

Permitted clearing of native vegetation – Biodiversity assessment guidelines

Location risk has been determined for all locations in Victoria by DEPI (now DELWP). The location risk of a particular site is determined by using the *Native vegetation location risk map* available in the Native Vegetation Information Management system (DELWP website).

The scattered tree is in Location A on the Native vegetation location risk map, and as less than 15 scattered trees are proposed for removal, the application for removal of this native vegetation meets the requirements of, and will be assessed under, the low risk-based pathway.

If approval is granted to remove the scattered tree, the offset requirement defined by the DELWP BAR (attached) amounts to an offset of 0.006 general biodiversity equivalence units. Further details of the offset requirement can be found in Biosis 2014b.

Level of impact

The level of impact to native vegetation and flora and fauna species is low.

Response to submissions

No submitters raised objections to the project on the basis of impacts to native vegetation, or flora and fauna values within the site.

A number of objectors raised concerns regarding potential off-site water contamination impacts to Burrumbeet Creek and the broader Mount Emu Creek Catchment. The native vegetation, flora and fauna study area was limited to the project site and did not examine off-site impacts.

The Department of Economic Development, Jobs, Transport & Resources requested consideration of the National Airports Safeguarding Framework (NASF) Guidelines for Managing the Risk of Wildlife Strikes in the Vicinity of Airports. Our assessment of the level of risk is provided in the attached letter to Greg Tobin dated 2/6/2015. We consider the risk to be 'low' for a range of reasons, including distance of the site from the airport, the location of the site in relation to the orientation of the runways, the presence of a large area of existing wetlands in the area, and the lack of reported strikes to date.

Conclusion

The proposed schedule to the special use zone (SUZ15) includes a requirement for a vegetation management plan to be included in the development plan. I consider the information requirements specified in SUZ15 for the vegetation management plan to be adequate to ensure that impacts to native vegetation are minimised, and that appropriate consideration is given to offsetting impacts to native vegetation.

SUZ15 makes no specific mention of the NASF Guidelines for Managing the Risk of Wildlife Strikes in the Vicinity of Airports. Based on assessment of the current concept plan and the context of the site, the level of risk has been determined to be low. As section 2.0 of SUZ15 requires the saleyard development to be generally in accordance with the concept plan shown in section 8.0, I do not believe it necessary to give further consideration to the bird strike-risk issue.

References cited

Biosis 2014a. Central Victorian Livestock Exchange: Flora and Fauna Assessment. Report for RLMC Investment Company Pty Ltd. Author: Gibson, M. Biosis Pty Ltd, Ballarat. Project no. 16029.

Biosis 2014b. Central Victorian livestock Exchange – Permitted clearing of native vegetation. Report for RLX Investment Company Pty Ltd. Author: Gibson, M. Biosis Pty Ltd, Ballarat. Project no. 16029.

DEPI 2013. *Permitted clearing of native vegetation – Biodiversity assessment guidelines*. Victorian Government Department of Environment and Primary Industries, Melbourne, September 2013.

DNRE 2002. *Victoria's Native Vegetation Management: A Framework for Action.* Victorian Government Department of Natural Resources & Environment, East Melbourne.

Declaration

I have made all the inquiries that I believe are desirable and appropriate and no matters of significance which I regard as relevant have to my knowledge been withheld from Panel.

Matthew Gibson
Senior Consultant Botanist
Biosis Pty. Ltd.

Appendix 1– Curriculum Vitae

Curriculum Vitae

Matthew Gibson

Position:

Senior Consultant Botanist
Ballarat Resource Group
Victoria

Professional Affiliations and Memberships:

Australasian Bat Society

Qualifications and Training:

Bachelor of Applied Science, University of Ballarat

Professional Experience:

Matthew is a Senior Botanist with Biosis Pty Ltd and has over 18 years experience in the survey and management of native vegetation.

Matthew has a broad knowledge and understanding of environmental issues and conservation management with skills in project management, plant identification, monitoring, habitat hectare assessments, condition assessment, mapping, analysis of biodiversity data and targeted searching for rare and threatened species in a wide range of environments.

Matthew has successfully managed several large and complex projects, including Landscape Function Analysis and Vegetation Condition Monitoring within the Lower Murray Darling Catchment, the Shepparton Bypass Habitat Study and Vegetation Condition Monitoring within the Victorian Mallee Parks.

Matthew has excellent plant identification skills and has worked in a range of vegetation communities across Victoria, South Australia and Western New South Wales. He has extensive experience as a Consultant in natural resource management projects involving stakeholder consultation and interactions between managing authorities.

He has a detailed understanding of biodiversity legislation and takes an innovative approach to providing excellent environmental outcomes for his clients. Matthew is a DSE Certified Habitat Hectares Assessor

Fields of Competence:

- Flora identification
- Native vegetation assessment
- Vegetation mapping
- Targeted survey and monitoring for rare and threatened species
- Ecological advice for a range of large-scale infrastructure projects
- Vegetation Quality Assessments (certified Habitat Hectares assessor)
- Net Gain offset management plans
- Conservation management plans

- Ecological data management and analysis
- Bat ecology and bat call analysis

Publications:

Adams, M.D., Law, B.S. and **Gibson, M.S.** (2010). Reliable Automation of Bat Call Identification for Eastern New South Wales, Australia, Using Classification Trees and AnaScheme Software. *Acta Chiropterologica* 12(1): 231-245.

Callister, K., Westbrooke, M., Gowans, S., and **Gibson, M**. (2005). Feasibility study for the use of small format large-scale aerial photography for vegetation condition assessment in north-west Victoria. *Victorian Naturalist* 122(1), 35-46.

Cook, C. N., Wardell-Johnson, G., Keatley, M., Gowans, S. A., **Gibson, M.**, Westbrooke, M. E. and Marshall, D. J. (2010), Is what you see what you get? Visual vs. measured assessments of vegetation condition. Journal of Applied Ecology, 47: 650–661.

Florentine, S.K., Milberg, P., **Gibson, M**. and Westbrooke, M. (2008). Post-wildfire Seedling Colonisation Patterns in a Eucalyptus delegatensis (Myrtaceae) Windthrow Site at Snowy River National Park, Victoria. Australian Forestry 71(1): 48-53.

Gill, A. M., Ryan, P. G., Moore, P. H. R. and **Gibson, M**. (2000), Fire regimes of World Heritage Kakadu National Park., Australia. Austral Ecology, 25: 616–625.

Gowans, S., Callister, K., Westbrooke, M., and **Gibson, M.** (2005). Vegetation condition assessment of the semi-arid woodlands of Murray-Sunset National Park, Victoria. *Victorian Naturalist* **122**(2), 85-93.

Gowans, S. A., **Gibson, M. S**., Westbrooke, M. E., and Pegler, P. (2010). Changes in vegetation condition following kangaroo population management in Wyperfeld National Park. In: *Macropods: The Biology of Kangaroos, Wallabies and Rat-kangaroos* (eds G. Coulson and M. Eldridge) pp. 361-370. CSIRO Publishing, Collingwood, Victoria, Australia.

Pigott J. P., Brown G. W., **Gibson M. S.**, Orscheg, C., Palmer G. C., Tolsma A. D., Wright J. R. & Yen A. (2011) Box-Ironbark Ecological Thinning Trial: Documentation of Methods and Monitoring Framework. Parks Victoria Technical Series No. 57, Parks Victoria, Melbourne (in press).

Pigott, J.P., Palmer, G.P., Yen, A., Tolsma, A.D., Brown, G.W., **Gibson, M.S.** and Wright, J.R. (2010). Establishment of the Box-Ironbark Ecological Thinning Trial in North Central Victoria. Proceedings of the Royal Society of Victoria. 122(2) 112-123.

Westbrooke, M., Gowans, S. and **Gibson, M**. (2011). The vegetation of the Coonavitra area, Paroo Darling National Park, western New South Wales. Cunninghamia. 12(1) 7-26.

Westbrooke, M., Leversha, J., **Gibson, M.**, O'Keefe, M., Milne, R., Gowans, S., Harding, C., and Callister, K. (2003). The vegetation of Peery Lake area, Paroo-Darling National Park, western New South Wales. *Cunninhamia* 8(1), 111-128.

Central Victorian Livestock Exchange: Flora and Fauna Assessment

Prepared for RLMC Investment Company Pty Ltd

29 January 2014

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- Spiire: Anthony Wansink
- Department of Environment and Primary Industries for access to the Victorian Biodiversity Atlas

The following Biosis staff were involved in this project:

- James Shepherd for mapping

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Summary

Biosis Pty Ltd was commissioned by RLMC Investment Company Pty Ltd to undertake a flora and fauna assessment of an area of land proposed for development of the Central Victorian Livestock Exchange. The study area is located near the intersection of the Sunraysia Highway and the Western Highway approximately 1.5 km south-west of Miners Rest (Figure 1).

The study area is 45.6 ha in size, and consists of the following parcels:

- Lot 1 – TP840697
- Lot 2 – TP840697
- Lot 1 – TP915649

The study area also includes two areas of road reserve (crown land):

- A fenced un-used road reserve bordering the site to the west
- An un-fenced road reserve running in a north-south direction near the eastern edge of the site

Ecological values

The site is predominantly cleared pasture.

Ecological values identified within the study area are as follows:

- 0.01 ha of remnant vegetation - Plains Grassy Wetland Ecological Vegetation Class
- One remnant tree

Government legislation and policy

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

Legislation / Policy	Relevant ecological feature on site	Permit / Approval required	Notes
EPBC Act	No threatened species or communities are considered likely to occur within the site.	Referral not required	
FFG Act	No threatened species or communities are considered likely to occur within the site.	Protected Flora Permit not required	Site includes private and public land.
Planning & Environment Act	The site contains a small patch of remnant vegetation and one remnant tree. Cleared paddocks support scattered native grasses and rushes.	Planning permit required, including permission to lop or remove native vegetation.	Permit application needs to outline measures taken to address steps 1 and 2 of Net Gain policy (Victoria's Native Vegetation Management Framework).

Legislation / Policy	Relevant ecological feature on site	Permit / Approval required	Notes
			Comply with 3 step approach to Net Gain May require provision of Net Gain offsets if removal of remnant vegetation cannot be avoided.
CaLP Act	Four noxious weed species recorded within the site.	N/A	Comply with requirements to control/eradicate

Note: Guidance provided in this report does not constitute legal advice.

Native Vegetation Management Framework (the Framework)

Losses of native vegetation and offset requirements identified for the current design through the Net Gain calculation process are summarised below:

Native vegetation	Losses	Offsets
Patches	< 0.01 habitat hectares	0.02 habitat hectares
Scattered trees	One Medium Old Tree	Source and permanently protect two Medium Old Trees if removal of the one tree present is required. This will also allow for associated recruitment of 10 new trees.

Native vegetation is very limited within the site and if may be possible to design the development to avoid impacts to the small areas of vegetation present. If this is not possible, off-site offsets will be required, as specified above.

Recommendations

The results of this assessment should be incorporated into the project design, by adding the flora and fauna mapping information into the planning maps and investigating options to retain as much of the mapped vegetation/habitats as possible.

No further survey is considered necessary.

1 Introduction

1.1 Project background

Biosis Pty Ltd was commissioned by RLMC Investment Company Pty Ltd to undertake a flora and fauna assessment of an area of land proposed for development of the Central Victorian Livestock Exchange.

1.2 Scope of assessment

The objectives of this investigation are to:

- Describe the vascular flora (ferns, conifers, flowering plants) and vertebrate fauna (mammals, birds, reptiles, frogs, fishes)
- Map native vegetation and other habitat features
- Conduct a vegetation quality assessment
- Review the implications of relevant biodiversity legislation and policy, including Victoria's Native Vegetation Management Framework (Net Gain policy)
- Identify potential implications of the proposed development and provide recommendations to assist with development design
- Recommend any further assessments of the site that may be required (such as a Net Gain assessment or targeted searches for significant species).

1.3 Location of the study area

The study area is located near the intersection of the Sunraysia Highway and the Western Highway approximately 1.5 km south-west of Miners Rest (Figure 1).

The study area is 45.6 ha in size, and consists of the following parcels:

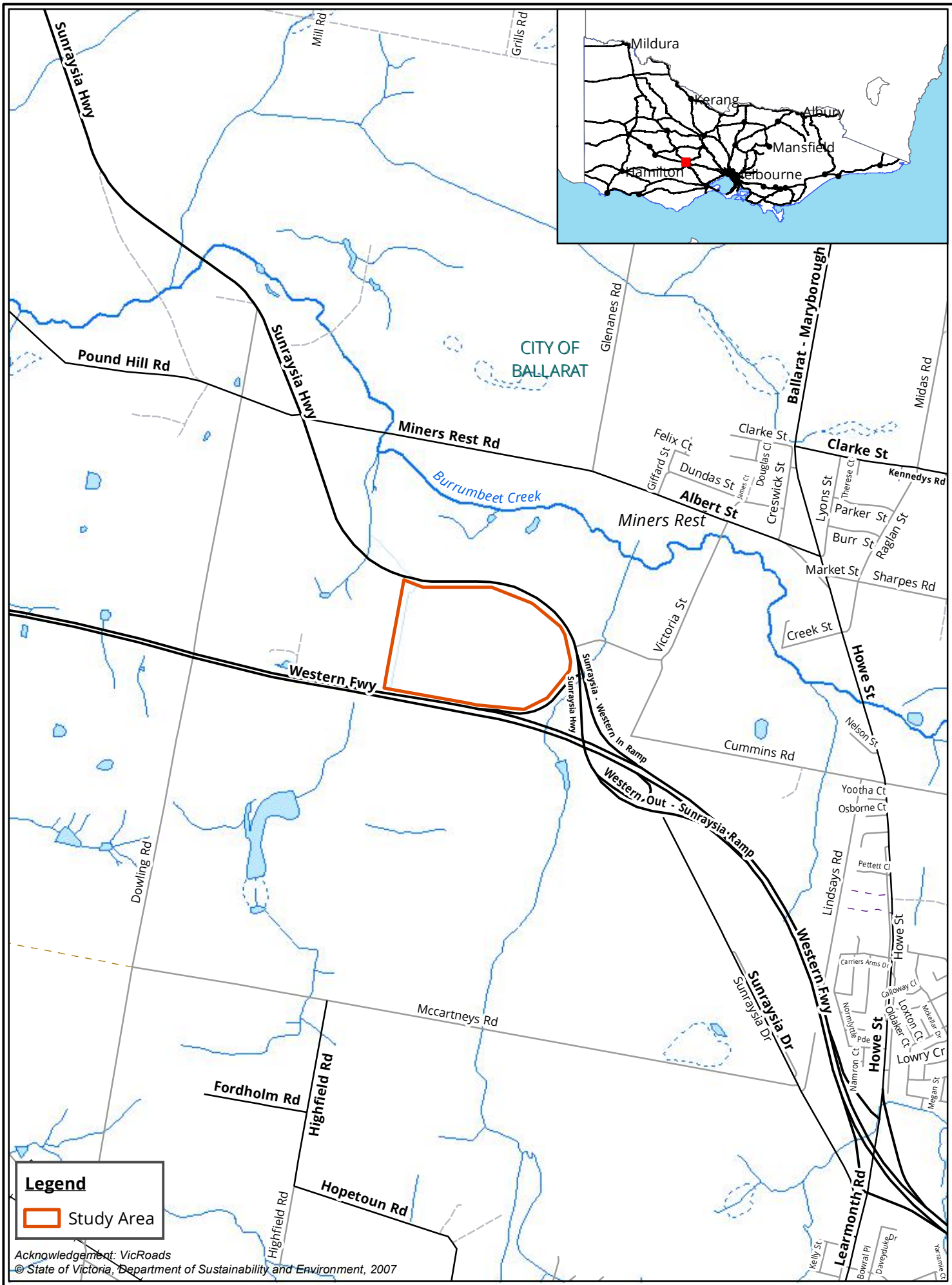
- Lot 1 – TP840697
- Lot 2 – TP840697
- Lot 1 – TP915649

The study area also includes two areas of road reserve (crown land):

- A fenced un-used road reserve bordering the site to the west.
  This crown land road reserve is outside the property, but has been included in this assessment to gain an understanding of the vegetation present and the potential implications of extending the development into the reserve.
- An un-fenced road reserve running in a north-south direction near the eastern edge of the site.
  This crown land road reserve is subject to a long term lease and has been assessed as part of the study area.

The study area is within the:

- Victorian Volcanic Plain Bioregion
- Burrumbeet Creek Basin (Hopkins catchment)
- Glenelg Hopkins Catchment Management Authority
- City of Ballarat



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Ballarat, Brisbane, Canberra, Melbourne, Sydney, Wangaratta & Wollongong

Figure 1: Location of the Study Area - Miner's Rest, Victoria

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Date: 16 December 2013,
Checked by: MSG, Drawn by: JMS, Last edited by: jshepherd
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2 Methods

2.1 Literature and database review

In order to provide a context for the study site, information about flora and fauna from within 5 km of the study area (the 'local area') was obtained from relevant public databases. Records from the following databases were collated and reviewed:

- Flora Information System which includes records from the Victorian Biodiversity Atlas 'VBA_FLORA25, FLORA100 & FLORA Restricted' August 2012 © The State of Victoria, Department of Environment and Primary Industries (DEPI). The contribution of the Royal Botanical Gardens Melbourne to the database is acknowledged.
- Victorian Biodiversity Atlas 'VBA_FAUNA25, FAUNA100 & FAUNA Restricted' August 2012 © The State of Victoria,
- DEPI Biodiversity Interactive Map (BIM)
- BirdLife Australia, the New Atlas of Australian Birds 1998-2012 (BA)
- Protected Matters Search Tool of the Australian Government Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) for matters protected by the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Other sources of biodiversity information:

- DEPI NaturePrint; accessed through the Biodiversity Interactive Map

2.2 Definitions of significance

2.2.1 Species and ecological communities

The significance of a species or community is determined by its listing as rare or threatened under Commonwealth or State legislation / policy. The sources used to categorise significance of species and communities in this report are summarised below in Table 1.

Table 1: Criteria for determining significance of species & ecological communities

Significance	
National	Listed as threatened (critically endangered, endangered, vulnerable or conservation dependent) under the *Environment Protection and Biodiversity Conservation Act 1999*
State	Listed as threatened (critically endangered, endangered, vulnerable) or rare for flora species, in Victoria on a DEPI Advisory List (DSE 2005, 2013a) Listed as threatened under the *Flora and Fauna Guarantee Act 1988*

Fauna species listed as near threatened or data deficient are listed in Appendix 2, however in accordance with advice from DEPI these fauna species are not considered to be at the same level of risk as higher categories of threat. These species are generally not discussed in detail in this report.

2.2.2 NaturePrint areas

Areas of conservation significance were formerly documented in the DEPI Biodiversity Interactive Map as Biosites ranked as significant at national, state and regional levels. DEPI have advised that the Biosite reports are obsolete and their replacement layer on the Biodiversity Interactive Map is now NaturePrint which identifies areas that contribute most to protecting a range of biodiversity values and identifies their relative contribution.

2.3 Likelihood of occurrence

The likelihood of occurrence is a broad categorisation used by Biosis to indicate the potential for a species to occur within the site: it is based on expert opinion and implies the relative value of a site for a particular species.

The likelihood of species occurring within the site is ranked as negligible, low, medium or high. The rationale for the rank assigned is provided for each species in Appendix 1 (flora) and Appendix 2 (fauna).

Species which have at least medium likelihood of occurrence are given further consideration in this report. Those species listed as rare or threatened on the DEPI Advisory Lists are also addressed in the assessment of conservation significance for Net Gain (DSE 2007). The need for targeted survey for these species is also considered.

2.4 Site investigation

2.4.1 Flora assessment

The flora assessment was undertaken on 3 December 2013 and a list of flora species was collected (#S1446700). This list will be submitted to DEPI for incorporation into the Victorian Biodiversity Atlas.

The general condition of native vegetation was observed as well as the effects of current seasonal conditions. Notes were made on specific issues such as noxious weed infestations, evidence of management works, current grazing impacts and the regeneration capacity of the vegetation.

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

Where native vegetation was identified within the study area, an assessment in relation to the Native Vegetation Management Framework (Net Gain policy) according to standard methods provided by DEPI (DSE 2004) was also undertaken while on-site.

2.4.2 Fauna assessment

The study area was investigated on 3 December 2013 to determine its values for fauna. These were determined primarily on the basis of the types and qualities of habitat(s) present. All species of fauna observed during the assessment were noted and active searching for fauna was undertaken. This included direct observation, searching under rocks and logs, examination of tracks and scats and identifying calls. Particular attention was given to searching for significant species and their habitats. Fauna species were recorded with a view to characterising the values of the site and the investigation was not intended to provide a comprehensive survey of all fauna that has potential to utilise the site over time.

2.4.3 Permits

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

- Research Permit/Management Authorisation and Permit to Take Protected Flora & Protected Fish issued by the Department of Environment and Primary Industries under the *Wildlife Act 1975, Flora and Fauna Guarantee Act 1988* and *National Parks Act 1975* (Permit number 10006240, expiry date 9 May 2015)
- Approvals 04.12 and 14.12 from the Wildlife and Small Institutions Animal Ethics Committee
- Permit RP1071 issued by the Department of Environment and Primary Industries (Fisheries Victoria) under the *Fisheries Act 1995*

2.5 Qualifications

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

The current flora and fauna assessment was conducted in early summer, which is an optimal time for survey.

2.6 Legislation and policy

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

- Matters listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act); associated policy statements, significant impacts guidelines, listing advice and key threatening processes
- Threatened taxa, communities and threatening processes listed under Section 10 of the *Flora & Fauna Guarantee Act 1988* (FFG Act); associated action statements and listing advice
- Victoria's Native Vegetation Management – a Framework for Action (the Framework; DNRE 2002).
- Native Vegetation Management Plans prepared by Catchment Management Authorities
- *Planning and Environment Act 1987* – specifically Clauses 12.01-2, 52.17 and 66.02 and Overlays in the relevant Planning Scheme
- *Wildlife Act 1975* and associated Regulations
- *Fisheries Act 1995*
- *Water Act 1989*
- *Environment Protection Act 1971*: State Environmental Protection Policy (Waters of Victoria) 2003.

2.7 Mapping

Mapping was conducted using hand-held (uncorrected) GPS units (WGS84) and aerial photo interpretation. The accuracy of this mapping is therefore subject to the accuracy of the GPS units (generally ± 7 m) and dependent on the limitations of aerial photo rectification and registration.

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

3 Results

The ecological features of the study area are described below and mapped in Figure 2.

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

A list of significant species recorded or predicted to occur in the local area is also provided in those appendices, along with an assessment of the likelihood of the species occurring within the study area.

3.1 Vegetation & fauna habitat

The vegetation and fauna habitat throughout the majority of the study area has been highly modified by past disturbances which have included cattle grazing, hay cutting and fertiliser application. Most of the study area has been significantly degraded and supports predominantly introduced vegetation that is of limited value for native fauna.

The study area supports a range of ecological features including introduced grassland (pasture), planted trees, a remnant tree, farm dams and vegetated drains (Figure 2). The DEPI modelling predicts that the study area was once covered by Plains Grassy Woodland EVC 55, and that patches of this EVC are still present within the study area. No areas of Plains Grassy Woodland are present within the study area.

Introduced pasture occupies most of the study area. The study area is currently used for cattle grazing and hay cutting, and is dominated by a range of introduced grass species (refer to Appendix 1). Some native plant species were present, including Rushes *Juncus* spp. and several Wallaby Grass species *Rytidosperma* spp. Pasture areas provide habitat for common, open country birds but do not provide important habitat for any significant species.

Plate 1: Introduced pasture covers most of the study area

One **scattered remnant tree** is present within the study area. A single Swamp Gum *Eucalyptus ovata* is present within the south-eastern paddock.

Plate 2: Swamp Gum tree located in the south-eastern paddock

A small **plantation of cypress trees** is located within the north-eastern paddock. The plantation provides shelter for the cattle and the level of soil disturbance suggests that it is a regular cattle camp site.

Plate 3: Cypress plantation within the north-eastern paddock

Two **farm dams** are located within the study area. Both dams are un-fenced and the margins have been trampled by cattle. Water within the dams is highly turbid, and the dams did not support any aquatic or semi-aquatic vegetation at the time of the survey.

Plate 4: Dam near the southern boundary of the study area adjacent to the Western Highway

Plate 5: Dam in the north-west corner of the property

The **road reserve** adjacent to the western boundary of the study area is dominated by a similar suite of introduced pasture species to the remainder of the study area. Several woody weed species are also present, including Gorse *Ulex europeus*, Hawthorn *Crataegus monogyna* and Sweet Briar *Rosa rubiginosa*. The disused road formation is slightly raised, with signs of old drains running to either side of the road. These low-lying areas support several semi-aquatic species including both natives (including Common Swamp Wallaby-grass *Amphibromus nervosus*, Poong'ort *Carex tereticaulis* and Common Spike-sedge *Eleocharis acuta*) and weeds (including Meadow Fox-tail *Alopecurus pratensis* and Toowoomba canary-grass *Phalaris aquatica*).

Plains Grassy Wetland

One small patch of Plains Grassy Wetland (EVC 125) is located within the road reserve near the dam in the north-western corner of the property (Figure 2 and Plate 6). This patch supports sufficient cover of native vegetation to be identified as remnant vegetation, and has been subject to a vegetation quality assessment (Habitat Zone 1, Section 5). Native species present include Common Swamp Wallaby-grass, Poong'ort, Common Spike-sedge and Rushes *Juncus* spp.

Plate 6: Small patch of Plains Grassy Wetland within the road reserve near the north-west corner of the study area

This patch of Plains Grassy Wetland is of insufficient size to match the definition of the EPBC Act listed community 'Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains.

3.2 Landscape context

The site is situated within a predominantly cleared landscape where grazing is the primary land use. It is bordered on three sides by major roads (Western Highway and Sunraysia Highway). The road reserves along both highways include areas of planted native species, but very little remnant native vegetation is present.

The Burrumbeet Creek is located to the north of the site, flowing south-west into Lake Burrumbeet, located approximately 10 km west of the site. Lake Learmonth is located 8 km to the north-west.

3.3 Significant species and ecological communities

3.3.1 EPBC Act, FFG Act & DSE Advisory listed species

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

Table 2: Summary of significant species most likely to occur in the study area

Species name	Area of value within the study area
EPBC Act (Migratory Species)	
Eastern Great Egret	The two farm dams and the drains within the western road reserve during wet conditions.
Latham's Snipe	Damp ground around the two farm dams and the drains within the western road reserve during wet conditions.

While these species have potential to utilise the study area on occasions, the site is unlikely to provide important habitat.

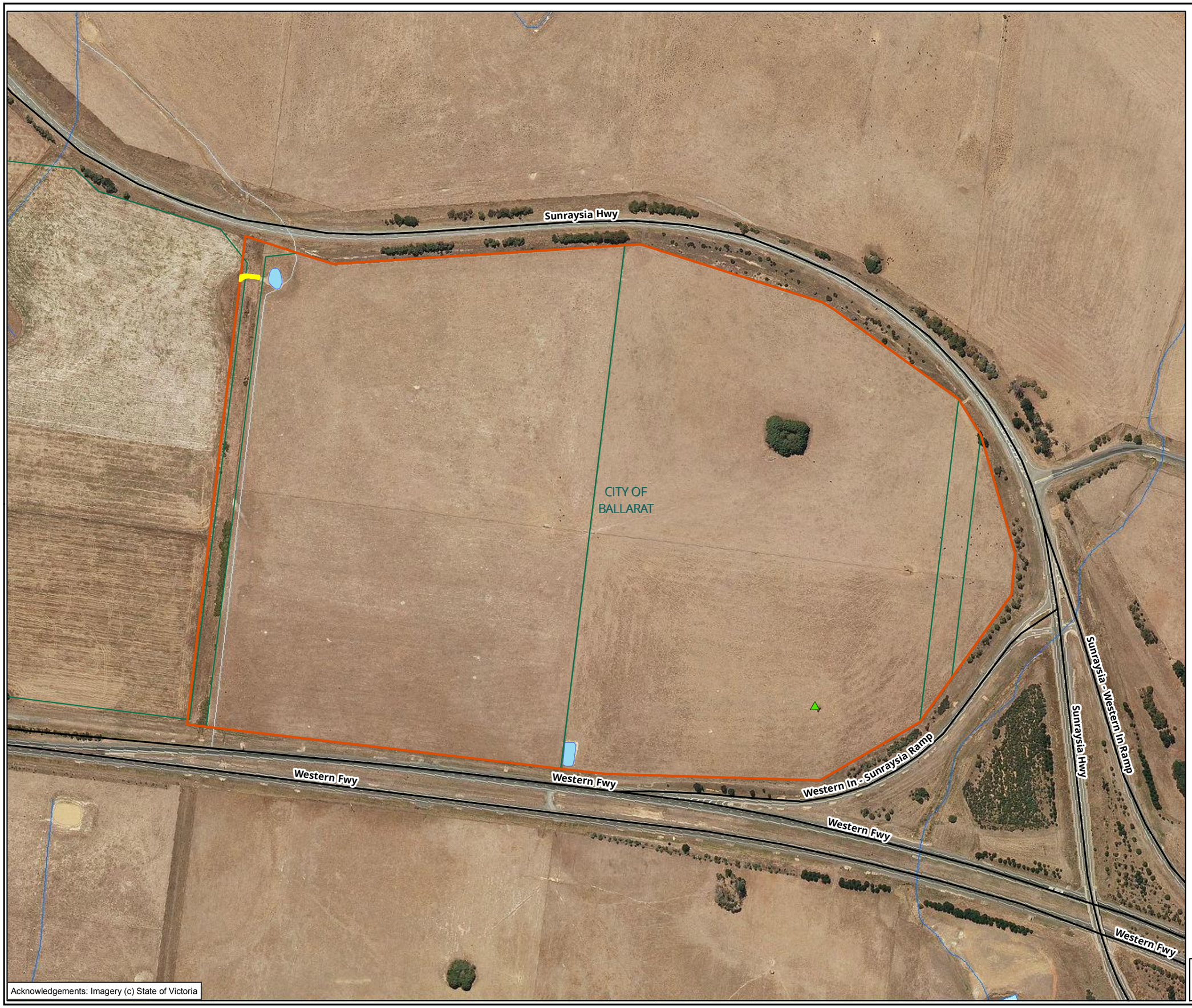
3.3.2 Significant ecological communities

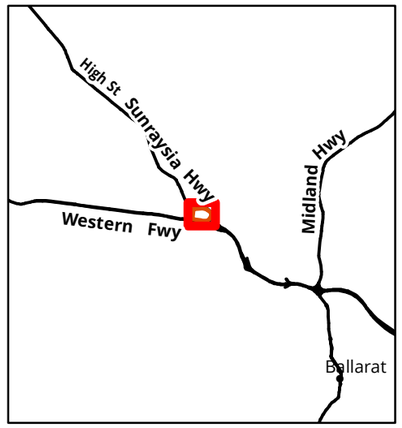
Plains Grassy Wetland EVC is included within the definition of the EPBC Act listed community 'Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plain', however the extent of this EVC within the study area (Habitat Zone 1) is insufficient for protection under the EPBC Act.

No significant ecological communities are present.

3.4 Further survey recommendations

No further survey is considered necessary.





Legend

- Study Area
- Swamp Gum
- Plains Grassy Wetland - Habitat Zone 1
- Dam

Figure 2: Ecological Features of the Study Area – Miner's Rest, Victoria

0 40 80 120 160 200

Metres

Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

Biosis Pty Ltd

Ballarat, Brisbane, Canberra, Melbourne, Sydney, Wangaratta & Wollongong

Matter: 16029,
Date: 16 December 2013,
Checked by: MSG, Drawn by: JMS, Last edited by: jshepherd
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4 Biodiversity Legislation and Government Policy

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

4.1 Commonwealth

4.1.1 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act applies to developments and associated activities that have the potential to significantly impact on Matters of National Environmental Significance (NES) protected under the Act.

Link for further information including a guide to the referral process is available at: http://www.environment.gov.au/epbc/index.html

Matters of National Environmental Significance relevant to the project are summarised in Table 3. It includes an assessment against the EPBC Act policy statements published by the Australian Government which provide guidance on the practical application of EPBC Act.

Table 3: Assessment of project in relation to the EPBC Act

Matter of NES	Project specifics	Assessment against Guidelines
Threatened species	Twenty-one species have been recorded or predicted to occur in the project search area.	None of these species are considered likely to occur within the study area (Appendix 1 and 2). The development is not likely to constitute a significant impact.
Threatened ecological communities	Five threatened ecological communities have been predicted to occur within the project search area.	Plains Grassy Wetland EVC is included within the definition of Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plain, but the extent of this EVC within the study area (Habitat Zone 1) is insufficient for protection under the EPBC Act. The other four threatened communities are not present within the study area.
Migratory species	Thirteen migratory species have been recorded or predicted to occur in the project search area (Appendix 2).	While some of these species would be expected to use the study area on occasions, in particular Eastern Great Egret and Latham's Snipe, it does not provide important habitat for an ecologically significant proportion of any of these species.
Wetlands of international importance (Ramsar sites).	The study area is identified as upstream from five Ramsar Sites	The study area does not drain directly into either Ramsar site and the development is not likely to result in a significant impact.

On the basis of criteria outlined in the relevant *Significant Impact Guidelines* it is considered unlikely that a significant impact on a Matter of National Environmental Significance would result from the proposed action.

4.2 State

4.2.1 Flora and Fauna Guarantee Act 1988 (FFG Act)

The FFG Act is the key piece of Victorian legislation for the conservation of threatened species and communities and for the management of potentially threatening processes. Under the FFG Act a permit is required from DSE to 'take' protected flora species from public land. A permit is generally not required for removal of protected flora from private land. Authorisation under the FFG Act is required to collect, kill, injure or disturb listed fish.

No threatened species or protected species were recorded within the study area.

No threatened communities were recorded within the study area.

A protected flora permit is not required.

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

The *Planning and Environment Act 1987* controls the planning and development of land in Victoria, and provides for the development of planning schemes for all municipalities. As part of the planning process regard needs to be given to Action Statements that have been produced under the FFG Act.

Reforms to the native vegetation permitted clearing regulations are underway and will include amendments to clauses in the Victorian Planning Provisions in all planning schemes in Victoria.

The study area supports one remnant Swamp Gum tree and several native species which are scattered throughout the paddocks, including Wallaby Grasses *Rytidosperma* spp. and Rushes *Juncus* spp. Clearance of these paddocks will require a planning permit, pursuant to Clause 72 of the City of Ballarat Planning Scheme which defines native vegetation as 'plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses'.

Clause 12.01-2 of the State Planning Policy Framework Clause (Native Vegetation Management) requires that a net gain in the extent and quality of native vegetation is achieved and planning must consider as relevant Victoria's Native Vegetation Management – a Framework for Action. An assessment of the proposed development in relation to the Framework is provided in Section 5.

Clause 66.02 vegetation removal thresholds (15 trees < 40cm DBH or 5 trees > 40 cm DBH or >0.5 hectares of EVC vegetation) are not likely to be triggered and thus DEPI will not be a mandatory referral authority.

The study area is not covered by any overlays relevant to biodiversity under the City of Ballarat Planning Scheme.

4.2.3 Native Vegetation Management Framework

The Framework provides State Government policy (referred to as the Net Gain policy) for the protection, enhancement and revegetation of native vegetation in Victoria (DNRE 2002) and is an incorporated document in all planning schemes. The Framework is due to be replaced with the *Permitted clearing of native vegetation – Biodiversity assessment guidelines* (DEPI 2013) as part of reforms to the Victoria Planning Provisions.

If the development seeks to remove native vegetation identified in this report, an application will need to be made under clause 52.17 of the City of Ballarat Planning Scheme to remove, destroy or lop native vegetation. Within the application the proponent must state (Clause 52.17-3) its response to the three step approach to Net Gain that have been taken to:

- avoid adverse impacts, particularly native vegetation clearance, where possible.
- minimise impacts through appropriate consideration in the planning process and utilise expert input to project design and/or management, if impacts cannot be avoided.
- identify appropriate offset options for the loss of native vegetation, if required.

This flora and fauna assessment establishes the extent, distribution and quality of native vegetation within the study area. An assessment against Victoria's Net Gain policy is included in Section 5. Responses and offset requirements for clearing native vegetation outlined in the Glenelg Hopkins Native Vegetation Plan are included in the assessment.

Regional Native Vegetation Plans provide a strategic and co-ordinated approach to the management of native vegetation within a given Catchment Management Authority region, and complement the Native Vegetation Management Framework.

4.2.4 Wildlife Act 1975 and associated Regulations

The *Wildlife Act 1975* (Wildlife Act) is the primary piece of legislation in Victoria providing for protection and management of wildlife. The Wildlife Act does not apply to fish, as defined under the *Fisheries Act 1995*.

The Wildlife Regulations 2002 prescribe penalties for persons who wilfully damage, disturb or destroy any wildlife habitat without appropriate authorisation. DEPI advise that a planning permit (under the planning scheme) constitutes appropriate authorisation and therefore the habitat protection provisions under the Wildlife Regulations 2002 are not applicable once the planning permit has been granted for this project.

5 Victoria's Native Vegetation Management Framework (Net Gain)

The Framework is state government policy providing the strategic direction for the protection, enhancements and revegetation of native vegetation within Victoria (DNRE 2002). It forms part of the State Policy Planning Framework. The Framework's primary goal is to achieve 'a reversal across the entire landscape, of the long-term decline in the extent and quality of native vegetation, leading to a Net Gain'.

The approach for applying the three-step approach of Net Gain to the current proposal is described in this section. According to the design concept / plan proposed, impacts to native vegetation cannot be avoided if the project is approved. In order to determine appropriate offsets the quality and extent of native vegetation within the study area must be quantified.

5.1 Quantifying native vegetation on site

Native vegetation within the study area was mapped (Figure 2) and assessed in relation to Net Gain policy according to standard methods provided by DSE (2004). Vegetation quality of identified patches was assessed using the DSE Vegetation Quality Assessment Sheet (DSE 2004) and pre-determined EVC benchmarks: http://www.dse.vic.gov.au/conservation-and-environment/ecological-vegetation-class-evc-benchmarks-by-bioregion.

One scattered Medium Old Tree (MOT) was mapped (outside of patch vegetation) and diameter at breast height (DBH) measured (DSE 2007).

Areas of uniform quality for each EVC within the patches are termed 'habitat zones' and assessed separately.

All remaining areas that are not EVC patches or scattered remnant canopy trees are termed Degraded Treeless Vegetation (DTV; DSE 2007).

5.1.1 Patches of native vegetation

One habitat zones was identified within the study area (Figure 2). The results of the vegetation quality assessment are provided in Table 4.

Table 4: Quantification and significance of native vegetation patches.

Habitat Zone			1
Bioregion			Victorian Volcanic Plain
EVC #: Name			125: Plains Grassy Wetland
EVC Bioregional Conservation Status			Endangered
		Max Score	**Score**
Site Condition	Large Old Trees	10	NA
	Canopy Cover	5	NA
	Lack of Weeds	15	9
	Understorey	25	5
	Recruitment	10	0
	Organic Matter	5	5
	Logs	5	NA
	Total Site Score		19
	EVC standardiser (x 75/55)		(75/55)
	Adjusted Site Score		26
Landscape Value	Patch Size	10	1
	Neighbourhood	10	0
	Distance to Core	5	0
	Total Landscape Score		1
HABITAT SCORE		100	27
Habitat points = #/100		1	0.27
Habitat Zone area (ha)			0.01
Habitat Hectares (Hha)			< 0.01
Conservation Significance	Conservation Status x Hab Score		High
	Threatened Species Rating		High
	Other Site Attribute Rating		-
	Overall Conservation Significance (highest rating)		High
Number of Large Old Trees present			**0**

Conservation significance for threatened species

Part of the assessment of conservation significance for Net Gain involves consideration of the value of habitat for threatened species in Victoria. Only species listed as threatened or rare under the DEPI Advisory lists (DSE 2005, 2007a) are considered in this process. The term 'threatened' is used to describe species that are classified as vulnerable, endangered or critically endangered. Species classified as data deficient or near threatened are not considered to be 'threatened' (DSE 2013). The term 'rare' has application for flora species only (DSE 2005).

Threatened or rare flora and threatened fauna species listed under DEPI Advisory Lists that have been recorded or have at least medium likelihood of occurrence within the study area are considered in the assessment of conservation significance provided they have potential to occur in areas of remnant vegetation that have been mapped and assessed.

The value of each habitat zone for each species is assessed against DEPI's criteria (DSE 2007, page 13). The pathway for each decision made (in accordance with DEPI's Table 2) is outlined in Table 5 below.

Only one species (Eastern Great Egret) requires consideration in this study. This species has the potential to occasionally visit the two dams or habitat zone 1. These features are in poor condition, however, and do not provide important habitat for this species.

Table 5: Determination of best/remaining habitat for rare or threatened species.

Species	Conservation Status	Habitat zone	Steps*	Outcome	Conservation Significance (threatened species rating)
Fauna					
Eastern Great Egret	Threatened	HZ1	ADF-No	Remaining 50% of habitat	High

** Steps taken to determine best or remaining 50 % of habitat. From Table 2 in the Guide for Assessment of Referred Planning Permit Applications (DSE 2007).*
HZ = Habitat Zone

The overall threatened species rating for each habitat zone is determined by the highest threatened species rating scored for any one species. This result is included in Table 4.

Summary

The study area contains 0.01 ha of native vegetation, which comprises less than 0.01 **Hha.**

5.1.2 Scattered Trees

The study area contains one scattered tree. A single Swamp Gum *Eucalyptus ovata* (DBH 51 cm) is located in the open paddock near the south-eastern corner of the study area. As a scattered medium old tree within a remnant of Plains Grassy Woodland EVC, considered endangered within the Victorian Volcanic Plain Bioregion, this tree has high conservation significance.

5.2 Assessing loss of native vegetation

As there is no concept design, loss of native vegetation and offset requirements are calculated based on complete clearance of the site.

5.2.1 Patches of native vegetation

The development may result in the loss of up to 0.01 habitat hectares (Table 6) and one scattered Medium Old Tree (Table 7).

Table 6: Impacts to vegetation patches (Victorian Volcanic Plain Bioregion)

Habitat Zone	1
EVC	Plains Grassy Wetland
Area to be cleared	0.01
Habitat hectares to be cleared:	< 0.01
Very High Conservation Significance	0
High Conservation Significance	< 0.01

5.2.2 Scattered Trees

The development may result in the loss of one scattered tree, as summarised in Table 7 below.

Table 7: Summary of tree losses (Victorian Volcanic Plain Bioregion)

			Tree Size Class			
Pre-1750 EVC	Bioregional Conservation Status	Conservation Significance	VLOT	LOT	MOT	ST
Plains Grassy Woodland	Endangered	High			1	

5.3 Gain targets

Offset requirements for identified losses are summarised in Table 8 and Table 9 below. The like-for-like requirements are outlined in the Framework (DNRE 2002: Table 6).

Table 8: Gain targets for clearing patches of native vegetation (Victorian Volcanic Plain Bioregion)

						Habitat Hectares Target			Large Tree Protection Target		
Target No.	Habitat Zones	EVC #: Name	Conservation Significance	Min Habitat score for target*	Other Like-for-like reqts*	Total Losses (Hha)	Net outcome ratio	Gain Target (Hha)	Total LOTs Lost	Protection multiplier	LOTs to be protected
H1	HZ 1	175: Plains Grassy Wetland	High	20	The same vegetation type or a very high significance vegetation type in the Victorian Volcanic Plain Bioregion	<0.01	1.5	0.02	0	N/A	0

** Based on the quality objectives for the offset specified in Table 6 of the Framework (DNRE 2002).*

Table 9: Gain targets for clearing scattered trees (Victorian Volcanic Plain Bioregion)

					Tree Protection			Recruit Only	
Target No.	Pre 1750 EVC #: Name	Conservation Significance	Tree Size	# Trees to be removed	Multiplier^	Offset Total*		Multiplier	Offset Total
H1	55: Plains Grassy Woodland	High	MOT	1	1	1	OR	n/a	n/a
						TOTAL number of plants to be recruited			n/a

**By protecting a Medium or Large Old Tree, it is assumed five recruits will be generated. To be considered protected, twice the canopy diameter for a tree must be fenced and protected from adverse impacts. It has therefore been assumed that protection of a tree will generate five recruits and no separate recruitment targets have been calculated.*

^The Framework (DNRE 2002) multiplier for Medium Old Trees within parcels of land >4 ha with eight or more scattered trees (table 6) has been applied in this case as the Glenelg-Hopkins Native Vegetation Plan does not provide protection and recruitment targets for removal of indigenous canopy trees.

In summary, complete clearance of the site would require the following offsets:

- Generate 0.02 habitat hectares of native vegetation through sourcing, permanent protection and management of another area of vegetation.
- Source and permanently protect one Medium Old Trees (for the loss of the scattered tree), which will also allow for associated recruitment of five new plants (protect and recruit method).

6 Key Ecological Values and Recommendations

This section identifies the key ecological features of the study area, provides an outline of potential implications of proposed development on those values and includes recommendations to assist the proponent to design a development to minimise impacts on biodiversity.

A summary of potential implications of development of the study area and recommendations to minimise impacts during the **design phase** of the project is provided in Table 10.

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

Ecological feature	Implications of development	Recommendations
Native vegetation (patches and trees)	The removal of up to 0.01 habitat hectares of vegetation and one Medium Old Tree.	Avoid and minimise removal of native vegetation, in accordance with Net Gain policy. Refer to Section 5. If avoidance is not possible Identify and implement appropriate offsets for vegetation losses as outlined in Section 5.
Other habitat features	The site contains two small farm dams which have very little value for flora and fauna.	Under a different management regime (ie removal of grazing), these dams may develop some aquatic vegetation and habitat value. Retention of these dams should be considered in the planning process.

Construction and post-construction management

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

References

DEPI 2013. *Permitted clearing of native vegetation - Biodiversity assessment guidelines.* Victorian Government Department of Environment and Primary Industries, Melbourne.

DNRE 2002. *Victoria's Native Vegetation Management: A Framework for Action.* Victorian Government Department of Natural Resources & Environment, East Melbourne.

DSE 2004. *Native Vegetation: Sustaining a living landscape. Vegetation Quality Assessment Manual – Guidelines for applying the habitat hectares scoring method. Version 1.3.* Victorian Government Department of Sustainability & Environment, Melbourne.

DSE 2005. *Advisory List of Rare or Threatened Plants in Victoria – 2005.* Victorian Government Department of Sustainability & Environment, East Melbourne.

DSE 2013. *Advisory List of Threatened Vertebrate Fauna in Victoria – 2013.* Victorian Government Department of Environment & Primary Industries, Melbourne.

DSE 2007. Native Vegetation – Guide for assessment of referred planning permit applications. Victorian Government Department of Sustainability & Environment, East Melbourne.

DSE 2010. Victorian Biodiversity Atlas 'VBA_FAUNA25, FAUNA100 & FAUNARestricted, FLORA25, FLORA100 & FLORARestricted' August 2010 © The State of Victoria. Victorian Government Department of Sustainability & Environment, Melbourne.

GHCMA (2000) Glenelg Hopkins Draft Native Vegetation Plan. Glenelg Hopkins Catchment Management Authority, Hamilton.

Walsh, N.G. & Stajsic, V. 2007. *A Census of the Vascular Plants of Victoria.* Eighth edition, Royal Botanic Gardens Melbourne.

Appendices

Appendix 1: Flora

Notes to tables:

EPBC Act: CR - Critically Endangered EN - Endangered VU - Vulnerable	**DSE 2005:** e - endangered v - vulnerable r - rare
PMST – Protected Matters Search Tool	**FFG Act:** L - listed as threatened under FFG Act P - protected under the FFG Act (public land only)
# - Native species outside natural range	**Noxious weed status:** SP - State prohibited species RP - Regionally prohibited species RC - Regionally controlled species RR - Regionally restricted species

A1.1 Flora species recorded from the study area

Table A1.1. Flora species recorded from the study area.

Status	Scientific name	Common name
	Indigenous species:	
	Amphibromus nervosus	Common Swamp Wallaby-grass
	Anthosachne scabra	Common Wheat-grass
	Carex tereticaulis	Poong'ort
	Cyperus sp.	Flat Sedge
	Eleocharis acuta	Common Spike-sedge
	Epilobium hirtigerum	Hairy Willow-herb
	Eucalyptus ovata	Swamp Gum
	Geranium sp.	Crane's Bill
	Juncus amabilis	Hollow Rush
	Juncus bufonius	Toad Rush
	Juncus flavidus	Gold Rush
	Juncus pallidus	Pale Rush
	Juncus subsecundus	Finger Rush
	Lythrum hyssopifolia	Small Loosestrife
	Rytidosperma caespitosum	Common Wallaby-grass
	Rytidosperma duttonianum	Brown-back Wallaby-grass
	Rytidosperma racemosum var. *racemosum*	Slender Wallaby-grass
	Rytidosperma setaceum	Bristly Wallaby-grass
	Introduced species:	
	Acetosella vulgaris	Sheep Sorrel
	Aira cupaniana	Quicksilver Grass
	Alopecurus pratensis	Meadow Fox-tail
	Anthoxanthum odoratum	Sweet Vernal-grass
	Arctotheca calendula	Cape Weed
	Avena barbata	Bearded Oat
	Avena fatua	Wild Oat
	Brachypodium distachyon	False Brome

Status	Scientific name	Common name
	Briza minor	Lesser Quaking-grass
	Bromus diandrus	Great Brome
	Bromus hordeaceus subsp. *hordeaceus*	Soft Brome
RR	*Cirsium vulgare*	Spear Thistle
RR	*Crataegus monogyna*	Hawthorn
	Cupressus macrocarpa	Monterey Cypress
	Erodium cicutarium	Common Heron's-bill
	Holcus lanatus	Yorkshire Fog
	Hordeum hystrix	Mediterranean Barley-grass
	Hypochaeris radicata	Flatweed
	Leontodon taraxacoides subsp. *taraxacoides*	Hairy Hawkbit
	Lolium perenne	Perennial Rye-grass
	Lysimachia arvensis (Red-flowered variant)	Scarlet Pimpernel
	Malva parviflora	Small-flower Mallow
	Phalaris aquatica	Toowoomba Canary-grass
	Pinus radiata	Radiata Pine
	Plantago coronopus	Buck's-horn Plantain
	Plantago lanceolata	Ribwort
	Poa annua	Annual Meadow-grass
	Polygonum aviculare	Prostrate Knotweed
RC	*Rosa rubiginosa*	Sweet Briar
	Rumex crispus	Curled Dock
	Sanguisorba minor	Salad Burnet
	Sonchus asper	Rough Sow-thistle
	Sonchus oleraceus	Common Sow-thistle
	Trifolium repens var. *repens*	White Clover
RC	*Ulex europaeus*	Gorse
	Vulpia bromoides	Squirrel-tail Fescue
	Vulpia myuros	Rat's-tail Fescue

A1.2 Significant flora species

The following table includes a list of the significant flora species that have potential to occur within the study area. The list of species is sourced from the Victorian Flora Information System and the Protected Matters Search Tool (DSEWPaC; accessed on 09/07/2013).

Table A1.2. Significant flora species recorded / predicted to occur within 5 km of the study area.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DSE	FFG					
National Significance									
Carex tasmanica	Curly Sedge	VU	v	L	-	PMST	Seasonally wet areas, such as around drainage lines and freshwater swamps, on fertile, clay soils derived from basalt.	Low	No suitable habitat present
Dianella amoena	Matted Flax-lily	EN	e	L	-	PMST	Lowland grassland and grassy woodland, on well-drained to seasonally waterlogged fertile sandy loam soils to heavy cracking clays.	Negligible	No suitable habitat present
Glycine latrobeana	Clover Glycine	VU	v	L	-	PMST	Grasslands and grassy woodlands, particularly those dominated by *Themeda triandra*.	Negligible	No suitable habitat present

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DSE	FFG					
Pimelea spinescens subsp. *spinescens*	Spiny Rice-flower	CR	e	L	-	PMST	Primarily grasslands featuring a moderate diversity of other native species and inter-tussock spaces, although also recorded in grassland dominated by introduced perennial grasses.	Negligible	No suitable habitat present
Poa sallacustris	Salt-lake Tussock-grass	VU	v	L	-	PMST	Grasslands and herblands on the sloping verges of saline lakes.	Negligible	No suitable habitat present
Prasophyllum frenchii	Maroon Leek-orchid	EN	e	L	-	PMST	Grassland and grassy woodland environments on sandy or black clay loam soils, that are generally damp but well drained.	Negligible	No suitable habitat present
Prasophyllum suaveolens	Fragrant Leek-orchid	EN	e	L	2007	PMST	Open, species rich grasslands dominated by *Themeda triandra* on poorly draining red-brown soils in western Victoria.	Low	Recorded in grassland near the Burrumbeet Creek, but no suitable habitat present within study area.
Senecio behrianus	Stiff Groundsel	EN	e	L	2007	PMST	Specific habitat requirements of this species are poorly understood, but they are known to occur in seasonally	Low	Not recorded during field survey. Suitable habitat not present

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DSE	FFG					
							inundated habitats on clay soils.		
State Significant									
Diuris behrii	Golden Cowslips		v		2008		Grasslands, open grassy woodlands and Box Ironbark Forests.	Low	Recorded in grassland near the Burrumbeet Creek, but no suitable habitat present within study area.

Appendix 2: Fauna

Notes to tables:

EPBC Act: EX - Extinct CR - Critically Endangered EN - Endangered VU - Vulnerable CD - Conservation dependent PMST – Protected Matters Search Tool	**DSE 2013:** ex - extinct cr - critically endangered en - endangered vu - vulnerable nt - near threatened dd - data deficient rx - regionally extinct
* - introduced species ** - pest species listed under the CaLP Act	**FFG Act:** L - listed as threatened under FFG Act N - nominated for listing as threatened I - determined ineligible for listing

Fauna species in these tables are listed in alphabetical order within their taxonomic group.

A2.1 Fauna species recorded from the study area

Table A2.1. Vertebrate fauna recorded from the study area (present assessment)

Status	Scientific name	Common name
	Birds	
	Acanthiza chrysorrhoa	Yellow-rumped Thornbill
	Acanthiza pusilla	Brown Thornbill
*	*Alauda arvensis*	Eurasian Skylark
	Anthus novaeseelandiae	Australasian Pipit
*	*Carduelis chloris*	Common Greenfinch
	Cracticus tibicen	Australian Magpie
	Cinclorhamphus cruralis	Brown Songlark
	Corvus coronoides	Australian Raven
	Malurus cyaneus	Superb Fairy-wren
	Pardalotus striatus	Striated Pardalote
	Petrochelidon ariel	Fairy Martin
	Rhipidura leucophrys	Willie Wagtail
*	*Turdus merula*	Common Blackbird

A2.2 Significant fauna species

The following table includes a list of the significant fauna species that have potential to occur within the study area. The list of species is sourced from the Victorian Biodiversity Atlas and the Protected Matters Search Tool (DSEWPaC; accessed on 09/07/2013).

Table A2.2. Significant fauna species recorded, or predicted to occur, within 5 km of the study area.

Species	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
	EPBC	DSE	FFG					
Mammals								
Petrogale penicillata Brush-tailed Rock-wallaby	VU	cr	L	-	PMST	Currently known only from the tributaries of the Snowy River in East Gippsland and the Grampians in the west. Found in a variety of habitat types, including rainforest gullies, wet and dry sclerophyll forest, and open woodlands, preferring rock faces with large tumbled boulders, ledges and caves and areas that are relatively open and receiving direct sunlight for much of the day.	Negligible	No suitable habitat.
Pteropus poliocephalus Grey-headed Flying-fox	VU	vu	L	-	PMST	Utilises a wide range of habitats from lowland rainforest in East Gippsland and coastal Stringybark forests to agricultural land and suburban gardens, with permanently established colonies in Melbourne, Geelong and Mallacoota.	Negligible	No suitable habitat.
Birds								
Anas rhynchotis Australasian Shoveler		vu		2003		Prefers large, permanent lakes and swamps with deep water, stable conditions and abundant aquatic vegetation. Less commonly recorded in small or shallow waters, such as billabongs, sewage ponds, freshwater rivers and densely vegetated farm dams. Forages in	Low	Insufficient aquatic habitat within study area.

Species	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
	EPBC	DSE	FFG					
						open water but nests in densely vegetated freshwater wetlands, where fringing vegetation may be an important habitat feature.		
Ardea modesta Eastern Great Egret		vu	L	2000	PMST	Usually found in terrestrial wetland, estuarine and wet grassland habitats particularly permanent well-vegetated water bodies but also use freshwater meadows, channels and larger dams. Forages by wading on shallow open water, generally avoiding dry or deeply flooded areas preferring moist, low-lying, poorly drained pasture, especially near hollows and ditches and where tussocks of long grass are present . Uses estuarine mudflats as summer-autumn or drought refuges.	Medium	May occasionally utilise farm dams within the study area.
Aythya australis Hardhead		vu		2002		A mainly aquatic species preferring large, deep freshwater environments with abundant aquatic vegetation, including slow moving areas of rivers. Also occurs in brackish wetlands and can be found in deep dams and water storage ponds. Occasionally in estuarine and littoral habitats such as saltpans, coastal lagoons and sheltered inshore waters. Avoids main streams or rivers, except in calm reaches where aquatic flora is developed.	Low	Insufficient aquatic habitat within study area.
Biziura lobata Musk Duck		vu		2003		A largely aquatic species preferring deep water on large, permanent swamps, lakes and estuaries with abundant aquatic vegetation. Often occurs in areas of dense	Low	Insufficient aquatic habitat within study area.

Species	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
	EPBC	DSE	FFG					
						vegetated cover within a wetland. Less commonly recorded in small or shallow waters, such as billabongs, sewage ponds, freshwater rivers and densely vegetated farm dams.		
Botaurus poiciloptilus Australasian Bittern	EN	en	L	-	PMST	Occurs in wetlands with tall, dense vegetation where it forages in shallow water at the edges of pools or waterways. Prefers permanent freshwater habitats, particularly when dominated by sedges, rushes and reeds.	Negligible	No suitable habitat.
Chlidonias hybrid Whiskered Tern		nt		2010		A breeding migrant to Australia from September to March where it occurs in wetlands, lakes, swamps, rivers, and other water bodies with submerged and emergent vegetation such as grasses, sedges, reeds and rushes. Rarely recorded along rivers or creeks.	Low	Insufficient aquatic habitat within study area.
Gallinago hardwickii Latham's Snipe		nt		2003	PMST	A migrant to Australia from July to April occurring in a wide variety of permanent and ephemeral wetlands. Prefers open freshwater wetlands with nearby cover, but also recorded on the edges of creeks and rivers, river-pools and floodplains. Forages in soft mud at edge of wetlands and roosts in a variety of vegetation around wetlands including tussock grasslands, reeds and rushes, tea-tree scrub, woodlands and forests.	Medium	May occasionally utilise damp areas associated with dams.
Haliaeetus leucogaster		vu	L	-	PMST	Occurs in marine habitats and terrestrial wetlands along or near coastal areas in eastern Victoria, particularly	Low	Insufficient aquatic habitat within study

Species	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
	EPBC	DSE	FFG					
White-bellied Sea-Eagle						around large open wetlands such as deep freshwater swamps, lakes, reservoirs and billabongs. Uses tall trees in or near water for breeding.		area.
Hirundapus caudacutus White-throated Needletail		vu		-	PMST	An almost exclusively aerial species within Australia, occurring over most types of habitat, particularly wooded areas. Less often seen over open farm paddocks but has been recorded in vineyards flying between the rows of trees.	Low	Potential occasional visitor.
Lathamus discolour Swift Parrot	EN	en	L	-	PMST	Migrates to south-east mainland Australia during the winter months where it prefers dry, open eucalypt forests and woodlands, especially Box Ironbark Forest in north-central Victoria. Has also been recorded in urban parks, gardens, street trees and golf courses with flowering ornamental trees and shrubs.	Negligible	No suitable habitat.
Leipoa ocellata Malleefowl	VU	en	L	-	PMST	Malleefowl occur mainly in semi-arid mallee habitats; in Victoria this type of habitat is largely restricted to the north-west area of the State. Malleefowl are sedentary birds that establish home ranges within which they forage on the ground in leaf litter and low vegetation and nest in distinctive mounds constructed with light soil and leaf litter.	Negligible	No suitable habitat.
Oxyura australis Blue-billed Duck		en	L	2002		A largely aquatic species preferring deep, large permanent wetlands with stable conditions and abundant aquatic vegetation, including Melaleuca	Low	Insufficient aquatic habitat within study area.

Species	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
	EPBC	DSE	FFG					
						swamps. Occurs less commonly on river frontages, billabongs and flooded depressions. It is a secretive bird, rarely venturing far from dense vegetative cover in wetland areas.		
Rostratula australis Australian Painted Snipe	EN	cr	L	-	PMST	Generally found in shallow, terrestrial freshwater wetlands with rank, emergent tussocks of grass, sedges and rushes. Australian Painted Snipe can occur in well vegetated lakes, swamps, inundated pasture, saltmarsh and dams.	Low	Insufficient aquatic habitat within study area.
Reptiles								
Delma impar Striped Legless Lizard	VU	en	L	-	PMST	Inhabits native and modified grasslands, where sufficient cover is available to provide protection from predators. Often associated with soils of cracking clays with embedded and surface rocks. Occasionally recorded from grassy woodlands.	Low	No suitable habitat present.
Frogs								
Litoria raniformis Growling Grass Frog	VU	en	L	-	PMST	Occupies a variety of permanent and semi-permanent water bodies generally containing abundant submerged and emergent vegetation, within lowland grasslands, woodlands and open forests.	Low	The two dams on site do not have sufficient cover of aquatic vegetation for breeding habitat. Potential habitat during migration.
Fishes								

Species	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
	EPBC	DSE	FFG					
Galaxiella pusilla Dwarf Galaxias	VU	en	L	-	PMST	Occurs in relatively shallow still or slow flowing water bodies including streams, wetlands, drains, that in many instances are ephemeral and partially dry up over summer. Typically requires abundant marginal and aquatic vegetation.	Low	Insufficient aquatic habitat within study area.
Maccullochella peelii peelii Murray Cod	VU	vu	L	-	PMST	Found within the Murray River catchment usually in sluggish turbid rivers, in deep holes or amongst fallen timber and other debris. Also occurs in upper reaches of rivers where water is clear and there is little fallen timber.	Negligible	Insufficient aquatic habitat within study area.
Macquaria australasica Macquarie Perch	EN	en	L	-	PMST	A riverine fish preferring deep holes, its natural distribution extends north of the Great Dividing Range in tributaries of the Murray River. Early this century it was introduced to many waters south of the Great Dividing Range but has only been recorded in the Yarra with any regularity since.	Negligible	Insufficient aquatic habitat within study area.
Prototroctes maraena Australian Grayling	VU	vu	L	-	PMST	A diadromous species which spends most of its life in freshwater within rivers and large creeks. Juveniles inhabit estuaries and coastal seas. Adults occur in freshwater habitats, typically rivers and streams with cool, clear waters and gravel substrates, but occasionally also in turbid waters.	Negligible	Insufficient aquatic habitat within study area.

Species	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
	EPBC	DSE	FFG					
Invertebrates								
Synemon plana Golden Sun Moth	CR	cr	L	-	PMST	This medium-sized diurnal moth inhabits grassy woodlands and grasslands. Once thought to be a specialised species inhabiting grasslands dominated by Wallaby-grasses, it is now recognised that this species can occur in exotic grasslands dominated by Chilean Needle Grass *Nassella neesiana*.	Low	Insufficient cover of host plants.

A2.3 Migratory species (EPBC Act listed)

Table A2.3. Migratory fauna species recorded or predicted to occur within 5 km of the study area.

Scientific Name	Common Name	Most recent record
Acrocephalus stentoreus	Clamorous Reed Warbler	2003
Apus pacificus	Fork-tailed Swift	-
Ardea modesta	Eastern Great Egret	2000
Bubulcus ibis	Cattle Egret	-
Gallinago hardwickii	Latham's Snipe	2003
Haliaeetus leucogaster	White-bellied Sea-Eagle	-
Hirundapus caudacutus	White-throated Needletail	-
Leipoa ocellata	Malleefowl	-
Merops ornatus	Rainbow Bee-eater	-
Monarcha melanopsis	Black-faced Monarch	-
Myiagra cyanoleuca	Satin Flycatcher	-
Rhipidura rufifrons	Rufous Fantail	-
Rostratula australis	Australian Painted Snipe	-

A5.1 Net Gain Glossary

Items marked with an asterisk (*) are cited from DSE (2007b).

Benchmark*

A standard vegetation –quality reference point, dependent on vegetation type, which is applied in habitat hectare assessments. Represents the average characteristics of a mature and apparently long undisturbed state of the same vegetation type.

Biodiversity*

The variety of all life-forms, the different plants, animals and micro-organisms, the genes they contain, and the ecosystems of which they form a part. The Framework applies this definition to those native species indigenous to or expected to visit the site.

Biodiversity Interactive Map (BIM)

Web based interactive map available on the DSE website that provides information on the biodiversity of Victoria and displays flora and fauna data from the Victorian Biodiversity Atlas.

Bioregion*

Biogeographic areas that capture the patterns of ecological characteristics in the landscape or seascape, providing a natural framework for recognising and responding to biodiversity values. A landscape based approach to classifying the land surface using a range of environmental attributes such as climate, geomorphology, lithology and vegetation.

Bioregional conservation status (of an EVC)*

A state-wide classification of the degree of depletion in the extent and/or quality of an Ecological Conservation Class (EVC) within a bioregion in comparison to the State's estimation of its pre-1750 extent and condition. The assessment takes account of how commonly it originally occurred, the current level of depletion due to clearing, and the level of degradation of condition typical of remaining stands. There are 6 classes: Presumed Extinct, Endangered, Vulnerable, Depleted, Rare and Least Concern as described on page 51 of the Framework (NRE 2002).

Conservation status (see Bioregional conservation status)

Degraded treeless vegetation*

Vegetation that is neither a wetland, a remnant patch nor scattered tree(s).

DBH (Diameter at Breast Height)*

The diameter of the main trunk of a tree measured 1.3 m above ground level.

Ecological Vegetation Class (EVC) *

A type of native vegetation classification that is described through a combination of its floristic, life form and ecological characteristics, and though an inferred fidelity to particular environmental attributes. Each EVC includes a collection of floristic communities (i.e. lower level in the classification that is based solely on groups of the same species) that occur across a biogeographic range, and although differing in species, have similar habitat and ecological processes operating.

EVC (see Ecological vegetation class) *

Forb

A herbaceous flowering plant that is not a graminoid (grass, sedge or rush).

Gain*

An increase in the extent and/or quality of a site either by management or maintenance commitments and actions.

Gain Target*

The amount of gain that needs to be achieved to offset a loss measured in habitat hectares.

Habitat hectare*

A site based measure of quality and quantity of native vegetation that is assessed in the context of the relevant native vegetation.

Habitat score*

The score assigned to a habitat zone that indicates the quality of the vegetation relative to

the ecological vegetation class benchmark – sum of the site condition score and landscape context score, usually expressed as a percentage or on a scale of 0 to 1.

Habitat zone*

A discrete area of native vegetation consisting of a single vegetation type (EVC) within an assumed similar quality. This is the base spatial unit for conducting a habitat hectare assessment. Separate *Vegetation Quality Assessments* (or habitat hectare assessments) are conducted for each habitat zone within the designated assessment area.

Improvement gain*

This is gain resulting from management commitments beyond existing obligations under legislation to improve the current vegetation quality. Achieving improvement gain is predicated on maintenance commitments being already in place. For example, control of any threats such as grazing that could otherwise damage the native vegetation must already be agreed. Typical actions leading to an improvement gain include reducing or eliminating environmental weeds, enhancement planting or revegetation over a 10-year management period. If the vegetation is to be used as an offset, a commitment to maintain the improvement gain (i.e. no subsequent decline in quality) will be required in perpetuity.

Indigenous vegetation*

The type of native vegetation that would have normally been expected to occur on the site prior to European settlement.

Large Old Tree (LOT)*

A tree with a DBH equal to or greater than the large tree diameter as specified in the relevant EVC benchmark.

Like-for-like*

These are part of the criteria for determination of an offset and provide a direct link between the loss and the offset gain, in terms of vegetation type or landscape function. There are more specific requirements for higher conservation significance vegetation and more flexible requirements for lower significance.

Maintenance Gain*

This is gain from commitments that contribute to the maintenance of the current vegetation quality over time (i.e. avoiding any decline). Includes foregoing certain entitled activities that could otherwise damage or remove native vegetation, such as grazing or firewood collection. Also typically requires a commitment to ensure no further spread of environmental weeds that may otherwise result in the loss of vegetation quality over time. If the vegetation is to be used as an offset, a commitment to maintain the vegetation quality will be required in perpetuity.

Medium Old Tree (MOT)*

A tree with a DBH equal to or greater than 0.75 of the large tree diameter in the relevant EVC benchmark but less than the DBH for a large old tree.

Native (indigenous) vegetation*

Native vegetation is plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses (as defined in Clause 72 of the planning scheme).

Net Gain*

Where, over a specified area and period of time, losses of native vegetation and habitat, as measured by a combined quality-quantity measure (habitat-hectare), are reduced, minimised and more than balanced by commensurate gains.

Net outcome*

The result of applying conservation significance criteria to protection, investment and offset decisions. This results in a range of outcomes from short term losses for Low conservation significance to substantial net gain for Very High conservation significance. For offsets, the Framework (Table 6) specifies a multiplier on the calculated loss (in habitat hectares) to achieve the net outcome. This is graded according to conservation significance.

Offset Management Plan (OMP)

A document which sets out the requirements for establishment, protection and management of a Net Gain offset site.

Old tree*

A tree with a DBH equal to or greater than 0.75 of the large tree diameter as specified in the relevant EVC benchmark. Includes medium old trees and large old trees (see separate definitions). Some Regional Native Vegetation Plans additionally define very large old trees (1.5 times large tree diameter).

Offset*

A native vegetation offset is any works, or other actions to make reparation for the loss of native vegetation arising from the removal or destruction of native vegetation. The gains achieved must be permanent and ongoing, and linked to a specific clearing site. See also on-site offset and third-party offset.

On-site offset*

An offset located on the same property as the clearing.

Third-party offset*

An offset located on a property owned by a person other than the landowner who incurs the native vegetation loss being offset.

Patch (see Remnant Patch)

Prior management gain

This gain acknowledges actions to manage vegetation since State-wide planning permit controls for native vegetation removal were introduced in 1989.

Property Vegetation Plan*

A plan which relates to the management of native vegetation within a property, and which is contained within an agreement made pursuant to section 69 of the Conservation, Forests and Lands Act 1987.

Protection (of a tree) *

An area with twice the canopy diameter of the tree(s) fenced and protected from adverse impacts: grazing, burning and soil disturbance not permitted, fallen timber retained, weeds controlled, and other intervention and/or management if necessary to ensure adequate natural regeneration or planting can occur.

Recruitment*

The production of new generations of plants, either by allowing natural ecological processes to occur (regeneration etc), by facilitating such processes such as regeneration to occur, or by actively revegetating (replanting, reseeding). See Revegetation.

Remnant patch or patch*

An area of vegetation, with or without trees, where native plants constitute more than 25% of the total understorey plant cover (bare ground is not included); or an area of treed vegetation where the density of the trees is such that canopy tree cover is at least at benchmark canopy cover.

Remnant vegetation*

Native vegetation that is established or has regenerated on a largely natural landform. The species present are those normally expected in that vegetation community. Largely natural landforms may have been subject to some past surface disturbance such as some clearing or cultivation (or even the activities of the nineteenth century gold rushes) but do not include man-made structures such as dam walls and quarry floors.

Revegetation*

Establishment of native vegetation to a minimum standard in formerly cleared areas, outside of a remnant patch.

Scattered trees

Canopy trees within an area where total understorey plant cover comprises more than 75% of weeds or non-native plants and the overall canopy cover for a group (i.e. Three or more trees) is less than 20%.

Section 173 agreements*

A management agreement primarily between a landowner and the responsible authority according to section 173 of the Planning and Environment Act 1987.

Security Gain

This is gain from actions to enhance security of the on-going management and protection of native vegetation at the offset site, either by entering into an on-title agreement (for example under Section 173 of the *Planning and Environment Act 1987*), or by locating the offset on land that has greater security than the clearing site, or by transferring private land to a secure public conservation reserve.

Small tree*

A tree with a DBH equal to or greater than 0.25 of the large tree diameter in the relevant EVC benchmark but less than the DBH for a medium old tree.

sp.

Species (one species).

spp.

Species (more than one species).

Supplementary planting

Establishment of overstorey and/or understorey plants within a remnant patch. Typically includes the planting or direct-seeding of understorey life forms.

Taxon (plural taxa)

A term used to describe any taxonomic unit. This term is typically used when referring broadly to any scientifically recognised species, subspecies or variety.

Understorey

Understorey is all vegetation other than mature canopy trees – includes immature trees, shrubs, grasses, herbs, mosses, lichens and soil crust. It does not include dead plant material that is not attached to a living plant. More information on understorey life forms is set out in the Vegetation Quality Assessment Manual (DSE 2004).

Vegetation Quality Assessment

The standard DSE method for assessing remnant patches of vegetation. Details of the method are outlined in the Vegetation Quality Assessment Method (DSE 2004). The results of the assessment are expressed in habitat hectares. Also referred to as a 'habitat hectare assessment'.

Very Large Old Tree (VLOT)

A tree with a DBH of at least 1.5 times that of the large tree DBH as specified in the relevant EVC benchmark

14 January 2014

Mr Anthony Wansink
Associate - Planner
Spiire
Level 2, 10 Moorabool Street
Geelong Vic 3220

Dear Anthony

Central Victorian Livestock Exchange – Permitted clearing of native vegetation

Our Ref: Matter 16029

On the 20th December 2013 planning scheme amendment VC105 was gazetted giving effect to Victoria's native vegetation permitted clearing regulations. The amendment introduced changes to a number of planning scheme clauses, including 12.01, 52.16, 52.17 and 66.02-2. Most importantly for this project, clause 52.17 now requires consideration of the G*uidelines for permitted clearing of native vegetation* rather than *Victoria's Native Vegetation Management – A Framework for Action*.

The flora and fauna report we have completed for the Miner's Rest property (Biosis 2014) includes an assessment against the Framework and the purpose of this letter is to provide advice re permit information requirements under the new system (the Guidelines).

Biodiversity Assessment Guidelines

Pursuant to clause 52.17 a permit is required to remove, destroy or lop native vegetation under the native vegetation permitted clearing regulations.

The *Permitted clearing of native vegetation – Biodiversity assessment guidelines* (the Guidelines) (DEPI 2013) outline how impacts on Victoria's biodiversity are assessed when an application to remove native vegetation is lodged. The Guidelines are an incorporated document in all Victorian planning schemes.

The Guidelines are applied alongside other requirements of the planning scheme when an application for a permit to remove native vegetation is considered by the responsible authority.

The purpose of the Guidelines is to guide how impacts to biodiversity should be considered when assessing a permit application to remove, destroy or lop native vegetation. The objective for permitted clearing of native vegetation in Victoria is 'No net loss in the contribution made by native vegetation to Victoria's biodiversity'.

The Guidelines describe three strategies for ensuring the objective for permitted clearing of native vegetation is achieved at the permit level:

- avoiding the removal of native vegetation that makes a significant contribution to Victoria's biodiversity

- minimising impacts to Victoria's biodiversity from the removal of native vegetation
- where native vegetation is permitted to be removed, ensuring it is offset in a manner that makes a contribution to Victoria's biodiversity that is equivalent to the contribution made by the native vegetation to be removed.

Defining native vegetation

For the purpose of the *Guidelines* (DEPI 2013), native vegetation is defined by two categories:

Remnant patch

A remnant patch of native vegetation (consisting of one or more habitat zones) is either:

- an area of vegetation where at least 25 per cent of the total perennial understory 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.

A remnant patch consists of one or more habitat zones.

Scattered tree

A scattered tree is:

- a native canopy tree that does not form part of a remnant patch.

This definition is slightly different to that used under the Framework, however in this case the remnant vegetation patch and scattered tree identified in Biosis (2014) match the definition requirements under the guidelines.

It is our understanding that clearance of the remnant patch mapped in the road reserve to the west of the property will not be required, and hence the only native vegetation on the site requiring clearance is the scattered tree towards the eastern end of the property (Figure 2 in Biosis (2014)).

Risk-based pathway

There are three risk-based pathways for assessing an application for a permit to remove native vegetation:

- low risk
- moderate risk
- high risk.

To determine the risk-based pathway, the following risks are considered in relation to the native vegetation proposed to be removed:

- extent risk
- location risk.

Extent risk is determined based on the extent of native vegetation proposed to be removed. Extent risk is determined with reference to:

- the area of any remnant patches of native vegetation
  no patches of remnant native vegetation require removal.

- the number of any scattered trees
  One scattered tree may require removal.

Location risk has been determined for all locations in Victoria by DEPI. The location risk of a particular site is determined by using the *Native vegetation location risk map* available in the Native Vegetation Information Management system (DEPI website).

For this project, the native vegetation (the scattered tree) is in Location A on the *Native vegetation location risk map*, and as less than 15 scattered trees are proposed for removal, the application for removal of this native vegetation meets the requirements of, and will be assessed under, the **low risk-based pathway.**

The computer generated DEPI Biodiversity Assessment Report (BAR) is provided in Appendix 1.

Offset

If a permit is granted to remove the scattered tree, the offset requirement defined by the DEPI BAR amounts to an offset of **0.006 general biodiversity equivalence units** (Appendix 1).

Information requirements

Information requirements to be included in the permit application to be assessed in the low risk-based pathway are as follows (DEPI 2013).

1. The location of the site of native vegetation to be removed. This includes the address of the property.

2. A description of the native vegetation to be removed including:

- whether the native vegetation is a remnant patch, or scattered trees
- the area of any remnant patches of native vegetation
- the number of any scattered trees.

Provided in Biosis (2014).

3. Maps or plans containing the following information:

- north point and property boundaries
- all areas of native vegetation, clearly showing the native vegetation to be removed (including any area that the Country Fire Authority has recommended for removal or management for fire protection purposes)
- all scattered trees to be removed

Provided in Biosis (2014).

4. Recent dated photographs of the native vegetation to be removed.

Provided in Biosis (2014)

5. The risk-based pathway of the application to remove native vegetation.

The application is in the low risk-based pathway.

6. Where the purpose of removal, destruction or lopping of native vegetation is to create defendable space, a statement is required that explains why removal, destruction or lopping of native vegetation is necessary. The statement must have regard to other available bushfire risk mitigation measures. This requirement does not apply to the creation of defendable space in conjunction with an application under the Bushfire Management Overlay.

This component is not relevant to this application.

7. A copy of any property vegetation plan that applies to the site.

This component is not relevant to this application.

8. Details of any other native vegetation that was permitted to be removed on the same property with the same ownership as the native vegetation to be removed, where the removal occurred in the five year period before the application to remove native vegetation is lodged.

This component is not relevant to this application.

9. The strategic biodiversity score of the native vegetation to be removed.

The strategic biodiversity score of the native vegetation to be removed is 0.291 (Appendix 1).

10. The offset requirements should a permit be granted to remove native vegetation.

The offset requirement is 0.006 general biodiversity equivalence units (Appendix 1).

Clause 66.02-2 Referral requirements

Under Clause 66.02-2, only applications involving the high risk pathway or moderate risk pathway applications specifying clearance of greater than 0.5 hectares of vegetation require mandatory referral to DEPI. Additionally, DEPI is now a 'recommending' referral authority, and council is not bound by their advice.

As this project is assessed under the low risk pathway, the City of Ballarat is not required to refer the application to DEPI.

Please contact me if you have any enquiries.

Yours sincerely

Matthew Gibson
Ballarat Resource Group Manager

References

Biosis 2014. Central Victorian Livestock Exchange: Flora and Fauna Assessment. Report for RLMC Investment Company Pty Ltd. Author: Gibson, M. Biosis Pty Ltd, Ballarat. Project no. 16029

DEPI 2013. *Permitted clearing of native vegetation – Biodiversity assessment guidelines*. Victorian Government Department of Environment and Primary Industries, Melbourne, September 2013.

Appendix 1 – Biodiversity Assessment Report

Biodiversity assessment report

Biodiversity information for applications for permits to remove native vegetation under clause 52.16 or 52.17 of the Victoria Planning Provisions

Date of issue: **14 January 2014**

Time of issue: **14:02:40**

Property address	22-76 VICTORIA STREET MINERS REST 3352

Summary of marked native vegetation

Risk-based pathway	**Low**
Total extent	1 tree
Scattered trees	1 tree
Location risk	A

See Appendix 1 for risk-based pathway details

Offset requirements

If a permit is granted to remove the marked native vegetation, a requirement to obtain a native vegetation offset will be included in the permit conditions. The offset must meet the following requirements:

Offset type	General offset
Offset amount (general biodiversity equivalence units)	0.006
Offset attributes	
Vicinity	Glenelg Hopkins Catchment Management Authority (CMA)
Minimum strategic biodiversity score	0.233
Strategic biodiversity score of marked native vegetation	0.291

See Appendix 2 for offset requirements details

Next steps

This proposal to remove native vegetation must meet the application requirements of the low risk-based pathway and it will be assessed in the low risk-based pathway.

If you wish to remove the marked native vegetation you are required to apply for a permit from your local council.

The Biodiversity assessment report should be submitted with your application for a permit to remove native vegetation you plan to remove, lop or destroy.

The Biodiversity assessment report provides the following information that is required to be provided with your application for a permit to remove native vegetation:

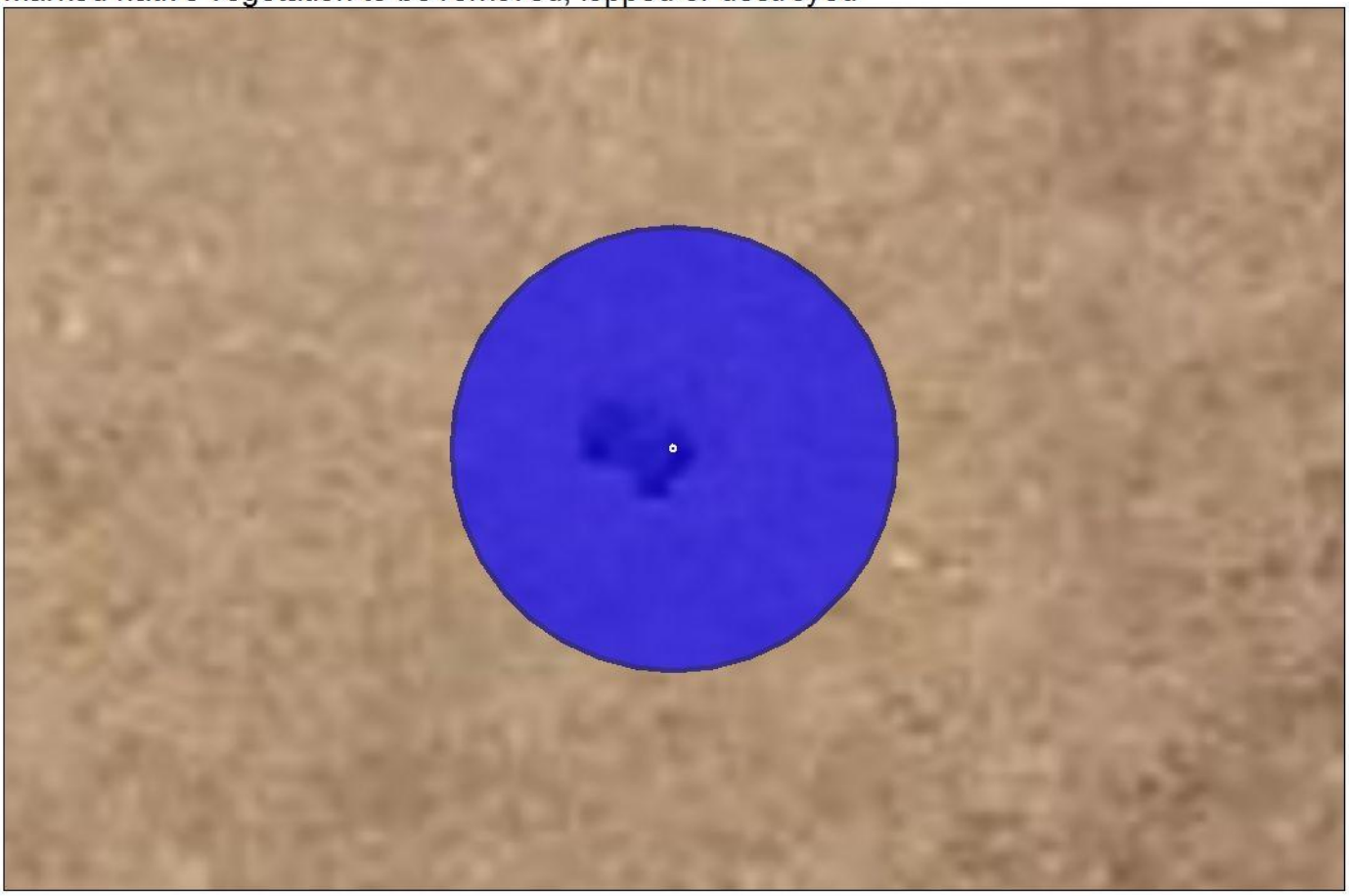
- The location of the site where native vegetation is to be removed.
- The area of the patch of native vegetation and/or the number of any scattered trees to be removed.
- Maps or plans containing information set out in the *Permitted clearing of native vegetation - Biodiversity assessment guidelines*.
- The risk-based pathway of the application for a permit to remove native vegetation.
- The strategic biodiversity score of the native vegetation to be removed.
- The offset requirements should a permit be granted to remove native vegetation.

If you have undertaken any permitted clearing on your property within the last five years contact DEPI to confirm offset requirements.

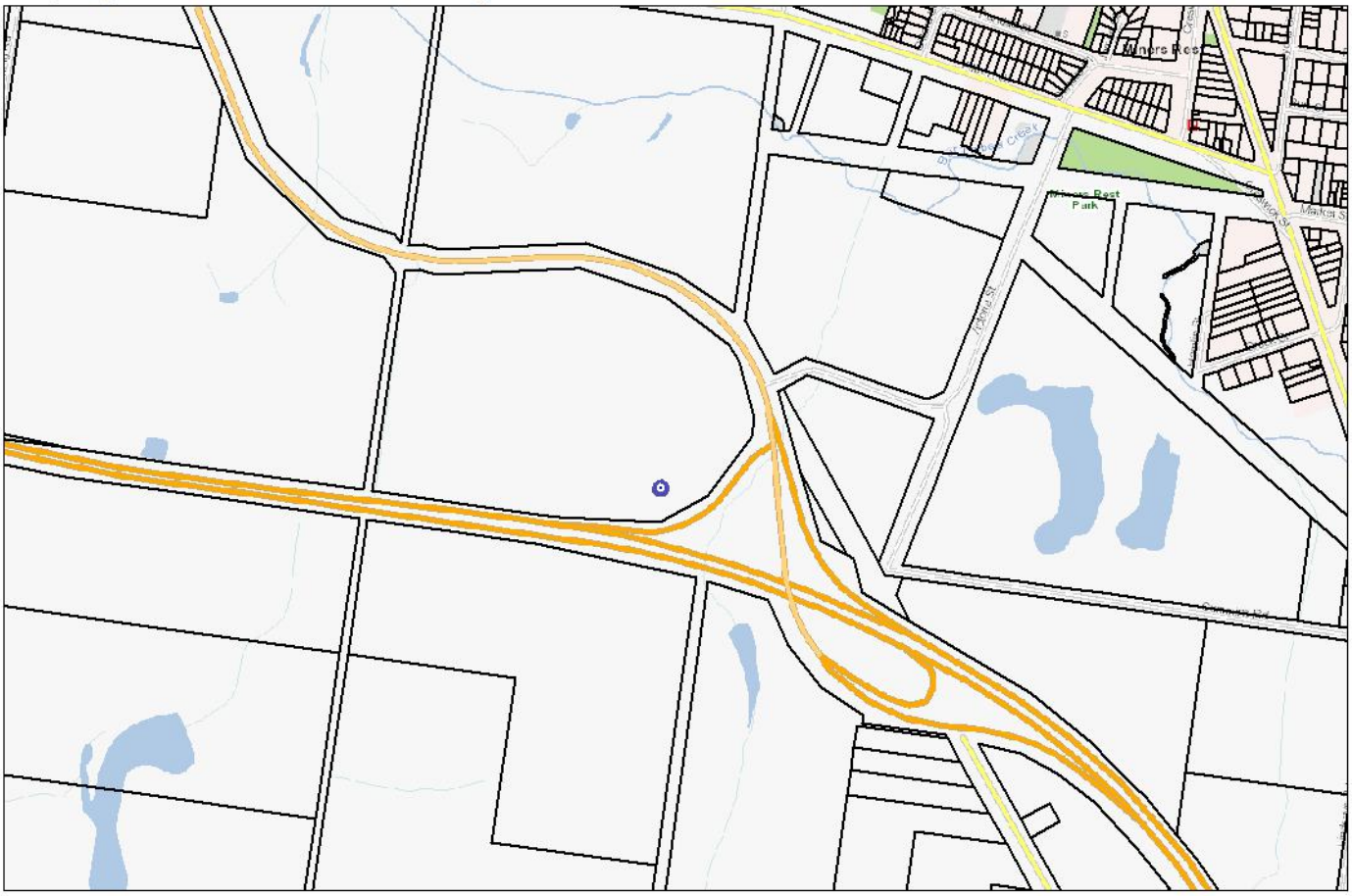
Additional information is required when submitting an application for a permit to remove native vegetation. Refer to the *Permitted clearing of native vegetation - Biodiversity assessment guidelines* for a full list of application requirements.

Maps of marked native vegetation

Marked native vegetation to be removed, lopped or destroyed



Property view of marked native vegetation



See Appendix 3 for biodiversity information maps

Authorised by the Victorian Government, 8 Nicholson Street, East Melbourne.

For more information contact the DEPI Customer Service Centre 136 186

Disclaimer

This publication may be of assistance to you but the State of Victoria and its employees do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this publication.

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

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

Department of Environment and Primary Industries
State Government Victoria

www.depi.vic.gov.au

Appendix 1 - Risk-based pathway details

Risk-based pathway	**Low**
Total extent	1 tree
Scattered trees	1 tree
Location risk	A

Why is the risk-based pathway low?

The following table explains how the risk-based pathway is determined:

Extent	Location A	Location B	Location C
< 15 scattered trees	Low	Moderate	High
≥ 15 scattered trees	Moderate	High	High

The marked native vegetation is located entirely within Location A and has a total extent of less than 15 scattered trees.

At this location, native vegetation removal of this size is not expected to have a significant impact on the habitat of any rare or threatened species. As a result, an application for the removal of this native vegetation must meet the requirements of, and will be assessed in, the low risk-based pathway.

For further information on location risk please see *Native vegetation location risk map factsheet*. For information on the determination of the risk-based pathway see *Permitted clearing of native vegetation – Biodiversity assessment guidelines*.

Have you received a planning permit to remove native vegetation in the last five years?

If you have undertaken any permitted clearing on your property within the last five years, the extent of this past clearing must be included in the total extent of your current permit application. The risk-based pathway for your application requirements and assessment pathway is determined using the combined extent of permitted clearing within the last five years and proposed clearing.

If the risk-based pathway determined from this combined extent is low, contact DEPI to confirm offset requirements.

Appendix 2 - Offset requirements details

If a permit is granted to remove the marked native vegetation the permit condition will include the requirement to obtain a native vegetation offset. This offset must meet the following requirements:

Offset type	General offset
Offset amount (general biodiversity equivalence units)	0.006
Offset attributes	
Vicinity	Glenelg Hopkins Catchment Management Authority (CMA)
Minimum strategic biodiversity score	0.233
Strategic biodiversity score of marked native vegetation	0.291

Native vegetation to be removed		
Total extent (hectares) for calculating habitat hectares	0.071	This is the total area of the marked native vegetation in hectares. The total extent of native vegetation is an input to calculating the habitat hectares of a site and in calculating the general biodiversity equivalence score. Where the marked native vegetation includes scattered trees, each tree is converted to hectares using a standard area calculation of 0.071 hectares per tree.
Condition score*	0.200	This is the weighted average condition score of the marked native vegetation. This condition score has been calculated using the *Native vegetation condition map*. The condition score of native vegetation is a site-based measure of how close the native vegetation is to its mature natural state, as represented by a benchmark reflecting pre-settlement circumstances. The *Native vegetation condition map* is a modelled layer based on survey data combined with a benchmark model and a range of other environmental data.
Habitat hectares	0.014	Habitat hectares is a site-based measure that combines extent and condition of native vegetation. The habitat hectares of native vegetation is equal to the current condition of the vegetation (condition score) multiplied by the extent of native vegetation. Habitat hectares = total extent x condition
Strategic biodiversity score	0.291	This is the weighted average strategic biodiversity score of the marked native vegetation. This strategic biodiversity score has been calculated using the *Strategic biodiversity map*. The strategic biodiversity score of native vegetation is a measure of the native vegetation's importance for Victoria's biodiversity, relative to other locations across the landscape. The *Strategic biodiversity map* is a modelled layer that prioritises locations on the basis of rarity and level of depletion of the types of vegetation, species habitats, and condition and connectivity of native vegetation.

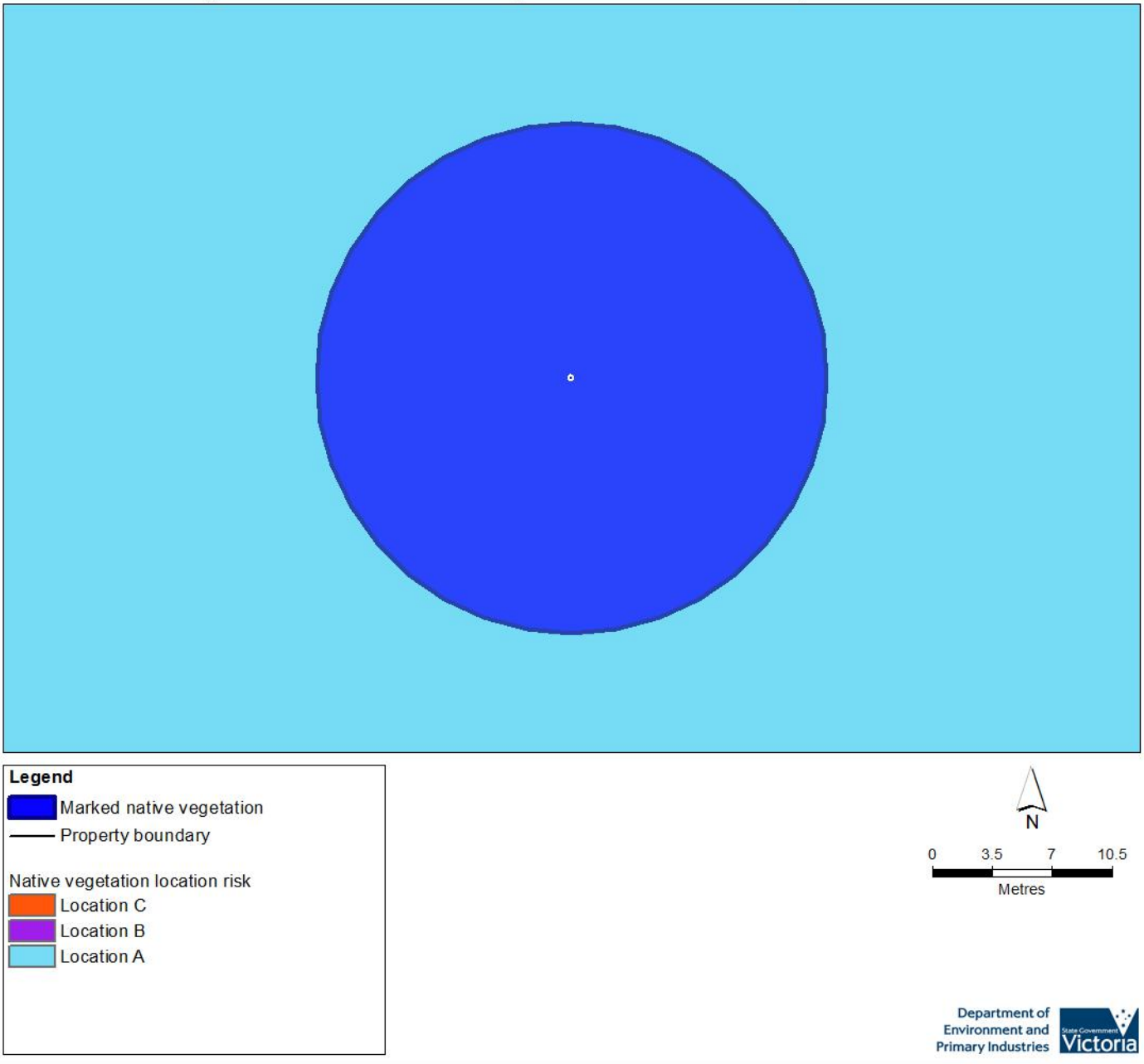
General biodiversity equivalence score	0.004	The general biodiversity equivalence score quantifies the relative overall contribution that the native vegetation to be removed (the marked native vegetation) makes to Victoria's biodiversity. It is calculated as follows: General biodiversity equivalence score = habitat hectares × strategic biodiversity score

* Offset requirements for partial clearing: If your proposal is to remove parts of the native vegetation in a remnant patch (for example only understorey plants) the condition score must be adjusted. This will require manual editing of the *condition score*, and an update to the following calculations that the biodiversity assessment tool has provided: *habitat hectares*, *general biodiversity equivalence score* and *offset amount*.

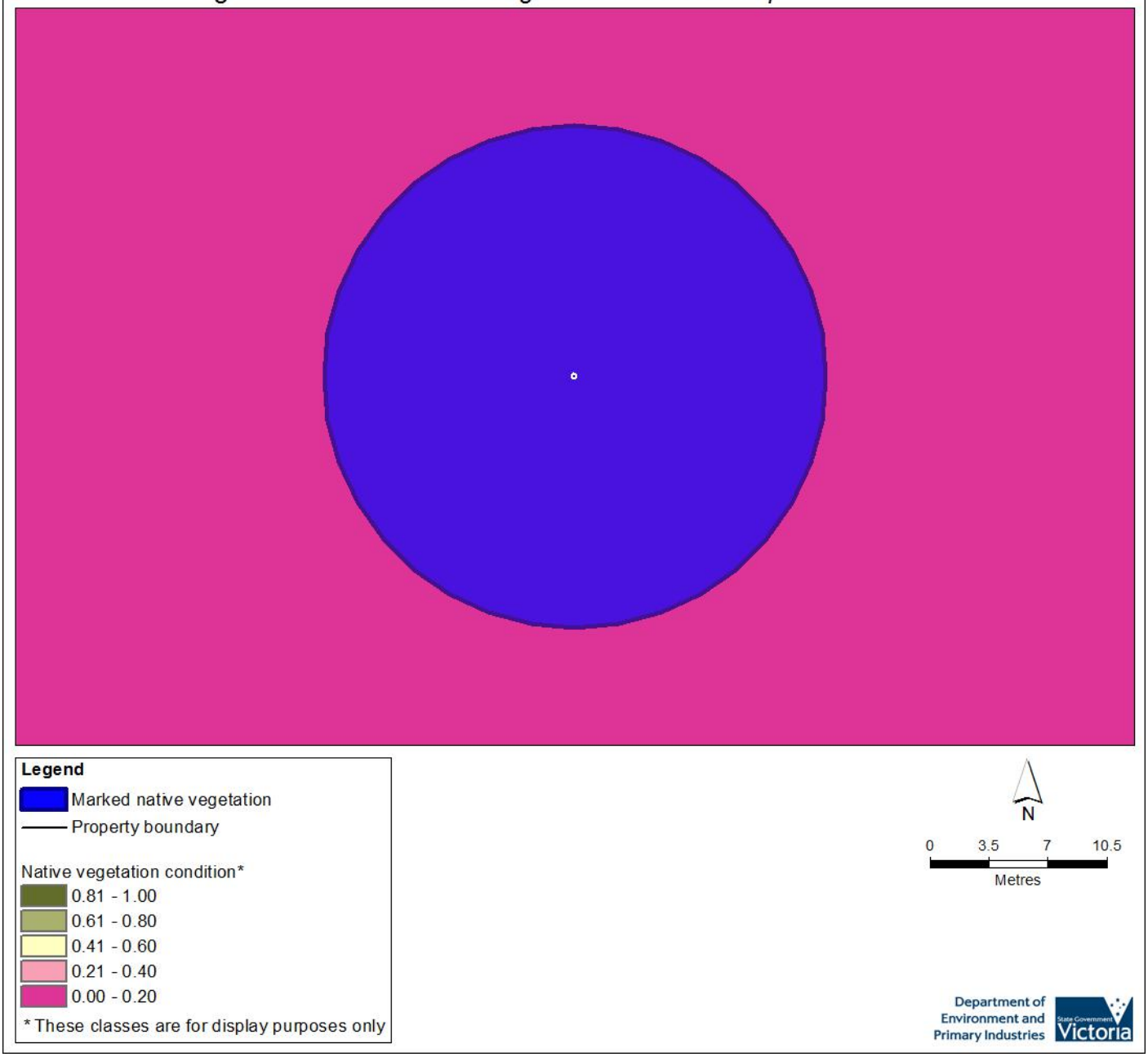
Offset requirements		
Offset type	General offset	A general offset is required when a proposal to remove native vegetation is not deemed, by application of the specific-general offset test, to have a significant impact on habitat for any rare or threatened species. All proposals in the low risk-based pathway will require a general offset.
Risk factor for general offsets	1.5	There is a risk that the gain from undertaking the offset will not adequately compensate for the loss from the removal of native vegetation. If this were to occur, despite obtaining an offset, the overall impact from removing native vegetation would result in a loss in the contribution that native vegetation makes to Victoria's biodiversity. To address the risk of offsets failing, an offset risk factor is applied to the calculated loss to biodiversity value from removing native vegetation.
Offset amount (general biodiversity equivalence units)	0.006	This is calculated by multiplying the general biodiversity equivalence score of the native vegetation to be removed by the risk factor for general offsets. This number is expressed in general biodiversity equivalence units and is the amount of offset that is required to be provided should the application be approved. This offset requirement will be a condition to the permit for the removal of native vegetation. Risk adjusted general biodiversity equivalence score = general biodiversity equivalence score $_{\text{clearing}}$ × 1.5
Minimum strategic biodiversity score	0.233	The strategic biodiversity score of the offset site must be at least 80 per cent of the strategic biodiversity score of the native vegetation to be removed. This is to ensure offsets are located in areas with a strategic value that is comparable to, or better than, the native vegetation to be removed.
Vicinity	Glenelg Hopkins CMA	The offset site must be located within the same Catchment Management Authority boundary as the native vegetation to be removed.

Appendix 3 - Biodiversity information maps

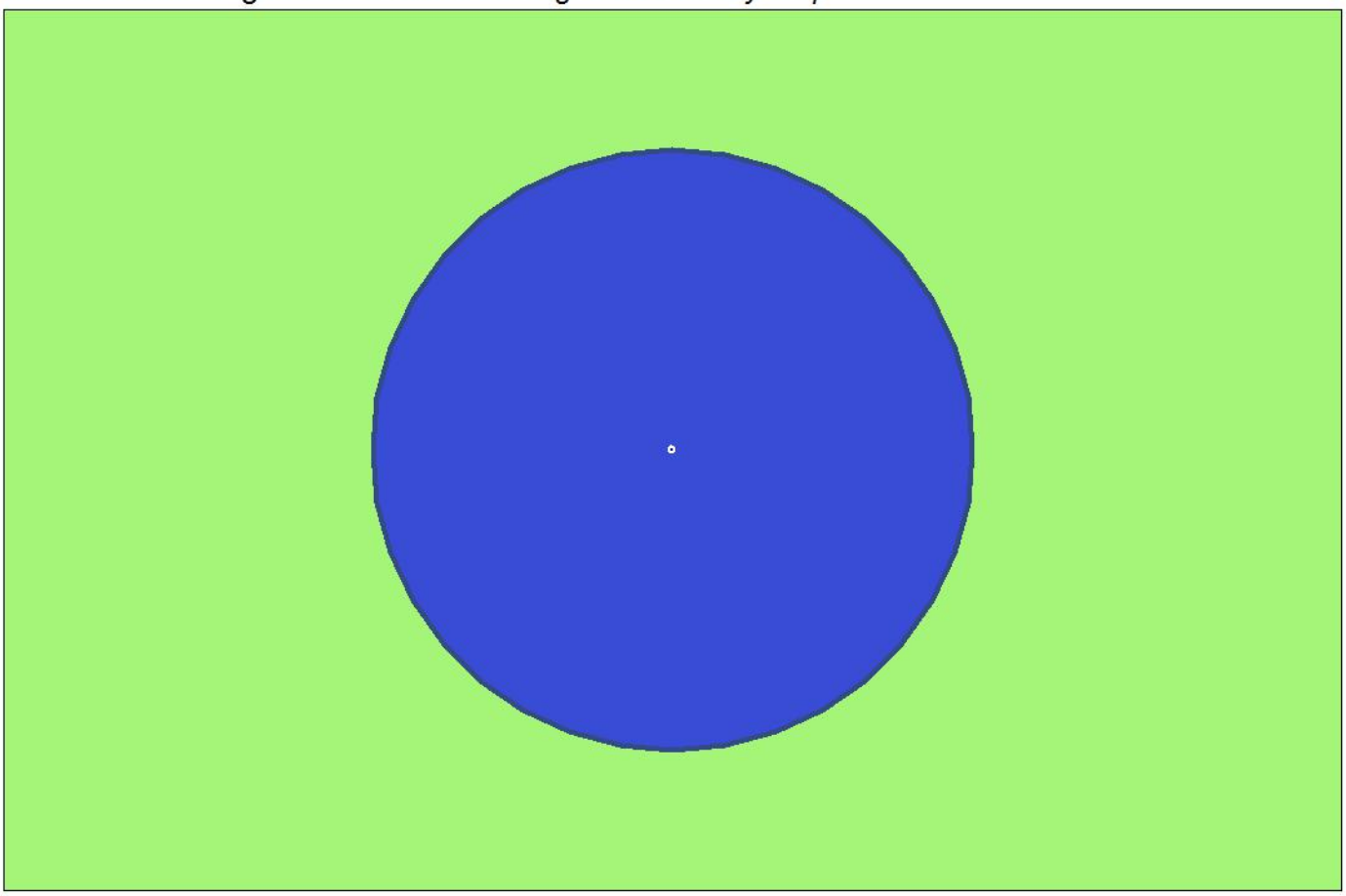
Marked native vegetation and the *Native vegetation location risk map*



Marked native vegetation and the *Native vegetation condition map*



Marked native vegetation and the *Strategic biodiversity map*



Legend

Marked native vegetation

Property boundary

Strategic biodiversity score*

0.81 - 1.00

0.61 - 0.80

0.41 - 0.60

0.21 - 0.40

0.00 - 0.20

* These classes are for display purposes only

N

0 3.5 7 10.5

Metres

Department of Environment and Primary Industries

State Government Victoria

2 June 2015

Mr Greg Tobin
Principal
Harwood Andrews
70 Gheringhap Street
Geelong, VIC 3220

Dear Greg

Advice regarding potential response of birds to the proposed Ballarat Livestock Exchange

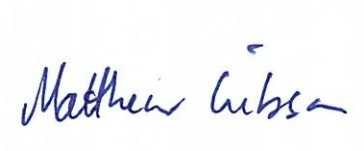
Our Ref: Matter 20164

Biosis has been commissioned to provide advice about the proposed Ballarat Livestock Exchange and the potential for it to attract birds that might represent a risk to aviation using the Ballarat Airport.

Our assessment, including consideration of the site plans, potential use of the water treatment facilities by birds, proximity to the airport and other nearby wetlands, is attached.

Please contact us if you have any enquiries.

Yours sincerely



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Potential response of birds to the proposed Ballarat Livestock Exchange

The site of the proposed Ballarat Livestock Exchange is immediately west of the Western Hwy / Sunraysia Hwy intersection, three kilometres north of Ballarat Airport.

Ballarat Livestock Exchange plans

The Ballarat Livestock Exchange development proposal includes a number of waterbodies for various processes involving waste management and surface and rainwater management. Specifically they include:

- First flush
- Facultative ponds (2x)
- Aerobic pond
- Holding pond
- Rainwater pond
- Wetlands (2x)

At full water levels, the combined surface area of these waterbodies will amount to 28,660m^2 (J. Hannagan, Harwood Andrews 29/05/2015).

The plan includes the use of water in irrigation of two areas that will be pasture and/or cropped.

In order to offer advice about the likely use by birds we have been provided with some further information about the expected/intended properties of the various waterbodies (J. Hannagan, Harwood Andrews 20/05/2015). This indicates the following:

- The surface water wetlands will contain aquatic vegetation.
- Potentially the rainwater pond and surface water wetlands will have water quality sufficient for them to be inhabited by aquatic invertebrates, fish or tadpoles.
- Both of the two irrigated areas will be used for pasture/grazing and/or cropping.
- The irrigation of the two areas will be a deficit irrigation regime that will not saturate the soils or cause surface ponding of irrigation water.

Local habitats for waterbirds

The site of the proposed Ballarat Livestock Exchange is three kilometres north of Ballarat Airport. The following waterbodies are also within a three kilometre radius of the airport:

- Winter's Swamp, south of the airport (the three kilometre radius passes through the swamp)
- a waterbody south of McKenzie Drive
- Ballarat North Wastewater Treatment Plant
- wetlands north-east of Learmonth Rd / Western Fwy intersection
- flooded quarry holes east of Western Hwy / Sunraysia Hwy intersection
- man made wetlands associated with various industries to the east of the Airport

- wetlands associated with drainage lines
- numerous agricultural dams

Wetlands within three kilometres of the Aerodrome reference point have been mapped using available GIS datasets and examination of aerial photography. The total area of these wetlands is estimated to be 69.6 hectares. Construction of the 28,660m^2 of surface water points associated with the saleyards would lead to a 4% increase in wetland area within the three kilometre radius area.

Aircraft birdstrike hazard

The hazard of aircraft birdstrike is substantially related to aircraft height as bird flights occur within a limited height range. In the geographic context of Ballarat Airport some level of hazard due to waterbirds currently exists at nearby waterbodies and, presumably due to birds moving from one area of habitat to another.

The National Airports Safeguarding Advisory Group has published the *National Airports Safeguarding Framework Guideline C: Managing the Risk of Wildlife Strikes in the Vicinity of Airports* (version 3.1.4 2014). The following extract from the Guideline is relevant to consideration of waterbodies proposed as part of the Ballarat Livestock Exchange development.

> *Key considerations for managing risk of wild life strikes in the vicinity of airports*
>
> 12. Most wildlife strikes occur on and in the vicinity of airports, where aircraft fly at lower elevations. The risk of a strike on airport relates to the level and form of wildlife activity both within the boundary of an airport and in surrounding areas. Wildlife attracted to land uses around airports can migrate onto the airport or across flight paths, increasing the risk of strikes. Airports actively reduce wildlife populations and manage the risk of strikes on airport land. Such on-airport activities are underpinned by current aviation safety regulations.
>
> 13. Australia's international aviation safety obligations as a contracting state to the Convention on Civil Aviation include responsibilities to take action to manage the risk from wildlife hazards. Specifically, the following standards and recommendations relating to wildlife hazards apply. Clauses 9.4.3 and 9.4.4 and 9.4.5 of Annex 14 of ICAO state:
>
> • Action shall be taken to decrease the risk to aircraft operations by adopting measures to minimize the likelihood of collisions between wildlife and aircraft;
>
> • The appropriate authority shall take action to eliminate or to prevent the establishment of garbage disposal dumps or any source which attracts wildlife to the aerodrome, or its vicinity, unless an appropriate wildlife assessment indicates that they are unlikely to create conditions conducive to a wildlife hazard problem. Where the elimination of existing sites is not possible, the appropriate authority shall ensure that any risk to aircraft posed by these sites is assessed and reduced to as low as reasonably practicable; and
>
> • States should give due consideration to aviation safety concerns related to land developments in the vicinity of the aerodrome that may attract wildlife.

GUIDELINES FOR MANAGING THE RISK OF WILD LIFE STRIKES IN THE VICINITY OF AIRPORTS

14. Aviation safety regulations do not address the risk of wildlife strikes occurring outside the boundary of airports in the same way as they address on-airport risk. The risk of a strike off airport relates mostly to wildlife activity in areas surrounding the airport. There is a need to strengthen arrangements to address the risk of wildlife hazards that occur off airport and ensure Australia is in step with its local and international obligations.

15. The International Civil Aviation Organisation (ICAO) has developed specific advice on land uses with the potential to become high risk wildlife attractants. These include:

- food garbage disposal;
- sewage treatment and disposal;
- artificial and natural lakes;
- abattoirs and freezing works;
- fish processing plants;
- bird sanctuaries; and
- outdoor theatres.

16. The table at Attachment 1 aligns with international benchmarks set by ICAO and other international aviation regulators. It provides guidance on the land uses that present a risk of attracting wildlife and triggers (based on distance from an airport) for adopting active measures to mitigate that risk. Attachment 1 is a tool to assess plans for new or revised land uses within 3km, 8km and 13km of an airport.

The table in Attachment 1 to Guideline C ranks 'Wildlife Attraction Risk' of various land uses in the vicinity of airports within three radii of the Aerodrome Reference Point (3 km, 8 km and 13 km). The table lists the following:

- *'Sewage / wastewater treatment facility'* is ranked as Moderate for wildlife attraction risk and as requiring 'Mitigation' within 3 km radius for Actions for Proposed Developments/Changes to Existing Developments.

The Transport Safety Investigation Regulations 2003 provide a list of matters reportable to the Australian Transport Safety Bureau. One routine reportable matter is a collision with an animal, including a bird, for:

- all air transport operations (all bird and animal strikes), and
- aircraft operations other than air transport operations when the strike occurs on a licensed aerodrome.

On the basis of statistics for 12,447 aircraft birdstrikes reported across Australia in the period 2002 – 2010 the Australian Transport Safety Bureau (2012) report that the great majority of birdstrikes occur with high capacity transport jet aircraft of the types flying interstate and international routes. Fixed-wing aircraft in the 5,700 – 2251 kg weight range averaged less than 1.5 strikes per 10,000 movements and those in the weight range below 2250 kg averaged less than 0.4 strikes per 10,000 movements. The report also notes that:

> *"The vast majority of birdstrikes occurred at airports. More than 40 per cent of birdstrikes with a known phase of flight involving aeroplanes occurred during takeoff, and almost 30 per cent occurred during landing. In total, 96 per cent of birdstrikes with a known phase of flight occurred while the aircraft was on the runway, on approach to land or just after takeoff. Very few occurred during cruise."*

Over the past decade Biosis has collected flight height information for birds at multiple wind farm sites across south-eastern Australia. All of them had wetlands used by waterbirds within the sites and in the immediate surrounding areas. We are not aware of any similar database for bird flight heights. The pooled set of this data for waterbird species totals 14,106 flights. Of these, 84.2% were between the ground and 50 metres height; 15.2% were between 51 and 100 metres height; and 0.5% were between 101 and 500 metres height. We expect that waterbird flight height over the site of the proposed Ballarat Livestock Exchange may be similarly concentrated. Since the site is three kilometres from Ballarat Airport it would seem reasonable to assume that the majority of aircraft flights in the vicinity of the site will be higher than the majority of waterbird flights.

John Hartigan, Manager of Ballarat Airport has confirmed (pers. comm. 28/05/2015 to M. Gibson, Biosis) that the airport has not had any reported birdstrikes and that the airport does not have a wildlife hazard management plan.

Discussion

With the notable exception of the Western Treatment Plant at Werribee, the values of wastewater treatment ponds to waterbirds have been poorly documented internationally. However, a series of studies have been undertaken in Victoria in recent years and Murray and Hamilton (2010) have provided a first review. The waterbodies planned for the Ballarat Livestock Exchange project fall into the categories of waste stabilization ponds and constructed wetlands. Waste stabilization ponds are open-water earthen basins that exploit natural processes to treat waste-water and constructed wetlands use wetland vegetation, although in a more controlled environment from that of a natural wetland, for wastewater treatment.

It is clear from experience with such wastewater treatment ponds that they can be attractive to a wide array of waterbirds. Murray *et al.* (2014) have assessed waterbird usage of different types of ponds in the wastewater treatment process at 18 sewage treatment plants in the Goulbourn Valley, Victoria. They report that:

> *Waterbird abundance and species richness generally increased progressively through the treatment system, with values in winter-storage and maturation ponds significantly greater than in anaerobic and aerated ponds, and with similar trends for waterbird density. Facultative ponds also supported a greater abundance and density of waterbirds than anaerobic ponds.*

The permanence of water at wastewater treatment ponds represents a particular value to waterbirds. Many Australian waterfowl species breed on ephemeral inland wetlands and migrate to perennial wetlands for the non-breeding period and treatment ponds at many locations are important refuges at these times. Murray *et al.* (2012) reported on a major investigation of many types of natural and artificial wetlands across Victoria which found that the density of total waterfowl was significantly greater on waste stabilization ponds than on all other wetland types.

Many of the species of waterbirds in Victoria are highly nomadic across the entire Australian continent and respond to suitable ephemeral conditions wherever they may occur. This makes their use of any particular location at any given time unpredictable. Nonetheless, the various ponds proposed for the Ballarat Livestock Exchange are likely to be utilized by a variety of species. The majority of duck species and grebes will use open-water ponds, whether or not these offer foraging opportunities, in addition to vegetated ponds. Ducks are likely to flock in greater numbers than the majority of other waterbirds, some of which usually occur as in low numbers on any given waterbody. Ponds that support fish are likely to be used by cormorants and Australian Pelicans. Ponds with aquatic vegetation are likely to be used by the species above, in addition to Eurasian Coots, Dusky Moorhens and, potentially some species of rails, crakes and Purple Swamphens. If ponds are relatively steep-sided they will have limited, or no value to the majority of short-legged waders, including almost all internationally migratory shorebirds, but individuals of deep-water wading birds, like egrets and herons can be expected to occur unless the banks are almost perpendicular.

The irrigation regime proposed is not likely to create conditions that will be attractive to birds in the manner, for instance, that flood irrigation creates foraging conditions for substantial numbers of ibis species.

While it is likely that the proposed waterbodies at Ballarat Livestock Exchange will support an increased number of waterbirds it is not possible to accurately predict how many birds that might use them. It is also probable that numbers of waterbirds will vary seasonally and relative to multiple extrinsic factors. Using a different approach, we have approximated the potential increase in habitat availability to waterbirds, measure by surface area of water, that the proposal will represent within three kilometres of the airport.

The combined surface area of waterbodies planned for Ballarat Livestock Exchange is 28,660m^2.

The various other waterbodies within three kilometres of Ballarat Airport are listed above. We have not investigated them in the field for the purposes of this advice but a number of them are well-known habitats for waterbirds and, from aerial photography, all those listed appear well suited to waterbirds. The combined surface area of these waterbodies when full is in the order of 69.6 hectares. For the purpose of this consideration the entire area of Winter's Swamp is included despite the fact that it extends to approximately 3.4 km from the airport, because it is used as a single entity by waterbirds.

On those measures the addition of the waterbodies planned for the Livestock Exchange represents a 4% increase in available wetland habitat for birds.

Conclusions

All available information indicates that other than during take-off and landing, aircraft and birds rarely collide because, in the main, they fly at different heights. In the current situation for take-off and landing at Ballarat Airport, some risk of collision with waterbirds already exists due to substantial wetland habitats within three kilometres in almost all directions from the airport. Despite this the actual risk appears to be low as no collisions are known to have occurred there.

It is not possible to accurately predict an increase in numbers of birds that might result from development and operation of the proposed Livestock Exchange, and it is probable that numbers of waterbirds will vary seasonally and due to multiple extrinsic factors. We have assessed the potential increase in habitat availability to waterbirds that the proposal will represent within three kilometres of the airport at 4%. The additional habitat area may contribute to a minor increase in bird activity within the area, and this may in turn contribute to a minor increase in strike risk, but we consider this to remain a low risk for a number of reasons, as discussed in this letter, including:

- There are a number of existing wetlands within the area, some of which are known to support favourable habitat for water birds, and to date there have been no recorded strikes.
- The increase in wetland area is only 4%, and similar wetland types are already present in the area at the Ballarat North Wastewater Treatment Plant.
- At approximately 3km from the airport, and not directly in line with either runway, it is unlikely that aircraft will be flying over the proposed saleyards site at a height where strikes are likely. Note that a full analysis of flight paths and heights has not been undertaken.

References

Australian Transport Safety Bureau. 2012. Australian aviation wildlife strike statistics: Bird and animal strikes 2002 to 2011. ATSB Transport Safety Report. Aviation Research and Analysis Report No. AR-2012-031. Commonwealth of Australia. Canberra.

Murray, C.G. and Hamilton, A.J. 2010. *Perspectives on wastewater treatment wetlands and waterbird conservation.* Journal of Applied Ecology 47: 976–985.

Murray, C.G, Kasel, S., Szantyr, E., Barratt, R. and Hamilton, A.J. 2014. *Waterbird use of different treatment stages in waste-stabilisation pond systems.* Emu 114: 30–40.

Murray, C.G., Loyn, R.H., Kasel, S., Hepworth, G., Stamation, K. and Hamilton, A. J. 2012. *What can a 22-year database tell us about the use of different types of wetlands by waterfowl in south-eastern Australian summers?* Emu 112: 209–217.

National Airports Safeguarding Advisory Group. 2014. National Airports Safeguarding Framework Guideline C: Managing the Risk of Wildlife Strikes in the Vicinity of Airports (version 3.1.4).