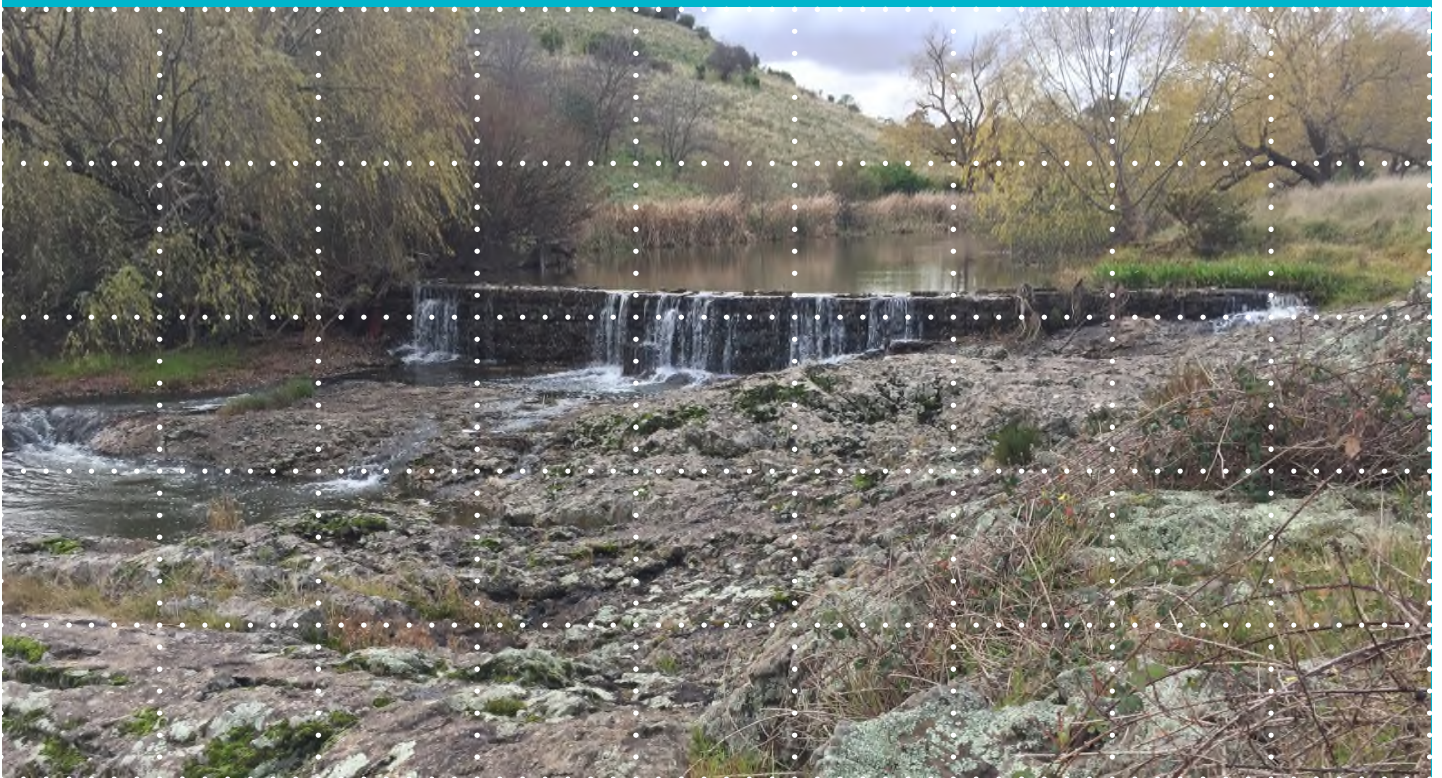


## Statement of Expert Evidence:

275 Sunbury Road, Sunbury: Amendment C207 to the Hume Planning Scheme. Sunbury South Precinct Structure Plan

Prepared for:

Capitol Property Group



Ecology and Heritage Partners Pty Ltd

August 2017

Shannon LeBel

## 1 AUTHOR'S EXPERTISE

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This Statement of Expert Evidence has been prepared by Mr Shannon LeBel, Senior Botanist of Ecology and Heritage Partners Pty Ltd, of 233 Latrobe Terrace, Geelong West, Victoria, Ph: (03) 9377 0100, [slebel@ehpartners.com.au](mailto:slebel@ehpartners.com.au)

It is based on the findings of an investigation undertaken by myself, and a Bushfire Attack Level assessment completed by Nicholas Symons (General Manager – Ecotide Pty Ltd).

I have an Honours degree in Conservation Biology and Ecology, and am a PhD candidate in the field of Plant Ecology. I have over 11 years' experience in the environmental field, including six years as an ecological consultant, have a broad working knowledge of flora and fauna species throughout Victoria, and have either managed or played an important role in providing environmental advice on a number of large infrastructure projects such as proposed pipelines, windfarms, road and rail developments, and numerous urban development projects (residential, industrial and commercial).

I am Department of Environment, Land, Water and Planning (DELWP) certified for the Vegetation Quality Assessment (Habitat Hectare) method, and have completed numerous ecological assessments, flora and fauna surveys, environmental weed mapping projects, and audit reports for remnant vegetation condition in urban and rural areas. I have also been a lead author and/or co-author for over 150 projects and have provided expert advice to a range of private and Government clients pertaining to the relevant State and Commonwealth environmental legislation and policies.

I have completed certified County Fire Authority and Planning Institute of Australia's Bushfire Management Statement training, and have conducted numerous Bushfire Management Statements (BMS) and Bushfire Attack Level (BAL) assessments around Victoria. Further, I have provided detailed bushfire advice in accordance with the relevant State planning and policy for developments affected by the Bushfire Prone Area and Bushfire Management Overlay requirements.

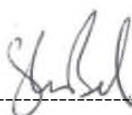
In the context of the current proposal, I have a sound knowledge of the study area, and the major issues involved.

## 2 AUTHOR'S STATEMENT AND DECLARATION

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I, Shannon LeBel of Ecology and Heritage Partners Pty Ltd, have prepared this Statement of Expert Evidence pertaining to the bushfire protection provisions associated with Amendment C207 at 275 Sunbury Road, Sunbury, Victoria. The proceeding statement is based on a review of all relevant background material, the findings of a review of relevant planning material, and the results of a site assessment undertaken by myself, and Nicholas Symons (General Manager) of Ecotide Pty Ltd.

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



----- Date: 14/08/2017

### 3 SUMMARY OF EXPERT OPINION

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The study area is located at 725 Sunbury Road, Sunbury, and abuts existing development as parts of the existing Sunbury township. The majority of the study area comprises Grassland vegetation, with small areas of Scrub present, as well as Woodland vegetation along Jacksons Creek. The land within the study area is undulating, with approximately 5% of land on slopes exceeding 20 degrees.

Bushfire risk and associated mitigation measures associated with the study area as part of Amendment C207 have been assessed against Clause 13.05, proposed Clause 37.07 (UGZ9), the Sunbury South PSP, and the BPA minimum standards using Australia Standard (AS) 3959-2009. A Bushfire Attack Level (BAL) assessment of the study area has also been assessed using Method 2 of AS3959-2009 by Ecotide Pty Ltd (2017).

In light of all available information, the study area and Concept Masterplan (Tract 2017) are considered to improve the interface between the existing bushfire hazard and residential development. This is expected to reduce the bushfire risk in the area to the existing residential dwellings and their properties.

It is my opinion that bushfire protection measures required under AS3959-2009, and detailed in Ecotide Pty Ltd (2017) can be practically achieved across the proposed development areas detailed in the Concept Masterplan in accordance with the requirements for development in designated Bushfire Prone Areas (BPAs) of Victoria, Clause 13.05, and proposed Clause 37-07 (UGZ9) of the Hume Planning Scheme. Further, it is considered that the bushfire risk to life and property in the study area can be reduced to an acceptable level, and on this basis, the study area is considered suitable for future development under Amendment C207 of the Hume Planning Scheme.

## 4 INTRODUCTION

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### 4.1 Background

Ecology and Heritage Partners Pty Ltd was instructed by HWL Ebsworth Lawyers on behalf of by Capitol Property Group to provide expert evidence relating to the bushfire matters associated with Amendment C207 to the Hume Planning Scheme, specifically relating to the land located at 725 Sunbury Road (herein referred to as the study area) (Figure 1)

The key elements of Amendment C207 include:

- Introduction of Schedule 9 of the Urban Growth Zone (UGZ9), which sets out the land use and development controls for the precinct, and rezoning much of the land to UGZ9;
- Inserts the Sunbury South Precinct Structure Plan (PSP) document into the Hume Planning Scheme; and,
- Applies the Rural Conservation Zone (RCZ) and Environmental Significance Overlay – Schedule 10 (ESO10) to the land within the amendment area, which falls within the Biodiversity Conservation Strategy (BCS) conservation areas and areas of significant regional landscape value.

In accordance with *Ministerial Direction 11: Strategic Assessment of Amendments*, this report demonstrates how the development of the study area addresses the relevant bushfire risk.

Any future subdivision and development of land within the area will need to comply with the requirements of the Bushfire Prone Area (BPA). This report has been prepared to assess how the proposed development plan within the study area can respond to the requirements of the BPA. It includes:

- The identification and description of vegetation types, fuel hazards, topography and potential risks to proposed development in the study area;
- A landscape hazard assessment to identify bushfire risk within the broader landscape;
- The determination, assessment and mapping of classified vegetation and slopes;

As an addendum to this report, a Method 2 analysis (in accordance with AS 3959-2009) was conducted by Nicholas Symons from Ecotide Pty Ltd, to address bushfire risk where the slope exceeds 20 degrees within the study area. In these scenarios, I have relied on the expert advice provided by Nicholas Symons of Ecotide Pty Ltd to address bushfire risk within the study area. The Ecotide report is provided in Attachment 1 to this report.

The Ecotide Pty Ltd report (2017) includes a summary of minimum bushfire construction standards and associated separation distances in accordance with Australian Standard (AS) 3959-2009 *Construction of buildings in bushfire prone areas* (Standards Australia 2009).

### 4.2 Study Area

The study area is located at 725 Sunbury Road, Sunbury, and abuts existing development as parts of the existing Sunbury township (Figure 1). The study area is approximately 207 hectares in size, with the Harker

Street land comprising 14.1 hectares, and the Sunbury Hills land comprising 192.4 hectares. The entire study area is currently comprised of undeveloped agricultural land.

The study area is bound by Sunbury Road to the north-east, the existing Sunbury township to the north and north-west, and undeveloped agricultural land on the remaining aspects. Jacksons Creek intersects the Harker Street and Sunbury Hills land to the north-west (Figure 1).

### 4.3 Bushfire Prone Area

The study area is within a designated Bushfire Prone Area (BPA) as designated by the Victorian Minister for Planning. The Building Interim Regulations 2017, through the application of the Building Code of Australia, require minimum bushfire protection standards for certain classes of buildings in designated bushfire prone areas.

In accordance with AS 3959-2009, applicable buildings in the BPA must be built to a minimum Bushfire Attack Level (BAL) rating of 12.5, or to a maximum of BAL FZ (flame zone) depending on the radiant heat flux (RHF) a building may be exposed to in a bushfire event, with the appropriate BAL determined through the result of the site assessment to ascertain vegetation type and slope.

### 4.4 Instructions

This statement has been prepared in accordance with the instructions provided by HWL Ebsworth Lawyers on 20 July 2017. I was instructed to:

- Prepare expert bushfire evidence regarding Amendment C207 as it relates to the study area;
- Consider whether the Concept Masterplan can adequately respond to the required standards for bushfire protection for dwellings in designated Bushfire Prone Areas (BPAs) of Victoria, with a specific focus on:
  - Hillside Precinct; and,
  - Harker Street Precinct.
- Provide evidence relating to my area of expertise at the Panel hearing.



## 5 METHODS

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### 5.1 Site and Desktop Assessment

The following site assessment and desktop analysis was undertaken to inform the findings contained in this report:

- A site assessment was undertaken on 18 July 2017 to characterise and map the classifiable vegetation within the study area, including a 100 metre buffer around the perimeter;
- A landscape hazard assessment to determine the potential bushfire hazard and risk within the broader locality; and,
- Analysis and mapping of slope throughout the study area using 1 metre contours and GIS software (ArcGIS); and,
- A Bushfire Attack Level (BAL) assessment of the study area undertaken by Nicholas Symons of Ecotide Pty Ltd on 10 August 2017.

### 5.2 Document Review

The following reports and documents have been reviewed for the preparation of this expert witness statement:

- Ecotide 2017. Method 2 Bushfire Attack Level (BAL) Report. Sunbury South PSP.
- Tract Consultants 2016a. Sunbury Hills Harker Street Precinct Design Response. Prepared by Tract Consultants for Capitol Property Group;
- Tract Consultants 2016b. Sunbury Hills Design Response to Slope. Prepared by Tract Consultants for Capitol Property Group;
- Sunbury South Precinct Structure Plan supporting documentation, including:
  - VPA 2016. Sunbury South Precinct Structure Plan. November 2016: Exhibition. Prepared by the Victorian Planning Authority;
  - Proposed Hume Planning Scheme ordinance;
  - Proposed Hume Planning Scheme maps;
- Tract Consultants 2017. Concept Masterplan – PSP Overlay. 275 Sunbury Road, Sunbury.

### 5.3 Bushfire Attack Level Assessment

A detailed Bushfire Attack Level (BAL) assessment based on the Concept Masterplan for the study area has been undertaken by Nicholas Symons of Ecotide Pty Ltd. The findings made by myself in Section 7 of this report, relating to the ability of the Concept Masterplan (Tract 2017) to adequately respond to the required standards for bushfire protection for dwellings in designated Bushfire Prone Areas, is wholly based on the BAL assessment undertaken by Ecotide Pty Ltd (2017).

The BAL assessment prepared by Nicholas Symons of Ecotide Pty Ltd, as well as a summary of his experience and qualifications to undertake the assessment, is included at Attachment 1.

## 6 STUDY AREA CONDITIONS

### 6.1 Topography

Slope analysis of the study area using VicMap Elevation (interpolated) 1-5 metres contours has classified the slope into six categories for the purposes of modelling the effective slope under areas comprising classifiable vegetation (Figure 2). The determination of effective slope and classifiable vegetation enable the applicable BAL ratings and associated separation distances to then be ascertained.

The land to the east of the study area adjacent to Redstone Road and directly abutting Sunbury Road is relatively flat, with a slight downslope of less than 5 degrees towards Jacksons Creek, until sloping downwards along an escarpment near Jacksons Creek. Land between Jacksons Creek and the escarpment is undulating to flat. There is a steep rise on the other side of Jacksons Creek up to Harker Street before plateauing to a relatively flat area adjacent to existing residential development.

A breakdown of the proportion of land within each slope class is provided in Table 1.

**Table 1.** Slope analysis of land within the study area

Slope class (degrees)	Sunbury Hills Precinct	Harker Street Precinct	Total	% of Study Area
<b>Flat</b>	9.121	0.645	9.766	4.73
<b>0.01-5.00</b>	129.04	2.67	131.71	63.78
<b>5.01-10.00</b>	19.40	1.99	21.39	10.36
<b>10.01-15.00</b>	13.58	3.82	17.40	8.43
<b>15.01-20.00</b>	7.62	2.90	10.52	5.09
<b>&gt;20.00</b>	13.63	2.10	15.72	7.61
<b>Total</b>	<b>192.39</b>	<b>14.11</b>	<b>206.51</b>	<b>100%</b>

As detailed in Table 1, approximately 68% % of the study area comprises land with a slope equal to, or less than 5 degrees. A total of 7.6% of the study area is on a slope that exceeds 20 degrees.

### 6.2 Classifiable Vegetation

#### Grassland

Although the study area has historically been used for agricultural purposes (grazing, cropping), and the majority of woody vegetation has been cleared, the study area is well vegetated, and is predominantly comprised of Grassland vegetation as described in Table 2.3, and Figure 2.4 (G) of AS 3959-2009. For the most part, Grassland vegetation is comprised of a suite of native and non-native grasses, with occasional specimens of woody shrubs or trees (where the cover of shrubs was less than 10%), and thistles (Plate 1).

The AS3959-2009 assigns default fuel loads to each vegetation classification that are ultimately used to calculate the appropriate BAL construction standard, and associated separation distances between a building and the bushfire threat (classifiable vegetation). The default surface fuel load for Grassland vegetation is 4.5 tonne per hectare (t/ha), and an overall fuel load of 4.5 t/ha (AS 3959-2009 Amendment 2).



**Plate 1.** Grassland vegetation within the study area

### **Scrub**

Areas within the study area comprising a high density of woody shrubs (predominantly the noxious weed African Box-thorn *Lycium ferocissimum*) where the foliage cover is greater than 10% has been classified as Scrub (Plate 2). The majority of Scrub vegetation is located along the steeper slopes of escarpments present in the study area.

The default fuel load for Scrub vegetation is 25 tonne per hectare (t/ha), and an overall fuel load of 25 t/ha (AS 3959-2009 Amendment 1).

### **Woodland**

Vegetation adjacent to Jacksons Creek is generally comprised of remnant River Red-gum *Eucalyptus camaldulensis*, with occasional shrubs *Acacia* spp. and non-native deciduous trees present (Plate 3). This vegetation has been classified as Woodland, and has a default surface fuel load of 15 t/ha, and an overall fuel load of 25 t/ha (AS 3959-2009 Amendment 1).





**Plate 2.** Grassland vegetation in the foreground, and Scrub in the background within the study area



**Plate 3.** Woodland vegetation along Jacksons Creek at the base of the escarpment

## 6.3 Landscape Hazard Assessment

In accordance with the descriptions and processes detailed in *Practice Note 65: Preparing and Assessing a Planning Application Under the Bushfire Provisions in Planning Schemes* (DTPLI 2014), the bushfire hazard assessment identifies the broader landscape as being assessed as Landscape Type One due to the following attributes:

- There is little vegetation beyond 150 metres of the study area (except Grassland and low-threat vegetation);
- Extreme bushfire behaviour is not possible;
- The type and extent of vegetation is unlikely to result in the neighbourhood-scale destruction of property; and,
- Immediate access is available to a place that provides shelter from bushfire (Figure 3).

Landscape Type 1 presents the lowest bushfire risk, whereas Landscape Type Four presents an extreme risk (DTPLI 4). This landscape-type also equates to Landscape scenario A as described in *Planning for Bushfire Victoria* (CFA 2012).

Aside from some scattered pockets of Woodland vegetation approximately two kilometres east of the study area near Wildwood, and larger remnants in Lerderderg State Park approximately 12 kilometres west, there is little vegetation aside from Grassland vegetation beyond 150 metres of the site.



**Plate 4.** Landscape Hazard Assessment. Sunbury township adjacent to the north-west of the study area (outlined in RED). Photo image from Google Earth 2017.

Further, the surrounding properties adjacent to the east, south-east and south-west of the study area will also be developed as part of the Sunbury South PSP, with the majority of retained vegetation likely maintained in a low-fuel state, which will not present a significant bushfire hazard and will be classified as Low Threat (in accordance with AS 3959-2009) once developed.

In any potential bushfire scenario, future occupants of the houses within and adjoining the proposed subdivision can readily move to the Neighbourhood Safer Places and Bushfire Protection Areas identified in Figure 3 via Sunbury Road.

## 7 Planning Controls and Design Response

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This section identifies the relevant bushfire planning controls applicable to the study area as part of Amendment C207 of the Hume Planning Scheme.

### 7.1 Victorian Planning Provisions

#### 7.1.1 Clause 13.05 – Bushfire

The objective of Clause 13.05 is to assist to strengthen community resilience to bushfire, through the implementation of strategies to:

- Prioritise the protection of human life over other policy considerations in planning and decision-making in areas at risk from bushfire; and,
- Where appropriate, apply the precautionary principle to planning and decision-making when assessing the risk to life, property and community infrastructure from bushfire.

The *Development Control Strategy* within Clause 13.05 requires that new development will only be permitted where:

- The risk to human life, property and community infrastructure from bushfire can be reduced to an acceptable level;
- Bushfire protection measures, including the siting, design and construction of buildings, vegetation management, water supply and access and egress can be readily implemented and managed within the property; and,
- The risk to existing residents, property and community infrastructure from bushfire is not increased.

##### 7.1.1.1 *Concept Masterplan Response*

The Concept Masterplan is considered to meet the objective of Clause 13.05-01 to ‘strengthen community resilience to bushfire’ for the following reasons:

- Objective 23 of the Sunbury South PSP is to ‘ensure that bushfire protection measures are considered in the layout, staging and design of development and the local street network’. This has resulted in:
  - Perimeter roads between the proposed development and classifiable vegetation (Tract 2017);
  - Minimum setbacks from escarpments and designated conservation areas (page 87 and 94 of VPA 2016);
  - Due to historic clearing and ongoing development, the study area and surrounding land are considered to be a low bushfire threat; and,



- Specific bushfire mitigation measures will be further implemented at the subdivision stage through the UGZ9 with the requirement to prepare a 'Bushfire Management Plan'.
- Requirement 18 of the Sunbury South PSP requires *"Any subdivision abutting a 'fire threat edge' as defined on Plan 5 must be designed to minimise the impact of potential bushfires, including"*:
  - The provision of appropriate development setbacks from the break of slope, or other potential sources of threat; and,
  - Building guidelines.
- As per Requirement 19 of the of the Sunbury South PSP, and informed by a Bushfire Management Assessment, to the satisfaction of the Responsible Authority and the CFA, any buffer established to minimise fire threat must be functional and be able to be managed appropriately and cost effectively, to the satisfaction of the Responsible Authority and the CFA.

Ecotide Pty Ltd (2017) have identified separation buffers based on potential minimum construction standards that can be incorporated from the break of slope (as identified in the Sunbury South PSP). In order to facilitate practical and functional management of the proposed separation buffer, the minimum BAL construction standard of dwellings adjacent to an escarpment or 'fire edge threat', can result in a separation distance that is wholly maintained in the designated setbacks (from break of slope) identified in the Sunbury South PSP.

### 7.1.2 Urban Growth Zone – Schedule 9

Section 3.12 *Subdivision – Land Subject to Capability Assessment* of the UGZ9 requires an application to subdivide land which includes the area designated as 'land subject to capability assessment' in Plan 3 of the Sunbury South PSP must be accompanied by a Bushfire Management Plan, to be prepared to the satisfaction of the Responsible Authority.

#### 7.1.2.1 Concept Masterplan Response

As part of the staging of development for the study area, a Bushfire Management Plan (BMP) will be prepared to inform the minimum BAL rating and associated separation distance required for each relevant building. This schedule provides a mechanism to adequately address the bushfire requirements and mitigation measures as part of future development within the Sunbury South PSP area.

The BAL Assessment prepared by Ecotide Pty Ltd (2017) indicates that the separation distance required under AS3959-2009 for dwellings at the top of the escarpment can be adequately met within the setback distances detailed in the Sunbury South PSP adjacent to the Conservation Area (page 87 of VPA 2016), the Regionally Sensitive Landscape – Visually Sensitive (page 93 of VPA 2016), and the Regionally Sensitive Landscape – Non-visually Sensitive (page 94 of VPA 2016) areas. Further information relating to specific areas within the Concept Masterplan is provided below.

#### Harker Street Precinct

Based on the findings of Ecotide Pty Ltd (2017), any future dwelling in the Harker Street precinct can be constructed to an appropriate BAL rating to ensure the associated separation distance can be incorporated into the existing setback area. As such, it is considered that the Harker Street Precinct has been designed to

reduce the bushfire risk to an acceptable level and achieve compliance with requirements for Bushfire Prone Areas.

Further, it is considered that development of the Harker Street precinct will result in:

- A reduction in bushfire risk to existing dwellings that abut the development area; and,
- Improve emergency services access through the construction of new roads servicing the development, which will facilitate access to the escarpment in the event of a bushfire emergency. It is noted that the land is currently inaccessible in the event of a bushfire emergency.

### **Hillside Precinct**

The Ecotide Pty Ltd (2017) report acts as the '*Capability Assessment*' for bushfire risk-related matters as required under the UGZ9 to determine whether this land can be appropriately developed as part of the Sunbury South PSP.

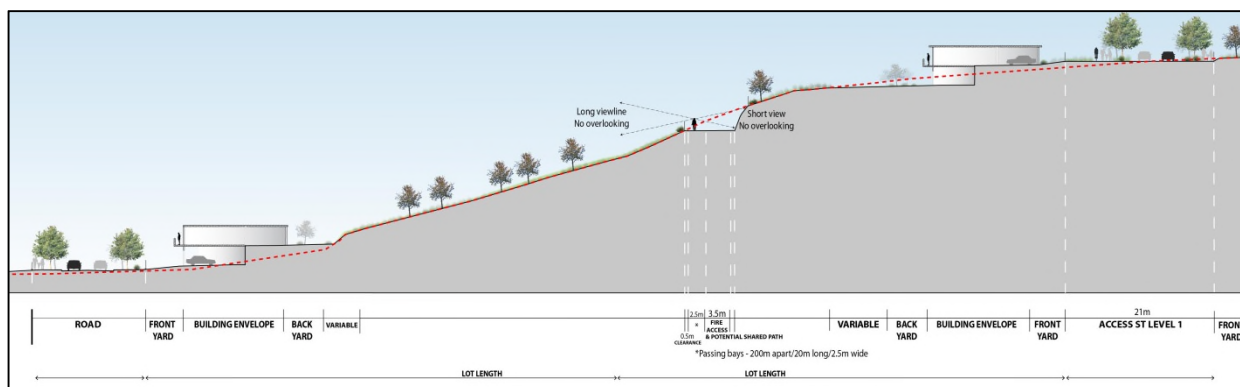
Based on the findings of the Ecotide Pty Ltd (2017) Method 2 analysis, the precinct contains Grassland vegetation on a 30 degree downslope. However, to provide a conservative approach to determining the potential bushfire mitigation measures, the vegetation has been classified as Shrubland. Even in this 'worst-case' scenario, the Ecotide report demonstrates that any future dwelling in the Hillside Street precinct, particularly those located at the top of the slope (as per Plate 5) can be constructed to an appropriate BAL rating to ensure the associated separation distance can be incorporated downslope within the precinct.

Although the BAL rating and associated separation distances would not be affected, additional options to further mitigate bushfire risk within the Hillside Precinct include:

- The construction of a shared path mid-slope between dwellings at the top and bottom of the slope that can be used as a fire access track in emergency situations (Plate 5). This would allow CFA access in times of a potential fire emergency, as well as creating a non-vegetation buffer along the slope; and/or,
- The creation of a Body Corporate within the Hillside Precinct with a requirement to ensure any vegetation along the slope is maintained in a low-threat condition (i.e. grass maintained to a height of 100 millimetres) during the fire danger period (late-Spring to mid-Autumn).

As such, it is considered that development in the Hillside Precinct can be designed to reduce the bushfire risk to an acceptable level and achieve compliance with requirements for Bushfire Prone Areas.





**Plate 5.** Potential design of a shared path through the Hillside Precinct (provided by Tract Consultants)

### Conservation Reserve Interface

Based on the findings of Ecotide Pty Ltd (2017), any future dwelling along the Conservation Reserve interface can be constructed to an appropriate BAL rating to ensure the associated separation distance can be incorporated into the existing setback area.

However, it should be noted that if existing areas of African Boxthorn were managed and removed, then the bushfire threat would be reduced to a lower fuel load and vegetation type, and as such, the appropriate BAL and separation distances would also be reduced. As this scenario is considered likely to occur as part of the development of the study area, it is considered appropriate that detailed bushfire mitigation measures can be ascertained through the preparation of a Bushfire Management Plan as required under the UGZ9 at the time of subdivision.

### 7.1.3 Special Use Zone – Schedule 9

There are no specific bushfire planning controls detailed in the SUZ9.

### 7.1.4 Clause 35.06-2: Rural Conservation Zone

Clause 35.06-2 *Use of land for a dwelling* requires a lot used for a dwelling must meet the following requirements:

- Access to the dwelling must be provided via an all-weather road with dimensions adequate to accommodate emergency vehicles; and,
- Any dwelling within the RCZ must be connected to a reticulated potable water supply or have an alternative potable water supply with adequate storage for domestic use as well as for fire-fighting purposes.

#### 7.1.4.1 Concept Masterplan Response

There is no land proposed to be used for a dwelling within areas affected by the RCZ.

### **7.1.5 Bushfire Prone Area**

The study area is in a designated Bushfire Prone Area (BPA) as determined by the Minister for Planning. The requirements under the BPA are summarised in Section 4.3 of this report.

Based on a bushfire threat comprising Grassland 'Scrub' and 'Woodland' vegetation in accordance with the classification detailed in AS3959-2009, as well as the BAL Assessment (Ecotide Pty Ltd 2017), the Concept Masterplan is able to respond to, and be in accordance with the bushfire protection required for development in designated Bushfire Prone Areas (BPAs) of Victoria.

## 8 CONCLUSION

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The Concept Masterplan for 725 Sunbury Road is in a designated Bushfire Prone Area, exposed to Grassland, Scrub and Woodland vegetation. Bushfire risk and associated mitigation measures associated with the study area as part of Amendment C207 have been assessed in accordance with Clause 13.05, proposed Clause 37.07 (UGZ9), the Sunbury South PSP, and the BPA minimum standards using AS 3959-2009. Where parts of the study area are subject to slopes exceeding 20 degrees, bushfire risk has been assessed using Method 2 of AS3959-2009 by Ecotide Bushfire Consultants (Ecotide 2017).

In accordance with *Practice Note* 65 (DTPLI 2014), the landscape hazard assessment identifies the broader landscape as being Landscape Type 1.

Bushfire risk is considered low due to the absence of vegetation types supporting a high fuel load (Woodland, Forest) within close proximity to the study area. As such, the landscape does not provide conditions for an extreme bushfire scenario. Although grassfires may occur over areas of steep terrain, the bushfire risk is considered to be within the parameters of the Method 2 assessment of AS3959-2009.

In light of all available information, and even using the findings of the conservative approach applied by Ecotide Pty Ltd to determine BAL ratings and separation distances associated with future development in the study area, it is my opinion that bushfire protection measures required under AS3959-2009 can be achieved across the proposed development areas detailed in the Concept Masterplan in accordance with the requirements for development in designated Bushfire Prone Areas (BPAs) of Victoria. This will result in dwellings in close proximity to slopes exceeding 20 degrees being constructed to a higher BAL rating to ensure the separation distance can be practically maintained on top of the escarpments within the required setback distances detailed in the Sunbury South PSP (VPA 2016).

Future vegetation management within the study area, particularly woody weed removal, will further reduce the fuel load, and likely alter the existing vegetation classification from Scrub to Grassland. It is therefore considered appropriate that detailed bushfire mitigation measures associated with future development are ascertained at the subdivision stage through the preparation of a Bushfire Management Plan as required under the UGZ9.

## 9 RESPONSE TO SUBMISSIONS

I have reviewed a total of 26 objections relating to Amendment C207, of which 6 raised concerns relating to bushfire issues. Table 2 responds to the relevant bushfire issues raised. It should be noted that some submissions raised multiple issues. It should be noted that CFA supports Amendment C207 in its current form.

**Table 2.** Response to C207 submissions.

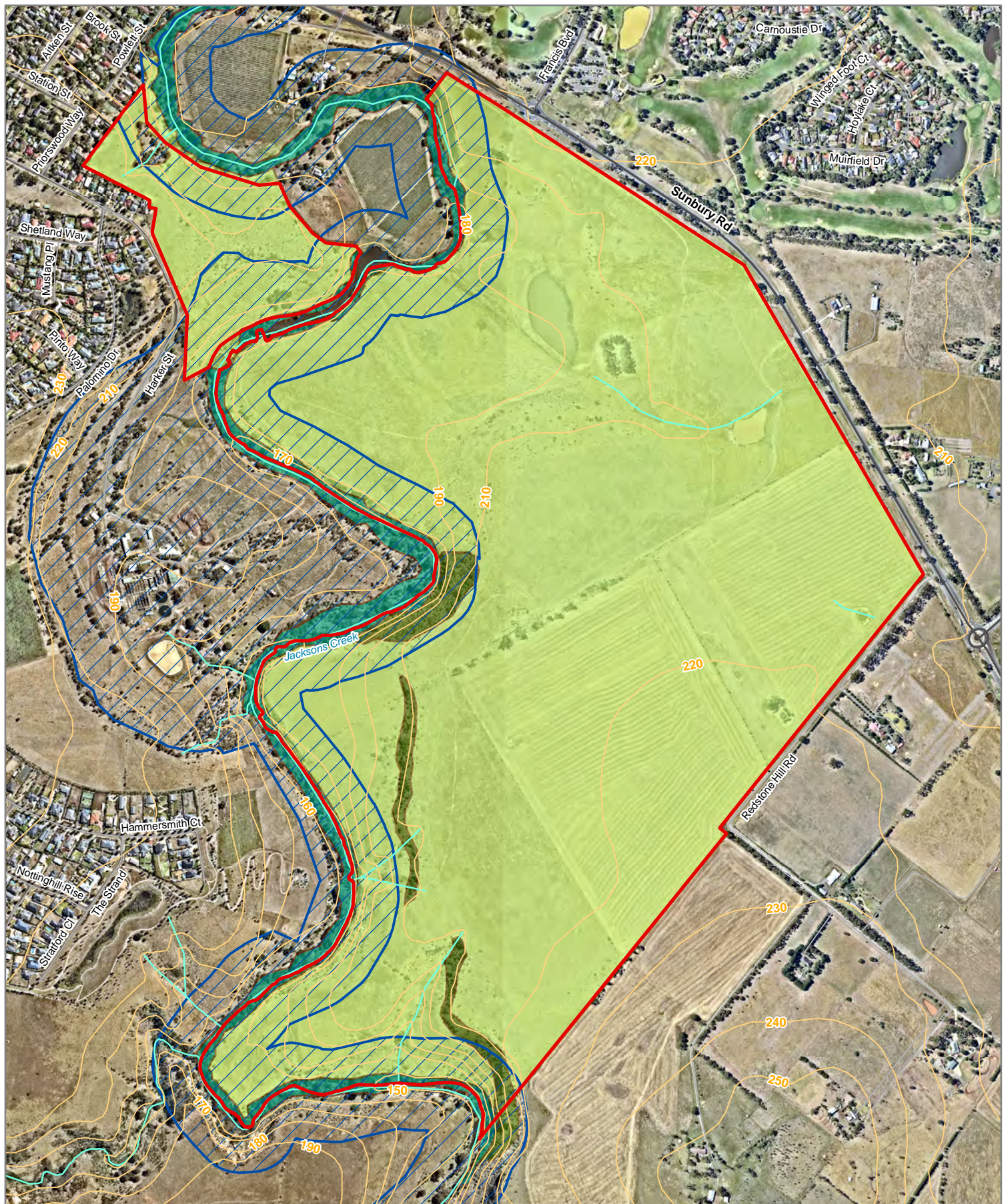
Total Number of Objections	Outline of submission relevant to biodiversity (terrestrial and aquatic flora and fauna)	Response
4	Escarpment setbacks	<ul style="list-style-type: none"> <li>The setbacks are in accordance with those detailed in the Sunbury South PSP;</li> <li>New dwellings can be constructed to an appropriate BAL rating based on the existing bushfire threat to ensure the associated separation distance can be incorporated into the designated setback area;</li> <li>Bushfire risk to existing dwellings that abut the development area is considered to be reduced due to improved emergency services access through the construction of new roads (including a perimeter road) servicing the development, which will facilitate access to the escarpment in the event of a bushfire emergency. It is noted that the land is currently inaccessible in the event of a bushfire emergency.</li> </ul>
2	Setbacks appropriate to the Bushfire Risk	<ul style="list-style-type: none"> <li>The Ecotide report (Ecotide Pty Ltd 2017) identifies appropriate BAL construction standards and setbacks that can be incorporated adjacent to escarpments;</li> <li>A Bushfire Management Plan is required to be undertaken under the UGZ9) at the subdivision stage to confirm BAL requirements for proposed dwellings;</li> <li>Ecotide Pty Ltd have identified that the potential separation distances can be accommodated within the setbacks specified within the Sunbury South PSP.</li> </ul>
2	Interface with Holden Flora Reserve	<ul style="list-style-type: none"> <li>Holden Flora Reserve is located outside of the study area on the western side of Jacksons Creek;</li> <li>Holden Flora Reserve is located further than 100 metres from proposed development within the study area, so vegetation type will not be assessed when determining bushfire implications for future development.</li> </ul>

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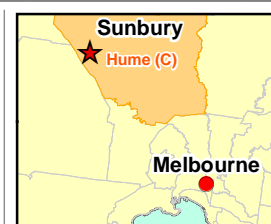




**Figure 1**  
**Study Area: 725**  
**Sunbury Road, Sunbury**  
*Expert Witness Statement*  
*for Amendment C207 to*  
*the Hume Planning*  
*Scheme*

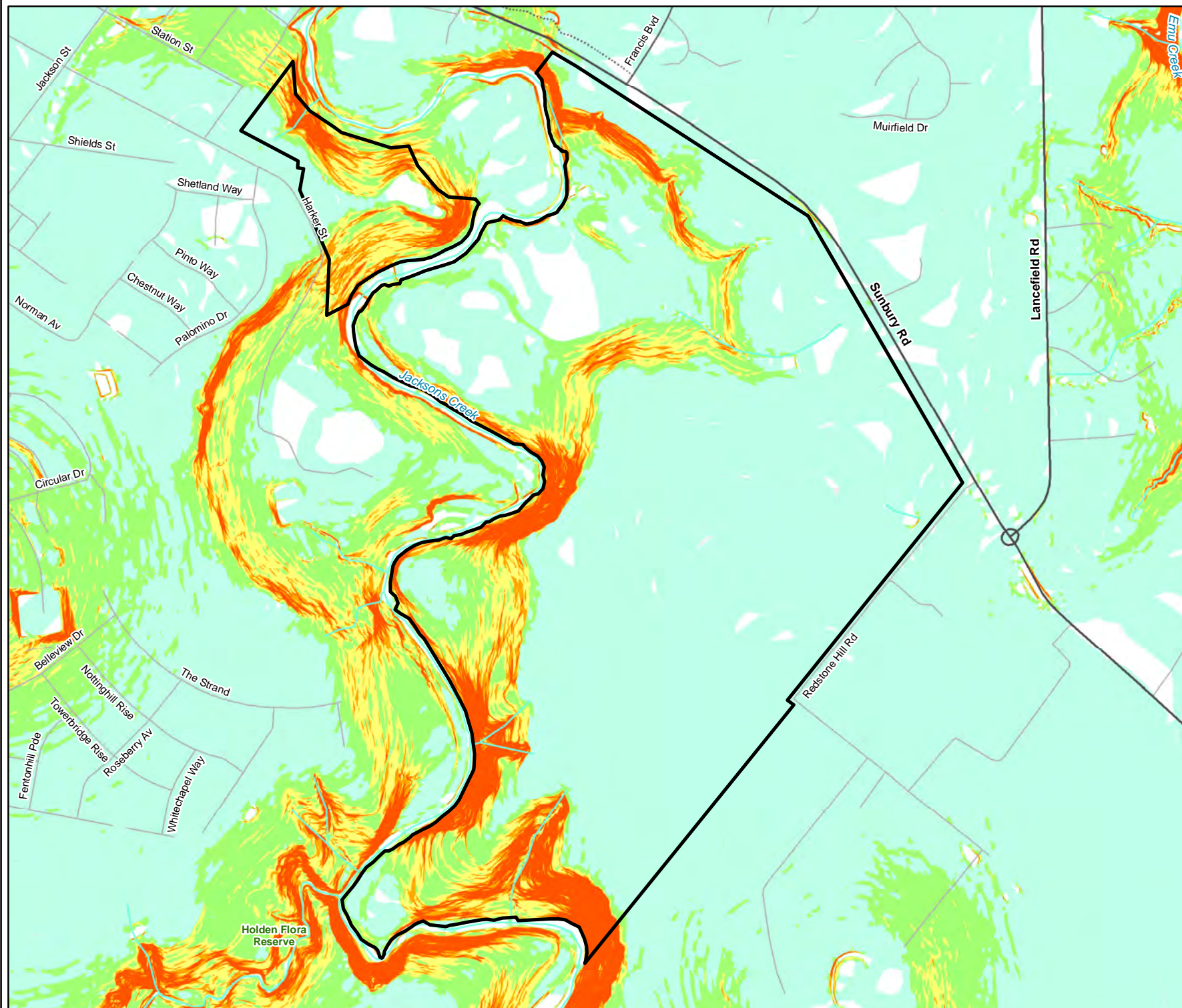
#### Legend

- Study Area
- BCS Conservation Area
- Vegetation types**
  - Grassland
  - Shrubland
  - Woodland



VicMap Data: The State of Victoria does not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that the State of Victoria shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information.





## Legend

Study Area

## Slope (degrees)

Flat

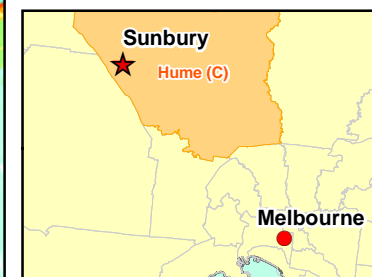
0.01 - 5

5.1 - 10

11 - 15

16 - 20

>20



**Figure 2**

## Slope Classification in the Study Area

*Expert Witness Statement for Amendments C207 to the Hume Planning Scheme*

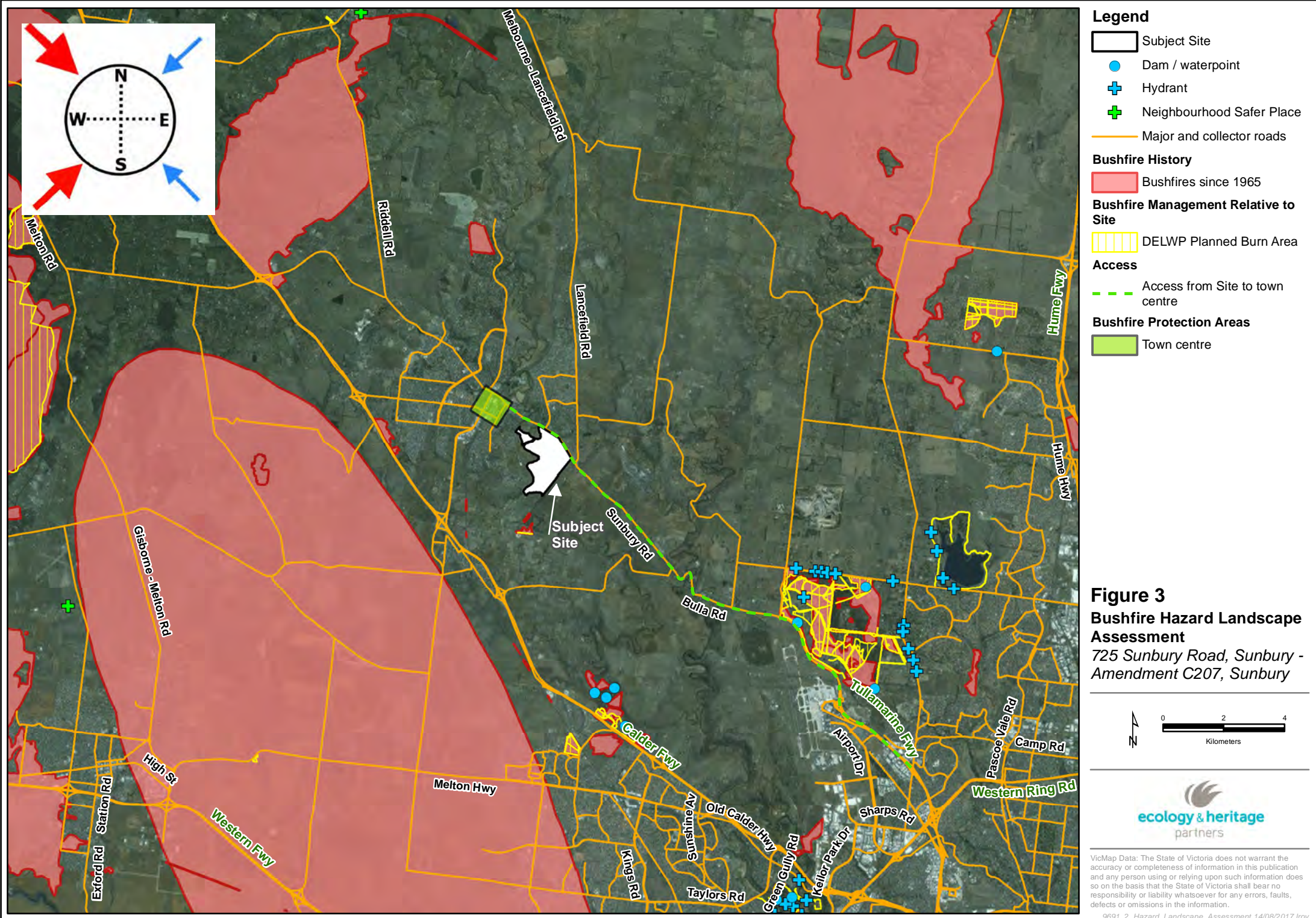


0 160 320  
Metres



VicMap Data: The State of Victoria does not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that the State of Victoria shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information.





## **Appendix 1 – Curriculum Vitae**

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## Shannon LeBel

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**Position** Senior Botanist

**Qualifications** Bachelor of Conservation Biology and Ecology (Honours), La Trobe University, 2004 • Certified Vegetation Assessment (Habitat Hectare Methodology) Practitioner • Certified EnviroDevelopment Professional (Urban Development Institute of Australia) • PIA/CFA Certified Bushfire Management Statement Assessment and Preparation

**Years' Experience** 11



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### Skills and Experience

Shannon has over 11 years' experience in the environmental field, specialising in ecological research, plant ecology and vegetation management and assessment. He has an extensive knowledge of the indigenous and exotic vegetation of south-eastern Australia, and a strong understanding of ecosystems present in these regions.

Shannon has project-managed a number of major ecological investigations including ecological studies for the EES for Stawell Gold Mine's Big Hill Project, the ecological monitoring and auditing as part of Public Transport Victoria's Caroline Springs Railway Station Development, and a major component of DELWP's Central Highlands Eden weed mapping project. Previously, he has been a lead botanist on a variety of other projects, including state-wide vegetation condition and bushfire fuel load assessments for the Victorian government, and extensive vegetation quality assessments and mapping within Melbourne's expanded growth areas. He also provides expert planning advice around the relevant State and Commonwealth environmental legislation, and appeared as an expert witness at the Victorian Civil and Administrative Tribunal.

Shannon has been a lead author and/or co-author for over 150 projects and has provided expert advice to a range of private and government clients. Some of these projects include a large number of mining and infrastructure developments in Victoria and Queensland, and long-term flora and fauna monitoring throughout the Greater Melbourne region. In addition, Shannon has completed numerous offset assessments, flora and fauna surveys, environmental weed mapping projects, unpermitted vegetation clearance assessments and audit reports for remnant vegetation condition in urban and rural areas.

Shannon has completed certified County Fire Authority and Planning Institute of Australia's Bushfire Management Statement training, and has conducted numerous Bushfire Management Statements (BMS) and Bushfire Attack Level (BAL) assessments around Victoria. In addition, he is DELWP certified for the Vegetation Quality Assessment (Habitat Hectare) method.

---

### Relevant Projects

- **Vegetation Condition and Fuel Load Assessment (DELWP), VIC 2013-2014:** Shannon was one of the lead botanists for Ecology and Heritage Partners for this project. The project aimed to undertake a Vegetation Condition Assessment and Fuel Load Assessments across Victoria by assessing routine vegetation condition and fuel loads in regions of the State that had been selected based upon environmental typology related to vegetation type, vegetation condition and fire history on both privately owned and Crown lands. The data was used to inform fire hazard mapping and assist in the design and application of prescribed burning. Shannon was responsible for collecting bushfire-related data for over 70 quadrat sites,



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including estimating fine fuel load cover in a variety of woodland and grassland ecosystems.

- Ecology and Heritage Partners Pty Ltd 2013. Bushfire Management Statement for 61 Morley Avenue, Wye River, Victoria., Unpublished Report for Urban Edge Consultants Pty. Ltd.
  - Ecology and Heritage Partners Pty Ltd 2013. Bushfire Management Statement: Construction of a single dwelling at 8 Kennedy Road, Avonsleigh, Victoria. Report prepared for ARU Designs.
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  - Ecology and Heritage Partners Pty Ltd 2014. Bushfire Management Statement for 20 Wanda Close, Portsea, Victoria., Unpublished Report for Anthea Bickford.
  - Ecology and Heritage Partners Pty Ltd 2014. Bushfire Management Statement: Proposed 35 lot residential subdivision at 160 Potts Road, Langwarrin South, Victoria, Unpublished Report for Breese Pitt Dixon Pty Ltd
  - Ecology and Heritage Partners Pty Ltd. 2013. Bushfire Management Statement: Five Lot Subdivision at 1 Robbins Road, Narbethong, Victoria, Unpublished Report for Breese Pitt Dixon Pty Ltd
  - Ecology and Heritage Partners, 2014. Bushfire Management Plan Statement for a Subdivision at 205 Humphries Road and 8 Armagh Road, Frankston South: Bushfire Management Statement, Unpublished Report for Ratio Consultants Pty Ltd.
  - Ecology and Heritage Partners, 2015. Bushfire Attack Level Assessment for 100 Verney North Road. Congupna, Victoria: Unpublished Report for Ed Ewers Architecture.
  - Ecology and Heritage Partners, 2015. Bushfire Management Plan 25 Lot Subdivision, 160 Potts Road, Langwarrin: Bushfire Management Plan, Unpublished Report for Breese Pitt Dixon Pty Ltd.
  - Ecology and Heritage Partners, 2016. Bushfire Management Plan for 40-70 Callaghan Street, Jackass Flat, Victoria: Bushfire Management Plan, Unpublished Report for Yourland Developments.
  - Ecology and Heritage Partners, 2016. Bushfire Management Statement for a Subdivision at 61 Smythe Street & 48-56 Cuthbert Street, Corinella, Victoria: Unpublished Report for Reeds Consulting (Melbourne City)
  - Ecology and Heritage Partners, 2016. Bushfire Management Plan, Stage 1 and 2, Little Green Development Tarneit North Precinct Structure Plan, Tarneit. Unpublished Report for Peet Limited (Melbourne City)
  - Ecology and Heritage Partners, 2016. Bushfire Management Plan, Stages 3 to 8, Little Green Development Tarneit North Precinct Structure Plan, Tarneit. Unpublished Report for Peet Limited (Melbourne City)
  - Ecology and Heritage Partners, 2016. Bushfire Management Plan: Stages 1-16, Newhaven Development, Tarneit. Unpublished Report for Peet Limited (Melbourne City).
  - Ecology and Heritage Partners, 2017, Bushfire Management Statement for the Construction of a single Dwelling at Lot 2, 95 West Road, Langwarrin South. Unpublished Report for MB Plastering
  - Ecology and Heritage Partners, 2017, Bushfire Management Statement: Proposed Ecotourism Development (interpretive nature trail/walking track), Apollo Bay, Victoria. Unpublished report prepared for Tract Consultants Pty Ltd.
-

## **ATTACHMENT 1. ECOTIDE PTY LTD 2017.**

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## Method 2 Bushfire Attack Level (BAL) Report

Sunbury South PSP

14 August 2017



## Bushfire Attack Level (BAL) Report

Sunbury South PSP

**Date of Inspection:** 10/08/2017

### Prepared For:

**Company:** Ecology & Heritage Partners

**Contact:** Shannon LeBel

**Phone:** 5221 8122

**Email:** slebel@ehpartners.com.au

### Ecotide Pty Ltd

ACN 112761850

3 Hobson Street Newport

Victoria 3015, Australia

M: 0438 506 476

nsymons@ecotide.com.au

[www.ecotide.com.au](http://www.ecotide.com.au)

## Table of Contents

Introduction.....	4
Objective of the Report .....	4
General Terms of Engagement for Bushfire Property Assessment.....	4
Locality, Site and Property Description .....	5
Proposal.....	5
Category of Bushfire Attack Estimation for AS3959-2009 .....	6
Relevant Fire Danger Index .....	6
Vegetation Classification .....	6
Effective Slope .....	6
Summary of Bushfire Assessment Parameters .....	8
Method 2 Analyses .....	12
Method 2 – Analysis 1 (Harker Development) .....	12
Method 2 – Analysis 2 (Sunbury Hill Development).....	12
Method 2 – Analysis 3 (Hillside Precinct) .....	13
Summary of BALs and Setbacks.....	14
Conclusion .....	18
References .....	18
Appendix 1 – Method 2 Calculations Results .....	19
Method 2 – Analysis 1 (Harker Development) .....	19
Method 2 – Analysis 2 (Sunbury Hill Development).....	19
Method 2 – Analysis 3 (Hillside Precinct) .....	20
Appendix 2 – Consultant Bio .....	21



## Introduction

### Objective of the Report

Provide a Bushfire Attack Level (BAL) rating (Method 2) for the client according to the performance requirements of the Building Code of Australia (BCA).

## General Terms of Engagement for Bushfire Property Assessment

The general terms of engagement and conditions set out below apply to all work undertaken by Ecotide Pty Ltd in the general field of bushfire property assessments.

### Role of Ecotide Pty Ltd

ECOTIDE PTY LTD will:

- Act in all professional matters as a faithful advisor to its clients.
- Exercise all reasonable skill and care in the provision of its professional services and shall abide by the codes of ethics or practice specified by the Environment Institute of Australian and New Zealand and other relevant professional bodies.
- Provide its services to clients effectively within the limitations imposed by the scope of work and budgets allocated by its clients.

### Role of the Client

A client shall make available to ECOTIDE PTY LTD, as soon as practical after a commission has been awarded, all information, documents, maps and other particulars relevant to the subject commission.

A client shall cooperate with ECOTIDE PTY LTD in all reasonable ways regarding in the conduct of a commission being undertaken on its behalf.

### Bushfire Property Assessment Reports

ECOTIDE PTY LTD shall retain ownership of the reports, drawings, designs, displays and other work produced by ECOTIDE PTY LTD during the course of fulfilling a commission until final payment by the client.

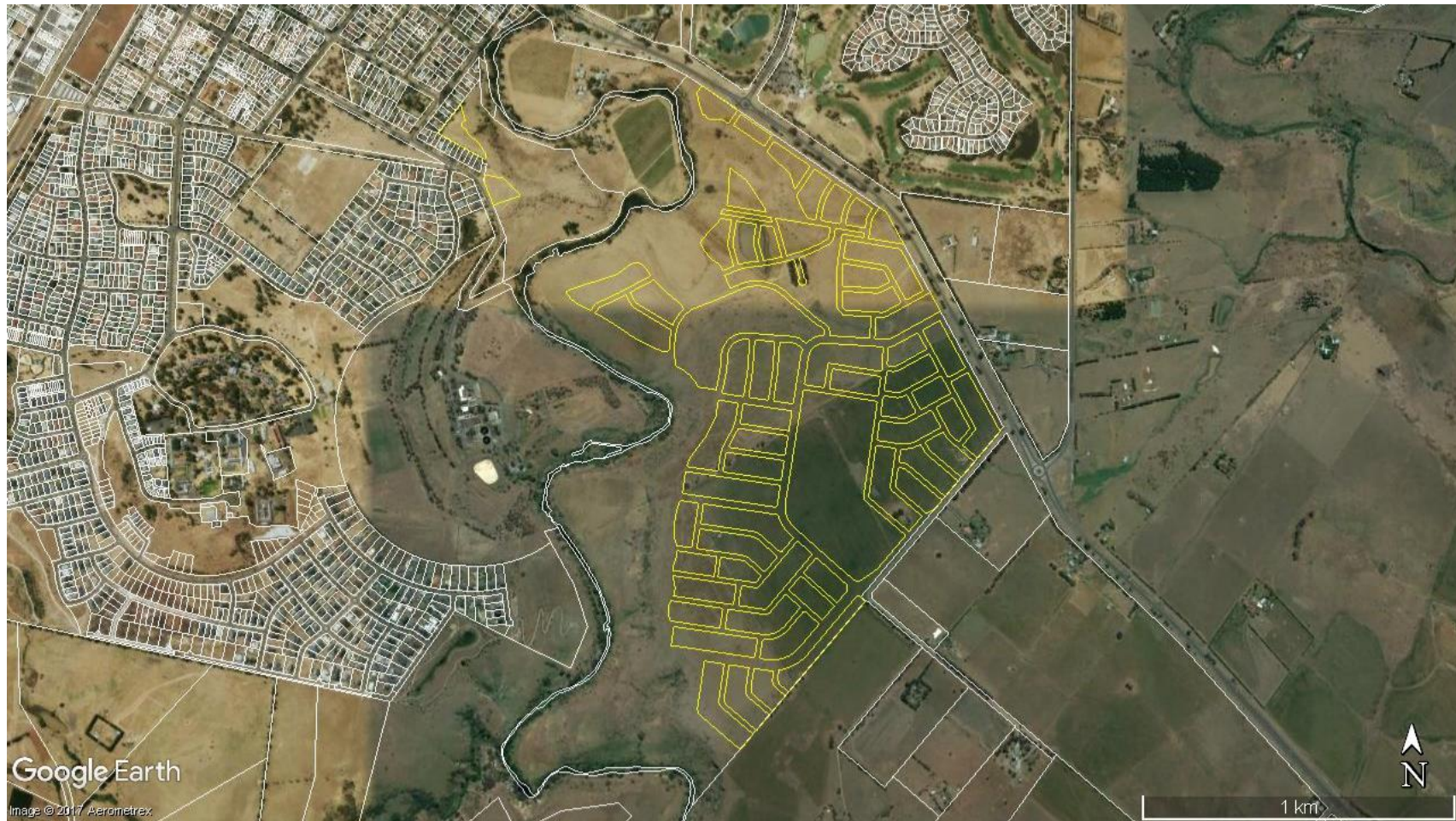
### When the client pays for the services the client has read and FULLY understands:

- That managing the bushfire risk is a complex set of interrelated activities and environmental parameters and that the risk cannot be fully mitigated to their personal safety, family and assets.
- That even a well-planned, carefully constructed home with management of the surrounding vegetation can be vulnerable to bushfire.
- That survival in a bushfire is critically dependent on a combination of preparedness (competency) and activation of effective survival strategies and plans (capacity) of residents.
- That dwelling occupants should always develop a written bushfire survival plan.
- That the concepts and the contents of the report become their responsibility to implement.
- That the company (Ecotide Pty Ltd) is exempt from any liability now and into the future for any loss whatsoever resulting from the impacts of bushfire.

## Locality, Site and Property Description

### Proposal

The proposal is for the rezoning of land in the south-east of Sunbury for the purposes of residential development. Figure 1 provides an illustration of a potential development design for the land.



**Figure 1.** Potential residential development of the site, with residential areas outlined in yellow (Google Inc., 2017).

## Category of Bushfire Attack Estimation for AS3959-2009

A site inspection was undertaken on the 10<sup>th</sup> of August 2017, using the AS3959 (2009) assessment methodology to determine the potential bushfire risk for the proposed development. Areas on and surrounding the site were inspected to identify the classifiable vegetation that may pose a significant bushfire risk. Bushfire parameters were assessed at sampling points of high risk, classifiable vegetation. Using these bushfire parameters, a corresponding table of setback distances and Bushfire Attack Levels (BAL) was determined for development in the area.

### Relevant Fire Danger Index

In accordance with the Australian Standard (AS3959) and the Australasian Fire and Emergency Service Authorities Council (AFAC), the general Fire Danger Index for Victoria is fixed at 100. This FDI has been used within all the analyses conducted for the site.

### Vegetation Classification

The vegetation over the site is predominantly grassland, with Needle Grass and Serrated Tussock grass typically below 1 m in height. Shrubs are spread across the landscape, usually with coverage below 10%. A higher density of shrubs, including boxthorn and acacia, occur along sections of the escarpment and the river front, which varies in coverage between 10-50%, and is usually between 2-5 m in height. These areas have been classified as Scrub vegetation for the purposes of the Method 2 analyses to ensure a conservative assessment is made in regard to the potential fuel loads.

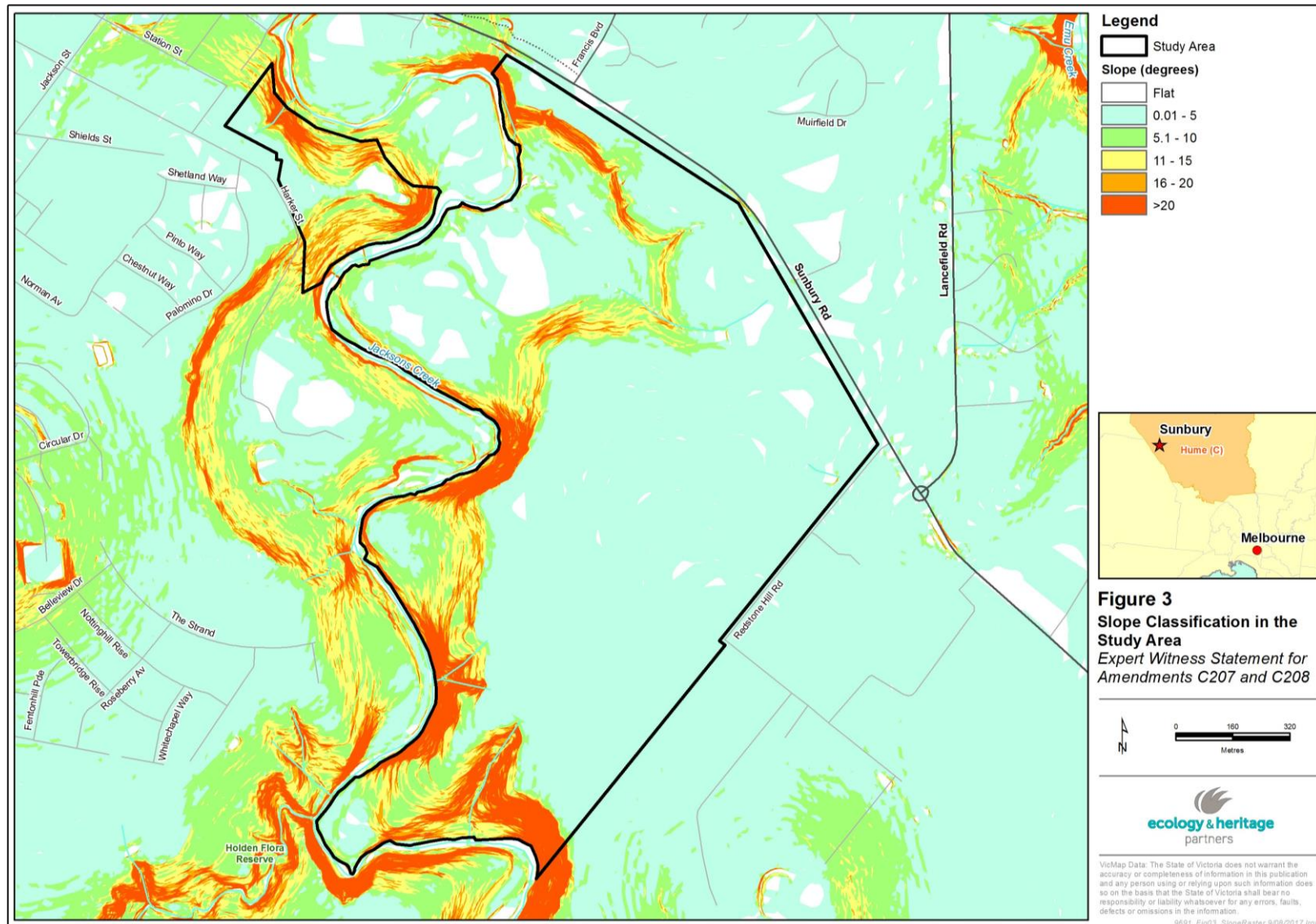
Vegetation around the Hillside Precinct within the Sunbury Hills development predominantly consists of grassland, with sparse coverage of low shrubs (under 1.5 m in height). The coverage of shrubs in this area is generally below 10%, which corresponds to Grassland, however, for the purposes of a conservative assessment the area has been assessed as Shrubland within the Method 2 analysis.

Riparian Woodland vegetation stretches along the banks of Jacksons Creek, which forms the western boundary of the Sunbury Hills site. This vegetation is generally more than 100 m from the proposed development areas, which means it is outside the area of assessment.

### Effective Slope

The effective slope over the land is estimated in Figure 2, while an on-ground estimation was made during the site inspection for the analysis of the identified high-risk areas. Slopes in some sections of the escarpment were recorded to exceed downslope 20°, necessitating a Method 2 analysis of the bushfire threat. Limited areas of the escarpment feature rocky outcrops that exceed downslope 30° in slope, although these sections are not significantly vegetated. The underlying slope for these sections has been assessed as a downslope of 30°, which is the maximum slope for calculating setbacks for a BAL rating in accordance with AS3959.





**Figure 2.** Estimated effective slope over the site (Ecology & Heritage Partners).



### Summary of Bushfire Assessment Parameters

A summary of the bushfire assessment parameters around the identified high-risk development areas is presented below in Figures 3-6. These parameters were used to perform the BAL rating for potential development in these areas, based on a Method 1 or Method 2 analysis in accordance with AS3959.



**Figure 3.** Summary of bushfire assessment parameters around Harker development area (Google Inc., 2017).





**Figure 4.** Summary of bushfire assessment parameters around northern section of Sunbury Hill development area (Google Inc., 2017).





**Figure 5.** Summary of bushfire assessment parameters around central section of Sunbury Hill development area (Google Inc., 2017).





**Figure 6.** Summary of bushfire assessment parameters around southern section of Sunbury Hill development area (Google Inc., 2017).

## Method 2 Analyses

The Method 2 analyses have been applied to high-risk areas where the effective slope under the vegetation is estimated to be greater than 20°, which is outside of the scope of the simplified Method 1 procedure of AS3959. The Method 2 analyses were made using a calculator that is the product of CSIRO research. The inputs to these calculations come from a combination of the values defined in the Australian Standard (AS3959) and the parameters measured on the site at the time of inspection.

Three Method 2 analyses were conducted for the site, one for the Harker development area, one along the creek of the Sunbury Hill development, and one associated with the Hillside Precinct. All of these analyses were made using a conservative estimate of the fuel within the vegetated areas, representing a worst-case scenario. There is the potential for vegetation management, such as the removal of boxthorn, to significantly reduce the fuel (both in fuel load and height) in these areas and thereby reduce the required setbacks and BAL ratings.

### Method 2 – Analysis 1 (Harker Development)

The Method 2 analysis of the Harker Development (see Figure 3 for applicable area) utilises the slope estimates made at the time of inspection, which were a downslope of 23° under the vegetation and a downslope of 10° to the edge of the vegetation. The outcomes of the Method 2 calculation with the BAL ratings and setbacks is presented below in Table 2. The standard values used in this calculation were:

**Table 1.** Standard inputs used in Method 2 calculation for Analysis 1.

<b>Vegetation Class</b>	Scrub	<b>Flame Width (m)</b>	100
<b>Overall Fuel Load (t/ha)</b>	25	<b>Flame Temperature (K)</b>	1090
<b>Vegetation Height (m)</b>	5	<b>Flame Emissivity</b>	0.95
<b>Wind Speed (km/h)</b>	45	<b>Ambient Temperature (K)</b>	308
<b>FDI</b>	100	<b>Relative Humidity</b>	25%

**Table 2.** Summary of Method 2 analysis results for Harker Development.

<b>Setback Distance</b>	24 - <31 m	31 - <43 m	43 - <56 m	≥56 m
<b>Radiant Heat Flux</b>	39.7 kW/m <sup>2</sup>	28.9 kW/m <sup>2</sup>	18.4 kW/m <sup>2</sup>	12.3 kW/m <sup>2</sup>
<b>BAL Rating</b>	BAL 40	BAL 29	BAL 19	BAL 12.5

### Method 2 – Analysis 2 (Sunbury Hill Development)

The analysis of the Sunbury Hill Development is based on the maximum slope possible for a Method 2 calculation, downslope 30°, for the identified high-risk areas (Figures 4-6). Limited sections of the escarpment are estimated to exceed this slope level, although these areas consist of rocky outcroppings that are not classifiable. The results of the analysis are presented below in Table 4. The standard values used in this calculation were:

**Table 3.** Standard inputs used in Method 2 calculation for Analysis 2.

<b>Vegetation Class</b>	Scrub	<b>Flame Width (m)</b>	100
<b>Overall Fuel Load (t/ha)</b>	25	<b>Flame Temperature (K)</b>	1090
<b>Vegetation Height (m)</b>	5	<b>Flame Emissivity</b>	0.95
<b>Wind Speed (km/h)</b>	45	<b>Ambient Temperature (K)</b>	308
<b>FDI</b>	100	<b>Relative Humidity</b>	25%

**Table 4.** Summary of Method 2 analysis results for Sunbury Hill Development.

<b>Setback Distance</b>	30 - <38 m	38 - <50 m	50 - <65 m	≥65 m
<b>Radiant Heat Flux</b>	38.8 kW/m <sup>2</sup>	28.4 kW/m <sup>2</sup>	19.0 kW/m <sup>2</sup>	12.4 kW/m <sup>2</sup>
<b>BAL Rating</b>	BAL 40	BAL 29	BAL 19	BAL 12.5

### Method 2 – Analysis 3 (Hillside Precinct)

The analysis of the Hillside Precinct is based on the maximum slope possible for a Method 2 calculation, downslope 30°, for the area identified in Figure 5. Some sections of the slope may exceed the 30° slope maximum, however, these areas are limited and consist of rocky outcroppings. The vegetation, while consistent with Grassland, has been classified as Shrubland within the Method 2 calculation in order to provide a conservative assessment of a worst-case scenario. The results of the analysis are presented below in Table 2. The standard values used in this calculation were:

**Table 5.** Standard inputs used in Method 2 calculation for Hillside Precinct.

<b>Vegetation Class</b>	Shrubland	<b>Flame Width (m)</b>	100
<b>Overall Fuel Load (t/ha)</b>	15	<b>Flame Temperature (K)</b>	1090
<b>Vegetation Height (m)</b>	1.5	<b>Flame Emissivity</b>	0.95
<b>Wind Speed (km/h)</b>	45	<b>Ambient Temperature (K)</b>	308
<b>FDI</b>	100	<b>Relative Humidity</b>	25%

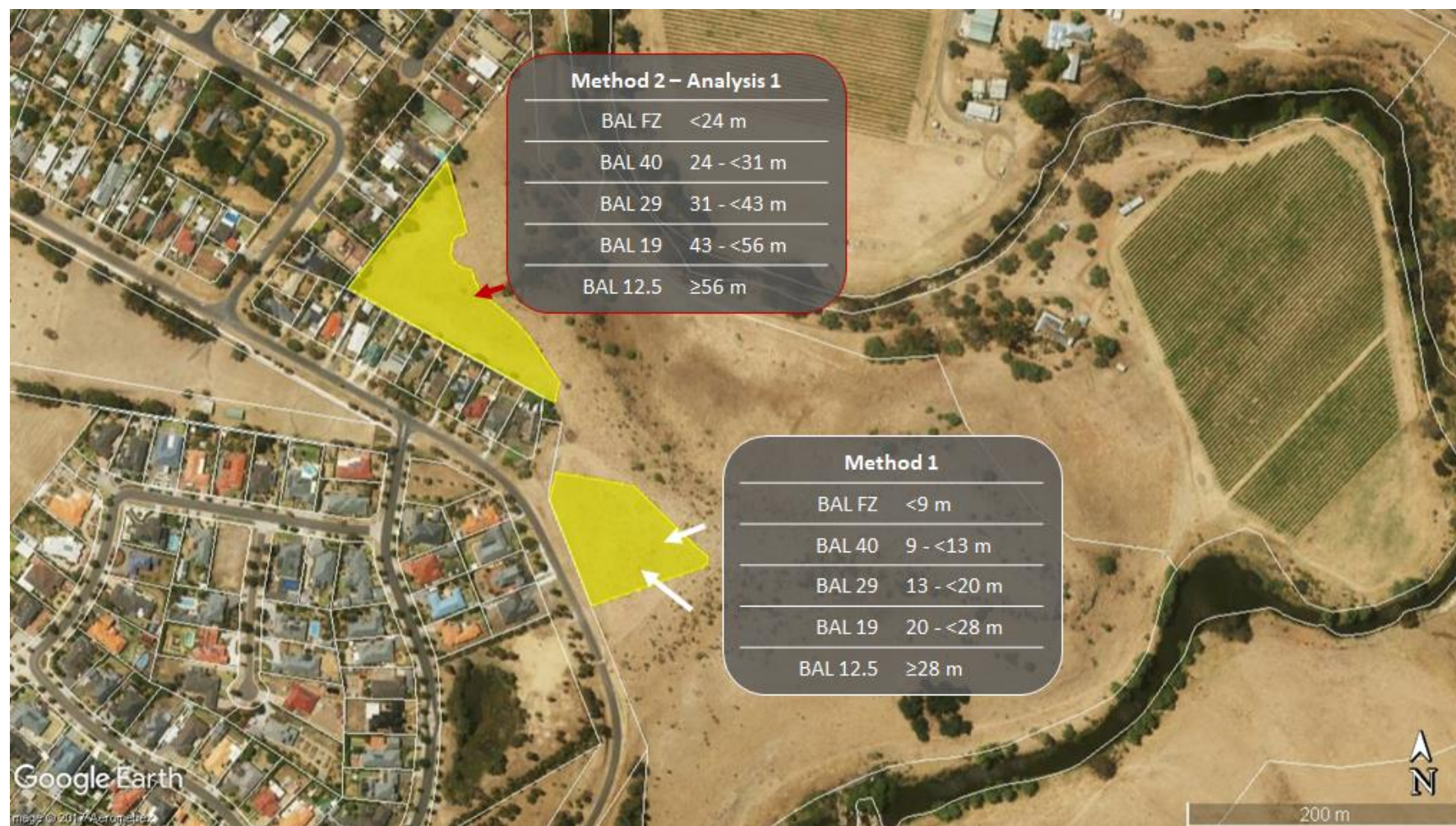
**Table 6.** Summary of Method 2 analysis results for Sunbury Hill Development.

<b>Setback Distance</b>	18 - <24 m	24 - <33 m	33 - <45 m	≥45 m
<b>Radiant Heat Flux</b>	39.5 kW/m <sup>2</sup>	28.2 kW/m <sup>2</sup>	18.8 kW/m <sup>2</sup>	12.2 kW/m <sup>2</sup>
<b>BAL Rating</b>	BAL 40	BAL 29	BAL 19	BAL 12.5



## Summary of BALs and Setbacks

A summary of the Method 1 and Method 2 analyses of the high-risk areas are presented in Figures 7-10. Future development in these areas would need to have a managed setback of the appropriate distance from the vegetation to achieve the corresponding BAL rating for the dwelling.



**Figure 7.** Summary of BAL setbacks for Harker development area (Google Inc., 2017).





**Figure 8.** Summary of BAL setbacks for northern section of Sunbury Hill development area (Google Inc., 2017).





**Figure 9.** Summary of BAL setbacks for central section of Sunbury Hill development area (Google Inc., 2017).



**Figure 10.** Summary of BAL setbacks for northern section of Sunbury Hill development area (Google Inc., 2017).



## Conclusion

The design of a future development on the site has the potential to respond to the bushfire risk in the area. Appropriate setbacks could be incorporated into the design and created lots to reduce the bushfire risk to an acceptable level.

The analyses presented in this report identify the appropriate setbacks and their corresponding BAL ratings for multiple high-risk areas over the potential development site. The Method 2 analyses presented in this report are conservative calculations made using relatively higher fuel loads than those observed during the site inspection. Areas not assessed within this report are expected to be able to comply with maintaining appropriate setbacks from vegetation based on the standard Method 1 assessment of AS3959.

The removal and management of weedy shrub species within classified areas of vegetation could reduce fuel loads and alter the assessment presented in this report. Such works may significantly reduce the potential bushfire threat, and the subsequent setback distances and corresponding BAL ratings. If these works were undertaken, a new assessment of these areas may be required.

Based on the analysis presented in this report, there are no impediments to an appropriate development design facilitating compliance with the requirements for Bushfire Prone Areas. It is expected that a development specific analysis would be conducted to determine setbacks and building envelope placements once there is a finalised development design.

## References

- ABCB (2016) National Construction Code - Vol. 2 - Building Code of Australia - Class 1 and Class 10 Buildings
- CFA. (2011). *Landscaping for Bushfire*. Victoria.
- Google Inc. (2017). Google Earth Pro. 7.1.2.2041.
- Standards Australia. (2009). *AS3959 - Construction of buildings in bushfire-prone areas*.
- VBR (2006) Victorian Building Regulations.

## Appendix 1 – Method 2 Calculations Results

### Method 2 – Analysis 1 (Harker Development)

Setback Distance	24 m	31 m	43 m	56 m
Rate of Spread	5.5 km/h	5.5 km/h	5.5 km/h	5.5 km/h
Slope ROS	26.8 km/h	26.8 km/h	26.8 km/h	26.8 km/h
Flame Length	27.4 m	27.4 m	27.4 m	27.4 m
Flame Angle	45	52	58	61
View Factor	0.62	0.46	0.31	0.21
Elevation of Receiver	13.9 m	16.3 m	19.2 m	21.8 m
Path Length	14.3 m	22.6 m	35.7 m	49.4 m
Transmissivity	0.85	0.82	0.79	0.77
Radiant Heat Flux	39.7 kW/m <sup>2</sup>	28.9 kW/m <sup>2</sup>	18.4 kW/m <sup>2</sup>	12.3 kW/m <sup>2</sup>
BAL Rating	BAL 40	BAL 29	BAL 19	BAL 12.5

### Method 2 – Analysis 2 (Sunbury Hill Development)

Setback Distance	30 m	38 m	50 m	65 m
Rate of Spread	5.5 km/h	5.5 km/h	5.5 km/h	5.5 km/h
Slope ROS	43.5 km/h	43.5 km/h	43.5 km/h	43.5 km/h
Flame Length	34.2 m	34.2 m	34.2 m	34.2 m
Flame Angle	44	50	55	59
View Factor	0.61	0.46	0.32	0.21
Elevation of Receiver	17.2 m	19.8 m	22.8 m	26.1 m
Path Length	17.7 m	27.0 m	40.2 m	56.2 m
Transmissivity	0.84	0.81	0.78	0.76
Radiant Heat Flux	38.8 kW/m <sup>2</sup>	28.4 kW/m <sup>2</sup>	19.0 kW/m <sup>2</sup>	12.4 kW/m <sup>2</sup>
BAL Rating	BAL 40	BAL 29	BAL 19	BAL 12.5

**Method 2 – Analysis 3 (Hillside Precinct)**

<b>Setback Distance</b>	<b>18 m</b>	<b>24 m</b>	<b>33 m</b>	<b>45 m</b>
<b>Rate of Spread</b>	2.9 km/h	2.9 km/h	2.9 km/h	2.9 km/h
<b>Slope ROS</b>	22.7 km/h	22.7 km/h	22.7 km/h	22.7 km/h
<b>Flame Length</b>	20.1 m	20.1 m	20.1 m	20.1 m
<b>Flame Angle</b>	46	54	60	64
<b>View Factor</b>	0.60	0.44	0.31	0.21
<b>Elevation of Receiver</b>	10.4 m	12.3 m	14.5 m	16.9 m
<b>Path Length</b>	11.0 m	18.1 m	28.0 m	40.6 m
<b>Transmissivity</b>	0.86	0.84	0.81	0.78
<b>Radiant Heat Flux</b>	39.5 kW/m <sup>2</sup>	28.2 kW/m <sup>2</sup>	18.8 kW/m <sup>2</sup>	12.2 kW/m <sup>2</sup>
<b>BAL Rating</b>	BAL 40	BAL 29	BAL 19	BAL 12.5

## Appendix 2 – Consultant Bio

**Name:** Nicholas Symons  
**Position:** General Manager  
**Company:** Ecotide Pty. Ltd.  
**ACN:** 112761850  
**Address:** 3 Hobson Street, Newport. Victoria. 3015  
**Telephone:** M: 0438 506 476  
**Email:** nsymons@ecotide.com.au

### Bio

Nicholas is the General Manager and Principal Consultant of Ecotide, and has 8 years of experience in bushfire risk assessment and emergency management planning. Initially trained by Ecotide owner Paul Barnard, Nicholas has completed numerous bushfire planning assessments, such as Bushfire Attack Level (BAL) assessments and Bushfire Management Overlay (BMO) reports, including Method 2 analyses. He has worked across the state of Victoria providing bushfire protection advice for a variety of developments, including residential, commercial, education facilities, accommodation, and aged care facilities. Nicholas also has experience with strategic bushfire management planning, having prepared bushfire management plans for council reserves and provided bushfire risk assessments of vulnerable townships.

### Role

Ecotide: General Manager – 2015 - Present  
Senior Consultant – 2013 – 2015  
Consultant – 2009 – 2013

As the General Manager and Principal Consultant of Ecotide, I am responsible for all of the company's bushfire assessment and risk management services. I have led a number of bushfire risk assessments and emergency management planning projects, working closely with emergency services and relevant authorities.

#### Duties:

- Bushfire planning assessments (Bushfire Attack Level and BMO assessments).
- Strategic bushfire management planning.
- Emergency and risk management.
- Liaison with authorities and stakeholders.
- Project management.
- Client management and conflict resolution.

### Project Experience

#### Preparation of Windfarm Emergency Response Plan (2017)

This project resulted in an Emergency Response Plan for a proposed windfarm to the west of Melbourne. The risks to the proposal, including grassfire and bushfire, were analysed and treated within a plan that included a complete risk assessment, risk mitigation strategies and response procedures. The plan was developed in consultation with members of the Municipal Emergency Management Planning Committee.



### **Festival Bushfire Emergency Management Plan (2016)**

The creation of this Emergency Management Plan involved a detailed bushfire risk assessment process, resulting in the construction of specific mitigation measures for the festival site. The bushfire risk assessment analysed likely bushfire scenarios and determined appropriate vegetation management, equipment and on-site responses.

### **Water Authority Asset Bushfire Risk Review (2016)**

Acting as project manager and principal consulted, I completed a desktop bushfire risk analysis and on-ground assessment of a sample of assets, which resulted in a prioritised list of at-risk assets and recommendations for bushfire risk mitigation. The bushfire risk assessment followed the methodology of AS3959, with reference to the standards of the Bushfire Management Overlay (BMO), resulting in a Bushfire Attack Level (BAL) rating, and other appropriate protection measures.

### **Frankston Reserves Bushfire Management Review (2015)**

In the role of project manager, I completed a works and compliance review of bushfire mitigation strategies within Frankston City Council reserves. I undertook a bushfire risk analysis and fuel hazard assessment of the reserves in accordance with Victorian standards. The outcomes of the project were an evaluation of the suitability of the mitigation strategies, and a compliance review of the on-ground works in the reserves.

### **Macedon Townships Strategic Planning Review (2013)**

The townships of Macedon and Mount Macedon were the subjects of this project, in which I acted as lead bushfire consultant to assess the potential bushfire risk to the townships. The bushfire risk assessment was undertaken using AS3959 techniques, in accordance with the provisions of the BMO. I provided advice to Council on the bushfire risk to the townships, and recommended strategies for bushfire risk reduction.

### **Qualifications**

Bachelor of Environmental Science (B.Env.Sc.) First Class Honours (2009) – Monash University.

SAI Global – Integrated Governance, Risk Management & Compliance (2016).