470 CRAIGIEBURN ROAD, WOLLERT

EXPERT WITNESS STATEMENT OF BRETT LANE

Murdesk Investments Pty. Ltd.

BL&A Brett Lane & Associates Pty. Ltd.
Ecological Research & Management
Suite 5 61–63 Camberwell Road, Hawthorn, VIC 3123
P.O. Box 337, Camberwell, VIC 3124
Ph. (03) 9815 2111
Fax. (03) 9815 2685

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Report No. 15064 (3.1)

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1. WITNESS INFORMATION

1.1. Expert witness information

Brett Alexander Lane
Brett Lane & Associates Pty Ltd
Suite 5, 61-63 Camberwell Road
Hawthorn East, Vic. 3123

Brett Lane has extensive expertise in terrestrial ecology and related legislation and policies.

His qualifications and experience are summarised in Appendix 1.

1.2. Information of other significant contributors

The names, addresses and areas of expertise of other significant contributors to this report, and associated background reports, are presented in Table 1. Their details are provided in Appendix 1.

Table 1: Details of other significant contributors

Name of contributor	Address	Area of Relevant Expertise	Location of summary of qualifications and expertise
Alan Brennan	Brett Lane & Associates Pty Ltd Suite 5, 61-63 Camberwell Road, Hawthorn East, Vic. 3123	Ecology	Appendix 1
Davide Coppolino		Botany	

2. WORK UNDERTAKEN

Brett Lane & Associates Pty Ltd undertook the following investigations associated with 470 Craigieburn Road, Wollert:

- *470 Craigieburn Road, Wollert — Advice on Biodiversity Conservation Strategy Issues — BL&A Letter Report 15064 (1.0) dated 20 July 2015*
- *470 Craigieburn Road, Wollert — Time Stamping Survey — BL&A Report 15064 (2.1) dated September 2015*

These investigations were undertaken at the invitation of the Department of Environment Lane Water and Planning (DELWP) as set out in a letter dated 15th June 2015 to Murdesk. A copy of this letter is appended to this statement at Appendix 5.

2.1. Scope of assessments

The scope of each assessment is described as follows.

470 Craigieburn Road, Wollert — Advice on Biodiversity Conservation Strategy [BCS] *Issues — BL&A Letter Report 15064 (1.0) dated 20 July 2015*

- A preliminary assessment, involving the following:
    - A briefing meeting with the client;
    - Preliminary site assessment of the flora and fauna values of the site, including a review of the BCS as it relates to the land.
    - Provision of brief written advice (a letter) outlining the results of the investigation, including discussion on the likelihood of amendments to the BCS and PSP to reduce the conservation area.

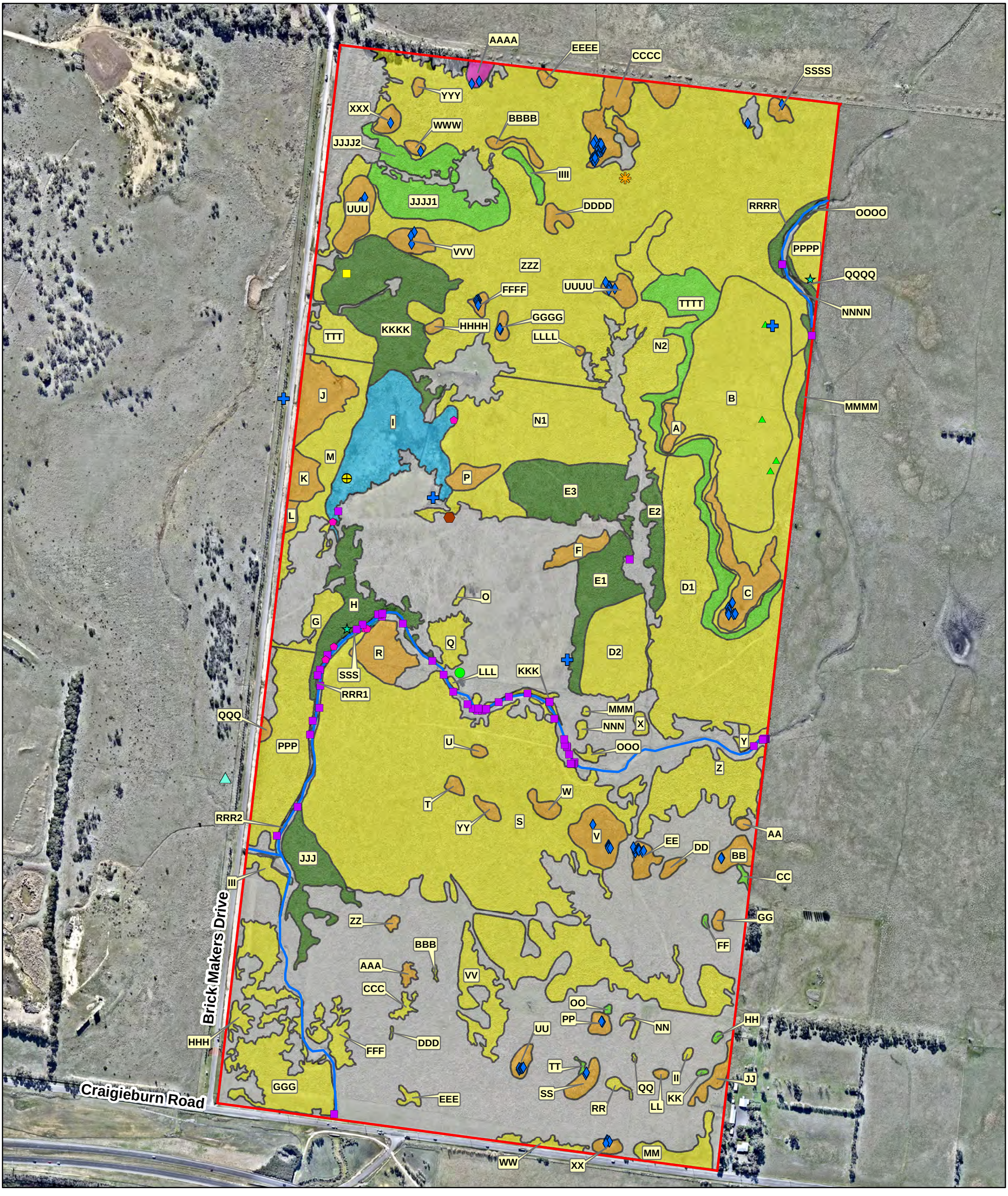
470 Craigieburn Road, Wollert — Time Stamping Survey — BL&A Report 15064 (2.1) dated September 2015

- A site survey involving:
    - Assessment of native vegetation in accordance with DELWP's *Time Stamping Manual* including a habitat hectare assessment and scattered tree assessment;
    - Assessment of the occurrence of EPBC Act listed ecological communities on the site.
- Preparation of a report that includes the following:
    - A statement of the methods used and sources of information for the investigation, including any limitations, where applicable;
    - Preparation of time stamping data in a format acceptable by DELWP;
    - A map of the site showing the results of the assessment based on the site survey and aerial photographs obtained through NearMap;
    - Discussion of the implications of the findings and the scope for a proposed change to the reserve boundary.

2.2. Area covered by assessments

The study area for the above assessments was 470 Craigieburn Road, Wollert (Figure 1) being a property identified as Conservation Area 32 under the Biodiversity Conservation

Strategy (BCS) (DELWP 2015a). The study area was approximately 121 hectares of private land, located approximately 33 kilometres north of Melbourne's CBD. The study area is bordered by Craigieburn Road (to the south), Brick Makers Drive (to the west) and farmland to the north and east.



Legend

- Property boundary
- Curly Sedge Creek

Native vegetation

- DTV
- (VVP_0125) Plains Grassy Wetland
- (VVP_0132_61) Heavier-soils Plains Grassland
- (VVP_0649) Stony Knoll Shrubland
- (VVP_0649_61) Treed Stony Knoll Shrubland
- (VVP_0654) Creekline Tussock Grassland
- (VVP_0656) Brackish Wetland
- Small scattered tree

Listed Flora

BL&A site assessment

- Adamson's Blown-grass
- Arching Flax-lily
- Brackish Plains Buttercup
- Curly Sedge
- Matted Flax-lily
- Western Golden-tip

Existing VBA records

- Curly Sedge
- Slender Tick-trefoil
- Tough Scurf-pea

Listed Fauna

Existing VBA records

- Growling Grass Frog
- Plains-wanderer

Metres

0 75 150 300

N

Figure 1: Study area, native vegetation and rare/threatened species records

Project: 470 Craigieburn Road, Wollert

Client: Murdesk Investments Pty. Ltd.

Project No.: 15064	Date: 16/09/2015	Created By: M. Ghasemi / D. Coppolino

BL&A Brett Lane & Associates Pty. Ltd.
Ecological Research & Management
Experience Knowledge Solutions
Suite 5, 61 - 63 Camberwell Road
Hawthorn East ,VIC 3123
PO Box 337, Camberwell, VIC 3124, Australia
Ph (03) 9815 2111 / Fax (03) 9815 2685
enquiries@ecologicalresearch.com.au
www.ecologicalresearch.com.au

3. METHODS

3.1. Existing information

Existing information used for this investigation is described below.

3.1.1. Planning

The following information relating to the orderly planning of the study area was reviewed.

- Whittlesea Planning Scheme (DTPLI 2015)
- Wollert Precinct Structure Plan (MPA 2015)

3.1.2. Native vegetation

Pre-1750 (pre-European settlement) vegetation mapping administered by DELWP was reviewed to determine the type of native vegetation likely to occur in the study area and surrounds. Information on Ecological Vegetation Classes (EVCs) was obtained from published EVC benchmarks. These sources included:

- Relevant EVC benchmarks for the Victorian Volcanic bioregion[1] (DELWP 2015c); and
- Biodiversity Interactive Maps (DELWP 2015d).

3.1.3. Listed rare and threatened species

Existing records of rare and threatened terrestrial flora and fauna were obtained from the Victorian Biodiversity Atlas (VBA) records (VBA 2014).

3.1.4. Listed ecological communities

Existing records and information about the potential occurrence of listed ecological communities was obtained from an area termed the 'search region', defined here as an area with a radius of ten kilometres from the approximate centre point of the study area (coordinates: latitude 37˚ 35' 45" S and longitude 144˚ 58' 42" E).

The list of communities on the FFG Act Threatened List (DEPI 2014b) was reviewed to ascertain whether any Victorian listed ecological communities were likely to occur in the study area. FFG Act listed ecological community modelling within DELWP's Biodiversity Interactive Map (DELWP 2015d) was consulted to determine which listed communities (if any) were likely to occur in the study area.

The online *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Search Tool (Department of the Environment 2015) was consulted to determine whether nationally listed ecological communities potentially occurred in the search region based on habitat modelling.

3.2. Field methodology

The field assessments were conducted between 24th August and 1st September 2015. During these assessments, the study area was surveyed initially by vehicle and areas supporting remnant native vegetation were inspected in more detail on foot.

[1] A bioregion is defined as "a geographic region that captures the patterns of ecological characteristics in the landscape, providing a natural framework for recognising and responding to biodiversity values". In general bioregions reflect underlying environmental features of the landscape (DNRE 1997).

Sites in the study area found to support native vegetation, degraded treeless vegetation and non-native vegetation were mapped. Mapping was undertaken through a combination of aerial photograph interpretation and ground-truthing using a hand held GPS (accurate to approximately five metres).

I inspected the property on 27th November 2015 in order to verify the findings of the previous field investigations and familiarise myself with the study area.

3.2.1. Native vegetation

Native vegetation was assessed against criteria set out in the Time Stamping and Assessment Standards 2015/16 (DELWP 2015b), referred to herein as 'the Standards', and Native Vegetation Management Framework (DNRE 2002; DSE 2004), referred to hereon as 'the Framework'. Man-made structures which do not support any vegetation do not require mapping or assessment under the Standards.

The native vegetation assessment guidelines set out under the Framework and the Standards categorised native vegetation into the following four categories:

- Remnant patch;
- Scattered trees;
- Degraded treeless vegetation; or
- Non-native vegetation.

A description of these is provided below with the prescribed DELWP methods to assess them.

Remnant patch

Remnant patches of native vegetation comprise the following:

> *"areas of vegetation, with or without trees, where less than 75% of the total understorey plant cover is weeds or non-native plants (bare ground and surface rocks are not included). That is, at least 25% of the understorey cover is native*[2]
>
> *OR*
>
> *An area with a group of indigenous canopy trees (3 or more)* [3] *with ≥ 20% canopy cover"* (DELWP 2015b).

Remnant patch vegetation is assessed using the habitat scoring or habitat hectare method (Parkes *et al*. 2003; DSE 2004) whereby components of native vegetation (e.g. tree canopy, understorey and ground cover) are assessed against a DELWP-issued EVC benchmark (see appendices) that describe the notional pre-European condition of that EVC. The score effectively measures the percentage resemblance of the vegetation to its original condition.

Each habitat zone was also assessed to determine whether high-threat perennial grassy weeds contributed greater than, less than or equal to 25% cover.

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[2] Native understorey cover can include bryophytes, lichens and soil crust.

[3] Indigenous canopy trees includes all tree species that typically form part of the canopy as per the relevant EVC benchmark that are ≥ 80% of the benchmark tree height.

Scattered trees

DELWP define scattered trees as follows:

> "*Indigenous canopy trees (trees that typically form part of the canopy as per the relevant EVC benchmark and are greater than 1.3 metres in height)*[4]*, that have a diameter at breast height (dbh) ranging from 0.25 times the benchmark Large Tree diameter to over 1.5 times the benchmark Large Tree diameter.*
>
> *Scattered trees fall into three size classes:*
>
> 1. *Very Large Old Trees (VLOT): indigenous trees with a dbh ≥ 1.5 x benchmark Large Tree diameter*
> 2. *Large Old Trees (LOT): indigenous trees with a dbh ≥ benchmark Large Tree diameter up to < 1.5 x benchmark Large Tree diameter*
> 3. *Medium Old Trees (MOT): indigenous trees with a dbh from ≥ 0.75 up to < benchmark Large Tree diameter*" (DELWP 2015b).

Scattered trees are identified to species level and their DBH measured. The size class of scattered trees is determined based on the large tree DBH in the relevant benchmark for the EVC to which it once belonged.

Degraded treeless vegetation

Degraded treeless vegetation comprises the following:

> "*Areas that contain native vegetation, but do not meet the remnant patch cover thresholds for both understorey and canopy trees, or are not a wetland, should be mapped as degraded treeless vegetation*[5]*. This includes all areas of vegetation that may or may not contain non-indigenous trees and < 25% of the total understorey cover is native (bare ground and surface rocks not included). Indigenous canopy trees that meet scattered tree Diameter at Breast Height (dbh*[6]*) thresholds occurring in degraded treeless sites will be mapped as scattered trees*" (DELWP 2015b).

Degraded treeless vegetation is mapped for time stamping purposes.

Non-native vegetation

Non-native vegetation comprises the following:

> "*Areas that contain no indigenous understorey vegetation (i.e. the area only contains understorey plants that are non-indigenous to the site) should be mapped as non-native vegetation. In addition, indigenous canopy trees occurring in non-native vegetation sites, that meet scattered tree dbh thresholds, but do not*

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[4] In relation to scattered trees, indigenous canopy trees includes all tree species that typically form part of the canopy as per the relevant EVC benchmark that are ≥ 1.3m in height at the time of the assessment and meet the diameter at breast height (dbh) thresholds. As opposed to the definition of trees used to assess tree canopy cover in the Vegetation Quality Assessment, which must be ≥ 80% of the benchmark tree height.

[5] DSE's Guide for Assessment of Referred Planning Permit Applications (DSE 2007) allows for the classification of sites as degraded treeless if the % cover meets the remnant patch threshold, but is now dominated by species that are unlikely to have originally dominated the site. This may include such situations as former grasslands that have had a history of cropping, and now have an extremely modified cover consisting of a few opportunistic, primary colonising native grass species generally amongst exotic species, with little other indigenous diversity. However, this categorisation may only be made at the discretion of DSE. For the purposes of this project all sites that meet remnant patch thresholds must be categorised, mapped and assessed as remnant vegetation.

[6] Diameter at Breast Height (dbh) is the diameter of the main trunk of a tree measured at 1.3 metres above ground level.

meet the remnant patch cover thresholds for canopy trees, will be recorded as scattered trees" (DELWP 2015b).

Non-native vegetation is mapped for time stamping purposes.

3.2.2. Rare and threatened flora

Where flora species listed as rare or threatened under the EPBC Act, FFG Act or DELWP's Advisory List (DEPI 2014a) were incidentally observed during habitat hectare surveys, they were recorded. Their locations were mapped to an accuracy of approximately five metres using a hand-held GPS and they were identified to species level. Where species occurred in very high numbers, a sample of individuals were mapped to indicate general extent.

Note that detailed targeted surveys for rare and threatened species were not conducted as part of this investigation.

DELWP initially advised that targeted surveys for rare and threatened species would not be required as part of Murdesk Investments' application to amend the boundary of Conservation Area 32. Subsequent to this advice, DELWP required targeted surveys to be undertaken for Matted Flax-lily and Curly Sedge. As these targeted surveys are seasonally dependent they could not be undertaken prior to the preparation of this witness statement. It is proposed to undertake targeted surveys for Matted Flax-lily and Curly Sedge in early December 2015 and present these findings at the Panel Hearing.

3.2.3. Threatened ecological communities

Each mapped habitat zone was assessed against identification criteria and condition thresholds for relevant listed threatened ecological communities found to potentially occur in the study area.

4. LEGISLATIVE BACKGROUND

Under normal circumstances, applications to change the boundaries of Conservation Area 32 may only be endorsed by Department of Environment, Land, Water and Planning (DELWP) for approval by the Commonwealth Minister for Environment if they meet set criteria.

A key document which provides guidance on applications to adjust conservation area boundaries is the Biodiversity Conservation Strategy (BCS) implementation guidance note (the 'Guidance Note') (DELWP 2015a). The Guidance Note sets out the process for proposing adjustments to conservation area boundaries, including the roles and responsibilities of the proponent and local, state and commonwealth governments.

However, the process initiated by DELWP through the letter of 15th June 2015 (see Appendix 5) provides for a change to the reserve boundary informed by detailed surveys that sits outside this process and acknowledges the limitations of the original boundary designation process, which was based on modelled information rather than real survey data.

Murdesk commissioned BL&A to undertake the detailed surveys. BL&A clarified the scope and methods of these surveys with Ms Anne Buchan of DELWP and undertook the surveys in accordance with her guidance and adopted the required 'time-stamping' native vegetation assessment method.

Any change to the boundary of Conservation Area 32 will require Commonwealth Government approval following local and state government endorsement of the proposed changes.

5. FINDINGS

5.1. Site description

The study area for this investigation (Figure 1) was approximately 121 hectares of private land located in Wollert, approximately 33 kilometres north of Melbourne's CBD. The property is bordered by Craigieburn Road (to the south), Brick Makers Drive (to the west) and farmland to the north and east.

The study area comprised an undulating plain with soils derived from quaternary basalt. Small to large stony rises/knolls were scattered throughout, particularly across a broad band of more elevated ground which swept from the north-western through central-eastern to south-eastern parts of the study area. These rises were characterised by an abundance of outcropping basalt boulders.

The land generally drained between the stony rises to a broad low-laying area in the south-western corner of the study area. The brackish and well-defined Curly Sedge Creek narrowly meandered and zigzagged (at the broader scale) roughly south-westward through the study area. A drainage line in the adjacent property to the west met Curly Sedge Creek in the south-western part of the study area. A less prominent ephemeral drainage line extended between the north-western part of the study area to the central-western part where it drained into Curly Sedge Creek. This second drainage was interrupted approximately midway (i.e. 140 metres north of Curly Sedge Creek) by a brackish seasonal wetland. A third broad, rudimentary drainage extended southward from the central part of the study area to Curly Sedge Creek.

At the time of survey, low-lying areas between stony rises and along drainages were damp to shallowly inundated following recent rainfall, although water was not flowing within any drainage lines.

Soils became increasingly heavier, from the silty clay-loam soils on stony rises to the heavy, black clays within drainages and boggy areas. Soils within Curly Sedge Creek comprised grey clays.

Trees were almost entirely absent from the study area. One paddock in the centre of the study area and low-laying areas adjacent to the eastern side of Curly Sedge Creek in the south-western part of the study area had been cropped in the past. Fill had been imported and spread over the north-western edge of the study area. The study area was being lightly grazed by cattle during the current investigation.

The above-mentioned areas that had been subject to significant soil disturbance as well as along access tracks were dominated by weeds such as Texas Needle-grass, Chilean Needle-grass, Cocksfoot, Toowoomba Canary-grass and Tall Wheat-grass. The remainder of the study area predominantly supported very low to high quality indigenous vegetation.

Stony rises supported mostly indigenous herbaceous vegetation (e.g. Weeping Grass, Common Wheat-grass, Kangaroo Grass, Dense Spear-grass, Wattle Mat-rush and Shady Wood-sorrel) with some scattered, much-grazed small shrubs (e.g. Black Wattle, Western Golden-tip and Hedge Wattle). Weeds were also present in varying abundance, including species such as Hair Grass, Squirrel-tail Fescue, Yorkshire Fog and Spear Thistle.

Brackish drainage lines and wetlands supported mostly weedy grasses and forbes (e.g. Tall Fescue, Artichoke Thistle, Ox-tongue and Barley Grass) with some small, isolated indigenous elements (e.g. Brackish Plains Buttercup, Common Spike-sedge, Shiny Swamp-mat and Sea Celery).

Low-laying ephemeral drainages and swampy ground were dominated by dense to fairly sparse stands of Common Tussock-grass with various indigenous and introduces graminoids and forbs in the inter-tussock spaces.

The remaining areas on intermediate ground mostly supported low to high quality native grasslands (e.g. Common Tussock-grass, Common Wheat-grass, Weeping Grass, wallaby grasses, spear grasses, Kangaroo Grass and various forbes) on rocky, gilgai or fairly featureless landforms. These grasslands were weedier along the northern study area boundary and to the south and east of Curly Sedge Creek. Species of the introduced genus *Nassella* were particularly abundant in these areas.

Adjacent farmland to the north and east supported similar but possibly more degraded vegetation. The property to the west supported similar but long-ungrazed vegetation where indigenous trees and shrubs had re-established.

Surrounding land uses include mostly farming (to the north and east), conservation reservation (to the south) and extractive industries (to the west).

The study area lies within the Victorian Volcanic Plain bioregion and falls within the Port Phillip and Westernport catchment and Whittlesea local government area. It is currently zoned Rural Conservation Zone in the Whittlesea Planning Scheme and occurs within a bushfire prone area.

The study area as well as the native vegetation and listed rare and threatened species and ecological communities recorded therein are shown in Figure 1.

5.2. Remnant patches

Pre–European EVC mapping (DELWP 2015d) indicated that the study area and surrounds would have supported Plains Grassland (EVC 132), Grey Clay Drainage-line Aggregate (EVC 124), Plains Grassy Woodland (EVC 55) and Plains Grassy Wetland (EVC 125) prior to European settlement based on modelling of factors including rainfall, aspect, soils and remaining vegetation.

Evidence on site, including floristic composition and soil characteristics, suggested that Heavier-soils Plains Grassland (EVC 132_61), Stony Knoll Shrubland (EVC 649), Plains Grassy Wetland (EVC 125), Creekline Tussock Grassland (EVC 654) and Brackish Wetland (EVC 656) were present across much of the study area (Figure 1).

Plans Grassy Wetland (EVC 125) is described in the published benchmark as "usually treeless, but in some instances can include sparse River Red Gum Eucalyptus camaldulensis or Swamp Gum Eucalyptus ovata. A sparse shrub component may also be present. The characteristic ground cover is dominated by grasses and small sedges and herbs. The vegetation is typically species-rich on the outer verges but is usually species-poor in the wetter central areas" (Appendix 2).

Heavier-soils Plains Grassland (EVC 132_61) is described in the published benchmark as "treeless vegetation mostly less than 1 m tall dominated by largely graminoid and herb life forms. Occupies fertile cracking basalt soils prone to seasonal waterlogging in areas receiving at least 500 mm annual rainfall" (Appendix 2).

Stony Knoll Shrubland (EVC 649) is described in the published benchmark as "a shrubland to 3 m tall or low non-eucalypt woodland to 8 m tall with a grassy understorey. It occurs on low stony rises on basalt flows. The soils are fertile and well drained but shallow without cropping rock, causing severe summer dryness" (Appendix 2).

Creekline Tussock Grassland (EVC 654) is described in the published benchmark as vegetation which "occurs along low gradient ephemeral and intermittent drainage lines across the volcanic plains. Soils are generally fertile heavy dark clays. Exposed basalt rocks can be common. Dominated by a dense sward of Common Tussock-grass Poa labillardierei primarily with small herbs and typically mat-forming grasses in the inter-tussock spaces. This EVC often includes small areas of sedgeland and/or wetland" (Appendix 2).

Brackish Wetland (EVC 656) is described in the published benchmark as a "treeless EVC dominated by sedges and herbs that are generally indicative of saline conditions. True halophytic species such as samphires, if present, only occur with very low cover. Occurs in estuaries and along poorly defined drainage lines or associated with shorelines of brackish lakes" (Appendix 2).

The following similar EVCs were identified as follows:

- **Creekline Tussock Grassland** - Denser swards of Common Tussock-grass fringing Curly Sedge Creek, connected channelized or broad ephemeral drainage lines and obvious wetlands; areas subject to seasonal inundation from flowing water;
- **Plains Grassy Wetland** – Areas dominated by Common Tussock-grass on black soils subject to periodic inundation by mostly still or ponding water; and
- **Plains Grassland** – other grassy areas, including comparatively elevated or freer-draining ground but excluding stony knolls.

A total of 105 remnant patches (referred to herein as habitat zones) comprising the abovementioned EVCs were identified in the study area. These habitat zones are categorised in Table 2 by EVC and general quality. The habitat hectare assessment results for these habitat zones are summarised in Table 3. More detailed habitat scoring results are presented in Appendix 2.

Table 2: EVCs and general quality of habitat zones in the study area

General quality*	EVC Name	EVC Number	Habitat Zone/s
High	Heavier-soils Plains Grassland	132_61	B
Moderate	Creekline Tussock Grassland	654	H
	Heavier-soils Plains Grassland	132_61	ZZZ & PPPP
	Plains Grassy Wetland	125	TTTT
	Stony Knoll Shrubland	649	J, K, XXX, VVV, WWW, UUU, HHHH & UUUU
Low	Brackish Wetland	656	I, RRR1, RRR2 & SSS
	Creekline Tussock Grassland	654	E1, E2, E3, JJJ, KKKK, MMMM, QQQQ & RRRR
	Heavier-soils Plains Grassland	132_61	D1, G, M, N1, N2, O, Q, S, Y, Z, MM, QQ, WW, PPP & TTT
	Plains Grassy Wetland	125	HH, IIII, JJJJ1 & JJJJ2
	Stony Knoll Shrubland	649	A, C, L, P, T, V, W, DD, EE, GG, PP, SS, UU, XX, YY, QQQ, YYY, BBBB, CCCC, DDDD, EEEE, FFFF, GGGG, LLLL & SSSS
	Treed Stony Knoll Shrubland	649_61	A
Very low	Brackish Wetland	656	NNNN & OOOO
	Heavier-soils Plains Grassland	132_61	D2, X, II, NN, RR, VV, BBB, CCC, DDD, EEE, FFF, GGG, HHH, III, KKK, LLL, MMM, NNN & OOO
	Plains Grassy Wetland	125	CC, FF, KK, OO & TT
	Stony Knoll Shrubland	649	F, R, U, AA, BB, JJ, LL, ZZ & AAA

* = General quality assigned based upon the following habitat score ranges:

Very high = 90-100
High = 70-89
Moderate = 50-69
Low = 30-49
Very low = 0-29

Table 3: Summary of habitat hectare assessment results

Habitat Zone	EVC no.	Area (ha)	Habitat score (out of 100)	Habitat Hectares	Listed ecological communities	
					EPBC Act	FFG Act
A	649_61	0.128415	33	0.042	None	None
B	132_61	4.466178	70	3.126	NTGVVP	WBPG
C	649	0.712368	37	0.264	None	None
D1	132_61	5.817982	34	1.978	NTGVVP	None
D2	132_61	1.316029	27	0.355	NTGVVP	None
E1	654	0.968208	34	0.329	NTGVVP	None
E2	654	0.436197	42	0.183	NTGVVP	None
E3	654	1.545756	42	0.649	NTGVVP	None
F	649	0.235809	28	0.066	None	None
G	132_61	0.335557	30	0.101	NTGVVP	None
H	654	0.986043	55	0.542	NTGVVP	None
I	656	2.057916	49	1.008	None	None
J	649	0.668806	54	0.361	NTGVVP	None
K	649	0.286743	54	0.155	NTGVVP	None
L	649	0.078024	35	0.027	None	None
M	132_61	1.189738	48	0.571	NTGVVP	None
N1	132_61	3.592550	35	1.257	NTGVVP	None
N2	132_61	1.821549	35	0.638	NTGVVP	None
O	132_61	0.026354	32	0.008	None	None
P	649	0.203198	44	0.089	None	None
Q	132_61	0.340768	44	0.150	None	None
R	649	0.553723	26	0.144	None	None
S	132_61	14.193238	39	5.535	NTGVVP	None
T	649	0.058252	39	0.023	None	None
U	649	0.037228	29	0.011	None	None
V	649	0.548559	40	0.219	None	None
W	649	0.111723	33	0.037	None	None
X	132_61	0.068533	18	0.012	None	None
Y	132_61	0.106963	41	0.044	None	None
Z	132_61	1.345352	38	0.511	NTGVVP	None
AA	649	0.034666	27	0.009	None	None
BB	649	0.211576	29	0.061	None	None
CC	125	0.032455	17	0.006	None	None
DD	649	0.069350	39	0.027	None	None
EE	649	0.164889	31	0.051	None	None
FF	125	0.016310	21	0.003	None	None
GG	649	0.044953	35	0.016	None	None

Habitat Zone	EVC no.	Area (ha)	Habitat score (out of 100)	Habitat Hectares	Listed ecological communities	
					EPBC Act	FFG Act
HH	125	0.018992	31	0.006	None	None
II	132_61	0.021176	19	0.004	None	None
JJ	649	0.163075	20	0.033	None	None
KK	125	0.013419	24	0.003	None	None
LL	649	0.027753	20	0.006	None	None
MM	132_61	0.379638	40	0.152	NTGVVP	None
NN	132_61	0.045911	19	0.009	None	None
OO	125	0.014361	19	0.003	None	None
PP	649	0.093678	38	0.036	None	None
QQ	132_61	0.007102	31	0.002	None	None
RR	132_61	0.051142	21	0.011	None	None
SS	649	0.166551	39	0.065	None	None
TT	125	0.015590	17	0.003	None	None
UU	649	0.116118	42	0.049	None	None
VV	132_61	0.678381	29	0.197	NTGVVP	None
WW	132_61	0.130666	31	0.041	NTGVVP	None
XX	649	0.085594	32	0.027	None	None
YY	649	0.077300	48	0.037	None	None
ZZ	649	0.035442	15	0.005	None	None
AAA	649	0.057759	15	0.009	None	None
BBB	132_61	0.011874	16	0.002	None	None
CCC	132_61	0.072045	19	0.014	None	None
DDD	132_61	0.007426	16	0.001	None	None
EEE	132_61	0.059207	18	0.011	None	None
FFF	132_61	0.313901	19	0.060	NTGVVP	None
GGG	132_61	1.880471	29	0.545	NTGVVP	None
HHH	132_61	0.113633	28	0.032	NTGVVP	None
III	132_61	0.172069	24	0.041	NTGVVP	None
JJJ	654	0.889851	37	0.329	NTGVVP	None
KKK	132_61	0.120511	25	0.030	NTGVVP	None
LLL	132_61	0.018589	19	0.004	None	None
MMM	132_61	0.014205	27	0.004	None	None
NNN	132_61	0.039671	27	0.011	None	None
OOO	132_61	0.059286	28	0.017	None	None
PPP	132_61	1.763121	49	0.864	NTGVVP	None
QQQ	649	0.047669	30	0.014	None	None
RRR1	656	0.037424	35	0.013	None	None
RRR2	656	0.064213	34	0.022	None	None

Habitat Zone	EVC no.	Area (ha)	Habitat score (out of 100)	Habitat Hectares	Listed ecological communities	
					EPBC Act	FFG Act
SSS	656	0.073434	33	0.024	None	None
TTT	132_61	0.658342	43	0.283	NTGVVP	None
UUU	649	0.431521	64	0.276	None	None
VVV	649	0.210506	63	0.133	None	None
WWW	649	0.049453	63	0.031	None	None
XXX	649	0.120601	62	0.075	None	None
YYY	649	0.042610	38	0.016	None	None
ZZZ	132_61	19.096833	50	9.548	NTGVVP	None
AAAA	649_61	0.118601	39	0.046	None	None
BBBB	649	0.108241	38	0.041	None	None
CCCC	649	0.748972	38	0.285	None	None
DDDD	649	0.116081	40	0.046	None	None
EEEE	649	0.046343	35	0.016	None	None
FFFF	649	0.064617	47	0.030	None	None
GGGG	649	0.069529	47	0.033	None	None
HHHH	649	0.047986	56	0.027	None	None
IIII	125	0.141922	40	0.057	SHW(F)TLP	None
JJJJ1	125	1.058311	40	0.423	SHW(F)TLP	None
JJJJ2	125	0.481342	40	0.193	SHW(F)TLP	None
KKKK	654	2.403527	35	0.841	NTGVVP	None
LLLL	649	0.016032	49	0.008	None	None
MMMM	654	0.148198	41	0.061	NTGVVP	None
NNNN	656	0.053154	25	0.013	None	None
OOOO	656	0.026282	25	0.007	None	None
PPPP	132_61	0.454283	52	0.236	NTGVVP	None
QQQQ	654	0.052675	38	0.020	NTGVVP	None
RRRR	654	0.182894	30	0.055	NTGVVP	None
SSSS	649	0.090887	42	0.038	None	None
TTTT	125	1.666498	51	0.850	SHW(F)TLP	None
UUUU	649	0.166735	50	0.083	None	None
Total		81.476000		35.115		

5.3. Scattered trees

The one scattered tree recorded in the study area (Figure 1) would have once comprised the canopy component of Plains Grassy Woodland (EVC 55_61). This tree was determined to be small compared to the benchmark DBH for Plains Grassy Woodland (EVC 55_61) of 80 centimetres.

Details of the scattered tree are provided in Appendix 4.

5.4. Listed rare and threatened species

The listed rare and threatened species recorded in the study area during the current investigation are listed in Table 4.

Table 4: Rare and threatened species recorded in the study area

Common Name	Scientific Name	Conservation status			Estimated minimum population size	Notes
		EPBC Act	FFG Act	DEPI		
Adamson's Blown-grass	*Lachnagrostis adamsonii*	EN	L	vu	1	Suspected to be species but identification not confirmed
Arching Flax-lily	*Dianella sp. aff. longifolia (Benambra)*			vu	4	
Brackish Plains Buttercup	*Ranunculus diminutus*			r	10	General locations mapped
Curly Sedge	*Carex tasmanica*	VU	L	vu	100s	General locations mapped
Matted Flax-lily	*Dianella amoena*	EN	L	en	2	Suspected to be species but identification not confirmed – potential hybrid
Western Golden-tip	*Goodia medicaginea*			r	112	

Note: EN, en = Endangered; VU, vu = Vulnerable; r = Rare; L = Listed;

The following additional rare and threatened species have also been recorded within or very close to the study area according to VBA records (VBA 2014):

- Slender Tick-trefoil;
- Tough Scurf-pea;
- Plains Wanderer; and
- Growling Grass Frog.

The current investigation confirmed that the study area does provide suitable habitat for these above-listed species. The study area was also considered to potentially support the following additional matters of national environmental significance:

- Spiny Rice-flower; and
- Striped Legless Lizard.

DELWP initially advised that targeted surveys for rare and threatened species would not be required as part of Murdesk Investments' application to amend the boundary of Conservation Area 32. Subsequent to this advice, DELWP required targeted surveys to be undertaken for Matted Flax-lily and Curly Sedge. As these targeted surveys are seasonally dependent they could not be undertaken prior to the preparation of this witness statement. It is proposed to undertake targeted surveys for Matted Flax-lily and Curly Sedge in early December 2015 and present these findings at the Panel Hearing.

5.5. Listed ecological communities

Based on an assessment of native vegetation in the study area against published descriptions and condition thresholds for these communities, the following listed ecological communities were recorded in the study area (as indicated in Table 3 above):

- Natural Temperate Grassland of the Victorian Volcanic Plain (listed as critically endangered on the EPBC Act);
- Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains (listed as critically endangered on the EPBC Act); and
- Western (Basalt) Plains Grassland Community (listed as threatened on the FFG Act).

No other listed ecological communities were found or considered to potentially occur in the study area.

5.6. Summary of findings

The current investigation recorded the following biodiversity values within the property.

- A total of 81.476 hectares (35.12 habitat hectares) of remnant patch native vegetation within 105 habitat zones. Of this vegetation:
    - A total of 68.409 hectares is Natural Temperate Grassland of the Victorian Volcanic Plain (listed under the EPBC Act)
    - A total of 3.348 hectares is Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains (listed under the EPBC Act)
    - A total of 4.466 hectares is Western (Basalt) Plains Grassland Community (listed as threatened on the FFG Act)
- One small scattered (River Red-gum) tree
- Confirmed records of Arching Flax-lily, Brackish Plains Buttercup, Curly Sedge and Western Golden-tip
- Unconfirmed records of Adamson's Blown-grass and Matted Flax-lily/Matted Flax-lily hybrid — targeted surveys for Matted Flax-lily and Curly Sedge will be undertaken in early December 2015 and the findings presented at the Panel Hearing.
- Suitable habitat for Slender Tick-trefoil, Tough Scurf-pea, Spiny Rice-flower, Plains Wanderer, Growling Grass Frog and Striped Legless Lizard.

6. DISCUSSION OF IMPLICATIONS

The aim of this investigation was to provide information required to accompany Murdesk Investments' application to amend the boundaries of Conservation Area 32 under the Biodiversity Conservation Strategy (BCS) (DELWP 2015a), as allowed for in the process initiated by DELWP in its letter of 15th June 2015.

The entire property falls within the current proposed boundary of Conservation Area 32 under the Biodiversity Conservation Strategy (BCS) (DELWP 2015a), which is 154.64 hectares in extent and is mapped as *Nature Conservation*. The BCS states that nature conservation areas will be protected and managed primarily for nature conservation, including matters of national environmental and state significance.

The BCS also states that the final boundaries of Conservation Area 32 will be settled during the Wollert Precinct Structure Plan (PSP) process and that applications can be made to amend the boundaries of the Conservation Area.

The current investigation recorded a total of 81.476 hectares of remnant patch native vegetation within the approximately 121 hectare study area. Of this vegetation, a total of 71.757 hectares comprises ecological communities listed under the EPBC Act. The EPBC Act-listed Curly Sedge was recorded while Adamson's Blown-grass and Matted Flax-lily may occur.

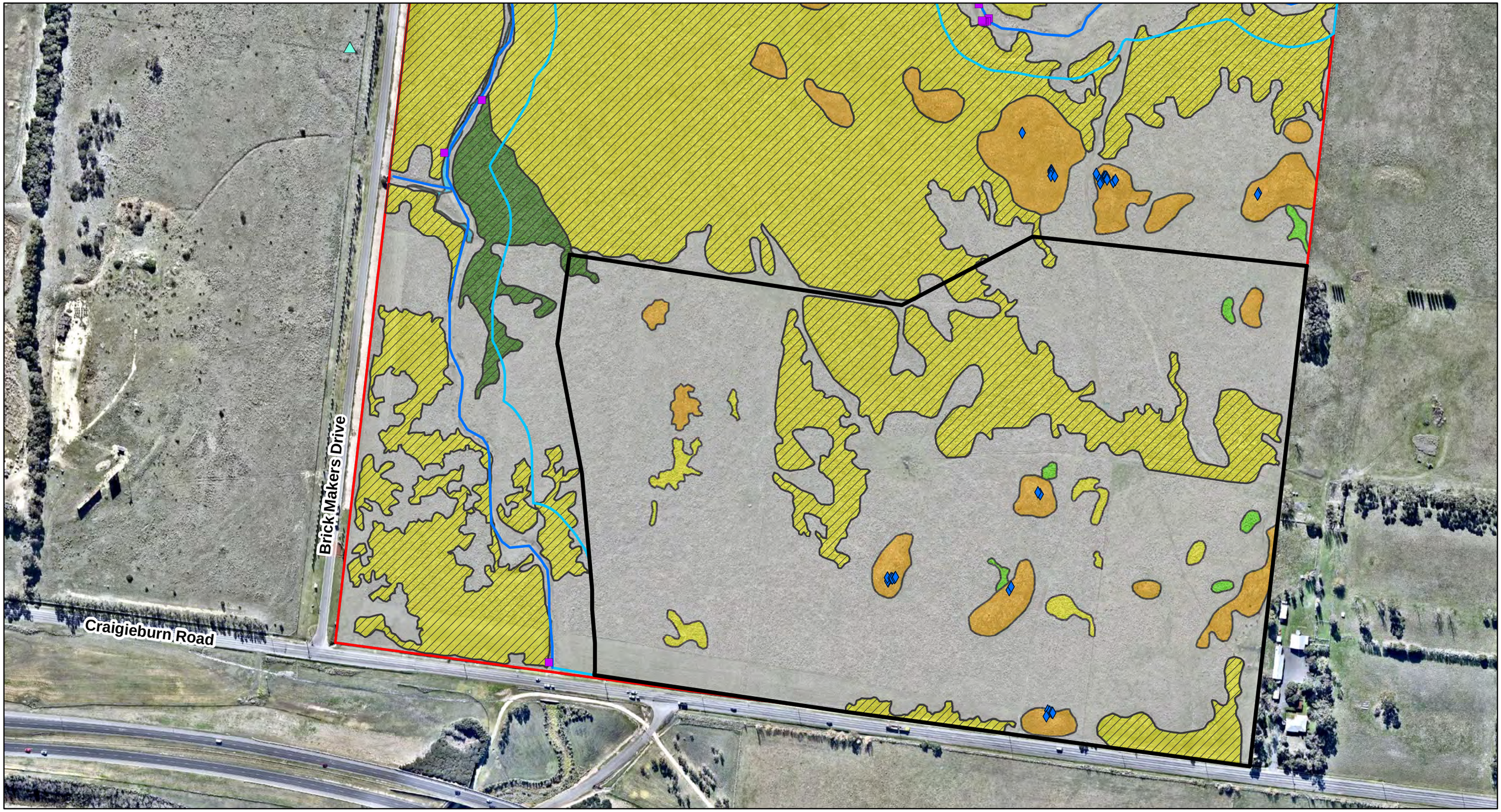
The southern section of the property, east of Curly Sedge Creek and a previously cropped rectangular area in the centre of the property were very weedy and supported limited biodiversity values. The remainder of the property supported very low to high-quality remnant native vegetation (including threatened ecological communities) as well as rare and threatened flora and threatened fauna habitat.

It is proposed that the boundary of Conservation Area 32 be amended by excising the southern section of the property, east of Curly Sedge Creek from the proposed reserve as shown in Figure 2. This change to the boundary would release 21.368 hectares of land for development, as contemplated in DELWP's letter of 15th June 2015. Most of this land supports introduced vegetation.

The land proposed for excision from the reserve comprises areas with limited benefit to biodiversity conservation if included in a conservation reserve. Furthermore, inclusion of these areas within a conservation reserve will likely present an extremely difficult and expensive conservation management burden. This area would provide limited benefit to biodiversity conservation if converted into a conservation reserve.

This amendment would result in the exclusion of the following biodiversity values from the currently proposed Conservation Area 32:

- 3.637 hectares of Natural Temperate Grassland of the Victorian Volcanic Plain (listed under the EPBC Act);
- 4.782 hectares of very weedy, low to very low quality remnant patch native vegetation; and
- At least 16 Western Golden-tip plants (DELWP-listed but not listed on the EPBC Act or FFG Act.).



Legend

- Property boundary
- Curly Sedge Creek
- Curly Sedge Creek 30m buffer
- Proposed boundary re-alignment

Native vegetation

- DTV
- (VVP_0125) Plains Grassy Wetland
- (VVP_0132_61) Heavier-soils Plains Grassland
- (VVP_0649) Stony Knoll Shrubland
- (VVP_0654) Creekline Tussock Grassland
- (VVP_0656) Brackish Wetland

Matters of national and state significance

BL&A site assessment

- Curly Sedge
- Western Golden-tip
- EPBC Act listed communities

Existing VBA records

- Growling Grass Frog

0 25 50 100 Metres

Figure 2: Proposed amendments to boundaries of Conservation Area 32

Project: 470 Craigieburn Road, Wollert

Client: Murdesk Investments Pty. Ltd.

Project No.: 15064	Date: 24/09/2015	Created By: M. Ghasemi / D. Coppolino

BL&A Brett Lane & Associates Pty. Ltd.
Ecological Research & Management
Experience Knowledge Solutions
Suite 5, 61 - 63 Camberwell Road
Hawthorn East ,VIC 3123
PO Box 337, Camberwell, VIC 3124, Australia
Ph (03) 9815 2111 / Fax (03) 9815 2685
enquiries@ecologicalresearch.com.au
www.ecologicalresearch.com.au

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The proposed adjustment will enable the overall biodiversity values of the conservation area to be maintained. Only approximately 8 hectares of native vegetation will be removed from the conservation reserve in areas where is it fragmented and isolated from the 'core areas of more extensive vegetation on the balance of the proposed reserve.

The proposed adjustment will be offset by a net conservation gain elsewhere in the Melbourne Strategic Assessment area in the amount and quality of native vegetation and habitat for matters of national environmental significance, with that offset to be identified in consultation with DELWP and paid for by the future development proponent.

The proposed adjustment will leave a conservation area similar to that shown in the BCS that will continue to protect nationally significant ecological values. All available information has been supplied to DELWP so that a determination can be made.

7. ASSUMPTIONS AND LIMITATIONS

Whilst the assessment was not designed to provide an exhaustive inventory of flora species in the study area, all efforts were made to schedule the site assessment at a time of year when the majority of native vegetation life forms and habitat niches are likely to be present. Nevertheless, site assessments may fail to record all life-forms because of the seasonal absence of some species and sampling nature of surveys.

The site assessments were carried out in late winter to early spring, when some annual and/or seasonally-emergent plant species may have been absent or in the senescent or pre-flowering stage of their life-cycle. The site was also visited in late spring 2015 to verify the findings of these previous investigations.

The level of disturbance within wetter parts of the study area made identification of similar EVCs difficult. In particular, distinguishing between Creekline Tussock Grassland (EVC 656), Plains Grassy Wetland (EVC 125) and wetter forms of Plains Grassland (EVC 132) was problematic in areas where site drainage, soils and extant native vegetation had been significantly modified.

Grazing by cattle, kangaroos and rabbits had diminished the more palatable herbaceous vegetation and stripped-bare woody plants. This grazing pressure made it difficult to identify some plants to species level and to separate indigenous versus introduced vegetation cover, particularly between introduced needle grasses (*Nassella spp.*) and the indigenous spear (*Austrostipa spp.*) and wallaby (*Rytidosperma spp.*) grasses.

The timing of the survey and condition of vegetation was otherwise considered suitable to ascertain the extent and condition of native vegetation.

8. 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 the Tribunal.

Signed:

Brett Alexander Lane
Director
Brett Lane & Associates Pty Ltd
Suite 5, 61-63 Camberwell Road
Hawthorn East, VIC 3123

27th November 2015

9. REFERENCES

Department of Environment, Land, Water and Planning (DELWP) 2015a, *Guidance Note: Implementing the Biodiversity Conservation Strategy for Melbourne's Growth Corridors*, Department of Environment, Land, Water and Planning, East Melbourne, Victoria.

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Department of the Environment 2015, *EPBC Act Protected Matters Search Tool*. Department of the Environment, Canberra, viewed 20th August 2015, <http://www.environment.gov.au/topics/about-us/legislation/environment-protection-and-biodiversity-conservation-act-1999/protected>

Department of Transport, Planning and Local Infrastructure (DTPLI) 2015, *Planning Schemes Online – Whittlesea Planning Scheme*, Department of Transport, Planning and Local Infrastructure, Melbourne, viewed 20th August 2015, http://planningschemes.dpcd.vic.gov.au/schemes/whittlesea

Victorian Biodiversity Atlas, © The State of Victoria, Department of Environment and Primary Industries (published [December 2014])

Appendix 1: Qualifications and experience of Brett Lane and other significant contributors

BL&A Brett Lane & Associates Pty. Ltd.
Ecological Research & Management

Brett Lane
Principal Consultant and Director

Profile

Brett has over 35 years' experience in ecological research and management. He has worked in a range of positions with environmental consultancies in Melbourne and Brisbane and with non-government environmental groups in Australia and East Asia. He has specialist knowledge in birds and wetlands, and extensive experience in ecological impact assessment, including in the infrastructure, renewable energy, property development and mining industries. Brett has undertaken and managed many hundreds of ecological assessments and prepared and reviewed documents that have accompanied development applications on behalf of private companies, government infrastructure agencies and private individuals. His extensive experience has given him an excellent knowledge of the regulatory environment relevant to native vegetation, flora and fauna and he can advise on the scope of scientific information needed to inform the development assessment and decision-making process. He has also defended his scientific work as an expert witness in courts and tribunals. Brett founded BL&A in 2001.

Biography

Working in industry since 1979

Qualifications

BA (Zoology & Physical Geography) *Monash University*

Certificates and Licenses

Management Authorisation – Salvage and Translocation
Victorian Animal Ethics Approval

Employment History

2001 – present
Director, *Brett Lane & Associates Pty Ltd, Melbourne*

1999 – 2000
Natural Resource Specialist, *PPK Environment & Infrastructure Pty Ltd, Melbourne*

1996 – 1998
Senior Ecologist, Ecology Australia Pty Ltd, *Melbourne*

1993 – 1996
Principal Terrestrial Ecologist, *WBM Oceanics Australia, Brisbane*

1991 – 1993
Assistant Director (East Asia), *Asian Wetland Bureau, Kuala Lumpur, Malaysia*

1987 – 1991
Director, *Brett A Lane Pty Ltd (Melbourne)*

1980 – 1986
Wader Studies Co-ordinator, *Royal Australasian Ornithologists' Union (now Birdlife Australia, Melbourne*

1979
Research Assistant, Kinhill Planners Pty Ltd., Melbourne

Key Skills

- Project Manager including budgeting, staffing, client liaison, production of high quality technical reports
- Ornithologist specialising in shorebirds
- Terrestrial fauna assessment
- Ecological Risk Assessment
- Expert flora and fauna witness for VCAT and planning panels
- Constraints analysis
- Project design recommendation
- EPBC Act and EES Referrals
- State and national regulatory framework
- Offset site selection
- Preparation of mitigation measures
- Preparation of assessment reports (preliminary documentation, public environmental report and environmental impact statement)

Suite 5, 61 - 63 Camberwell Road, Hawthorn East, VIC 3123
PO Box 337, Camberwell, VIC 3124
www.ecologicalresearch.com.au
Ph (03) 9815 2111
Fax (03) 9815 2685
enquiries@ecologicalresearch.com.au

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Ecological Research & Management

Project Examples

Property Development

Eynesbury Township, Eynesbury, Victoria: Flora, Fauna and Habitat Hectare Assessment, Targeted Flora Surveys, Growling Grass Frog Survey, Plains-wanderer Survey and Development of an Offset Tracking Tool. Net Gain Analysis for Planning Permit Applications of subsequent stages and advice on offset management (2003 – present)

Taylors Rd, Sydenham, Victoria (Broadcast Australia): EPBC Act Referral, preparation of EPBC Act Public Environment Report (PER), Offset Site Search and Offset Management Plan, Spiny Rice-flower Propagation and Translocation Plans, Seed Collection (2006 – present)

Somerfield Estate, Keysborough, Victoria: Flora, Fauna and Growling Grass Frog Survey and Offset Plan Preparation, preparation of offset tracking reports for each stage of development (2008 – present)

Burnside North Development, Burnside, Victoria: Flora and Fauna Assessment, targeted threatened species surveys, EPBC Act referrals and assessment, development of offset and mitigation plans (2002 – present)

Renewable Energy

Dundonnell Wind Farm, Dundonnell, Victoria: Overview and Targeted Assessments including Brolga, bat, migratory bird, Striped Legless Lizard, Flora Surveys, assessment of powerline route and road access options, EPBC Act Referral, Input to EES Referral, preparation of EES technical appendix on flora and fauna, Brolga impact assessment, collision risk modelling (2009 – present)

Granville Wind Farm, Granville Harbour, Tasmania: Overview Assessment, targeted surveys including Orange-bellied Parrot and bat surveys, EPBC Act Referral and advice for regulator negotiations (2011 – present)

MacArthur Wind Farm, MacArthur, Victoria: Overview assessment, detailed flora and fauna surveys, impact assessment, input to EPBC Act Referral and state EES, assessment of powerline and road rout options, appearance at state Planning Panel hearings as expert witness, preparation of pre-construction and operational flora and fauna management plans, net gain analysis and identification of suitable offsets (2004 – 2012)

Cherry Tree Wind Farm, Victoria: Overview assessment, native vegetation and threatened flora surveys, targeted threatened fauna surveys, assessment of powerline and road route options, offset site sourcing and assessment, preparation of expert witness statement and appearance at VCAT (2010 - 2013)

Mt Gellibrand Wind Farm, Mt Gellibrand, Victoria: Overview assessment, detailed flora and fauna surveys, including targeted Brolga and migratory bird surveys, and Striped Legless Lizard tile grid surveys, input to state planning permit application, preparation of witness statement and appearance at state Planning Panel hearing, preparation and early implementation of pre-construction flora and fauna management plans, including bat and avifauna management plan, native vegetation mapping, offset mapping, development of Brolga monitoring and mitigation strategies (2004 – present).

Road and Rail Infrastructure

Avalon Airport Rail Link, Little River, Victoria: Flora and Fauna Mapping, Constraint Analysis and Net Gain Analysis (2011 – present)

Dingley Bypass, Keysborough, Victoria: Flora and Fauna Assessment, including targeted flora surveys, habitat hectare assessment and Net Gain analysis (2008 – 2009)

Nagambie bypass, Nagambie Victoria: Flora and Fauna Assessment, including habitat hectare assessment and Net Gain analysis (2008)

Second Murray River Bridge Crossing at Echuca-Moama: Detailed Flora Assessment, Targeted Flora Survey (2008 – present)

Ecosystem Monitoring and Management

Scientific Review Panel, Kerang Lakes Bypass project (North Central Catchment Management Authority, Goulburn Murray Water): Scientific review of detailed technical reports to inform decisions of water savings plans and associated watering plans for five wetlands that form part of the Ramsar-listed Kerang Lakes wetlands system. (2013)

Northern Victoria Irrigation Renewal Program (NVIRP): Assessed the impact of a major federal water industry investment project on Matters of National Environmental Significance, including threatened flora, threatened fauna and listed migratory birds using wetlands located in the potential impact area. (2009-2011)

Cardinia Road, Officer, Victoria: Growling Grass Frog Management Plan (2009 – 2010)

BL&A Brett Lane & Associates Pty. Ltd.
Ecological Research & Management

Alan Brennan
Senior Ecologist and Project Manager

Profile

Alan Brennan joined Brett Lane and Associates Pty Ltd, Melbourne in 2007. Alan's role involves developing solutions for projects experiencing issues with ecological matters. During his career in the biological sciences Alan has developed specialised skills and abilities in vegetation and land management along with a sound knowledge of relevant policies and legislation. Since 2000, he has worked to ensure sustainable development outcomes are achieved across a range of industry sectors.

Biography

Working in industry since 1988

Qualifications

Graduate Diploma in Land Rehabilitation *University of Ballarat*
BAs (Applied Biology) *RMIT University*

Certificates and Licenses

Management Authorisation – Salvage and Translocation
DSE Certificate of Competency in Vegetation Quality Assessments Registration No. HH168
Victorian Animal Ethics Approval

Employment History

2007 – Present
Senior Ecologist / Project Manager, *BL&A, Australia*
2005 – 2007
Manager City Environment, *Hume City Council , Australia*
2000 – 2005
Environmental Services Manager, *Melton Shire Council , Australia*
2000 – 2000
Catchment Management Project Co-ordinator, *Melton Shire Council , Australia*
1998 – 2000
Grassland Project Officer, *Victorian DNRE (now DSE) , Australia*
1997 – 1998
Catchment Management Officer, *Victorian DNRE (now DSE), Australia*
1992 – 1995
Cell Physiologist, *Monash IVF, Australia*
1988 – 1992
Plant Pathologist, *Department of Agriculture , Australia*

Key Skills

- Project Manager including budgeting, staffing, client liaison, production of high quality technical reports
- Flora and Fauna Assessments
- Habitat hectare assessments
- Net gain analyses
- Expert witness for VCAT
- Constraints analysis
- Scoping assessments
- Management plan preparation for listed fauna and flora values and offset sites
- Impact assessment
- Project design recommendation
- Preparation of mitigation measures
- EPBC Act and EES Referrals
- Preparation of assessment reports (preliminary documentation, public environmental report and environmental impact statement)
- Offset site selection

Experience Knowledge Solutions
Suite 5, 61 - 63 Camberwell Road, Hawthorn East, VIC 3123
PO Box 337, Camberwell, VIC 3124
www.ecologicalresearch.com.au
Ph (03) 9815 2111
Fax (03) 9815 2685
enquiries@ecologicalresearch.com.au

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Project Examples

Property Development

Precinct Structure Plan 92 Westbrook, Wyndham Vale, Victoria — 550 hectares of land adjacent to the Werribee River: Initial and multiple targeted flora and fauna assessments, Submission to DSE Time Stamping review, liaison with DSE and GAA (2010 – 2012)

Brompton Lodge, Cranbourne West, Victoria, Flora and fauna assessment, preparation of Expert Witness Statement of Evidence for Logical Inclusion Assessment Panel, net gain analysis and preparation of Native Vegetation Precinct Plan (2007 to 2012).

River Valley Estate, Sunshine North — 100+ hectare site adjacent to the Maribyrnong River, Initial flora and fauna assessments, multiple targeted flora surveys, net gain analysis and offset search (2008 to 2012)

Chesterfield Estate, Melton South, Victoria, Development of an offset management plan and a Striped Legless Lizard Translocation & Salvage Plan

Hodgkins Road, Hastings, Victoria, Initial and targeted flora and fauna assessments, net gain assessments, preparation of Expert Witness Statement of Evidence for VCAT, provision of evidence at VCAT, development of an offset management plan and a conservation management plan, assessment of and assistance with Planning Scheme infringements

Renewable Energy

Portland Wind Energy Project Stage V, Portland, Victoria, flora and habitat hectare assessment and net gain analysis of development footprint (2008 – 2010).

Crookwell Wind Farm, Crookwell, New South Wales, flora and fauna assessment along with community consultation (2009)

Road and Rail Infrastructure

Dingley Bypass, Victoria: flora and fauna assessments for multiple stages, impact assessments, threatened flora and fauna species targeted surveys, preparation of EES Referral, preparation of a response to letter of community concern, sourcing of offsets, preparation of offset management plan, client & regulator liaison and development of mitigation measures, construction phase advice and assessments (2008 - 2012)

Avalon Airport rail Link, Victoria, Spiny Rice-flower and Striped Legless Lizard surveys, net gain assessments of three potential alignments and Department of Transport liaison (2012)

Bulla Bypass and Melbourne Airport Link to OMR, Victoria, overview flora and fauna assessments for multiple routes, impact assessment, threatened flora and fauna species targeted surveys, advice on preparation of EES Referral, development of mitigation measures and managing sub-contracting of aquatic surveys (2011- 2012)

Nagambie Northern Bypass, Victoria, flora and fauna assessments, net gain impact assessment and construction phase assessment and advice (2010 – 2011).

Ecosystem Monitoring and Management

DSE Bushfire Vegetation Assessments, Victoria, undertook rapid field assessments of public and private land across large areas at a high risk from bushfire.

Deep Lead, Victoria, provision of advice on EPBC Act, assessment of impacts from rail rehabilitation project, preparation of weed management plan, implementation of weed management plan, search for offsets (2010 – 2013)

Maidstone Street Altona, Victoria, Spiny Rice-flower salvage and translocation plan preparation and development of an offset and conservation management plan

Atherstone Estate, Melton South, Victoria, Preparation and implementation of a Striped Legless Lizard salvage and translocation plan

Northern Highway, Wallan to Kilmore, Victoria, Preparation and implementation of a fauna management plan

City of Greater Geelong Review of environmental programs, Victoria, Review of land and waterway programs involving review of existing information, staff interviews and benchmarking with other Councils.

Nagambie Northern Bypass, Victoria, flora and fauna assessments, net gain impact assessment and construction phase assessment and advice (2010 – 2011).

Experience Knowledge Solutions
Suite 5, 61 - 63 Camberwell Road, Hawthorn East, VIC 3123
PO Box 337, Camberwell, VIC 3124
www.ecologicalresearch.com.au
Ph (03) 9815 2111
Fax (03) 9815 2685
enquiries@ecologicalresearch.com.au

BL&A Brett Lane & Associates Pty. Ltd.
Ecological Research & Management

Davide Coppolino
Senior Botanist

Profile

Davide has extensive knowledge and experience in the natural ecosystems, flora and weeds of south-eastern Australia. He has expertise in the identification and management of Victoria's rare and threatened flora and ecological communities. He also has experience in identification and management of native fauna (including threatened species) within the Melbourne metropolitan area. Davide has managed a number of projects which has provided him with detailed knowledge of the regulatory system and in particular, Victoria's Biodiversity Assessment Guidelines and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. Davide has participated in the management of threatened grasslands on a professional and voluntary basis, with Iramoo Sustainable Community Centre (as an employee), the Friends of Iramoo (as a volunteer and committee member) and the Cairnlea Conservation Reserves Committee of Management (as part of the committee). Knowledge from this experience is regularly applied to Davide's working life.

Biography

Working in industry since 2004

Qualifications

BSc (Honours in Ecology and Sustainability), *Victoria University*

Certificates and Licenses

DSE Certificate of Competency Vegetation Quality Assessments (Habitat Hectares) - Registration No. HH060
Construction Induction 'White Card'
Track Safety Awareness Level 1
Rail Industry Worker Card

Employment History

2014 – present
Senior Ecologist, *BL&A, Melbourne*
2009 – 2014
Senior Botanist, *BL&A, Melbourne*
2007 – 2009
Botanist, *BL&A, Melbourne*
2004 –2006
Plant Nursery, Grounds Management & Research Assistant, *Iramoo Sustainable Community Centre - Victoria University, St Albans*

Key Skills

- Project Manager including budgeting, staffing, client liaison, production of high quality technical reports
- Orchid specialist
- Grassland assessments and management
- Vegetation monitoring
- Native vegetation assessments
- Habitat hectare and net gain assessments
- Flora assessments
- Targeted surveys for listed flora species
- Targeted surveys for listed fauna species
- Desktop assessments
- Management plan preparation for listed flora values
- and offset sites
- Salvage protocol implementation
- Project design recommendation
- Preparation of mitigation measures
- EPBC Act Referrals
- Offset site selection

Experience Knowledge Solutions
Suite 5, 61 - 63 Camberwell Road, Hawthorn East, VIC 3123
PO Box 337, Camberwell, VIC 3124
www.ecologicalresearch.com.au
Ph (03) 9815 2111
Fax (03) 9815 2685
enquiries@ecologicalresearch.com.au

BL&A Brett Lane & Associates Pty. Ltd.
Ecological Research & Management

Project Examples

Property Development

Atherstone Estate Wetlands and Park Link (2015) - Impact assessment under Melbourne Strategic Assessment and preparation of Construction Environmental Management Plans

Burnside North Development, Burnside, Victoria: Flora and Fauna Assessment, including targeted flora surveys, habitat hectare assessment and Net Gain analysis (2009 – present)

Somerfield Estate, Keysborough, Victoria: Offset Management Plan (2011)

Manor Lakes Residential Development, Manor Lakes, Victoria: Flora and Fauna Assessment, Managed Fat-tailed Dunnart Translocation, Environmental management Plan (2008 - 2010)

The Point Residential Development, Point Lonsdale, Victoria: Native Vegetation Impact Assessment and Preparation of Offset Plan (2009)

Renewable Energy

Taralga Wind Farm, Taralga, New South Wales (2009 - 2011): Infrastructure micrositing and targeted survey for Natural Temperate Grassland of the Southern Tablelands of NSW and ACT (2009 - 2011)

Rugby Wind Farm, Rugby, New South Wales: Flora and Fauna Scoping Study (2009)

North-west Victoria Renewable Energy Project, Carwarp, Victoria: Flora and Fauna Assessment, including habitat hectare assessment and Net Gain analysis for a proposed Solar Power Plant (2008)

Stockyard Hill Wind Farm, Stockyard Hill, Victoria: Infrastructure micrositing, Flora and Fauna Assessment, including targeted flora surveys, habitat hectare assessment and Net Gain analysis (2008)

Crowlands Wind Farm, Crowlands, Victoria: Flora and Fauna Assessment, including targeted flora surveys, habitat hectare assessment and Net Gain analysis (2008)

Berrybank Wind Farm, Berrybank, Victoria: Overview Flora and Fauna Assessment and Constraints Analysis (2007)

Road and Rail Infrastructure

Furlong Road Rail Separation Project: Ecological assessment and preparation of impact assessments, EPBC Act referral and Environmental Management Plan (2014-2015)

Murray River Crossing - Echuca, Victoria and Moama, New South Wales: Flora and Fauna Assessment, including targeted flora and fauna surveys, habitat hectare assessment and Net Gain analysis (2009)

Mullum Mullum Tunnel, EastLink Tollway, Victoria: Vegetation quality assessment and impacts monitoring (2008 – 2009)

Dingley Bypass, Keysborough, Victoria: Flora and Fauna Assessment, including targeted flora surveys, habitat hectare assessment and Net Gain analysis (2008 – 2009)

Nagambie bypass, Nagambie Victoria: Flora and Fauna Assessment, including habitat hectare assessment and Net Gain analysis (2008)

Outer Metropolitan Ring Road, Victoria: Desktop Flora and Fauna Overview Assessment (2008)

Ecosystem Monitoring and Management

DSE Vegetation Condition Assessment Project, East Gippsland, Victoria: Broad scale assessment of the quality and bushfire fuel loads of native vegetation across East Gippsland (2012)

Wimmera, Victoria: Monitoring the health of River Red Gums in the Lower Wimmera River (2007)

Infrastructure Projects

Bald Hills Wind Farm and External Powerline: Environmental impact and offset assessment and auditing (2014-2015)

Altona Recycled Water Project Stage 2, Werribee to Altona, Victoria: Flora and Fauna Assessment (2011 – present)

Experience Knowledge Solutions
Suite 5, 61 - 63 Camberwell Road, Hawthorn East, VIC 3123
PO Box 337, Camberwell, VIC 3124
www.ecologicalresearch.com.au
Ph (03) 9815 2111
Fax (03) 9815 2685
enquiries@ecologicalresearch.com.au

Appendix 2: EVC Benchmarks

VVP:

Plans Grassy Wetland (EVC 125)

Heavier-soils Plains Grassland (EVC 132_61)

Stony Knoll Shrubland (EVC 649)

Creekline Tussock Grassland (EVC 654)

Brackish Wetland (EVC 656)

Department of Sustainability and Environment

EVC/Bioregion Benchmark for Vegetation Quality Assessment

Victorian Volcanic Plain bioregion

EVC 125: Plains Grassy Wetland

Description:
This EVC is usually treeless, but in some instances can include sparse River Red Gum *Eucalyptus camaldulensis* or Swamp Gum *Eucalyptus ovata*. A sparse shrub component may also be present. The characteristic ground cover is dominated by grasses and small sedges and herbs. The vegetation is typically species-rich on the outer verges but is usually species-poor in the wetter central areas.

Life Forms:

Life form	#Spp	%Cover	LF code
Large Herb	5	5%	LH
Medium Herb	6	10%	MH
Small or Prostrate Herb	3	10%	SH
Large Tufted Graminoid	3	15%	LTG
Large Non-tufted Graminoid	1	5%	LNG
Medium to Small Tufted Graminoid	8	30%	MTG
Medium to Tiny Non-tufted Graminoid	2	10%	MNG
Bryophytes/Lichens	na	10%	BL

LF Code	Species typical of at least part of EVC range	Common Name
LH	*Epilobium billardierianum*	Variable Willow-herb
LH	*Villarsia reniformis*	Running Marsh-flower
LH	*Epilobium billardierianum ssp. cinereum*	Grey Willow-herb
MH	*Potamogeton tricarinatus s.l.*	Floating Pondweed
MH	*Lilaeopsis polyantha*	Australian Lilaeopsis
MH	*Utricularia dichotoma s.l.*	Fairies' Aprons
SH	*Eryngium vesiculosum*	Prickfoot
SH	*Neopaxia australasica*	White Purslane
SH	*Lobelia pratioides*	Poison Lobelia
LTG	*Juncus flavidus*	Gold Rush
LTG	*Deyeuxia quadriseta*	Reed Bent-grass
LTG	*Amphibromus nervosus*	Common Swamp Wallaby-grass
LTG	*Poa labillardierei*	Common Tussock-grass
MTG	*Triglochin procerum s.l.*	Water Ribbons
MTG	*Glyceria australis*	Australian Sweet-grass
MTG	*Juncus holoschoenus*	Joint-leaf Rush
MTG	*Austrodanthonia duttoniana*	Brown-back Wallaby-grass
MNG	*Eleocharis acuta*	Common Spike-sedge
MNG	*Eleocharis pusilla*	Small Spike-sedge

Recruitment:
Episodic/Flood. Desirable period between disturbances is 5 years.

Organic Litter:
20% cover

Logs:
5 m/0.1 ha.(where trees are overhanging the wetland)

Weediness:

LF Code	Typical Weed Species	Common Name	Invasive	Impact
LH	*Cirsium vulgare*	Spear Thistle	high	high
MH	*Leontodon taraxacoides ssp. taraxacoides*	Hairy Hawkbit	high	low
MH	*Hypochoeris radicata*	Cat's Ear	high	low
LTG	*Phalaris aquatica*	Toowoomba Canary-grass	high	high
LNG	*Holcus lanatus*	Yorkshire Fog	high	high
MTG	*Briza minor*	Lesser Quaking-grass	high	low
MTG	*Romulea rosea*	Onion Grass	high	low
TTG	*Cyperus tenellus*	Tiny Flat-sedge	high	low

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Department of Sustainability and Environment

EVC/Bioregion Benchmark for Vegetation Quality Assessment

Victorian Volcanic Plain bioregion

EVC 132_61: *Heavier-soils* Plains Grassland

Description:
Treeless vegetation mostly less than 1 m tall dominated by largely graminoid and herb life forms. Occupies fertile cracking basalt soils prone to seasonal waterlogging in areas receiving at least 500 mm annual rainfall.

Life Forms:

Life form	#Spp	%Cover	LF code
Large Herb	2	5%	LH
Medium Herb	12	20%	MH
Small or Prostrate Herb	4	5%	SH
Large Tufted Graminoid	1	5%	LTG
Medium to Small Tufted Graminoid	13	40%	MTG
Medium to Tiny Non-tufted Graminoid	4	5%	MNG
Bryophytes/Lichens and Soil Crust*	na	20%	BL

* Note: treat as one life form in this EVC

LF Code	Species typical of at least part of EVC range	Common Name
SS	*Pimelea humilis*	Common Rice-flower
LH	*Rumex dumosus*	Wiry Dock
MH	*Calocephalus citreus*	Lemon Beauty-heads
MH	*Acaena echinata*	Sheep's Burr
MH	*Leptorhynchos squamatus*	Scaly Buttons
MH	*Eryngium ovinum*	Blue Devil
SH	*Solenogyne dominii*	Smooth Solenogyne
SH	*Lobelia pratioides*	Poison Lobelia
LTG	*Austrostipa bigeniculata*	Kneed Spear-grass
LTG	*Dichelachne crinita*	Long-hair Plume-grass
MTG	*Themeda triandra*	Kangaroo Grass
MTG	*Austrodanthonia caespitosa*	Common Wallaby-grass
MTG	*Elymus scaber* var. *scaber*	Common Wheat-grass
MTG	*Schoenus apogon*	Common Bog-sedge
MNG	*Microlaena stipoides* var. *stipoides*	Weeping Grass
MNG	*Thelymitra pauciflora* s.l.	Slender Sun-orchid
MNG	*Microtis unifolia*	Common Onion-orchid
SC	*Convolvulus erubescens*	Pink Bindweed

Recruitment:
Episodic/Fire or Grazing. Desirable period between disturbances is 5 years.

Organic Litter:
10% cover

EVC 132_61: *Heavier-soils* Plains Grassland - Victorian Volcanic Plain bioregion

Weediness:

LF Code	Typical Weed Species	Common Name	Invasive	Impact
LH	*Plantago lanceolata*	Ribwort	high	low
LH	*Cirsium vulgare*	Spear Thistle	high	high
LH	*Sonchus oleraceus*	Common Sow-thistle	high	low
MH	*Hypochoeris radicata*	Cat's Ear	high	low
MH	*Leontodon taraxacoides* ssp. *taraxacoides*	Hairy Hawkbit	high	low
MH	*Trifolium subterraneum*	Subterranean Clover	high	low
MH	*Plantago coronopus*	Buck's-horn Plantain	high	low
MH	*Trifolium striatum*	Knotted Clover	high	low
MH	*Trifolium dubium*	Suckling Clover	high	low
LTG	*Phalaris aquatica*	Toowoomba Canary-grass	high	high
LNG	*Holcus lanatus*	Yorkshire Fog	high	high
MTG	*Romulea rosea*	Onion Grass	high	low
MTG	*Vulpia bromoides*	Squirrel-tail Fescue	high	low
MTG	*Briza minor*	Lesser Quaking-grass	high	low
MTG	*Bromus hordeaceus* ssp. *hordeaceus*	Soft Brome	high	low
MTG	*Briza maxima*	Large Quaking-grass	high	low
MTG	*Lolium rigidum*	Wimmera Rye-grass	high	low
MTG	*Lolium perenne*	Perennial Rye-grass	high	low
MTG	*Nassella neesiana*	Chilean Needle-grass	high	high
MNG	*Cynosurus echinatus*	Rough Dog's-tail	high	low
MNG	*Juncus capitatus*	Capitate Rush	high	low

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Department of Sustainability and Environment

EVC/Bioregion Benchmark for Vegetation Quality Assessment

Victorian Volcanic Plain bioregion

EVC 649: Stony Knoll Shrubland

Description:
Stony Knoll Shrubland is a shrubland to 3 m tall or low non-eucalypt woodland to 8 m tall with a grassy understorey. It occurs on low stony rises on basalt flows. The soils are fertile and well drained but shallow with out cropping rock, causing severe summer dryness.

[+] woodland only components (ignore when assessing treeless areas and standardise final score as appropriate)

Canopy Cover[+]:

%cover	Character Species	Common Name
15%	*Allocasuarina verticillata*	Drooping Sheoak
	Bursaria spinosa	Sweet Bursaria

Understorey:

Life form	#Spp	%Cover	LF code
Medium Shrub	3	10%	MS
Prostrate Shrub	1	1%	PS
Large Herb	2	1%	LH
Medium Herb	11	10%	MH
Small or Prostrate Herb	4	5%	SH
Medium to Small Tufted Graminoid	10	25%	MTG
Tiny Tufted Graminoid	2	5%	TTG
Medium to Tiny Non-tufted Graminoid	2	5%	MNG
Ground Fern	2	5%	GF
Bryophytes/Lichens	na	10%	BL
Soil Crust	na	10%	S/C
Total understorey projective foliage cover		**85%**	

LF Code	Species typical of at least part of EVC range	Common Name
MS	*Hymenanthera dentata* s.l.	Tree Violet
MS	*Acacia paradoxa*	Hedge Wattle
PS	*Kennedia prostrata*	Running Postman
LH	*Senecio quadridentatus*	Cotton Fireweed
LH	*Senecio glomeratus*	Annual Fireweed
MH	*Oxalis perennans*	Grassland Wood-sorrel
MH	*Rumex brownii*	Slender Dock
MH	*Hypericum gramineum*	Small St John's Wort
MH	*Acaena ovina*	Australian Sheep's Burr
SH	*Dichondra repens*	Kidneyweed
SH	*Hydrocotyle laxiflora*	Stinking Pennywort
SH	*Crassula sieberiana*	Sieber Crassula
MTG	*Themeda triandra*	Kangaroo Grass
MTG	*Poa sieberiana*	Grey Tussock-grass
MTG	*Austrodanthonia caespitosa*	Common Wallaby-grass
MTG	*Austrodanthonia setacea*	Bristly Wallaby-grass
TTG	*Carex breviculmis*	Short-stem Sedge
MNG	*Microlaena stipoides* var. *stipoides*	Weeping Grass
GF	*Pteridium esculentum*	Austral Bracken
GF	*Adiantum aethiopicum*	Common Maidenhair
SC	*Convolvulus erubescens* spp. agg.	Pink Bindweed

Recruitment:
Continuous

Organic Litter:
20 % cover

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EVC 649: Stony Knoll Shrubland - Victorian Volcanic Plain bioregion

Logs+:
5 m/0.1 ha. (note: large log class does not apply)

Weediness:

LF Code	Typical Weed Species	Common Name	Invasive	Impact
T	*Schinus molle*	Pepper Tree	high	high
MS	*Lycium ferocissimum*	African Box-thorn	high	high
MS	*Genista monspessulana*	Montpellier Broom	high	high
SS	*Marrubium vulgare*	Horehound	high	high
LH	*Sonchus oleraceus*	Common Sow-thistle	high	low
LH	*Helminthotheca echioides*	Ox-tongue	high	low
LH	*Lactuca serriola*	Prickly Lettuce	high	low
LH	*Sisymbrium officinale*	Hedge Mustard	high	low
LH	*Sonchus asper* s.l.	Rough Sow-thistle	high	low
LH	*Verbascum thapsus* ssp. *thapsus*	Great Mullein	high	high
LH	*Echium plantagineum*	Paterson's Curse	high	high
LH	*Centaurium tenuiflorum*	Slender Centaury	high	low
LH	*Foeniculum vulgare*	Fennel	high	high
MH	*Hypochoeris radicata*	Cat's Ear	high	low
MH	*Trifolium arvense* var. *arvense*	Hare's-foot Clover	high	low
MH	*Trifolium subterraneum*	Subterranean Clover	high	low
MH	*Trifolium campestre* var. *campestre*	Hop Clover	high	low
MH	*Trifolium angustifolium* var. *angustifolium*	Narrow-leaf Clover	high	low
MH	*Lotus suaveolens*	Hairy Bird's-foot Trefoil	high	low
MH	*Cerastium glomeratum* s.l.	Common Mouse-ear Chickweed	high	low
SH	*Medicago polymorpha*	Burr Medic	high	low
SH	*Trifolium glomeratum*	Cluster Clover	high	low
SH	*Modiola caroliniana*	Red-flower Mallow	high	low
SH	*Aptenia cordifolia*	Heart-leaf Ice-plant	high	high
LTG	*Phalaris aquatica*	Toowoomba Canary-grass	high	high
LNG	*Holcus lanatus*	Yorkshire Fog	high	high
LNG	*Avena fatua*	Wild Oat	high	low
MTG	*Nassella trichotoma*	Serrated Tussock	high	high
MTG	*Ehrharta longiflora*	Annual Veldt-grass	high	low
MTG	*Briza maxima*	Large Quaking-grass	high	low
MTG	*Bromus hordeaceus* ssp. *hordeaceus*	Soft Brome	high	low
MTG	*Sporobolus africanus*	Rat-tail Grass	high	high
MTG	*Vulpia bromoides*	Squirrel-tail Fescue	high	low
MTG	*Romulea rosea*	Onion Grass	high	low
MTG	*Pentaschistis airoides* ssp. *airoides*	False Hair-grass	high	low
MTG	*Lolium perenne*	Perennial Rye-grass	high	low
MTG	*Dactylis glomerata*	Cocksfoot	high	high
MTG	*Vulpia myuros*	Rat's-tail Fescue	high	low
MTG	*Bromus rubens*	Red Brome	high	low
MTG	*Avena barbata*	Bearded Oat	high	low
MTG	*Aira caryophyllea*	Silvery Hair-grass	high	low
SC	*Vicia sativa* ssp. *sativa*	Common Vetch	low	low

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EVC/Bioregion Benchmark for Vegetation Quality Assessment

Victorian Volcanic Plain bioregion

EVC 654: Creekline Tussock Grassland

Description:
Creekline Tussock Grassland occurs along low gradient ephemeral and intermittent drainage lines across the volcanic plains. Soils are generally fertile heavy dark clays. Exposed basalt rocks can be common. Dominated by a dense sward of Common Tussock-grass *Poa labillardierei* primarily with small herbs and typically mat-forming grasses in the inter-tussock spaces. This EVC often includes small areas of sedgeland and/or wetland.

Life forms:

Life form	#Spp	%Cover	LF code
Large Herb	4	5%	LH
Medium Herb	8	10%	MH
Small or Prostrate Herb	11	10%	SH
Large Tufted Graminoid	3	40%	LTG
Medium to Small Tufted Graminoid	10	10%	MTG
Medium to Tiny Non-tufted Graminoid	4	10%	MNG
Bryophytes/Lichens	na	20%	BL

LF Code	Species typical of at least part of EVC range	Common Name
LH	*Senecio quadridentatus*	Cottony Fireweed
LH	*Senecio tenuiflorus*	Narrow-leaf Groundesl
LH	*Craspedia glauca* spp. agg.	Common Billy-buttons
MH	*Calocephalus lacteus*	Milky Beaty-heads
LH	*Brachyscome basaltica* var. *gracilis*	Woodland Swamp-daisy
MH	*Microseris* sp. 1	Yam Daisy
MH	*Haloragis heterophylla*	Varied Raspwort
SH	*Dichondra repens*	Kidneyweed
SH	*Hydrocotyle sibthorpioides*	Shining Pennywort
SH	*Lobelia pratioides*	Poison Lobelia
SH	*Crassula helmsii*	Swamp Crassula
LTG	*Poa labillardierei*	Common Tussock-grass
LTG	*Carex tereticaulis*	Rush Sedge
LTG	*Juncus kraussii* ssp. *australiensis*	Sea Rush
MTG	*Austrodanthonia duttoniana*	Brown-back Wallaby-grass
MTG	*Austrodanthonia caespitosa*	Common Wallaby-grass
MTG	*Lachnagrostis filiformis*	Common Blown-grass
MTG	*Juncus planifolius*	Broad-leaf Rush
MNG	*Microlaena stipoides* var. *stipoides*	Weeping Grass
MNG	*Distichlis distichophylla*	Australian Salt Grass
MNG	*Hemarthria uncinata* var. *uncinata*	Mat Grass
MNG	*Eleocharis acuta*	Common Spike-sedge

Recruitment:
Episodic – fire/grazing – desirable period of disturbance is every 10 years

Organic Litter:
10% Cover

EVC 654: Creekline Tussock Grassland - Victorian Volcanic Plain bioregion

Weediness:

LF Code	Typical Weed Species	Common Name	Invasive	Impact
LH	*Rumex crispus*	Curled Dock	high	low
MH	*Lotus suaveolens*	Hairy Bird's-foot Trefoil	high	high
MH	*Leontodon taraxacoides* ssp. *taraxacoides*	Hairy Hawkbit	high	low
MH	*Hypochoeris radicata*	Cat's Ear	high	low
LNG	*Holcus lanatus*	Yorkshire Fog	high	high
MTG	*Phalaris aquatica*	Toowoomba Canary-grass	high	high
MTG	*Anthoxanthum odoratum*	Sweet Vernal-grass	high	high
MNG	*Paspalum distichum*	Water Couch	high	high
MNG	*Agrostis capillaris*	Brown-top Bent	high	high

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EVC/Bioregion Benchmark for Vegetation Quality Assessment

Victorian Volcanic Plain bioregion

EVC 656: Brackish Wetland

Description:
Treeless EVC dominated by sedges and herbs that are generally indicative of saline conditions. True halophytic species such as samphires, if present, only occur with very low cover. Occurs in estuaries and along poorly defined drainage lines or associated with shorelines of brackish lakes.

Life Forms:

Life form	#Spp	%Cover	LF code
Large Herb	1	5%	LH
Medium Herb	3	15%	MH
Small or Prostrate Herb	3	10%	SH
Large Tufted Graminoid	1	10%	LTG
Large Non-tufted Graminoid	2	10%	LNG
Medium to Small Tufted Graminoid	2	5%	MTG
Medium to Tiny Non-tufted Graminoid	3	15%	MNG
Scrambler or Climber	1	1%	SC
Soil Crust	na	10%	S/C
Total understorey projective foliage cover		**80%**	

LF Code	Species typical of at least part of EVC range	Common Name
LH	*Persicaria decipiens*	Slender Knotweed
LH	*Epilobium billardierianum* ssp. *billardierianum*	Smooth Willow-herb
MH	*Sarcocornia quinqueflora*	Beaded Glasswort
MH	*Samolus repens*	Creeping Brookweed
MH	*Suaeda australis*	Austral Seablite
SH	*Selliera radicans*	Shiny Swamp-mat
SH	*Crassula helmsii*	Swamp Crassula
SH	*Mimulus repens*	Creeping Monkey-flower
LTG	*Gahnia filum*	Chaffy Saw-sedge
LNG	*Juncus kraussii* ssp. *australiensis*	Sea Rush
LNG	*Phragmites australis*	Common Reed
MTG	*Poa poiformis*	Coast Tussock-grass
MTG	*Lachnagrostis filiformis*	Common Blown-grass
MNG	*Bolboschoenus caldwellii*	Salt Club-sedge
MNG	*Distichlis distichophylla*	Australian Salt-grass
MNG	*Schoenoplectus pungens*	Sharp Club-sedge
MNG	*Triglochin striatum*	Streaked Arrowgrass
SC	*Calystegia sepium*	Large Bindweed

Recruitment:
Episodic/Flood: desirable period of disturbance is every five years

Organic Litter:
10% cover

Weediness:
There are no consistent weeds in this EVC.

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EVC 656: Brackish Wetland - Victorian Volcanic Plain bioregion

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Appendix 3: Detailed habitat hectare assessment results

Habitat Zone			A	B	C	D1	D2	E1	E2	E3	F	G
Bioregion			VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP
EVC Number			649_61	132_61	649	132_61	132_61	654	654	654	649	132_61
Total area of Habitat Zone (ha)			0.128415	4.466178	0.712368	5.817982	1.316029	0.968208	0.436197	1.545756	0.235809	0.335557
Site Condition	Large Old Trees	/10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Tree Canopy Cover	/5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lack of Weeds	/15	6	9	6	0	0	6	6	6	6	0
	Understorey	/25	5	20	5	10	10	10	10	10	5	10
	Recruitment	/10	0	6	0	0	0	0	0	0	0	0
	Organic Matter	/5	2	5	5	4	4	4	4	4	5	2
	Logs	/5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Site condition standardising multiplier*		1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36
	Site Condition subtotal		*18*	*54*	*22*	*19*	*19*	*27*	*27*	*27*	*22*	*16*
Landscape Context	Patch Size	/10	8	8	8	8	2	2	8	8	2	8
	Neighbourhood	/10	3	4	3	3	3	2	3	3	1	3
	Distance to Core	/5	4	4	4	4	3	3	4	4	3	3
Total Condition Score		**/100**	**33**	**70**	**37**	**34**	**27**	**34**	**42**	**42**	**28**	**30**
Condition score out of 1			0.33	0.70	0.37	0.34	0.27	0.34	0.42	0.42	0.28	0.30
Habitat Hectares in Habitat Zone#			**0.042**	**3.126**	**0.264**	**1.978**	**0.355**	**0.329**	**0.183**	**0.649**	**0.066**	**0.101**
EPBC Act listed ecological communities			**None**	**NTGVVP**	**None**	**NTGVVP**	**NTGVVP**	**NTGVVP**	**NTGVVP**	**NTGVVP**	**None**	**NTGVVP**
FFG Act listed ecological communities			**None**	**WBPG**	**None**	**None**	**None**	**None**	**None**	**None**	**None**	**None**

= Habitat hectares = habitat score (out of 1) x area in zone; ***** = Modified approach to habitat scoring - refer to Table 14 of DSE's Vegetation Quality Assessment Manual (DSE, 2004); **NTGVVP** = Natural Temperate Grassland of the Victorian Volcanic Plain; **SHW(F)TLP** = Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains; **WBPG** = Western Basalt Plains Grassland Community

Habitat Zone			H	I	J	K	L	M	N1	N2	O	P
Bioregion			VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP
EVC Number			654	656	649	649	649	132_61	132_61	132_61	132_61	649
Total area of Habitat Zone (ha)			0.986043	2.057916	0.668806	0.286743	0.078024	1.189738	3.592550	1.821549	0.026354	0.203198
Site Condition	Large Old Trees	/10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Tree Canopy Cover	/5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lack of Weeds	/15	6	7	6	6	6	6	0	0	2	6
	Understorey	/25	20	15	15	15	5	15	10	10	15	5
	Recruitment	/10	0	0	5	5	0	0	0	0	0	5
	Organic Matter	/5	5	3	3	3	4	3	4	4	2	5
	Logs	/5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Site condition standardising multiplier*		1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36
	Site Condition subtotal		*42*	*34*	*39*	*39*	*20*	*33*	*19*	*19*	*26*	*29*
Landscape Context	Patch Size	/10	8	8	8	8	8	8	8	8	1	8
	Neighbourhood	/10	2	3	3	3	3	3	4	4	2	3
	Distance to Core	/5	3	4	4	4	4	4	4	4	3	4
Total Condition Score		**/100**	**55**	**49**	**54**	**54**	**35**	**48**	**35**	**35**	**32**	**44**
Condition score out of 1			0.55	0.49	0.54	0.54	0.35	0.48	0.35	0.35	0.32	0.44
Habitat Hectares in Habitat Zone#			**0.542**	**1.008**	**0.361**	**0.155**	**0.027**	**0.571**	**1.257**	**0.638**	**0.008**	**0.089**
EPBC Act listed ecological communities			**NTGVVP**	**None**	**NTGVVP**	**NTGVVP**	**None**	**NTGVVP**	**NTGVVP**	**NTGVVP**	**None**	**None**
FFG Act listed ecological communities			**None**	**None**	**None**	**None**	**None**	**None**	**None**	**None**	**None**	**None**

= Habitat hectares = habitat score (out of 1) x area in zone; ***** = Modified approach to habitat scoring - refer to Table 14 of DSE's Vegetation Quality Assessment Manual (DSE, 2004); **NTGVVP** = Natural Temperate Grassland of the Victorian Volcanic Plain; **SHW(F)TLP** = Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains; **WBPG** = Western Basalt Plains Grassland Community

Habitat Zone			Q	R	S	T	U	V	W	X	Y	Z
Bioregion			VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP
EVC Number			132_61	649	132_61	649	649	649	649	132_61	132_61	132_61
Total area of Habitat Zone (ha)			0.340768	0.553723	14.19323	0.058252	0.037228	0.548559	0.111723	0.068533	0.106963	1.345352
Site Condition	Large Old Trees	/10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Tree Canopy Cover	/5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lack of Weeds	/15	6	0	15	9	4	6	2	2	2	6
	Understorey	/25	15	5	0	5	5	5	5	5	15	15
	Recruitment	/10	0	0	0	0	0	6	5	0	0	0
	Organic Matter	/5	2	4	3	4	2	2	2	2	2	2
	Logs	/5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Site condition standardising multiplier*		1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36
	Site Condition subtotal		*31*	*12*	*24*	*24*	*15*	*26*	*19*	*12*	*26*	*31*
Landscape Context	Patch Size	/10	8	8	8	8	8	8	8	1	8	2
	Neighbourhood	/10	2	3	4	4	3	3	3	2	3	2
	Distance to Core	/5	3	3	3	3	3	3	3	3	4	3
Total Condition Score		**/100**	**44**	**26**	**39**	**39**	**29**	**40**	**33**	**18**	**41**	**38**
Condition score out of 1			0.44	0.26	0.39	0.39	0.29	0.40	0.33	0.18	0.41	0.38
Habitat Hectares in Habitat Zone#			**0.150**	**0.144**	**5.535**	**0.023**	**0.011**	**0.219**	**0.037**	**0.012**	**0.044**	**0.511**
EPBC Act listed ecological communities			**None**	**None**	**NTGVVP**	**None**	**None**	**None**	**None**	**None**	**None**	**NTGVVP**
FFG Act listed ecological communities			**None**	**None**	**None**	**None**	**None**	**None**	**None**	**None**	**None**	**None**

= Habitat hectares = habitat score (out of 1) x area in zone; ***** = Modified approach to habitat scoring - refer to Table 14 of DSE's Vegetation Quality Assessment Manual (DSE, 2004); **NTGVVP** = Natural Temperate Grassland of the Victorian Volcanic Plain; **SHW(F)TLP** = Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains; **WBPG** = Western Basalt Plains Grassland Community

Habitat Zone			AA	BB	CC	DD	EE	FF	GG	HH	II	JJ
Bioregion			VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP
EVC Number			649	649	125	649	649	125	649	125	132_61	649
Total area of Habitat Zone (ha)			0.034666	0.211576	0.032455	0.069350	0.164889	0.016310	0.044953	0.018992	0.021176	0.163075
Site Condition	Large Old Trees	/10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Tree Canopy Cover	/5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lack of Weeds	/15	6	6	2	6	6	2	7	4	2	2
	Understorey	/25	5	5	5	15	5	5	5	10	5	5
	Recruitment	/10	0	3	0	0	6	0	5	0	0	0
	Organic Matter	/5	4	4	2	4	2	5	5	5	3	4
	Logs	/5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Site condition standardising multiplier*		1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36
	Site Condition subtotal		*20*	*24*	*12*	*34*	*26*	*16*	*30*	*26*	*14*	*15*
Landscape Context	Patch Size	/10	2	1	1	1	1	1	1	1	1	1
	Neighbourhood	/10	2	1	1	1	1	1	1	1	1	1
	Distance to Core	/5	3	3	3	3	3	3	3	3	3	3
Total Condition Score		**/100**	**27**	**29**	**17**	**39**	**31**	**21**	**35**	**31**	**19**	**20**
Condition score out of 1			0.27	0.29	0.17	0.39	0.31	0.21	0.35	0.31	0.19	0.20
Habitat Hectares in Habitat Zone#			**0.009**	**0.061**	**0.006**	**0.027**	**0.051**	**0.003**	**0.016**	**0.006**	**0.004**	**0.033**
EPBC Act listed ecological communities			**None**	**None**	**None**	**None**	**None**	**None**	**None**	**None**	**None**	**None**
FFG Act listed ecological communities			**None**	**None**	**None**	**None**	**None**	**None**	**None**	**None**	**None**	**None**

= Habitat hectares = habitat score (out of 1) x area in zone; ***** = Modified approach to habitat scoring - refer to Table 14 of DSE's Vegetation Quality Assessment Manual (DSE, 2004); **NTGVVP** = Natural Temperate Grassland of the Victorian Volcanic Plain; **SHW(F)TLP** = Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains; **WBPG** = Western Basalt Plains Grassland Community

Habitat Zone			KK	LL	MM	NN	OO	PP	QQ	RR	SS	TT
Bioregion			VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP
EVC Number			125	649	132_61	132_61	125	649	132_61	132_61	649	125
Total area of Habitat Zone (ha)			0.013419	0.027753	0.379638	0.045911	0.014361	0.093678	0.007102	0.051142	0.166551	0.015590
Site Condition	Large Old Trees	/10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Tree Canopy Cover	/5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lack of Weeds	/15	6	2	6	2	2	9	6	4	9	2
	Understorey	/25	5	5	15	5	5	5	10	5	5	5
	Recruitment	/10	0	0	0	0	0	6	0	0	6	0
	Organic Matter	/5	3	4	5	3	3	4	3	3	5	2
	Logs	/5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Site condition standardising multiplier*		1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36
	Site Condition subtotal		*19*	*15*	*35*	*14*	*14*	*33*	*26*	*16*	*34*	*12*
Landscape Context	Patch Size	/10	1	1	1	1	1	1	1	1	1	1
	Neighbourhood	/10	1	1	1	1	1	1	1	1	1	1
	Distance to Core	/5	3	3	3	3	3	3	3	3	3	3
Total Condition Score		/100	**24**	**20**	**40**	**19**	**19**	**38**	**31**	**21**	**39**	**17**
Condition score out of 1			0.24	0.20	0.40	0.19	0.19	0.38	0.31	0.21	0.39	0.17
Habitat Hectares in Habitat Zone#			**0.003**	**0.006**	**0.152**	**0.009**	**0.003**	**0.036**	**0.002**	**0.011**	**0.065**	**0.003**
EPBC Act listed ecological communities			**None**	**None**	**NTGVVP**	**None**	**None**	**None**	**None**	**None**	**None**	**None**
FFG Act listed ecological communities			**None**	**None**	**None**	**None**	**None**	**None**	**None**	**None**	**None**	**None**

= Habitat hectares = habitat score (out of 1) x area in zone; ***** = Modified approach to habitat scoring - refer to Table 14 of DSE's Vegetation Quality Assessment Manual (DSE, 2004); **NTGVVP** = Natural Temperate Grassland of the Victorian Volcanic Plain; **SHW(F)TLP** = Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains; **WBPG** = Western Basalt Plains Grassland Community

Habitat Zone			UU	VV	WW	XX	YY	ZZ	AAA	BBB	CCC	DDD
Bioregion			VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP
EVC Number			649	132_61	132_61	649	649	649	649	132_61	132_61	132_61
Total area of Habitat Zone (ha)			0.116118	0.678381	0.130666	0.085594	0.077300	0.035442	0.057759	0.011874	0.072045	0.007426
Site Condition	Large Old Trees	/10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Tree Canopy Cover	/5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lack of Weeds	/15	9	0	6	9	9	0	0	0	2	0
	Understorey	/25	15	15	10	5	5	5	5	5	5	5
	Recruitment	/10	0	0	0	0	5	0	0	0	0	0
	Organic Matter	/5	3	3	3	5	5	2	2	3	3	3
	Logs	/5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Site condition standardising multiplier*		1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36
	Site Condition subtotal		*37*	*24*	*26*	*26*	*33*	*10*	*10*	*11*	*14*	*11*
Landscape Context	Patch Size	/10	1	1	1	1	8	1	1	1	1	1
	Neighbourhood	/10	1	1	1	2	4	1	1	1	1	1
	Distance to Core	/5	3	3	3	3	3	3	3	3	3	3
Total Condition Score		**/100**	**42**	**29**	**31**	**32**	**48**	**15**	**15**	**16**	**19**	**16**
Condition score out of 1			0.42	0.29	0.31	0.32	0.48	0.15	0.15	0.16	0.19	0.16
Habitat Hectares in Habitat Zone#			**0.049**	**0.197**	**0.041**	**0.027**	**0.037**	**0.005**	**0.009**	**0.002**	**0.014**	**0.001**
EPBC Act listed ecological communities			**None**	**NTGVVP**	**NTGVVP**	**None**	**None**	**None**	**None**	**None**	**None**	**None**
FFG Act listed ecological communities			**None**	**None**	**None**	**None**	**None**	**None**	**None**	**None**	**None**	**None**

= Habitat hectares = habitat score (out of 1) x area in zone; ***** = Modified approach to habitat scoring - refer to Table 14 of DSE's Vegetation Quality Assessment Manual (DSE, 2004); **NTGVVP** = Natural Temperate Grassland of the Victorian Volcanic Plain; **SHW(F)TLP** = Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains; **WBPG** = Western Basalt Plains Grassland Community

Habitat Zone			EEE	FFF	GGG	HHH	III	JJJ	KKK	LLL	MMM	NNN
Bioregion			VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP
EVC Number			132_61	132_61	132_61	132_61	132_61	654	132_61	132_61	132_61	132_61
Total area of Habitat Zone (ha)			0.059207	0.313901	1.880471	0.113633	0.172069	0.889851	0.120511	0.018589	0.014205	0.039671
Site Condition	Large Old Trees	/10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Tree Canopy Cover	/5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lack of Weeds	/15	2	0	0	0	0	4	6	2	2	2
	Understorey	/25	5	5	15	15	5	10	5	5	10	10
	Recruitment	/10	0	0	0	0	0	0	0	0	0	0
	Organic Matter	/5	3	5	2	2	2	3	3	2	4	4
	Logs	/5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Site condition standardising multiplier*		1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36
	Site Condition subtotal		*14*	*14*	*23*	*23*	*10*	*23*	*19*	*12*	*22*	*22*
Landscape Context	Patch Size	/10	1	1	1	1	8	8	1	1	1	1
	Neighbourhood	/10	0	1	2	1	3	3	2	3	1	1
	Distance to Core	/5	3	3	3	3	3	3	3	3	3	3
Total Condition Score		**/100**	**18**	**19**	**29**	**28**	**24**	**37**	**25**	**19**	**27**	**27**
Condition score out of 1			0.18	0.19	0.29	0.28	0.24	0.37	0.25	0.19	0.27	0.27
Habitat Hectares in Habitat Zone#			**0.011**	**0.060**	**0.545**	**0.032**	**0.041**	**0.329**	**0.030**	**0.004**	**0.004**	**0.011**
EPBC Act listed ecological communities			**None**	**NTGVVP**	**NTGVVP**	**NTGVVP**	**NTGVVP**	**NTGVVP**	**NTGVVP**	**None**	**None**	**None**
FFG Act listed ecological communities			**None**	**None**	**None**	**None**	**None**	**None**	**None**	**None**	**None**	**None**

= Habitat hectares = habitat score (out of 1) x area in zone; ***** = Modified approach to habitat scoring - refer to Table 14 of DSE's Vegetation Quality Assessment Manual (DSE, 2004); **NTGVVP** = Natural Temperate Grassland of the Victorian Volcanic Plain; **SHW(F)TLP** = Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains; **WBPG** = Western Basalt Plains Grassland Community

Habitat Zone			OOO	PPP	QQQ	RRR1	RRR2	SSS	TTT	UUU	VVV	WWW
Bioregion			VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP
EVC Number			132_61	132_61	649	656	656	656	132_61	649	649	649
Total area of Habitat Zone (ha)			0.059286	1.763121	0.047669	0.037424	0.064213	0.073434	0.658342	0.431521	0.210506	0.049453
Site Condition	Large Old Trees	/10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Tree Canopy Cover	/5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lack of Weeds	/15	2	9	4	2	2	0	6	9	9	9
	Understorey	/25	10	15	5	5	5	10	10	15	15	15
	Recruitment	/10	0	0	0	3	3	0	0	6	6	6
	Organic Matter	/5	4	2	3	5	5	3	3	5	4	4
	Logs	/5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Site condition standardising multiplier*		1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36
	Site Condition subtotal		*22*	*35*	*16*	*20*	*20*	*18*	*26*	*48*	*46*	*46*
Landscape Context	Patch Size	/10	1	8	8	8	8	8	8	8	8	8
	Neighbourhood	/10	2	3	3	4	3	4	5	4	5	5
	Distance to Core	/5	3	3	3	3	3	3	4	4	4	4
Total Condition Score		**/100**	**28**	**49**	**30**	**35**	**34**	**33**	**43**	**64**	**63**	**63**
Condition score out of 1			0.28	0.49	0.30	0.35	0.34	0.33	0.43	0.64	0.63	0.63
Habitat Hectares in Habitat Zone#			**0.017**	**0.864**	**0.014**	**0.013**	**0.022**	**0.024**	**0.283**	**0.276**	**0.133**	**0.031**
EPBC Act listed ecological communities			**None**	**NTGVVP**	**None**	**None**	**None**	**None**	**NTGVVP**	**None**	**None**	**None**
FFG Act listed ecological communities			**None**	**None**	**None**	**None**	**None**	**None**	**None**	**None**	**None**	**None**

= Habitat hectares = habitat score (out of 1) x area in zone; ***** = Modified approach to habitat scoring - refer to Table 14 of DSE's Vegetation Quality Assessment Manual (DSE, 2004); **NTGVVP** = Natural Temperate Grassland of the Victorian Volcanic Plain; **SHW(F)TLP** = Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains; **WBPG** = Western Basalt Plains Grassland Community

Habitat Zone			XXX	YYY	ZZZ	AAAA	BBBB	CCCC	DDDD	EEEE	FFFF	GGGG
Bioregion			VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP
EVC Number			649	649	132_61	649_61	649	649	649	649	649	649
Total area of Habitat Zone (ha)			0.120601	0.042610	#######	0.118601	0.108241	0.748972	0.116081	0.046343	0.064617	0.069529
Site Condition	Large Old Trees	/10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Tree Canopy Cover	/5	NA	NA	NA	0	NA	NA	NA	NA	NA	NA
	Lack of Weeds	/15	9	6	4	6	2	2	2	6	6	6
	Understorey	/25	15	5	15	5	5	5	5	5	5	5
	Recruitment	/10	6	0	0	6	5	6	6	0	6	6
	Organic Matter	/5	4	5	5	4	4	4	4	3	5	5
	Logs	/5	NA	NA	NA	0	NA	NA	NA	NA	NA	NA
	Site condition standardising multiplier*		1.36	1.36	1.36	1.15	1.36	1.36	1.36	1.36	1.36	1.36
	Site Condition subtotal		*46*	*22*	*33*	*24*	*22*	*23*	*23*	*19*	*30*	*30*
Landscape Context	Patch Size	/10	8	8	8	8	8	8	8	8	8	8
	Neighbourhood	/10	4	4	5	3	4	3	5	4	5	5
	Distance to Core	/5	4	4	4	4	4	4	4	4	4	4
Total Condition Score		/100	**62**	**38**	**50**	**39**	**38**	**38**	**40**	**35**	**47**	**47**
Condition score out of 1			0.62	0.38	0.50	0.39	0.38	0.38	0.40	0.35	0.47	0.47
Habitat Hectares in Habitat Zone#			**0.075**	**0.016**	**9.548**	**0.046**	**0.041**	**0.285**	**0.046**	**0.016**	**0.030**	**0.033**
EPBC Act listed ecological communities			**None**	**None**	**NTGVVP**	**None**	**None**	**None**	**None**	**None**	**None**	**None**
FFG Act listed ecological communities			**None**	**None**	**None**	**None**	**None**	**None**	**None**	**None**	**None**	**None**

= Habitat hectares = habitat score (out of 1) x area in zone; ***** = Modified approach to habitat scoring - refer to Table 14 of DSE's Vegetation Quality Assessment Manual (DSE, 2004); **NTGVVP** = Natural Temperate Grassland of the Victorian Volcanic Plain; **SHW(F)TLP** = Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains; **WBPG** = Western Basalt Plains Grassland Community

Habitat Zone			HHHH	IIII	JJJJ1	JJJJ2	KKKK	LLLL	MMMM	NNNN	OOOO	PPPP
Bioregion			VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP
EVC Number			649	125	125	125	654	649	654	656	656	132_61
Total area of Habitat Zone (ha)			0.047986	0.141922	1.058311	0.481342	2.403527	0.016032	0.148198	0.053154	0.026282	0.454283
Site Condition	Large Old Trees	/10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Tree Canopy Cover	/5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lack of Weeds	/15	9	2	2	2	0	9	6	0	0	9
	Understorey	/25	5	10	10	10	10	5	10	5	5	15
	Recruitment	/10	10	0	0	0	0	5	0	0	0	0
	Organic Matter	/5	5	5	5	5	3	5	3	2	2	3
	Logs	/5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Site condition standardising multiplier*		1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36
	Site Condition subtotal		*39*	*23*	*23*	*23*	*18*	*33*	*26*	*10*	*10*	*37*
Landscape Context	Patch Size	/10	8	8	8	8	8	8	8	8	8	8
	Neighbourhood	/10	5	5	5	5	5	4	3	3	3	3
	Distance to Core	/5	4	4	4	4	4	4	4	4	4	4
Total Condition Score		**/100**	**56**	**40**	**40**	**40**	**35**	**49**	**41**	**25**	**25**	**52**
Condition score out of 1			0.56	0.40	0.40	0.40	0.35	0.49	0.41	0.25	0.25	0.52
Habitat Hectares in Habitat Zone#			**0.027**	**0.057**	**0.423**	**0.193**	**0.841**	**0.008**	**0.061**	**0.013**	**0.007**	**0.236**
EPBC Act listed ecological communities			**None**	**SHW(F)TLP**	**SHW(F)TLP**	**SHW(F)TLP**	**NTGVVP**	**None**	**NTGVVP**	**None**	**None**	**NTGVVP**
FFG Act listed ecological communities			**None**	**None**	**None**	**None**	**None**	**None**	**None**	**None**	**None**	**None**

= Habitat hectares = habitat score (out of 1) x area in zone; ***** = Modified approach to habitat scoring - refer to Table 14 of DSE's Vegetation Quality Assessment Manual (DSE, 2004); **NTGVVP** = Natural Temperate Grassland of the Victorian Volcanic Plain; **SHW(F)TLP** = Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains; **WBPG** = Western Basalt Plains Grassland Community

Habitat Zone			QQQQ	RRRR	SSSS	TTTT	UUUU
Bioregion			VVP	VVP	VVP	VVP	VVP
EVC Number			654	654	649	125	649
Total area of Habitat Zone (ha)			0.052675	0.182894	0.090887	1.666498	0.166735
Site Condition	Large Old Trees	/10	NA	NA	NA	NA	NA
	Tree Canopy Cover	/5	NA	NA	NA	NA	NA
	Lack of Weeds	/15	4	2	6	6	9
	Understorey	/25	10	5	5	15	5
	Recruitment	/10	0	0	6	0	6
	Organic Matter	/5	3	3	3	5	5
	Logs	/5	NA	NA	NA	NA	NA
	Site condition standardising multiplier*		1.36	1.36	1.36	1.36	1.36
	Site Condition subtotal		*23*	*14*	*27*	*35*	*34*
Landscape Context	Patch Size	/10	8	8	8	8	8
	Neighbourhood	/10	3	4	3	4	4
	Distance to Core	/5	4	4	4	4	4
Total Condition Score		**/100**	**38**	**30**	**42**	**51**	**50**
Condition score out of 1			0.38	0.30	0.42	0.51	0.50
Habitat Hectares in Habitat Zone#			**0.020**	**0.055**	**0.038**	**0.850**	**0.083**
EPBC Act listed ecological communities			**NTGVVP**	**NTGVVP**	**None**	**SHW(F)TLP**	**None**
FFG Act listed ecological communities			**None**	**None**	**None**	**None**	**None**

= Habitat hectares = habitat score (out of 1) x area in zone; ***** = Modified approach to habitat scoring - refer to Table 14 of DSE's Vegetation Quality Assessment Manual (DSE, 2004); **NTGVVP** = Natural Temperate Grassland of the Victorian Volcanic Plain; **SHW(F)TLP** = Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains; **WBPG** = Western Basalt Plains Grassland Community

Appendix 4: Details of scattered tree recorded in the study area

Common name	Scientific Name	DBH (cm)	Size Class	Radius of TPZ (m)
River Red-gum	Eucalyptus camaldulensis	56	Small	6.72

Appendix 5: Letter to Murdesk from DELWP, 15th June 2015.

Department of Environment,
Land, Water & Planning

8 Nicholson Street
East Melbourne Victoria 3002

Mervyn J Dickey
Murdesk Investments Pty Ltd
40 Bells Hill Rd
RESEARCH VIC 3095

15 June 2015

Dear Mr Dickey,

As you are aware, your property is located within Conservation Area 32 identified in the Biodiversity Conservation Strategy for Melbourne's Growth Corridors (BCS) (DEPI, 2013) as part of the Melbourne Strategic Assessment (MSA) program.

Conservation Area 32 is classified as 'nature conservation' and the Department of Environment, Land, Water and Planning (DELWP) will offer to purchase your property on a voluntary basis as funds become available under the MSA program.

The boundary of Conservation Area 32 was determined on the basis of modelled information about the native vegetation on your property, rather than surveyed information.

As a result, DELWP wishes to review the boundary of Conservation Area 32 on the basis of surveys for native vegetation and habitat for threatened species. The intent of the boundary review is to remove areas of low biodiversity value from Conservation Area 32, such as areas of low quality native vegetation or that do not contain native vegetation. However, if surveys show the modelled information accurately reflects the native vegetation and threatened species habitat on your property, the review may not lead to any changes to the boundary. The review will not increase the size of the Conservation Area affecting your property.

DELWP is providing you an opportunity to undertake surveys of native vegetation and threatened species habitat and submit the results to DELWP to enable the review to be conducted. The surveys must be conducted by a suitably qualified ecologist in accordance with DELWP requirements.

DELWP will review the results of the surveys and may propose a change to the boundary of Conservation Area 32.

Any change to the boundary requires the agreement of the Commonwealth Minister for the Environment. DELWP will seek your comment prior to submitting a proposed change to the boundary to the Commonwealth Minister for agreement. Should the Minister agree to the boundary change, any land excluded from the conservation area may be available for urban development subject to the requirements of the planning scheme and relevant Commonwealth approval. This decision will be made by the Metropolitan Planning Authority.

If you are interested in undertaking and submitting surveys, please contact myself on 03 5226 4576 or richard.boekel@delwp.vic.gov.au

Sincerely

Richard Boekel
Manager, Precinct Structure Planning