

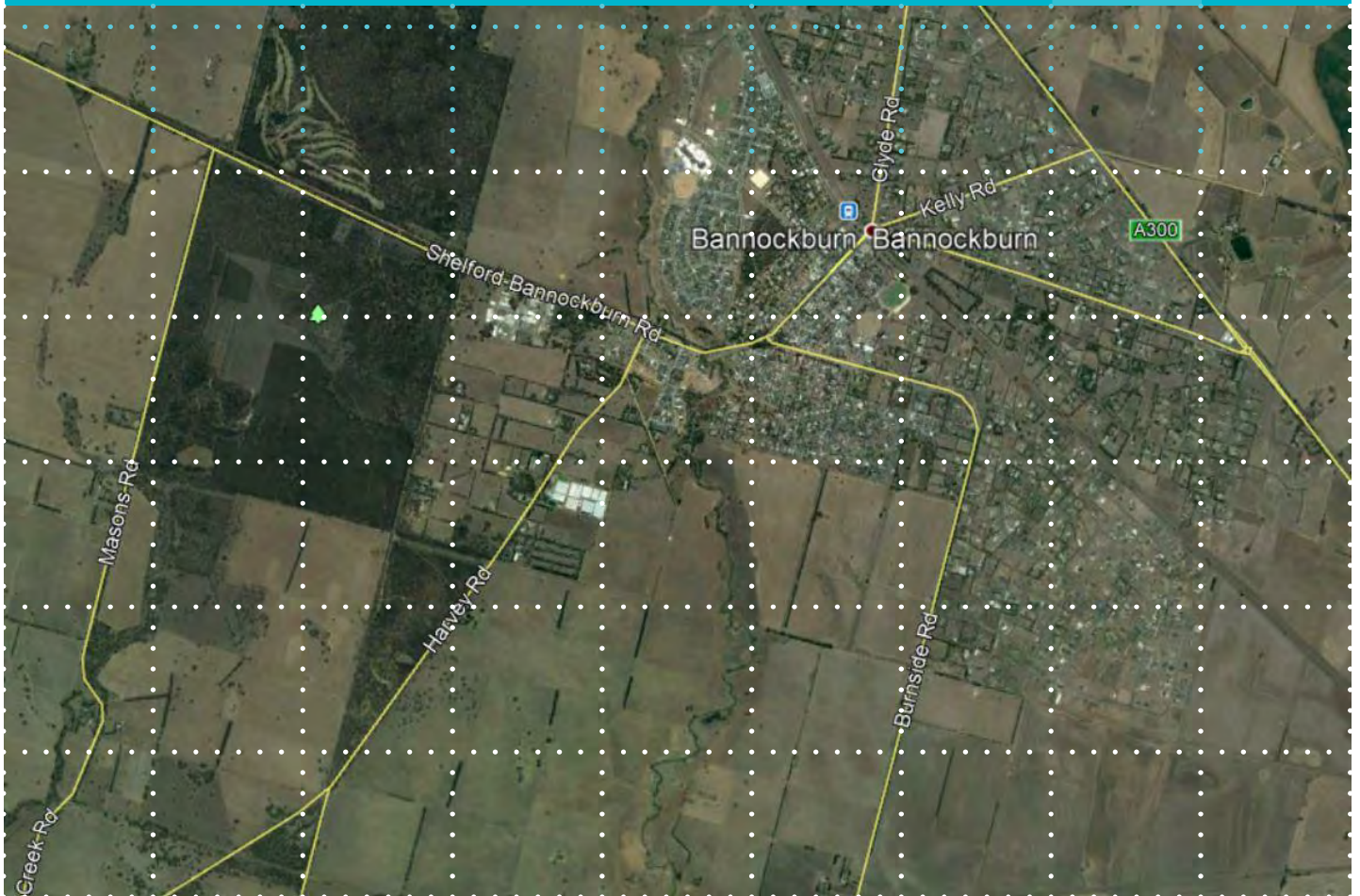
Final Report

# Strategic Bushfire Risk Assessment for the Bannockburn Growth Plan Investigation Area

Prepared for

Golden Plains Shire Council

August 2020



Ecology and Heritage Partners Pty Ltd

## DOCUMENT CONTROL

|                        |  |
|------------------------|--|
| <b>Assessment</b>      | Strategic Bushfire Risk Assessment                                   |
| <b>Address</b>         | Bannockburn Growth Plan Investigation Area                           |
| <b>Project number</b>  | 13530  |
| <b>Project manager</b> | Sally Burgemeestre (Bushfire Consultant)                             |
| <b>Report reviewer</b> | Cat Stephenson (Senior Bushfire Consultant/Botanist)                 |
| <b>Mapping</b>         | Louisa Roy (GIS Officer)   |
| <b>File name</b>       | EHP_13530_BRA_BannockburnStructurePlan_GoldenPlains_Final_2020-08-03 |
| <b>Client</b>          | Golden Plains Shire Council  |
| <b>Bioregion</b>       | Victorian Volcanic Plain   |
| <b>CMA</b>             | Corangamite  |
| <b>Council</b>         | Golden Plains Shire  |

| Report versions        | Comments   | Completed                          | Date submitted |
|------------------------|--|------------------------------------|----------------|
| <b>Draft</b>           | Report sent to client for review   |                                    | 03/04/2020     |
| <b>Draft Version 2</b> | Feedback received from VPA (1 set) and Golden Plains Shire (2 sets) and incorporated into the document. Amendments and clarifications also made. Report sent to client for dispersal to VPA for a final review before being sent to CFA for comment. | Sally Burgemeestre                 | 30/04/2020     |
| <b>Draft Version 3</b> | The inclusion of alternative area site assessments, addressing the CFA comments on Draft Version 2 and the inclusion of further VPA comments.  | Sally Burgemeestre; Cat Stephenson | 27/07/2020     |
| <b>Final</b>           | Small Amendments in section 4.3.6  | Sally Burgemeestre                 | 03/08/2020     |

**Cover photo from Google Earth Version 7.3 April 2020**

### **Copyright © Ecology and Heritage Partners Pty Ltd**

This document is subject to copyright and may only be used for the purposes for which it was commissioned. The use or copying of this document in whole or part without the permission of Ecology and Heritage Partners Pty Ltd is an infringement of copyright.

### **Disclaimer**

Although Ecology and Heritage Partners Pty Ltd have taken all the necessary steps to ensure that an accurate document has been prepared, the company accepts no liability for any damages or loss incurred as a result of reliance placed upon the report and its contents.

# CONTENTS

---

|   |           |
|---|-----------|
| <b>SUMMARY.....</b>   | <b>4</b>  |
| <b>1 INTRODUCTION .....</b>   | <b>5</b>  |
| <b>2 BUSHFIRE LEGISLATION CONSIDERATIONS .....</b>  | <b>7</b>  |
| 2.1 Clause 13.02-1S Bushfire.....   | 7         |
| 2.2 Bushfire Prone Area, Clause 44.06 Bushfire Management Overlay and Clause 53.02 Planning for Bushfire..... | 7         |
| <b>3 BUSHFIRE HAZARD ASSESSMENT .....</b>   | <b>8</b>  |
| 3.1 Bushfire Hazard Landscape, Local and Neighbourhood Assessment .....                                       | 8         |
| 3.2 Bushfire Hazard Vegetation Classifications .....  | 12        |
| <b>4 RESPONSE TO CLAUSE 13.02-1S BUSHFIRE.....</b>  | <b>15</b> |
| 4.1 Protection of human life.....   | 15        |
| 4.2 Bushfire hazard and identification assessment strategies .....  | 18        |
| 4.3 Settlement planning strategies .....  | 20        |
| 4.4 Areas of high Biodiversity Conservation Strategy.....   | 24        |
| 4.5 Use and development control in a Bushfire Prone Area .....  | 25        |
| <b>5 MANAGING THE FIRE RISK WITHIN THE STUDY AREA .....</b>   | <b>27</b> |
| 5.1 Vegetation Management.....  | 27        |
| 5.2 Water supply and Access .....   | 28        |
| <b>6 CONCLUSION .....</b>   | <b>30</b> |
| <b>7 REFERENCES.....</b>  | <b>31</b> |
| <b>8 ATTACHMENTS .....</b>  | <b>32</b> |

## SUMMARY

---

The Bannockburn Growth Plan Investigation Area meets the objective and strategies of Clause 13.02-1S Bushfire. The bushfire risk at both the site and broader scale (landscape, local and neighbourhood scales as specified above under the Bushfire hazard identification and assessment strategy of Clause 13.02-1S) are low and any residential development within the study area can implement bushfire mitigation measures that comply with Clause 13.02-1S, namely that any dwellings constructed within the Bannockburn Growth Plan Investigation Area can achieve a construction standard of Bushfire Attack Level (BAL)-12.5.

These statements are based on the detailed bushfire hazard assessment provided in Section 3 of this report. Sections 3 to 5 address all dot points listed above. The following summary table shows the most relevant points of the five key strategies of Clause 13.02-1S and a brief assessment of how each point has been addressed in the following Bushfire Risk Assessment.

## 1 INTRODUCTION

---

Golden Plains Shire is located approximately 70 kilometres south west of Melbourne between two of Victoria's largest regional cities, Ballarat and Geelong. With sufficient land being set aside for the moderate growth forecast across the Shire, no significant new areas of land need to be provided for residential development, except in Bannockburn where rezoning continues to be required to accommodate expected future growth.

Bannockburn is the largest town in Golden Plains Shire and supports the southern network of townships providing residential, commercial and administrative functions. The town's proximity to Geelong, its rural character and its access to servicing infrastructure have attributed to its strong growth, with the town consistently being one of the fastest growing areas in regional Victoria. Bannockburn is well suited to accommodate a greater share of the region's growth, supported by state and local policy.

The preparation of the Bannockburn Growth Plan is supported by the G21 Regional Growth Plan (2013) which identifies Bannockburn as a regional town that will support significant residential growth. Clause 11.01-1L (Settlement) of the Golden Plains Planning Scheme also supports the preparation of the Growth Plan, stating:

- Direct population growth to urban areas provided with water, sewerage and social infrastructure.
- Support a progressive series of land rezoning within Bannockburn, in line with the staged development of the town considering sustainable land supply, growth capacity and infrastructure provision.

There is currently limited zoned residential land supply in Bannockburn, the Bannockburn Growth Plan will set a framework for subsequent detailed planning work and rezoning of land for residential development to take place.

The Bannockburn Growth Plan (Growth Plan) will aim to guide the future sustainable growth of Bannockburn to the year 2050. The Growth Plan Investigation Area covers approximately 1,127 hectares to the south of the existing Bannockburn township, and is located 88 kilometres south west of Melbourne (Attachment 1). The Growth Plan will identify land for houses and ensure that the infrastructure is provided to support these new homes (Victorian Planning Authority (VPA) 2020). This report is an assessment of the Growth Plan investigation area (i.e. the study area). It has been prepared to inform the preparation of the Bannockburn Growth Plan which is being prepared by the Victorian Planning Authority (VPA) in collaboration with Council.

The study area is currently being used for agriculture, with several rural residential properties throughout the extent. The Geelong-Ballarat railway line runs east to west along the southern boundary of the study area and the Bannockburn Flora/Fauna and Recreation Reserve abuts the western boundary. There are several windrows that exist throughout the area and Bruce Creek runs north to south through the centre of the study area. The majority of the study area will contain dwellings, with some open space and other building types dispersed amongst them.

The study area is within the Farming Zone (FZ) and is partially covered by the Land Subject to Inundation Overlay (LSIO), Environmental Significance Overlay – Schedules 2 (ESO2) and the Salinity Management Overlay (SMO) (DELWP 2019). The entire study area is also in the designated Bushfire Prone Area (BPA) and the Bushfire Management Overlay (BMO) covers the Bannockburn Flora/Fauna and Recreation Reserves located outside the study area to the west and extends partially into the study area by approximately 150 metres (DELWP 2019) (Attachment 5).

Ultimately the Strategic Bushfire Risk Assessment will inform the Bannockburn Growth Plan and the identification of precincts for development, thereby assisting in directing any proposed development away from identified bushfire hazards. Bushfire protection measures are provided in response to the hazard and risks using relevant bushfire legislation, namely Clause 13.02-1S Bushfire, Clause 44.06 Bushfire Management Overlay, Clause 53.02 Planning for Bushfire and the BPA.

## 2 BUSHFIRE LEGISLATION CONSIDERATIONS

---

### 2.1 Clause 13.02-1S Bushfire

Clause 13.02-1S was updated through the gazettal of Amendment VC140 on 12 December 2017. It places much greater emphasis on strategic bushfire planning at the early stages of development, with its objective now being to “strengthen the resilience of settlements and communities to bushfire through risk-based planning that prioritises the protection of human life”. This clause applies to land which is in the BPA, Bushfire Management Overlay (BMO) or proposed to be used or developed in a way that may create a bushfire hazard.

- Clause 13.02-1S contains five key strategies to meet this objective, being the:
- Protection of human life;
- Bushfire hazard identification and assessment;
- Settlement planning;
- Areas of biodiversity conservation value; and
- Use and development control in a Bushfire Prone Area.

These strategies are analysed and addressed in the context of the study area in greater detail from Section 3 onwards.

### 2.2 Bushfire Prone Area, Clause 44.06 Bushfire Management Overlay and Clause 53.02 Planning for Bushfire

The BPA applies to a large majority of Victoria, basically encompassing all non-urbanised land. The study area is within the BPA due to the mosaic of grassed and treed vegetation within it and in the wider landscape. Developments are typically assessed under the BPA at the building permit stage, however Clause 13.02-1S requires all developments, including planning scheme amendments, in the BPA to be assessed at the planning permit stage. The minimum construction level for all buildings in the BPA is Bushfire Attack Level (BAL-12.5) (Building Amendment (Bushfire Construction) Regulations 2011), which aligns with the requirements of Clause 13.02-1S. Developments being assessed under the BPA must only meet one requirement, being the building(s) BAL construction standard. Clause 13.02-1S, however, requires that the full range of bushfire mitigation measures be assessed. Other measures include vegetation management around the buildings, access design and construction, and water supply.

### 3 BUSHFIRE HAZARD ASSESSMENT OF THE BANNOCKBURN GROWTH PLAN INVESTIGATION AREA

---

There are five scales in which the bushfire hazard assessment will be conducted to determine the bushfire risk to the study area. The vegetation type and slope within 150 metres of the study area is also discussed, with appropriate bushfire mitigation measures provided to address the risk. These scales include the following:

- Landscape Scale (20 kilometres; Attachment 1);
- Landscape Scale Fire History and Neighbourhood Safer Place (5 kilometres; Attachment 2);
- Local Scale (1 Kilometre; Attachment 3);
- Neighbourhood Scale (400 metres; Attachment 4); and,
- Site Scale (150 metres; Attachment 5).

#### 3.1 Bushfire Hazard Landscape, Local and Neighbourhood Assessment

The following Bushfire Risk Assessment is based on a desktop assessment at the landscape, local and neighbourhood scales as per the Bushfire Hazard Identification and Assessment strategy in Clause 13.02-1S.

##### Bushfire Hazard Landscape Scale Assessment

At the landscape scale within 20 kilometres of the Bannockburn Growth Plan Investigation Area (i.e. the study area) (Attachment 1), the land is used predominately for agriculture dominated by cropping and grazing. The townships of Teesdale, Inverleigh, Gheringhap and Batesford are located in close proximity to the study area and the urban centre of the City of Greater Geelong is located 24 kilometres to the east of the study area. Brisbane Ranges National Park and Steiglitz Historical Park are located approximately 15 kilometres to the north, and Bannockburn Reserve, Bannockburn Flora/Fauna & Recreation Reserve, the Inverleigh Nature Conservation Reserve, Bannockburn Golf Club and Inverleigh Golf Club are all located within 12 kilometres. The shore line of Port Phillip Bay is located 18 kilometres to the east.

The most likely directions of bushfire attack on severe fire weather days are from the north-west or south-west in Victoria. At a landscape-scale, there is the potential for a large-scale bushfire to impact the study area due to the fact that there is no urban development or wetland systems in these directions. Furthermore, there are two relatively larger flora and fauna reserves located immediately to the west of the study area and much of the broader landscape is used for agricultural purposes. The landscape also supports several patches of native vegetation within private properties, golf courses and along creek lines to the southwest.

A grassfire in the wider agricultural landscape or bushfire that are generated within either Inverleigh Nature Conservation Reserve or Bannockburn Flora/Fauna & Recreation Reserve located to the west have the potential to generate embers that can travel for many kilometres before landing in suitable fuel on days of severe bushfire weather and promoting the ignition of further grassfires or bushfires. There is, however, a lack of connectivity in the landscape where the fuel loads are considered large on a continual basis due to several roads intersecting the land, crops are periodically harvested, and farm animals graze the paddocks, which would likely greatly reduce the amount of fuel available. These factors would make it difficult for a fire to build momentum to the severity required to be a significant threat.

### Bushfire Hazard Local and Neighbourhood Bushfire Assessment

The local (one kilometre) and neighbourhood-scale (400 metre) bushfire assessments provide similar results (Attachments 3 and 4), however, the locations of the urban development located to north of the study area (i.e. the Bannockburn township and associated infrastructure) is now clearly visible. Given the presence of the Bannockburn Reserve along the western boundary and to the north west and south west, i.e. the most likely directions of bushfire attack, the potential for a bushfire to impact the study area is evident. Although the Bannockburn Reserve does not present a landscape-scale bushfire threat, there is the potential for a localised bushfire to impact the study area either by natural or anthropogenic means.

However, Harvey Road currently provides an effective fire break (i.e. between the southern portions of the Flora and Fauna Reserve and the study area) for a fire approaching from the south west, while Shelford-Bannockburn Road provides an effective fire break for a fire approaching from the north west. There is evidence that fire breaks and/or roads are currently being maintained within the Bannockburn Flora/Fauna & Recreation Reserve running north-south adjacent to the study area's western boundary (Figure 1), and east-west adjacent to Shelford-Bannockburn Road (Figure 2).

There is a moderate likelihood of a bushfire and/or grassfire impacting the study area from the unmanaged vegetation present as Grassland within the surrounding agricultural properties or as Woodland within the Bannockburn Flora and Fauna Reserve. Despite this, the threat can be mitigated to an acceptable level if the following the implementation of the following recommendations:

- Appropriate separation distances from unmanaged vegetation in accordance with AS 3959:2018 (Australian Standards 2018);
- The provision of appropriate Bushfire Attack Level (BAL-12.5) construction standards, in this case BAL-12.5, implemented at the subdivision stage;
- The inclusion of fire breaks between unmanaged Grassland or Woodland vegetation and buildings within the design of the Bannockburn Growth Plan Investigation Area that consist of low threat vegetation or non-vegetated areas. These could be in the form of public open space and landscape buffers consistent with Table 6 of Clause 53.02, that is:
  - Grass must be short cropped and maintained during the declared fire danger period;
  - All leaves and vegetation debris must be removed at regular intervals during the declared fire danger period;
  - Within 10 metres of a building, flammable objects must not be located close to the vulnerable parts of the building;
  - Plants greater than 10 centimetres in height must not be placed within 3 metres of a window or glass feature of the building;
  - Shrubs must not be located under the canopy of trees;
  - Individual and clumps of shrubs must not exceed 5 square metres in area and must be separated by at least 5 metres;
  - Trees must not overhang or touch any elements of the building;
  - The canopy of trees must be separated by at least 5 metres; and,

- o There must be a clearance of at least 2 metres between the lowest tree branches and ground level.
- Vegetation management within lots that complies with Table 6 to Clause 53.02 implemented at the subdivision stage;
- The provision of an appropriate static water supply for those areas within the BMO, implemented at the subdivision stage;
- The provision of appropriate access and egress opportunities implemented at the design and subdivision stage; and
- The provision of a perimeter road on aspects associated with classified vegetation.

As a site assessment was not conducted as part of this assessment, the vegetation classification was not confirmed and may potentially require a ground-truthing assessment at a later stage to confirm the correct vegetation classification has been applied.

Despite the moderate likelihood of a bushfire impacting the study area (i.e. from the Bannockburn Flora and Fauna Reserve or the surrounding agricultural areas), the threat is being mitigated to an acceptable level via the implementation of appropriate separation distances from unmanaged vegetation (i.e. the surrounding agricultural land, Bannockburn Flora and Fauna Reserve) as part of this assessment (and potentially ground-truthed at a later stage) and other bushfire mitigation strategies.



**Figure 1** Evidence of a potential fire break in the form of a road/track identified via the desktop assessment within Bannockburn Flora/Fauna & Recreation Reserve running north – south along the eastern edge (i.e. the interface between the reserve and the study area) of the reserve, Google Earth, April 2020.



**Figure 2** Evidence of a potential fire break in the form of a road/track identified via the desktop assessment within the northern section of Bannockburn Flora/Fauna & Recreation Reserve running east-west along the southern edge adjacent to Shelford-Bannockburn Road, Google Earth, April 2020

### 3.2 Bushfire Hazard Vegetation Classifications

The bushfire hazard site assessment process for developments located in the BPA is in Section 2.2 of AS 3959:2018 Construction of Buildings in Bushfire-prone Areas (Standards Australia 2018), which is where the below information is derived. Under the BPA, the site assessment zone encompasses the land within 150 metres of the study area. The vegetation condition and topography are assessed within the 150-metre site assessment zone to confirm that a BAL-12.5 construction standard for all buildings and the commensurate separation distance is achievable.

The topography within the assessment area is largely flat land with a slight Upslope (i.e. the slope under the classified vegetation is uphill from the edge vegetation nearest the site), however, a small Downslope (i.e. the slope of the land under the classified vegetation is downhill from the edge of the classified vegetation nearest the site) exists mainly to the south and west (Attachment 5). The Bannockburn Reserve will continue to contain unmanaged vegetation and thus the slope labels in Attachment 5 extend to this area's boundary. The separation distances are based on a desktop assessment of the vegetation within the assessment area and are conducted under the assumption that the imagery is accurately depicting the condition of the current vegetation.

There are several different vegetation classifications within the assessment zone including Woodland, Grassland and Shrubland as shown in Attachment 5. The resultant separation distances between any proposed dwelling, a dependant persons unit, industry, office or a retail premises and unmanaged vegetation to achieve a BAL-12.5 construction standard are:

- 19-metres in response to Flat land/Upslope Grassland;
- 22-metres in response to Downslope >0-5 degrees Grassland;
- 19-metres in response to Flat land/Upslope Shrubland;
- 33-metres in response to Flat land/Upslope Woodland; and
- 41-metres in response to Downslope >0-5 degrees Woodland.

The resultant separation distances between any proposed accommodation, a child care centre, an education centre, a hospital, leisure and recreation or a place of assembly and unmanaged vegetation to achieve a BAL-12.5 construction standard are:

- 35-metres in response to Flat land/Upslope Grassland;
- 40-metres in response to Downslope >0-5 degrees Grassland;
- 25-metres in response to Flat land/Upslope Shrubland;
- 40-metres in response to Flat land/Upslope Woodland; and
- 50-metres in response to Downslope >0-5 degrees Woodland.

The steps used to determine the above separation distances are provided in Table 2 below, while Attachment 6 illustrates the extent of the separation distances provided for dwellings, dependent persons units, and industry, office and retail buildings. The separation distances for the other building types listed in Table 2 are not illustrated in Attachment 6 due to the scale being relatively large, which does not allow the differences in these defensible space distances to be clearly shown.

**Table 1.** Determination of the BAL construction standard and minimum separation distance from unmanaged vegetation for all dwellings, a dependant persons unit, industry, office or a retail premises within the Bannockburn Growth Plan Investigation Area (from Section 2.2, AS 3959:2018, Standards Australia 2018).

| Aspect                       | North                                | North east | East                 | South east           | South   | South west                         | West   | North west                         |
|------------------------------|--------------------------------------|------------|----------------------|----------------------|---|------------------------------------|--|------------------------------------|
| Vegetation Type              | Grassland;<br>Shrubland;<br>Excluded | Excluded*  | Grassland            | Grassland            | Grassland;<br>Woodland;<br>Excluded                   | Woodland;<br>Grassland             | Woodland   | Woodland;<br>Grassland             |
| Effective Slope              | Grassland:<br>Upslope/Flat<br>land   | NA         | Upslope/Flat<br>land | Upslope/Flat<br>land | Grassland:<br>Upslope/Flat<br>land                    | Woodland:<br>Upslope/Flat<br>land  | Woodland:<br>Downslope 0-5<br>degrees                | Woodland:<br>Upslope/Flat<br>land  |
|                              |                                      |            |                      |                      | Grassland:<br>Downslope 0-5<br>degrees                |                                    |  |                                    |
|                              | Shrubland:<br>Upslope/Flat<br>land   |            |                      |                      | Woodland:<br>Upslope/Flat<br>land                     | Grassland:<br>Upslope/Flat<br>land | Woodland:<br>Upslope/Flat<br>land                    | Grassland:<br>Upslope/Flat<br>land |
|                              |                                      |            |                      |                      | Excluded: NA  |                                    |  |                                    |
| BAL construction<br>standard | BAL-12.5                             | BAL-12.5   | BAL-12.5             | BAL-12.5             | BAL-12.5  | BAL-12.5                           | BAL-12.5   | BAL-12.5                           |
| Separation distance          | Grassland:<br>19-metres              | NA         | 19-metres            | 19-metres            | Grassland:<br>19-metres<br>(Upslope/Flat<br>land)     | Woodland:<br>33-metres             | Woodland:<br>41-metres<br>(Downslope 0-5<br>degrees) | Woodland:<br>33-metres             |
|                              | Shrubland:<br>19-metres              |            |                      |                      | Grassland:<br>22-metres<br>(Downslope 0-5<br>degrees) | Grassland:<br>19-metres            | Woodland:<br>33-metres<br>(Upslope/Flat<br>land)     | Grassland:<br>19-metres            |
|                              |                                      |            |                      |                      | Woodland:<br>33-metres                                |                                    |  |                                    |

\*Excluded due to the presence of existing non-vegetated areas (i.e. the Bannockburn township)

**Table 2** Determination of the BAL construction standard and minimum separation distance from unmanaged vegetation for accommodation, a child care centre, an education centre, a hospital, leisure and recreation or a place of assembly within the Bannockburn Growth Plan Investigation Area (from Section 2.2, AS 3959:2018, Standards Australia 2018).

| Aspect                       | North                                | North east | East                 | South east           | South   | South west                         | West   | North west                         |
|------------------------------|--------------------------------------|------------|----------------------|----------------------|---|------------------------------------|--|------------------------------------|
| Vegetation Type              | Grassland;<br>Shrubland;<br>Excluded | Excluded*  | Grassland            | Grassland            | Grassland;<br>Woodland;<br>Excluded                   | Woodland;<br>Grassland             | Woodland   | Woodland;<br>Grassland             |
| Effective Slope              | Grassland:<br>Upslope/Flat<br>land   | NA         | Upslope/Flat<br>land | Upslope/Flat<br>land | Grassland:<br>Upslope/Flat<br>land                    | Woodland:<br>Upslope/Flat<br>land  | Woodland:<br>Downslope 0-5<br>degrees                | Woodland:<br>Upslope/Flat<br>land  |
|                              |                                      |            |                      |                      | Grassland:<br>Downslope 0-5<br>degrees                |                                    |  |                                    |
|                              | Shrubland:<br>Upslope/Flat<br>land   |            |                      |                      | Woodland:<br>Upslope/Flat<br>land                     | Grassland:<br>Upslope/Flat<br>land | Woodland:<br>Upslope/Flat<br>land                    | Grassland:<br>Upslope/Flat<br>land |
|                              |                                      |            |                      |                      | Excluded: NA  |                                    |  |                                    |
| BAL construction<br>standard | BAL-12.5                             | BAL-12.5   | BAL-12.5             | BAL-12.5             | BAL-12.5  | BAL-12.5                           | BAL-12.5   | BAL-12.5                           |
| Separation distance          | Grassland:<br>35-metres              | NA         | 35-metres            | 35-metres            | Grassland:<br>35-metres<br>(Upslope/Flat<br>land)     | Woodland:<br>40-metres             | Woodland:<br>50-metres<br>(Downslope 0-5<br>degrees) | Woodland:<br>40-metres             |
|                              | Shrubland:<br>25-metres              |            |                      |                      | Grassland:<br>40-metres<br>(Downslope 0-5<br>degrees) | Grassland:<br>35-metres            | Woodland:<br>40-metres<br>(Upslope/Flat<br>land)     | Grassland:<br>35-metres            |
|                              |                                      |            |                      |                      | Woodland:<br>40-metres                                |                                    |  |                                    |

## 4 RESPONSE TO CLAUSE 13.02-1S BUSHFIRE

---

### 4.1 Protection of human life

These strategies require that the priority be given to the protection of human life.

#### 4.1.1 *Prioritising the protection of human life over all other policy considerations*

It is considered that any future development can appropriately prioritise the protection of human life by ensuring that all buildings within the development will not be exposed to a radiant heat flux of more than 12.5 kilowatts/square metre, which is commensurate to a Bushfire Attack Level (BAL)-12.5 construction standard.

Another measure to prioritise human life is to ensure access requirements are managed in accordance with the Section 5.2 to ensure adequate occupant egress and emergency vehicle access opportunities to and from the study area. Emergency vehicle access to water supplies will also be provided via a hydrant network in accordance with CFA requirements, i.e. hydrants will be positioned so that they are within 120 metres of the rear of each building.

Some potential considerations for future planning regarding the Bannockburn Growth Plan include:

- The provision of multiple access and egress points to different roads adjoining the study area boundary and or multiple points along the same adjoining major road;
- The provision of an internal fire hydrant network;
- Road design in compliance with Golden Plains Planning Scheme;
- The provision of interface street along aspects fronting classified vegetation;
- Limiting residential development within the Bushfire Management Overlay (BMO) and replacing the existing Grassland with low threat vegetation in the form of a public open space;
- The provision of Bushfire Management Statements for those developments affected by the BMO; and
- The provision of a Bushfire Management Plan (BMP) for the construction of future subdivision stages within the Bannockburn Growth Plan Investigation Area.

#### 4.1.2 *Directing population growth and development to low risk locations and ensuring the availability of, and safe access to, areas where human life can be better protected from the effects of bushfire*

The rezoned precinct will be located in a highly modified setting in which all buildings will be able to achieve a BAL-12.5 construction standard. While majority of the landscape is classified by agricultural land, Bannockburn Reserve poses a potential threat for a bushfire to impact the study area is evident. Although the Bannockburn Reserve does not present a landscape-scale bushfire threat, there is the potential for a localised bushfire to impact the study area either by natural or anthropogenic means. However, Harvey Road currently provides an effective fire break (i.e. between the southern portions of the Flora and Fauna Reserve and the study area) for a fire approaching from the south west, while Shelford-Bannockburn Road provides an effective fire break for a fire approaching from the north west. There is evidence (Figure 1) that potential fire breaks and/or roads are currently being

maintained within the Bannockburn Reserve running north-south adjacent to the study area's western boundary, and east-west adjacent to Shelford-Bannockburn Road (Figure 2).

There is a moderate likelihood of a bushfire and/or grassfire impacting the study area from the unmanaged vegetation present as Grassland within the surrounding agricultural properties or as Woodland within the Bannockburn Flora and Fauna Reserve. Despite this, the threat can be mitigated to an acceptable level if the following the implementation of the following recommendations:

- Appropriate separation distances from unmanaged vegetation in accordance with AS 3959:2018 (Australian Standards 2018);
- The provision of appropriate Bushfire Attack Level (BAL-12.5) construction standards, in this case BAL-12.5, implemented at the subdivision stage;
- The inclusion of fire breaks between unmanaged Grassland or Woodland vegetation and buildings within the design of the Bannockburn Growth Plan Investigation Area that consist of low threat vegetation or non-vegetated areas. These could be in the form of public open space and landscape buffers consistent with Table 6 of Clause 53.02, that is:
  - Grass must be short cropped and maintained during the declared fire danger period;
  - All leaves and vegetation debris must be removed at regular intervals during the declared fire danger period;
  - Within 10 metres of a building, flammable objects must not be located close to the vulnerable parts of the building;
  - Plants greater than 10 centimetres in height must not be placed within 3 metres of a window or glass feature of the building;
  - Shrubs must not be located under the canopy of trees;
  - Individual and clumps of shrubs must not exceed 5 square metres in area and must be separated by at least 5 metres;
  - Trees must not overhang or touch any elements of the building;
  - The canopy of trees must be separated by at least 5 metres; and,
  - There must be a clearance of at least 2 metres between the lowest tree branches and ground level.
- Vegetation management within lots that complies with Table 6 to Clause 53.02 implemented at the subdivision stage;
- The provision of an appropriate static water supply for those areas within the BMO, implemented at the subdivision stage;
- The provision of appropriate access and egress opportunities implemented at the design and subdivision stage; and
- The provision of a perimeter road on aspects associated with classified vegetation.

As a site assessment was not conducted as part of this assessment, the vegetation classification was not confirmed and may potentially require a ground-truthing assessment at a later stage to confirm the correct vegetation classification has been applied.

Despite the moderate likelihood of a bushfire impacting the study area (i.e. from the Bannockburn Flora and Fauna Reserve or the surrounding agricultural areas), the threat is being mitigated to an acceptable level via the implementation of appropriate separation distances from unmanaged vegetation (i.e. the surrounding agricultural land, Bannockburn Flora and Fauna Reserve) as part of this assessment (and potentially ground-truthed at a later stage) and other bushfire mitigation strategies.

#### **4.1.3 *Reducing the vulnerability of communities to bushfire through the consideration of bushfire risk in decision making at all stages of the planning process***

Clause 13.02-1S is a strategic state-wide planning policy that provides the first opportunity to consider the bushfire risk in this process. This development addresses the risk by ensuring all buildings can be constructed to BAL-12.5, access and an internal road network that complies with Section 5.2 and a hydrant network is provided.

The CFA provide four principles to respond to Clause 13.02-1S, including that settlement planning decisions should:

- 'Direct development to locations of lower bushfire risk;
- Carefully consider development in locations where there is significant bushfire risk that cannot be avoided;
- Avoid development in locations of extreme bushfire risk; and
- Avoid development in areas where planned bushfire protection measures may be incompatible with other environmental objectives' (CFA, p.4).

The Bannockburn Growth Plan Investigation Area is considered to apply all four principles by directing development into largely cleared paddocks that do not pose an extreme bushfire risk. Where a bushfire risk is located (i.e. Bannockburn Flora/Fauna & Recreation Reserve), this report is considered to have recommended the appropriate separation distances (BPA) and/or defendable space (BMO) to effectively mitigate a potential threat. There are no incompatible environmental implications.

Please note: if the future design of the Bannockburn Growth Plan Investigation area results in the development of buildings occurring closer to the study area boundary than is recommended by this current Bushfire Risk Assessment a higher BAL construction standard will be required to mitigate the potential bushfire threat to an appropriate level.

## 4.2 Bushfire hazard and identification assessment strategies

These strategies require the bushfire hazard be identified and an appropriate risk assessment be undertaken.

### **4.2.1 *Applying the best available science to identify vegetation, topographic and climatic conditions that create a bushfire hazard***

This report identifies the bushfire hazard and applies the standard site assessment methodology used in AS 3959:2018 (Standards Australia 2018), which is applied to developments in the BPA and BMO and is based on the best available science. The bushfire modelling inputs that form the basis for this methodology factor in vegetation type (e.g. Forest, Woodland, Grassland), potential fuel-loads in a long-unburnt vegetation community, weather conditions on higher bushfire risk days (e.g. wind speed, fuel moisture content, days since last rainfall) and the effect of slope gradient on the way fire travels through unmanaged vegetation.

The site assessment process and desktop assessment using GIS software has determined the most appropriate vegetation type and commensurate slope category for each section/aspect of unmanaged vegetation, which has produced the requisite separation distance for BAL-12.5 construction across the development (Attachments 4 and 5).

### **4.2.2 *Considering the best available information about bushfire hazard including the map of designated bushfire prone areas prepared under the Building Act 1993 or regulations made under that Act***

The BPA applies to the entire study area and wider area due to the presence of pastures (i.e. Grassland) across the landscape. The BPA covers an extensive area east of Melbourne across largely agricultural and horticultural landscapes, with the closest areas not covered by the BPA being approximately 100 metres north of the study area within the Bannockburn township.

### **4.2.3 *Applying the Bushfire Management Overlay to areas where the extent of vegetation can create an extreme bushfire hazard***

The BMO impacts the study area along the western boundary and infringes into the Bannockburn Growth Plan Investigation Area by approximately 150-metres. The BMO is currently associated with the Bannockburn Flora/Fauna & Recreation Reserve and is considered appropriate given the high fuel load present within the reserve.

### **4.2.4 *Considering and assessing the bushfire hazard on the basis of the Landscape, local, neighbourhood and site conditions***

Refer to Section 3 for a detailed bushfire hazard landscape assessment.

### **4.2.5 *Consulting with emergency management agencies and the relevant fire authority early in the process to receive recommendations and implement appropriate bushfire protection measures***

Golden Plains Shire Council are currently and will continue to liaise with the CFA during the planning and development stages regarding BAL construction standard, vegetation management, water and access requirements and how best to implement mitigation measures into the design. This dialogue will continue to ensure that emergency management agencies are aware of the development's progress and are able to discuss certain design aspects and provide guidance where necessary.

**4.2.6 Ensuring that strategic planning documents, planning scheme amendments, planning permit applications and development plan approvals properly assess bushfire risk and include appropriate bushfire protection measures**

Clause 13.02-1S, Clause 44.06, Clause 53.02, DELWP advisory and practice notes (DELWP 2017a, 2017b, 2018), CFA guidance note (CFA 2015) and the building regulations (i.e. AS 3959:2018, Standards Australia, 2018) regarding bushfire matters have been referred to when assessing the bushfire risk. The standards and requirements provided in these documents have been addressed through several bushfire mitigation measures.

**4.2.7 Not approving development where a landowner or proponent has not satisfactorily demonstrated that the relevant policies have been addressed, performance measures satisfied, or bushfire protection measures can be adequately implemented**

Several bushfire mitigation measures will be implemented as part of the study area's development. These include constructing buildings to BAL-12.5 and providing the following commensurate separation distances:

- 19 metres between a building and classified Grassland (Upslope/Flat land)
- 22 metres between a building and classified Grassland (Downslope)
- 19 metres between a building and classified Shrubland (Upslope/Flat land)
- 22 metres between a building and classified Shrubland (Downslope)
- 33 metres between a building and classified Woodland (Upslope/Flat land)
- 41 metres between a building and classified Woodland (Downslope)

All commensurate defensible space will be provided entirely within the study area boundary (Attachment 6), managing all vegetation within the study area in a low threat state (i.e. lawn maintained to less than 100 millimetres in height, ornamental gardens), access that complies with the Section 5.2 and a compliant hydrant network.

The CFA specifies four situations where development should not proceed, which include:

- 'Isolated settlements where the size and/or configuration of the settlements will be insufficient to modify fire behaviour and provide protection from a bushfire;
- Where bushfire protection measures will not reduce the risk to an acceptable level;
- Where evacuation (access) is severely restricted; and
- Where the extent and potential impact of required bushfire protection measures may be incompatible with other environmental objectives or issues, e.g. vegetation protection, land subject to erosion or landslip.' (CFA 2015, pp.5-6)

Three of these criteria apply to the study area. The western sections of the study area will also be required to meet several environmental objects, which are discussed further in Section 4.4.1.

## 4.3 Settlement planning strategies

These strategies plan to strengthen the resilience of settlements and communities and prioritise protection of human life.

### **4.3.1 Directing population growth and development to low risk locations, being those locations assessed as having a radiant heat flux of less than 12.5 kilowatts/square metre under AS 3959:2018 Construction of Buildings in Bushfire-prone Areas (Standards Australia 2018)**

Buildings on the outer edge of the study area will be able to achieve a radiant heat flux of 12.5 kilowatts/square metre (Attachment 6), which aligns with a BAL-12.5 construction standard. Given that the study area is so large and assuming that it will all be developed, any building positioned more than 50 metres from Grassland and 100 metres from Shrubland or Woodland (Attachment 5) are considered to be in a low risk location (i.e. BAL-LOW using the methodology in AS 3959:2018 [Standards Australia 2018]). Furthermore, all residents/occupants within 50/100 metres of the study area boundary can simply travel inwards by these distances to reach areas considered as low-risk locations.

### **4.3.2 Ensuring the availability, and safe access to, areas assessed as a BAL-LOW rating under AS 3959:2018 Construction of Buildings in Bushfire-prone Areas (Standards Australia 2018) where human life can be better protected from the effects of bushfire**

Non-vegetated areas such as buildings, roads, carparks and footpaths, and low threat vegetation such as managed lawns, ornamental gardens and public open spaces are considered part of a landscape in which a building would be rated as BAL-LOW (Standards Australia 2018). Moving towards the centre of the development and away from the Grassland, Woodland and/or Shrubland adjacent to the study area would therefore provide space in which human life would be better protected from the effects of bush and grassfires. Alternatively, occupants could travel in a general northerly direction to reach the existing urbanised area of Bannockburn.

*Landscaping for Bushfire* (CFA 2011) addresses landscaping design in bushfire risk areas via the selection of suitable plants, garden design and planning, and maintenance. It can be used as a guide for designing public open spaces and provided as a resource for private residents purchasing lots.

### **4.3.3 Ensuring the bushfire risk to existing and future residents, property and community infrastructure will not increase as a result of future land use and development**

The development of this precinct is not expected to increase bushfire risk to existing and future residents, property or community infrastructure. The buildings will be separated from unmanaged (Grassland, Woodland and Shrubland) vegetation to allow BAL-12.5 construction and the development will contain entirely low threat vegetation (i.e. managed lawns, and landscaping) and non-vegetated areas (i.e. buildings, roads, carparks, footpaths) that will reduce the fire risk within the study area and therefore provide fire behaviour and management benefits for the surrounding properties.

### **4.3.4 Achieving no net increase in risk to existing and future residents, property and community infrastructure, through the implementation of bushfire protection measures and where possible reducing bushfire risk overall**

The risk to existing residents in the wider landscape will be reduced by the development due to the additional developed areas and associated low threat vegetation (e.g. nature strips, landscaping) and

non-vegetated land (e.g. buildings, roads, carparks, footpaths). There will be no net increase in risk to infrastructure as a result of the development, as appropriate bushfire mitigation measures will be implemented. These include providing enough separation distance to facilitate BAL-12.5 construction, appropriate vegetation management, access/egress points and hydrants.

#### **4.3.5 *Assessing and addressing the bushfire hazard posed to the settlement and the likely bushfire behaviour it will produce at a landscape, settlement, local, neighbourhood and site scale, including the potential for neighbourhood-scale destruction***

This report addresses the bushfire hazard posed to the study area at a range of scales in Section 3.

There is the potential for a bushfire and/or grassfire to impact the study area on severe fire weather days due to the presence of Bannockburn Reserve immediately adjacent to the study area to the west and Inverleigh Nature Conservation Reserve eight kilometres to the west. However, the potential for neighbourhood-scale destruction is considered low given that the surrounding unmanaged landscape consists largely of grassland that is grazed and/or slashed.

If a fire were to approach from the north west or south west, i.e. the most likely direction of fire attack on severe fire weather days, it would be moderated by low threat vegetation in the surrounding area, present around dwellings and as short grazed/cropped grass. Furthermore, the fire would be moderated by several roads such as Harvey Road which currently provides an effective fire break (i.e. between the southern portions of the Flora and Fauna Reserve and the study area) for a fire approaching from the south west, while Shelford-Bannockburn Road provides an effective fire break for a fire approaching from the north west. There is evidence that fire breaks and/or roads are currently being maintained within the Bannockburn Reserve running north-south adjacent to the study area's western boundary (figure 1), and east-west adjacent to Shelford-Bannockburn Road (figure 2). In response to the potential risk, however, this assessment has provided several bushfire mitigation measures.

There is a moderate likelihood of a bushfire and/or grassfire impacting the study area from the unmanaged vegetation present as Grassland within the surrounding agricultural properties or as Woodland within the Bannockburn Flora and Fauna Reserve. Despite this, the threat can be mitigated to an acceptable level if the following the implementation of the following recommendations:

- Appropriate separation distances from unmanaged vegetation in accordance with AS 3959:2018 (Australian Standards 2018);
- The provision of appropriate Bushfire Attack Level (BAL-12.5) construction standards, in this case BAL-12.5, implemented at the subdivision stage;
- The inclusion of fire breaks between unmanaged Grassland or Woodland vegetation and buildings within the design of the Bannockburn Growth Plan Investigation Area that consist of low threat vegetation or non-vegetated areas. These could be in the form of public open space and landscape buffers consistent with Table 6 of Clause 53.02, that is:
  - Grass must be short cropped and maintained during the declared fire danger period;
  - All leaves and vegetation debris must be removed at regular intervals during the declared fire danger period;
  - Within 10 metres of a building, flammable objects must not be located close to the vulnerable parts of the building;

- Plants greater than 10 centimetres in height must not be placed within 3 metres of a window or glass feature of the building;
  - Shrubs must not be located under the canopy of trees;
  - Individual and clumps of shrubs must not exceed 5 square metres in area and must be separated by at least 5 metres;
  - Trees must not overhang or touch any elements of the building;
  - The canopy of trees must be separated by at least 5 metres; and,
  - There must be a clearance of at least 2 metres between the lowest tree branches and ground level.
- Vegetation management within lots that complies with Table 6 to Clause 53.02 implemented at the subdivision stage;
  - The provision of an appropriate static water supply for those areas within the BMO, implemented at the subdivision stage;
  - The provision of appropriate access and egress opportunities implemented at the design and subdivision stage; and
  - The provision of a perimeter road on aspects associated with classified vegetation.

As a site assessment was not conducted as part of this assessment, the vegetation classification was not confirmed and may potentially require a ground-truthing assessment at a later stage to confirm the correct vegetation classification has been applied.

Despite the moderate likelihood of a bushfire impacting the study area (i.e. from the Bannockburn Flora and Fauna Reserve or the surrounding agricultural areas), the threat is being mitigated to an acceptable level via the implementation of appropriate separation distances from unmanaged vegetation (i.e. the surrounding agricultural land, Bannockburn Flora and Fauna Reserve) as part of this assessment (and potentially ground-truthed at a later stage) and other bushfire mitigation strategies.

#### **4.3.6 Assessing alternative low risk locations for settlement growth on a regional, municipal, settlement, local and neighbourhood basis**

The VPA and Council determined that the Growth Plan Investigation Area should be located to the south of the Bannockburn Township via several identified constraints associated with development in alternative locations such as:

- Connectivity constraints associated with Bruce Creek, Midland Highway and the Railway line to the north;
- Proximity of high-quality agricultural land to the east;
- The inclusion of a non-urban break between Gheringhap and Bannockburn to the east; and,
- The presence of the Bannockburn Recreation Reserve and Barwon Water Infrastructure to the west.

The following bushfire risk assessments are based on a desktop assessment and focus on the potential bushfire risk associated with the alternative locations (i.e. the northern zone, eastern zone and the

western zone west in regard to the Bannockburn Township) as identified by the VPA. These assessment zones have been based on locations determined via discussions with VPA and Council. The assessment looks at the landscape, local and neighbourhood scales as per the Bushfire Hazard Identification and Assessment strategy in Clause 13.02-1S and focusses exclusively on the potential for a bushfire and/or grassfire to impact the alternative zones.

#### Northern Zone

The most likely directions of bushfire attack on severe fire weather days are from the northwest or southwest in Victoria. At a landscape-scale, there is the potential for a large-scale bushfire to impact the northern zone due the absence of urban development or wetland systems in these directions. Furthermore, there are two relatively large flora and fauna reserves located to the southwest of the northern area and much of the broader landscape is used for agricultural purposes. The landscape also supports several patches of native vegetation within private properties, golf courses and along creek lines to the north, southwest and northwest.

A grassfire in the wider agricultural landscape or bushfire that are generated within either Inverleigh Nature Conservation Reserve to the west, the Bannockburn Flora/Fauna & Recreation Reserve located to the west and southwest and the vegetated areas within the Barwon Water land have the potential to generate embers that can travel for many kilometres before landing in suitable fuel on days of severe bushfire weather and promoting the ignition of further grassfires or bushfires. There is, however, a lack of fuel connectivity in the landscape due to several roads intersecting the land, crops being periodically harvested, and farm animals grazing the paddocks, which would likely greatly reduce the amount of fuel available. These factors would make it difficult for a fire to build momentum to the severity required to be a significant threat.

The local (one kilometre) and neighbourhood-scale (400 metre) bushfire assessments provide similar results, however, the urban development located to the south and southeast of the northern zone (i.e. the Bannockburn township and associated infrastructure) are now clearly visible. Given the presence of the Bannockburn Reserve to the southwest, i.e. one of the most likely directions of bushfire attack, the potential for a localised bushfire to impact the northern zone either by natural (radiant heat, embers) or anthropogenic means is evident. However, based on the desktop assessment, Bruce's Creek, Shelford-Bannockburn Road, the railway line and Midland Highway have the potential to provide effective firebreaks between classified vegetation and the northern zone in the event of a fire.

Development within the Northern Zone is considered to have similar risk to the development of the southern zone (i.e. the Bannockburn Growth Plan Investigation Area).

#### Eastern Zone

The eastern zone provides a separation distance of approximately five kilometres from the potential bushfire threat presented within the Bannockburn Flora/Fauna & Recreation Reserve. The Bannockburn township, which is characterised by low-threat vegetation (i.e. areas managed in a minimal fuel conditions such as landscaped lawns) and non-vegetated areas (i.e. roads, footpaths, buildings, etc.), significantly decreases the likelihood of a bushfire impacting the eastern zone on the western aspect.

A grassfire within the wider agricultural landscape is possible from the northwest or southwest, and the Bannockburn Flora/Fauna & Recreation Reserve and the Inverleigh Nature Conservation Reserve, both located to the west, have the potential to generate embers that can travel for many kilometres before landing in suitable fuel on days of severe bushfire weather and promoting the ignition of further grassfires. There is, however, an observed lack of connectivity regarding available fuel within the

landscape due to several roads intersecting the land, being periodically harvested, and farm animals grazing the paddocks, which would likely greatly reduce the amount of fuel available. These factors would make it difficult for a fire to build momentum to the severity required to be a significant threat. As such, development in the Eastern Zone can be considered of lower risk than the southern zone (i.e. the Bannockburn Growth Plan Investigation Area).

#### Western Zone

Development within the western zone immediately west of the Bannockburn township is considered to face similar constraints to the study area in this report because it is bound by the Bannockburn Flora/Fauna & Recreation Reserve to the west and paddocks in two other directions, i.e. to the north and south.

#### **4.3.7 Not approving any strategic planning document, local planning policy, or planning scheme amendment that will result in the introduction or intensification of development in an area that has, or will on completion have, more than a BAL-12.5 rating under AS 3959:2018 Construction of Buildings in Bushfire-prone Areas (Standards Australia 2018)**

All future buildings will achieve the recommended BAL-12.5 construction standard under AS 3959:2018 (Standards Australia 2018). While it is understood that this criteria will be implemented as part of any future development within the Bannockburn Growth Area, it should be noted that Clause 13.02-1S Bushfire Planning states that any strategic planning document, local planning policy, and/or planning scheme amendment that will result in the introduction or intensification of development in an area that has, or will on completion have, more than a BAL-12.5 rating under AS 3959:2018 Construction of Buildings in Bushfire-prone Areas (Standards Australia 2018) will not be approved.

In those areas closest to the Woodland vegetation west of the study area, a higher BAL construction standard of BAL-19 (i.e. in response to a radiant heat flux of 19 kilowatts/square metre) and/or BAL-29 (in response to a radiant heat flux of 29 kilowatts/square metre) could be implemented as an additional level of bushfire protection if it were to be undertaken in conjunction with maintaining a defendable space distance commensurate to BAL-12.5. That is, a higher BAL construction standard with a larger than required defendable space distance would greatly weaken the ability of a fire to impact the development through dwelling ignitions beyond what is already considered an acceptable response. This consideration will be addressed as part of the development's design and planning stage and will need to account for other factors. This proposition is not considered to contradict the requirement of this aim stated in the heading, as BAL-12.5 and the commensurate defendable space have been achieved, with the only difference being a BAL above the minimum requirement.

If future subdivisions are approved to be constructed with 150-metres of the Bannockburn Flora/Fauna and Recreation Reserve, they will fall within the Bushfire Management Overlay and need to produce a Bushfire Management Statement addressing the requirements of Clause 44.06 prior to beginning construction.

## **4.4 Areas of high Biodiversity Conservation Strategy**

This strategy directs growth away from unacceptable biodiversity impacts.

**4.4.1 *Ensure settlement growth and development approvals can implement bushfire protection measures without unacceptable biodiversity impacts by discouraging settlement growth and development in bushfire affected areas that are of high biodiversity conservation value***

The study area consists of paddocks used for grazing, with some windrows of exotic and native trees located throughout the southeast portion of the study area (Attachments 3 and 4). As a detailed site plan is yet to be finalised, any impacts the development and associated separation distances have to biodiversity are unable to be assessed. However, there remains the opportunity to incorporate any identified biodiversity values into the masterplan.

It should be noted that an Environmental Significance Overlay – Schedule 2 (relating to watercourse protection) currently exists on the site in close relation to Bruce Creek and a Vegetation Protection Overlay – Schedule 2 (relating to significant remnant vegetation) currently exists on the western boundary of the study area and while located on the neighbouring property (Bannockburn Flora & Fauna and Recreation Reserve) and not directly impact the site the flow on effects of the development and associated defendable space may have implications under this overlay. A Biodiversity Assessment may be required to appropriately assess the implications of the development on native flora and fauna within the study area.

## **4.5 Use and development control in a Bushfire Prone Area**

These strategies require certain developments in the BPA to consider the bushfire risk and potential impacts.

**4.5.1 *In a bushfire prone area designated in accordance with regulations made under the Building Act 1993, bushfire risk should be considered when assessing planning applications for the following uses and development:***

- ***Subdivisions of more than 10 lots.***
- ***Accommodation***
- ***Child care centre***
- ***Education centre***
- ***Emergency services facility***
- ***Hospital***
- ***Indoor recreational facility***
- ***Major sports and recreation facility***
- ***Place of assembly***
- ***Any application for development that will result in people congregating in large numbers***

The development is entirely within the BPA and falls under the category of ‘Any application for development that will result in people congregating in large numbers.’ The site assessment methodology and commensurate separation distances in AS 3959:2018 (Standards Australia 2018) have been applied to allow for BAL-12.5 construction, which applies to all buildings constructed within the study area.

**4.5.2 When assessing a planning permit application for the above uses and development:**

- ***Consider the risk of bushfire to people, property and community infrastructure***
- ***Require the implementation of appropriate bushfire protection measures to address the identified bushfire risk***
- ***Ensure new development can implement bushfire protection measures without unacceptable biodiversity impacts***

These considerations have been discussed throughout Section 2 and Section 3. The risk of a bushfire/grassfire impacting the study area is possible and, as such, bushfire mitigation measures have been proposed. These include achieving a BAL-12.5 construction standard for all buildings, providing the required separation distances (refer to Section 3) entirely within the study area boundary, complying with the access requirements and providing hydrants and static water supplies for firefighting purposes (refer to Section 5.2).

## 5 MANAGING THE FIRE RISK WITHIN THE STUDY AREA

---

### 5.1 Vegetation Management

The VPA and Golden Plains Shire have identified that there is currently little on-ground work undertaken to reduce fire hazard in the natural vegetated areas of the Bannockburn Reserve. The Friends of the Bannockburn Bush group and Ballarat Environment Network are in the process of applying for funding to aid in track maintenance and improve CFA access within the Reserve. The Wadawurrung traditional owners have also been approached about the application of Traditional Custodian burning within the reserve to aid in bushfire management. However, the land is Crown Land and it is poorly funded and has been reliant on volunteers and very little funds to achieve management goals.

Clause 13.02-1S requires that the grassfire risk to the future community is not increased as part of the development. It is understood that any future residential area will contain low threat vegetation throughout, including in the dwelling gardens, nature strips, active open space, passive open space, and waterway and drainage reserves. These are anticipated to be characterised largely by mown lawn and planted/landscaped vegetation (e.g. trees and shrubs in the open spaces or reeds and taller grasses in the waterway and drainage reserves) and will be planted in such a way that minimises the fire risk. The BMO vegetation management requirements are a good basis for achieving this outcome, and although they are not expected to be strictly followed, they will be a sound guide for plantings in public spaces:

- Grass must be short cropped and maintained during the declared fire danger period;
- All leaves and vegetation debris must be removed at regular intervals during the declared fire danger period;
- Within 10 metres of a building, flammable objects must not be located close to the vulnerable parts of the building;
- Plants greater than 10 centimetres in height must not be placed within 3 metres of a window or glass feature of the building;
- Shrubs must not be located under the canopy of trees;
- Individual and clumps of shrubs must not exceed 5 square metres in area and must be separated by at least 5 metres;
- Trees must not overhang or touch any elements of the building;
- The canopy of trees must be separated by at least 5 metres; and,
- There must be a clearance of at least 2 metres between the lowest tree branches and ground level.

With this in mind, the separation buffers within the Bushfire Prone Area and the defendable space distances within the Bushfire Management Overlay are able to support non-vegetated areas that are permanently cleared of vegetation (such as roads, footpaths and rocky outcrops) and vegetation regarded as low threat such as grassland managed in a minimal fuel condition (i.e. managed parkland, sports ovals), maintained lawns, golf courses (playing areas and fairways) and cultivated/landscaped gardens.

Provided that dwellings are not constructed within the separation distances shown in Table 2 and on Attachment 6, all dwellings will be able to achieve a BAL-12.5 construction standard. Therefore, the locations of future dwellings and any other buildings are therefore considered appropriate to mitigate the potential bushfire risk to life and property associated with the development. However, if the construction of dwellings and/or other buildings is planned to occur closer to the study area boundaries than anticipated by this current Bushfire Risk Assessment a higher BAL construction standard will be required. Furthermore, any dwellings constructed within 150 metres (i.e. within the Bushfire Management Overlay) of the western boundary will be required to satisfy the conditions of the Bushfire Management Overlay (Attachment 5) and future planning permits may be subject to the submission of a Bushfire Management Statement.

In the event of a bushfire and/or grassfire in the wider landscape, those occupying the study area will be able to move northwards towards the Bannockburn Township or at least 100 metres towards the centre of the study area to low threat areas.

The grassfire risk will also be managed during the construction phase to ensure buildings being constructed to BAL-12.5 are protected from bushfire hazards. This will involve managing a 'rolling front' buffer of 22 metres from any new buildings/construction stages.

## 5.2 Water supply and Access

As part of any future development, the design should ensure that access to an adequate supply of water is available for firefighting purposes to every lot in locations and amounts to enable firefighters to safely and efficiently carry out an initial attack on a grass and/or bushfire or building fire. This will be achieved through the provision of hydrants to the satisfaction of the CFA (2006). Hydrants must be suitably marked so that firefighters can locate them at all hours. The maximum distance between a hydrant and the rear of a lot must be 120 metres and hydrants must be no more than 200 metres apart.

Safe access and egress for emergency vehicles should also be provided as part of any future design and development via an internal road network. The internal road network must be designed in accordance with Clause 56 of the Golden Plains Planning Scheme and the CFA requirements for Water Supplies and Access for Subdivisions (CFA 2006). Specifically:

- Constructed roads must be a minimum of 7.3m trafficable width where cars park on both sides, or:
  - A minimum of 5.4m in trafficable width where cars may park on one side only.
  - A minimum of 3.5m width with no parking and 0.5m clearance to structures on either side, and if this width applies, there must be passing bays at least 20m long, 6m wide, and located not more than 200m apart.
- Roads must be constructed so that they are capable of accommodating a vehicle of 15 tonnes for the trafficable road width.
- The average grade of a road must be no more than 1 in 7 (14.4% or 8.1°).
- The steepest grade on a road must be no more than 1 in 5 (20% or 11.3°) with this grade continuing for no more than 50 metres at any one point.
- Dips in a road must have no more than a 1 in 8 grade (12.5% or 7.1°) entry and exit angle.

- Constructed dead end roads more than 60 metres in length from the nearest intersection must have a turning circle with a minimum radius of 8 m (including roll-over curbs if they are provided).

The road network should be capable of handling the volume of traffic required during a grass/bushfire emergency to allow rapid evacuation of residents and entry of emergency vehicles.

## 6 CONCLUSION

---

The suitability of implementing the results of the Bannockburn Growth Plan Investigation Area was assessed against the relevant bushfire legislation, namely Clause 13.02-1S Bushfire, Clause 44.06 Bushfire Management Overlay, Clause 53.02 Planning for Bushfire and the BPA.

It is understood that this Bushfire Risk Assessment will aid in the strategic development of the Bannockburn Growth Plan Investigation Area and inform strategic planning decisions to enable any development and/or dwellings to be placed in areas of negligible bushfire risk. Through the implementation of the findings of this assessment, the Bannockburn Growth Plan Investigation Area will meet the objective and strategies of Clause 13.02-1S via the incorporation of the recommended BAL construction standards and commensurate separation distances. Other fire mitigation measures would include maintaining the open space, parkland, waterways and sporting facilities in a low threat state, providing a hydrant network, providing adequate access for emergency vehicles throughout the precinct and providing a 22-metre-wide rolling front buffer around any new buildings during the construction phase.

It should be noted that the current assessment evaluates the bushfire risk from the surrounding landscape to inform the design of the Bannockburn Growth Plan Investigation Area, which is limited in its commentary on access and egress opportunities, water supply and internal road network provisions. It is understood that future assessments, likely conducted at the subdivision and design stage, will provide further commentary as to how future subdivisions will implement the recommended bushfire mitigation measures.

Furthermore, as part of any future subdivision, classified vegetation will potentially be required to be groundtruthed and further investigation may be required to determine the relevant bushfire mitigation measures and appropriate BAL construction standards in response to classified vegetation. Furthermore, it is understood that if dwellings are constructed within the Bushfire Management Overlay, located within the study area along the western boundary (Attachment 5), a Bushfire Management Statement must be produced to effectively respond to Clause 44.06 Bushfire Planning and mitigate the higher level of bushfire threat. Future developments within the BPA and BMO may also be required to submit a Bushfire Management Plan which addresses the mitigation measures to effectively respond to classified vegetation within the study area during construction.

## 7 REFERENCES

---

- CFA 2006. *Requirements for Water Supply and Access for Subdivisions in Residential 1 and 2 and Township Zones*. Country Fire Authority, Burwood East, Victoria.
- DELWP 2019. VicPlan Map [www Document]. URL: <https://mapshare.maps.vic.gov.au/vicplan/>. Victorian Department of Environment, Land, Water and Planning, Melbourne, Victoria.
- Golden Plains Shire 2019. Municipal Fire Management Plan 2018 – 2021 Golden Plains Shire, October 3<sup>rd</sup>, 2017 (Version 3.0) with CFA Amendments September 2019 (Version 3.1). Golden Plains Shire, Victoria.
- Google Earth Pro 7.3, 2019. Bannockburn Growth Plan Investigation Area (centred) 38°03'38.27" S 144°09'40.00" E, elevation 104 metres, viewed between 05-02-2020 and 30-04-2020.
- Grampians Regional Strategic Fire Management Planning Committee 2010. Grampians Regional Strategic Fire Management Plan, November 2010.
- Standards Australia 2018. *AS 3959:2018 Construction of buildings in bushfire-prone areas*. SAI Global Limited, Sydney, New South Wales.
- VPA 2020. Bannockburn Growth Plan Project Introduction, Opportunities and Constraints February 2020 Newsletter. Victorian Planning Authority and Golden Plains Shire, Victoria.

## 8 ATTACHMENTS

---



## Legend

- Study Area
- 20km Landscape Assessment Zone
- Railway
- Freeway
- Major Road
- Collector Road
- Minor Watercourse
- Major Watercourse
- Permanent Waterbody
- Land Subject to Inundation
- Wetland/Swamp

## Attachment 1 Bushfire Hazard Landscape Assessment Bannockburn Structure Plan



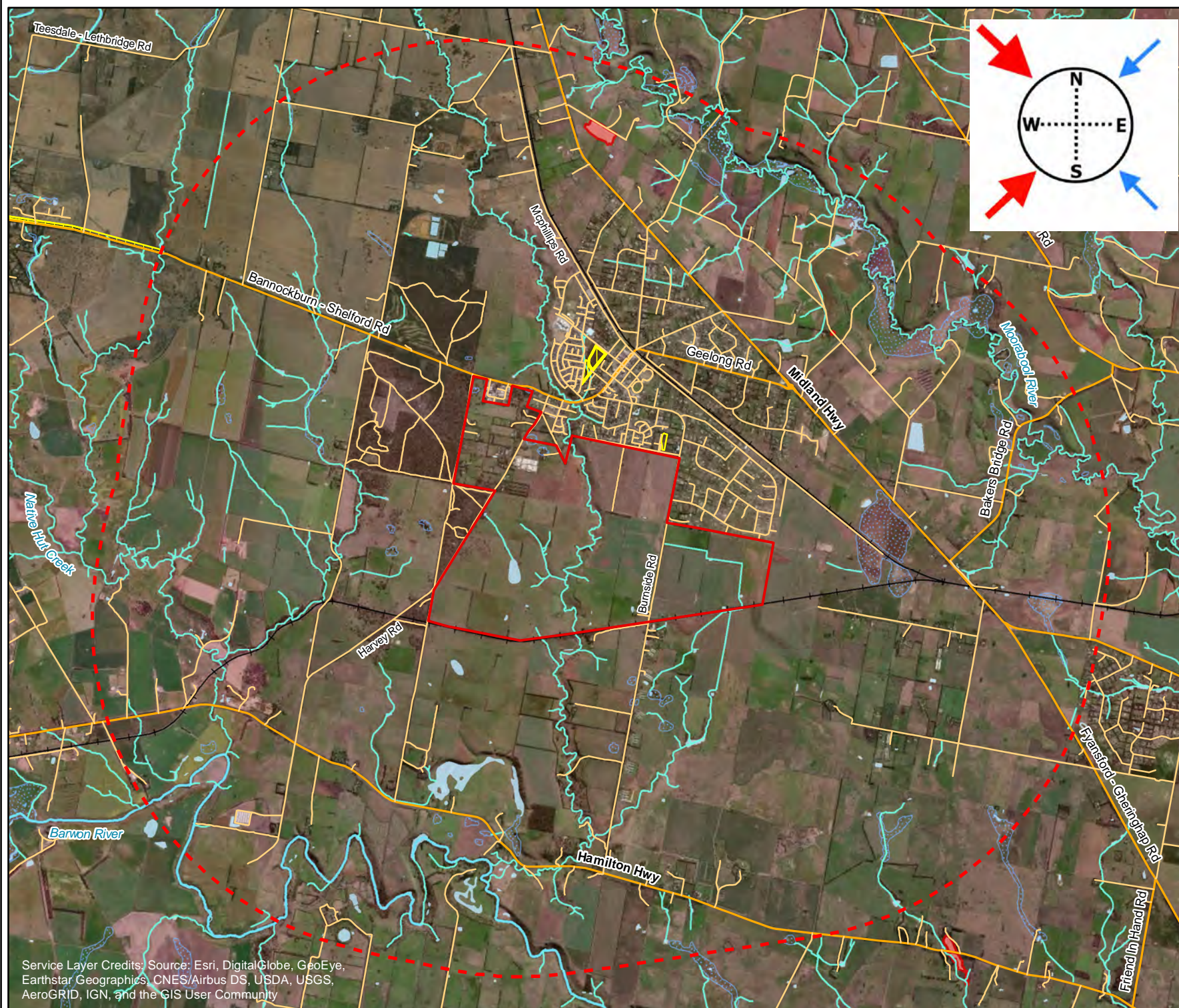
Map Scale: 1:250,000 @ A4  
Coordinate System: GDA2020 MGA Zone 54



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.

13530\_1\_LS\_Assessment\_G20 2/04/2020 psorensen

Service Layer Credits: Source: Esri, Digital Globe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



## Legend

- Study Area
- 5km Landscape Assessment Zone

## Other features

- Major and collector roads
- Minor roads
- Permanent Waterbody
- Land Subject to Inundation

## Fire History

- Bushfires since 2000
- DELWP Planned Burn Area (2017-2019)

## Attachment 2 Fire History and Neighbourhood Safer Place Assessment *Bannockburn Structure Plan*

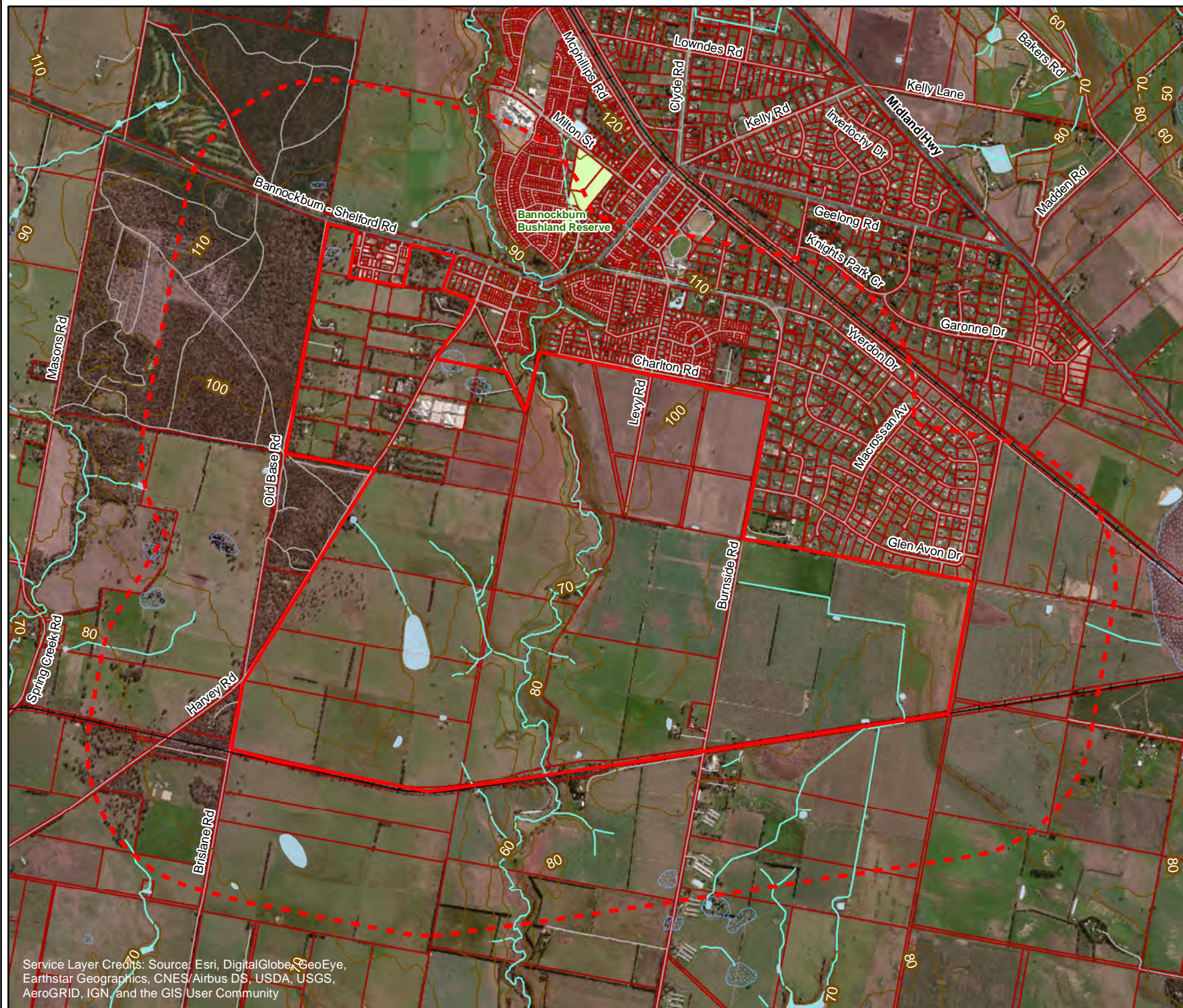


Map Scale: 1:75,000 @ A4  
Coordinate System: GDA2020 MGA Zone 54



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.

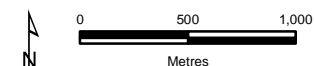
13530\_2\_NH\_Assessment\_G20 12/03/2020 lroy



## Legend

- Study Area
- 1km Site Assessment Area
- Other features**
- Property boundaries
- Permanent Waterbody
- Land Subject to Inundation
- Minor Watercourse
- Contour (10m)
- Major Road
- Collector Road
- Minor Road
- Proposed Road
- Walking Track
- Parks and Reserves

## Attachment 3 Bushfire Hazard Local Assessment Bannockburn Structure Plan



Map Scale: 1:35,000 @ A4  
Coordinate System: GDA2020 MGA Zone 54



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.

13530\_3\_Local\_Assessment\_G20 2/04/2020 psorensen

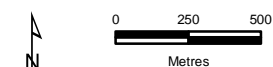
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



## Legend

- Study Area
- 400m Site Assessment Area
- Other features**
- Property boundaries
- Permanent Waterbody
- Land Subject to Inundation
- Minor Watercourse
- Contour (10m)
- Major Road
- Collector Road
- Minor Road
- Proposed Road
- Walking Track
- Parks and Reserves

## Attachment 4 Bushfire Hazard Neighbourhood Assessment *Bannockburn Structure Plan*

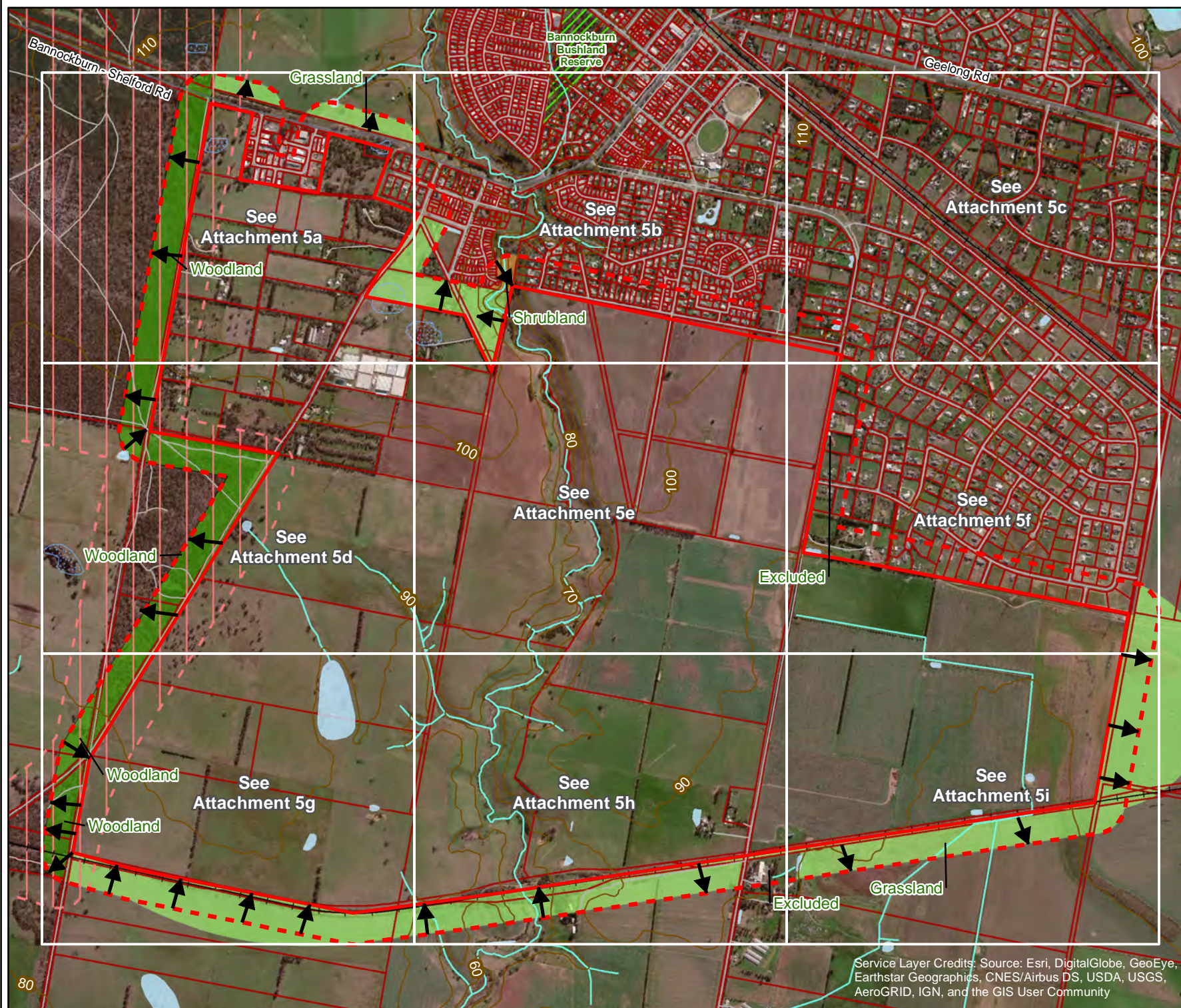


Map Scale: 1:26,000 @ A4  
Coordinate System: GDA2020 MGA Zone 54



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

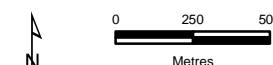
VicMap Data: The State of Victoria does not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that the State of Victoria shall bear no responsibility or liability whatsoever for any errors, faults, defects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



## Legend

- Study Area
- 150m Site Assessment Area
- Bushfire Management Overlay
- Slope arrows
- Other features**
- Property boundaries
- Permanent Waterbody
- Land Subject to Inundation
- Minor Watercourse
- Contour (10m)
- Major Road
- Collector Road
- Minor Road
- Walking Track
- Parks and Reserves
- Classified Vegetation**
- Grassland
- Shrubland
- Woodland

## Attachment 5 Overview Bushfire Hazard Desktop Assessment Bannockburn Structure Plan Site Size: 1127.12 ha



Map Scale: 1:24,500 @ A4  
Coordinate System: GDA2020 MGA Zone 54



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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.

13530\_5\_Desktop\_Assessment\_G20\_MB 2/04/2020 psorensen



## Legend

- Study Area
- 150m Site Assessment Area
- Bushfire Management Overlay

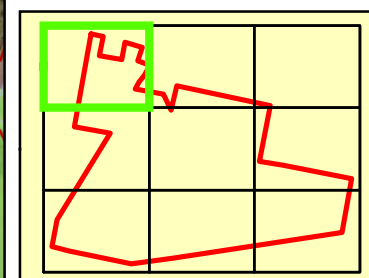
Slope arrows

## Other features

- Property boundaries
- Permanent Waterbody
- Land Subject to Inundation
- Minor Watercourse
- Contour (10m)
- Collector Road
- Minor Road

## Classified Vegetation

- Grassland
- Woodland

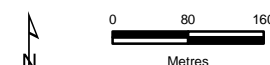


## Attachment 5a

### Bushfire Hazard Desktop Assessment

*Bannockburn Structure Plan*

Site Size: 1127.12 ha



Map Scale: 1:8,000 @ A4  
Coordinate System: GDA2020 MGA Zone 54



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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.

13530\_5 Desktop Assessment\_G20\_MB 2/04/2020 psorensen



## Legend

- Study Area
- 150m Site Assessment Area
- Slope arrows

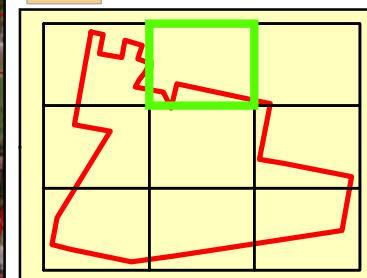
## Other features

- Property boundaries
- Permanent Waterbody
- Land Subject to Inundation
- Minor Watercourse
- Contour (10m)
- Collector Road
- Minor Road
- Walking Track

- Parks and Reserves

## Classified Vegetation

- Grassland
- Shrubland

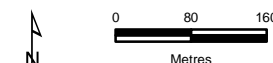


## Attachment 5b

### Bushfire Hazard Desktop Assessment

*Bannockburn Structure Plan*

Site Size: 1127.12 ha



Map Scale: 1:8,000 @ A4  
Coordinate System: GDA2020 MGA Zone 54

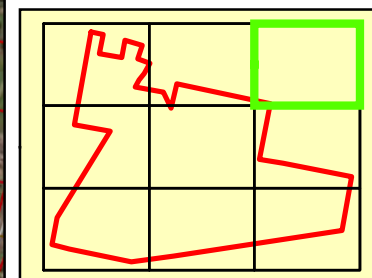


Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

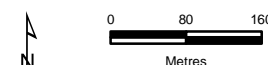
VicMap Data: The State of Victoria does not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that the State of Victoria shall bear no responsibility or liability whatsoever for any errors, faults, defects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



- Legend**
- Study Area
  - 150m Site Assessment Area
  - Other features**
  - Property boundaries
  - Permanent Waterbody
  - ~ Contour (10m)
  - Major Road
  - Collector Road
  - Minor Road



**Attachment 5c**  
**Bushfire Hazard Desktop**  
**Assessment**  
*Bannockburn Structure Plan*  
 Site Size: 1127.12 ha



Map Scale: 1:8,000 @ A4  
 Coordinate System: GDA2020 MGA Zone 54



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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
- 150m Site Assessment Area
- Bushfire Management Overlay

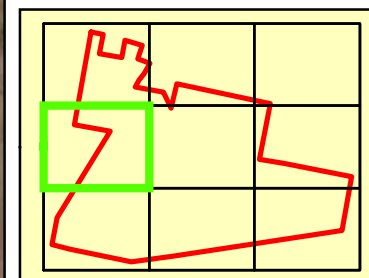
→ Slope arrows

## Other features

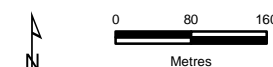
- Property boundaries
- Permanent Waterbody
- Land Subject to Inundation
- Minor Watercourse
- Contour (10m)
- Minor Road

## Classified Vegetation

- Woodland



## Attachment 5d Bushfire Hazard Desktop Assessment Bannockburn Structure Plan Site Size: 1127.12 ha



Map Scale: 1:8,000 @ A4  
Coordinate System: GDA2020 MGA Zone 54



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

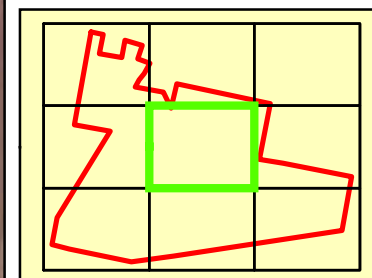
VicMap Data: The State of Victoria does not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that the State of Victoria shall bear no responsibility or liability whatsoever for any errors, faults, defects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



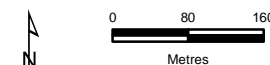
Excluded

## Legend

- Study Area
- 150m Site Assessment Area
- Other features**
- Property boundaries
- Permanent Waterbody
- Land Subject to Inundation
- Minor Watercourse
- Contour (10m)
- Minor Road
- Classified Vegetation**
- Grassland



## Attachment 5e Bushfire Hazard Desktop Assessment *Bannockburn Structure Plan* Site Size: 1127.12 ha



Map Scale: 1:8,000 @ A4  
Coordinate System: GDA2020 MGA Zone 54



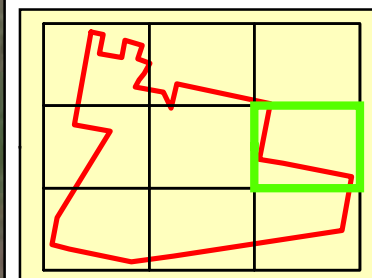
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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.

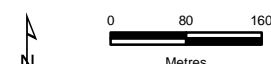
13530\_5\_Desktop\_Assessment\_G20\_MB 2/04/2020 psorensen



- Legend**
- Study Area
  - 150m Site Assessment Area
  - Slope arrows
- Other features**
- Property boundaries
  - Permanent Waterbody
  - Minor Watercourse
  - Contour (10m)
  - Minor Road
- Classified Vegetation**
- Grassland



**Attachment 5f**  
**Bushfire Hazard Desktop**  
**Assessment**  
*Bannockburn Structure Plan*  
 Site Size: 1127.12 ha



Map Scale: 1:8,000 @ A4  
 Coordinate System: GDA2020 MGA Zone 54



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

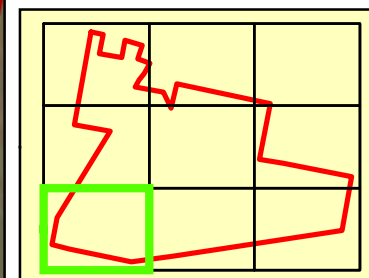
VicMap Data: The State of Victoria does not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that the State of Victoria shall bear no responsibility or liability whatsoever for any errors, faults, defects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

13530\_5 Desktop Assessment\_G20\_MB 2/04/2020 psorensen

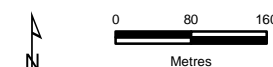


## Legend

- Study Area
- 150m Site Assessment Area
- Bushfire Management Overlay
- Slope arrows
- Other features**
- Property boundaries
- Permanent Waterbody
- Minor Watercourse
- Contour (10m)
- Minor Road
- Classified Vegetation**
- Grassland
- Woodland



## Attachment 5g Bushfire Hazard Desktop Assessment *Bannockburn Structure Plan* Site Size: 1127.12 ha

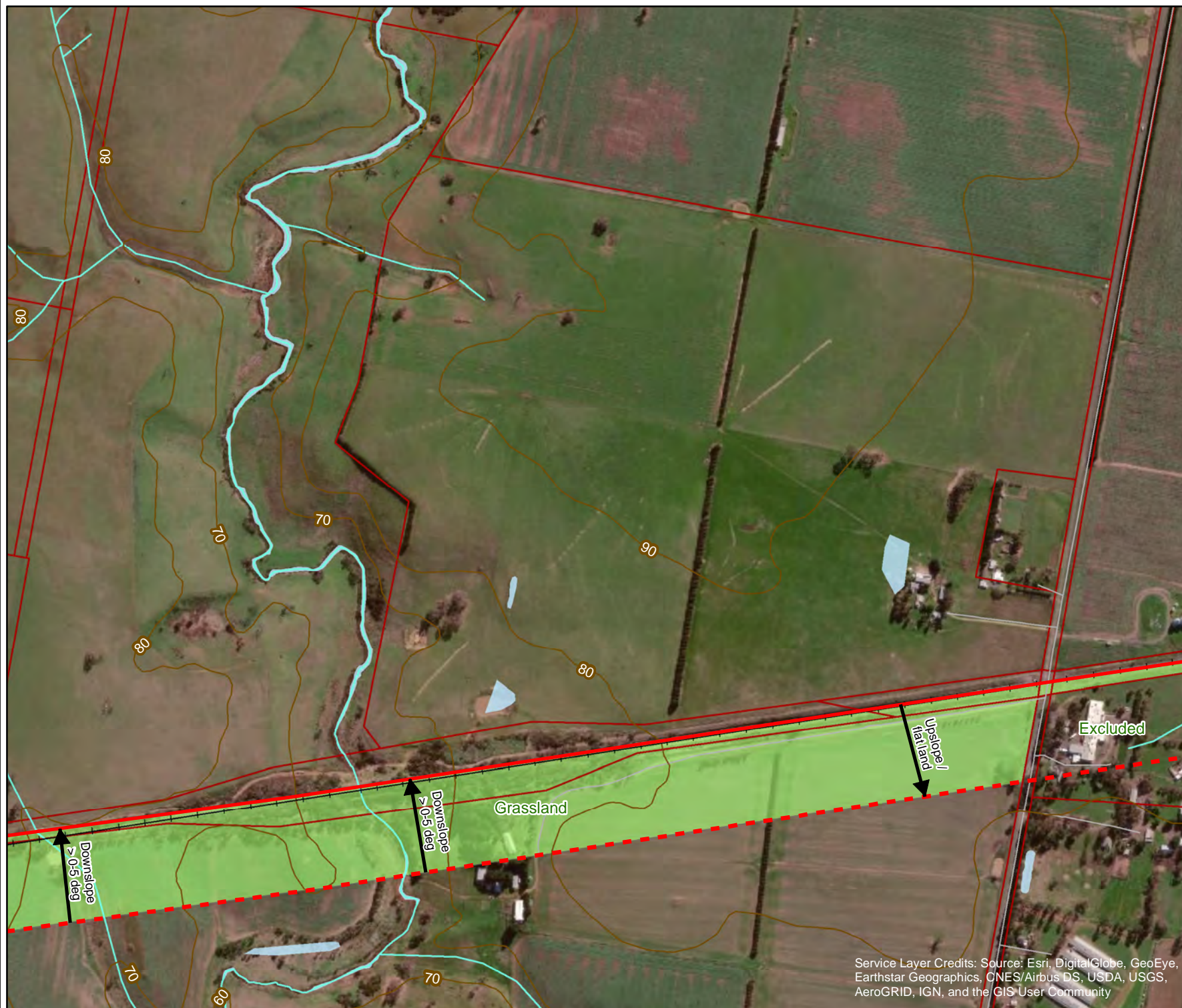


Map Scale: 1:8,000 @ A4  
Coordinate System: GDA2020 MGA Zone 54



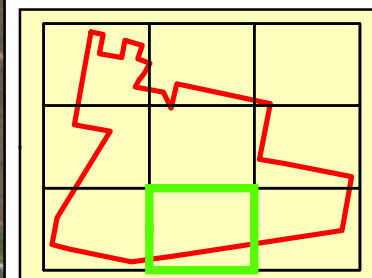
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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.

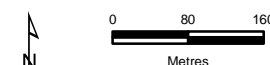


## Legend

- Study Area
- 150m Site Assessment Area
- Slope arrows
- Other features**
- Property boundaries
- Permanent Waterbody
- Minor Watercourse
- Contour (10m)
- Minor Road
- Classified Vegetation**
- Grassland



## Attachment 5h Bushfire Hazard Desktop Assessment Bannockburn Structure Plan Site Size: 1127.12 ha



Map Scale: 1:8,000 @ A4  
Coordinate System: GDA2020 MGA Zone 54



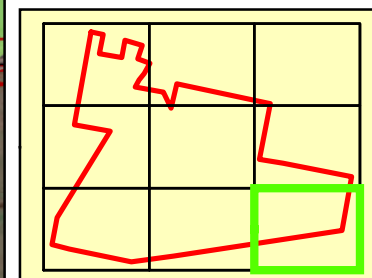
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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.

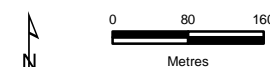


## Legend

- Study Area
- 150m Site Assessment Area
- Slope arrows
- Other features**
- Property boundaries
- Permanent Waterbody
- Minor Watercourse
- Contour (10m)
- Minor Road
- Classified Vegetation**
- Grassland



## Attachment 5i Bushfire Hazard Desktop Assessment *Bannockburn Structure Plan* Site Size: 1127.12 ha

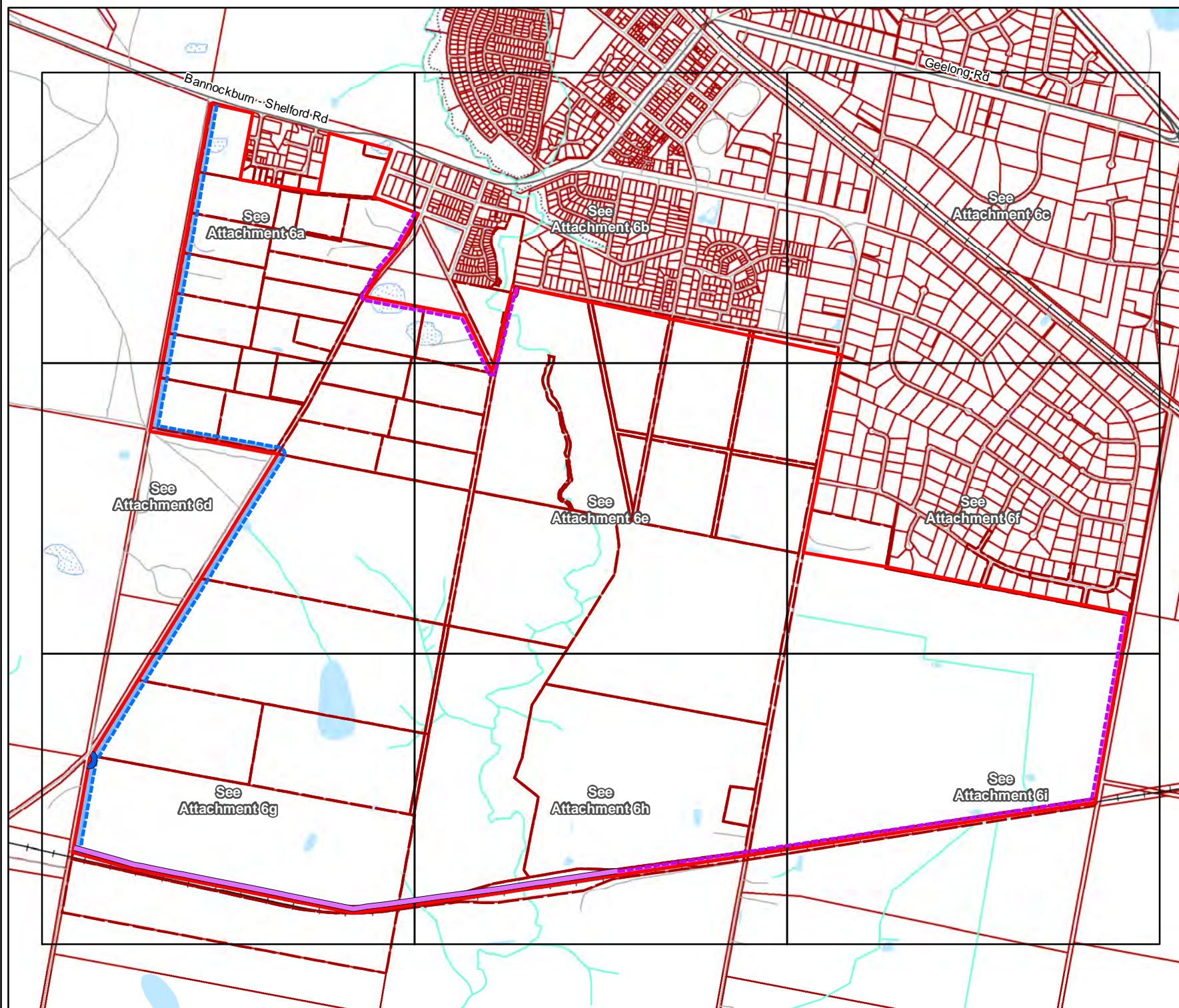


Map Scale: 1:8,000 @ A4  
Coordinate System: GDA2020 MGA Zone 54



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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
- Property

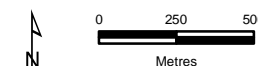
## BAL-12.5 separation distances

- Grassland > 19m (Upslope/Flat land)
- Grassland > 22m (Downslope >0-5 degrees)
- Shrubland > 19m (Upslope/Flat land)
- Shrubland >22m (Downslope >0-5 degrees)
- Woodland > 33m (Upslope / Flat land)
- Woodland > 41m (Downslope >0-5 degrees)

## Other features

- Property boundaries
- Permanent Waterbody
- Land Subject to Inundation
- Minor Watercourse
- Major Road
- Collector Road
- Minor Road
- Walking Track

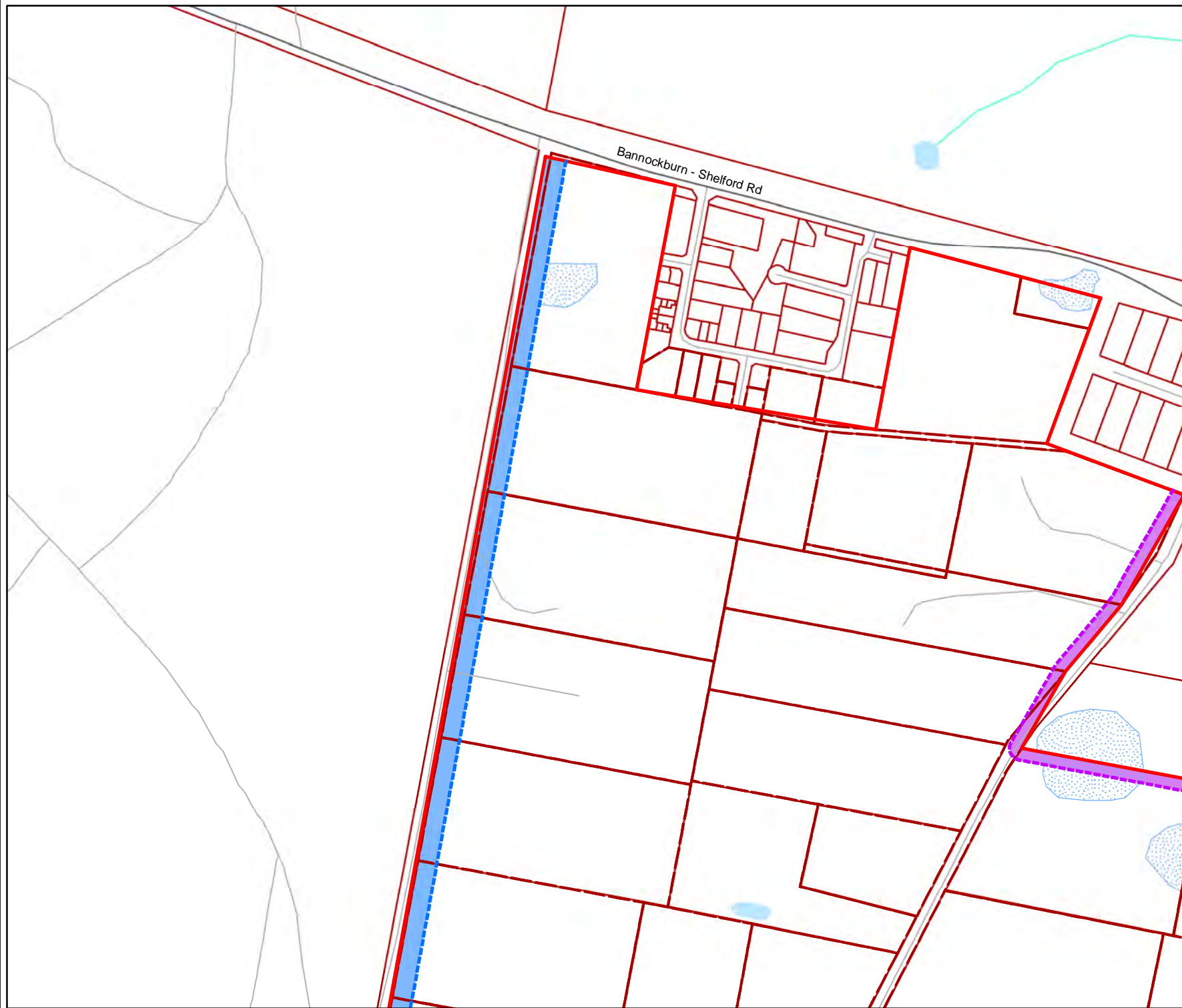
## Attachment 6 Overview Bushfire Management Plan Bannockburn Structure Plan



Map Scale: 1:24,500 @ A4  
Coordinate System: GDA2020 MGA Zone 54



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

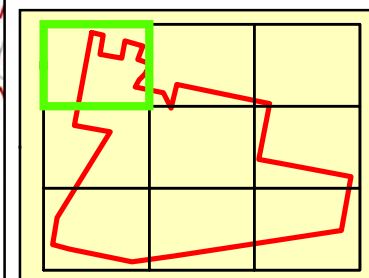
- Study Area
- Property

### BAL-12.5 separation distances

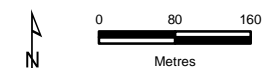
- Grassland > 19m (Upslope/Flat land)
- Woodland > 33m (Upslope / Flat land)

### Other features

- Property boundaries
- Permanent Waterbody
- Land Subject to Inundation
- Minor Watercourse
- Collector Road
- Minor Road



## Attachment 6a Bushfire Management Plan Bannockburn Structure Plan

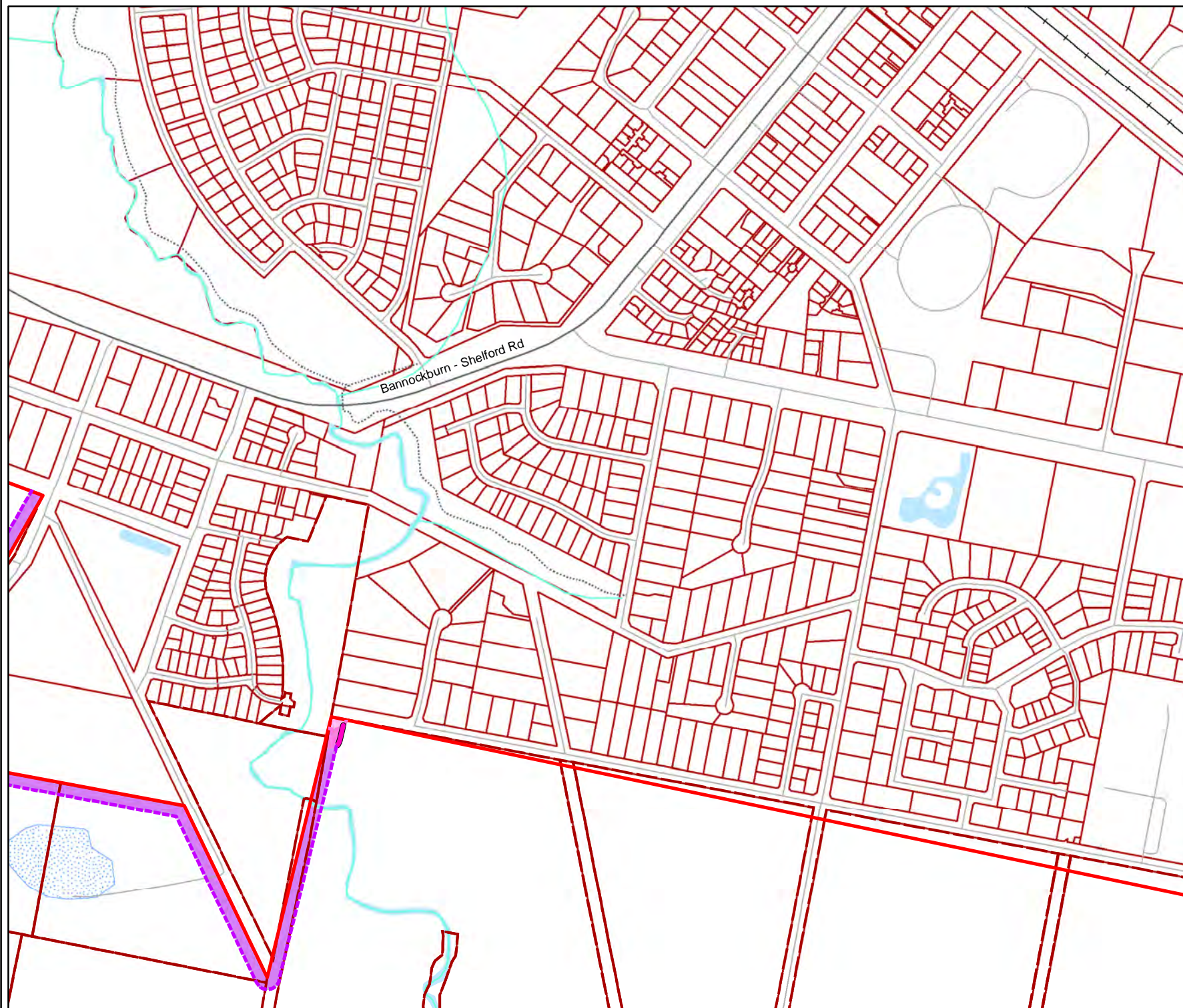


Map Scale: 1:8,000 @ A4  
Coordinate System: GDA2020 MGA Zone 54



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.

13530\_6\_Management\_Plan\_G20\_MB 2/04/2020 psorensen



## Legend

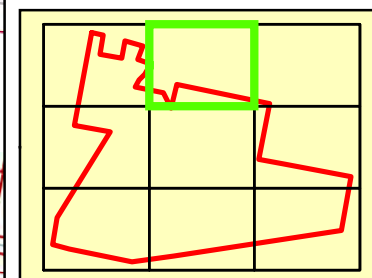
- Study Area
- Property

### BAL-12.5 separation distances

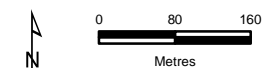
- Grassland > 19m  
(Upslope/Flat land)
- Shrubland > 19m  
(Upslope/Flat land)
- Shrubland >22m (Downslope  
>0-5 degrees)

### Other features

- Property boundaries
- Permanent Waterbody
- Land Subject to Inundation
- Minor Watercourse
- Collector Road
- Minor Road
- Walking Track



## Attachment 6b Bushfire Management Plan Bannockburn Structure Plan

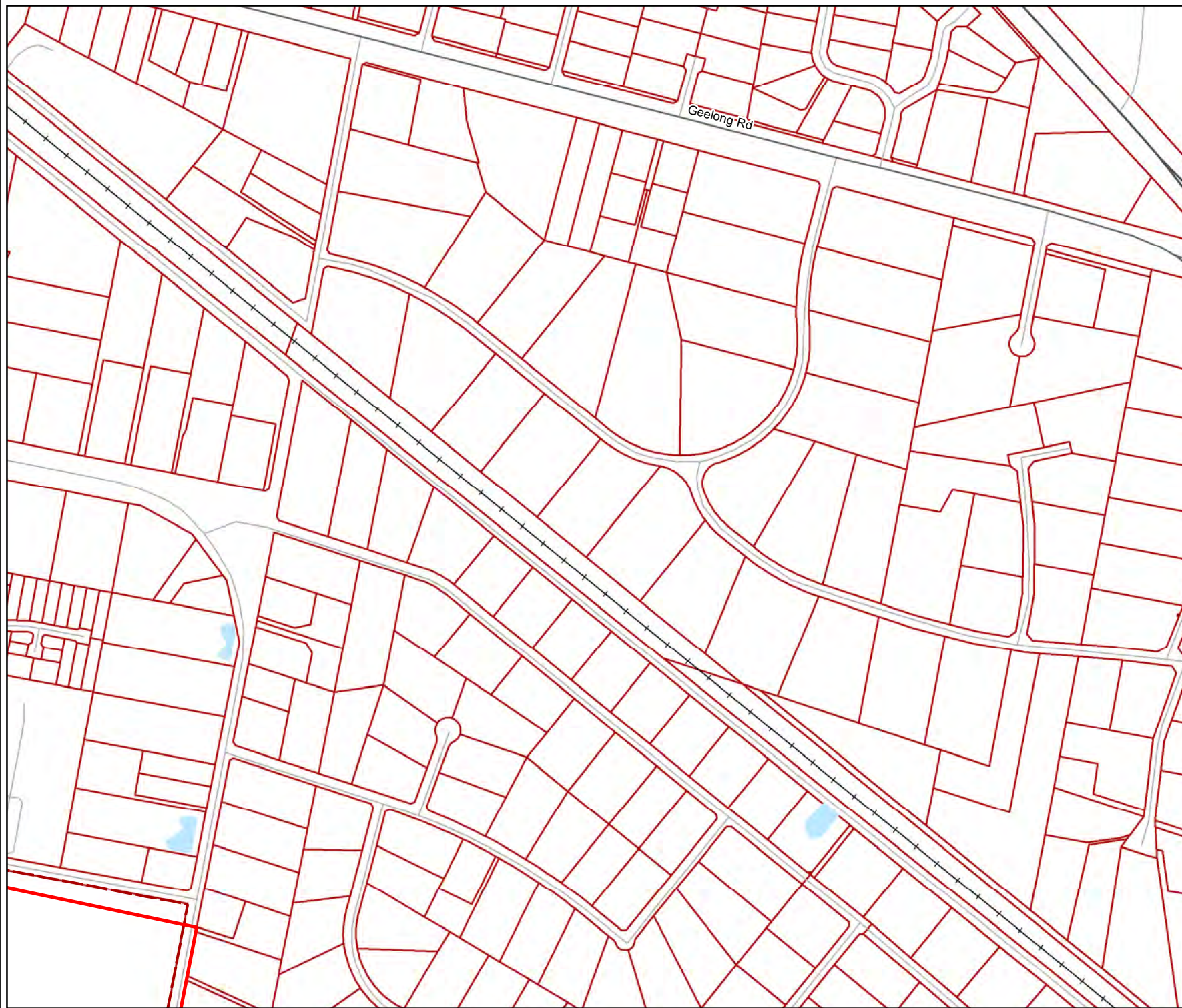


Map Scale: 1:8,000 @ A4  
Coordinate System: GDA2020 MGA Zone 54

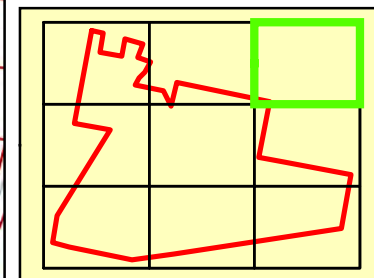


VicMap Data: The State of Victoria does not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that the State of Victoria shall bear no responsibility or liability whatsoever for any errors, faults, defects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

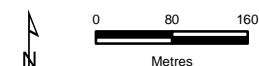
13530\_6\_Management\_Plan\_G20\_MB 2/04/2020 psorensen



- Legend**
- Study Area
  - Property
  - Other features**
  - Property boundaries
  - Permanent Waterbody
  - Major Road
  - Collector Road
  - Minor Road



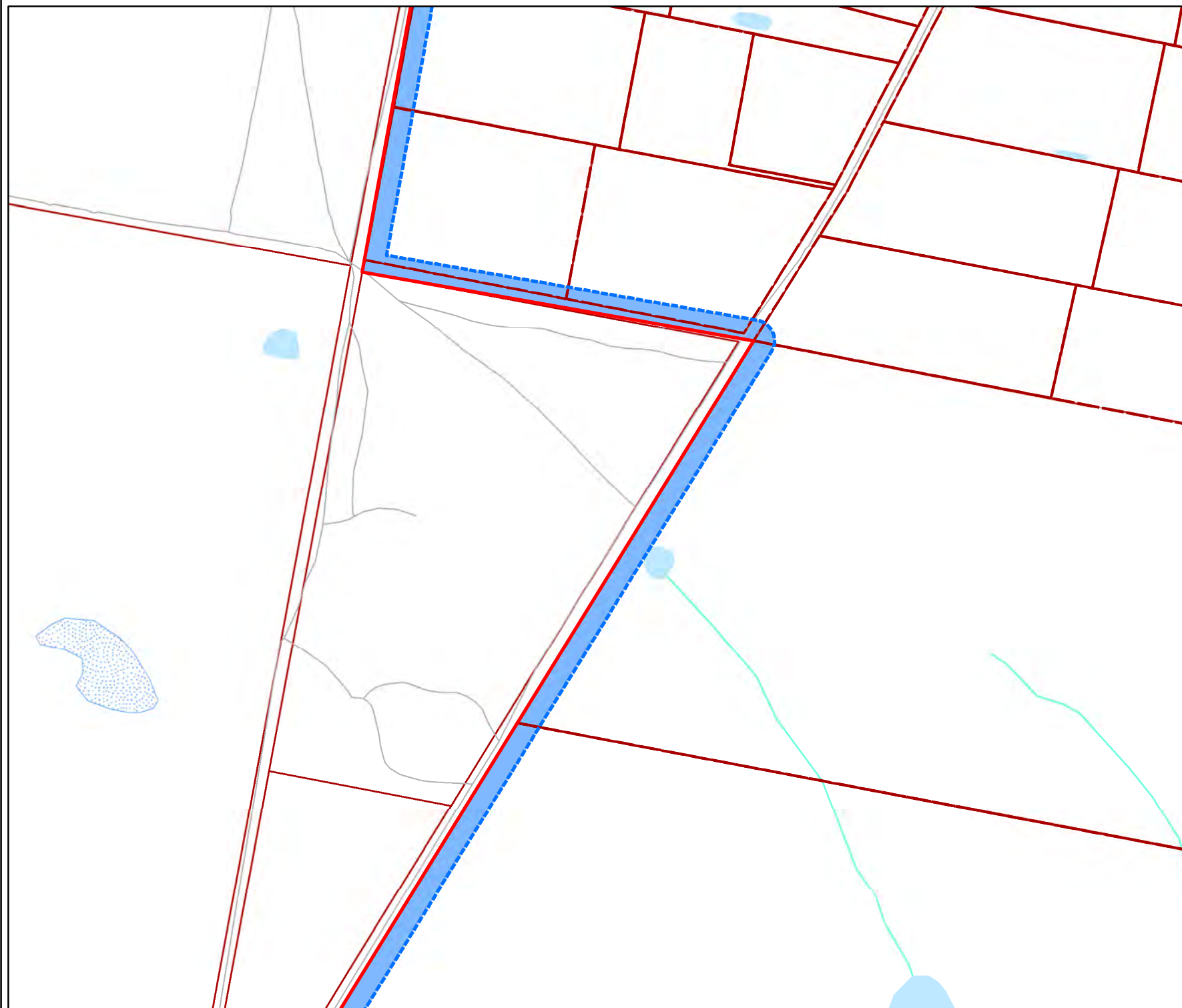
**Attachment 6c**  
**Bushfire Management Plan**  
*Bannockburn Structure Plan*



Map Scale: 1:8,000 @ A4  
Coordinate System: GDA2020 MGA Zone 54



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

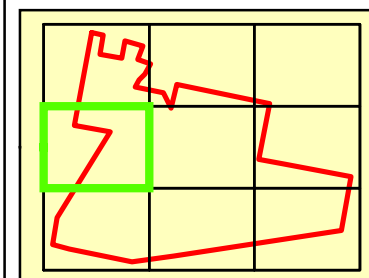
- Study Area
- Property

## BAL-12.5 separation distances

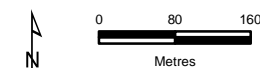
- Woodland > 33m (Upslope / Flat land)

## Other features

- Property boundaries
- Permanent Waterbody
- Land Subject to Inundation
- Minor Watercourse
- Minor Road



## Attachment 6d Bushfire Management Plan Bannockburn Structure Plan

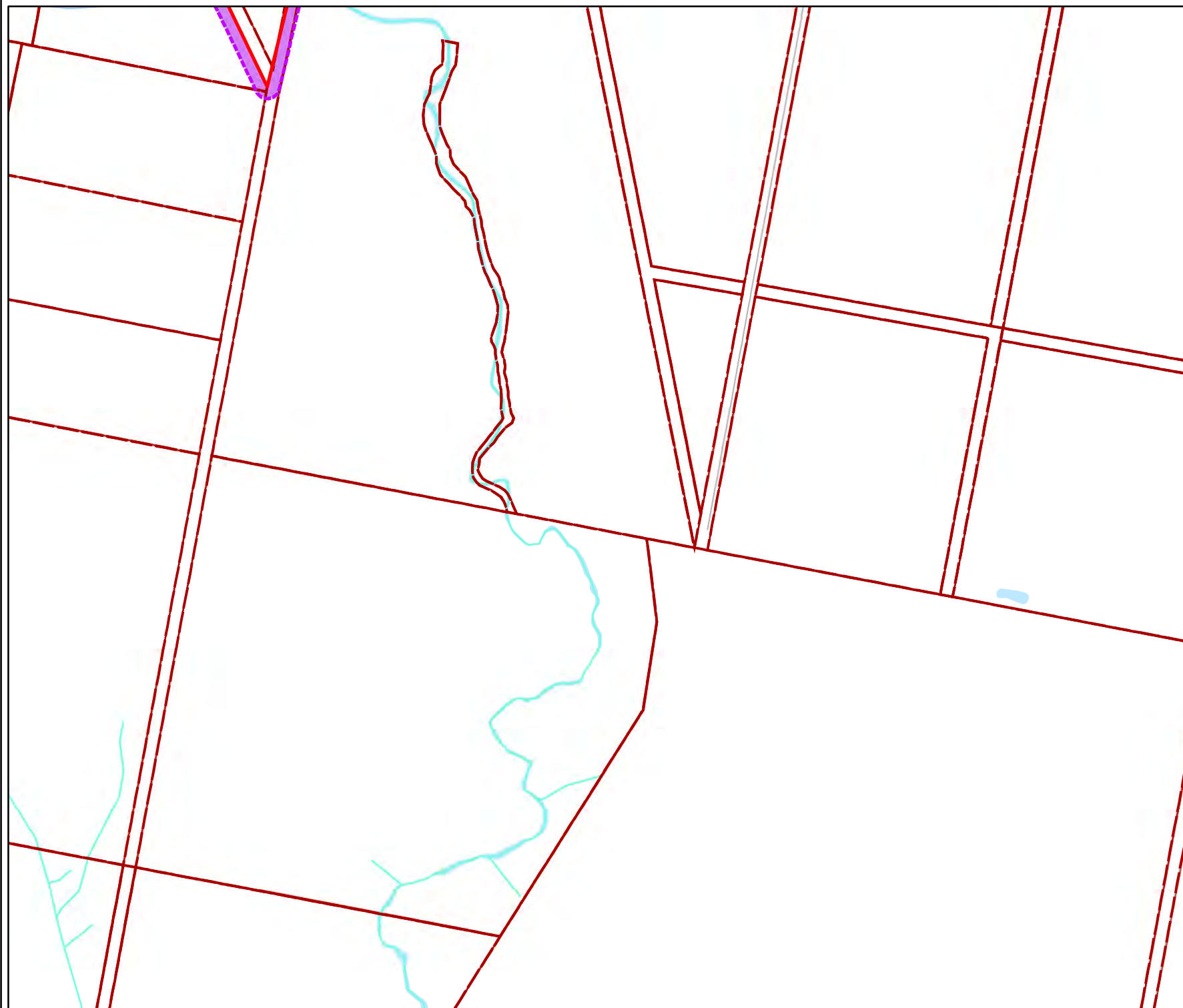


Map Scale: 1:8,000 @ A4  
Coordinate System: GDA2020 MGA Zone 54



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.

13530\_6\_Management\_Plan\_G20\_MB 2/04/2020 psorensen



## Legend

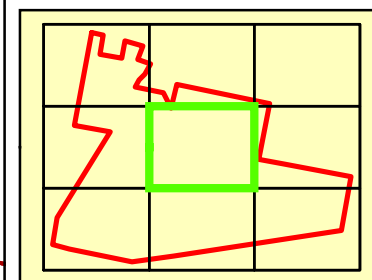
- Study Area
- Property

## BAL-12.5 separation distances

- Grassland > 19m (Upslope/Flat land)

## Other features

- Property boundaries
- Permanent Waterbody
- Land Subject to Inundation
- Minor Watercourse
- Minor Road



## Attachment 6e Bushfire Management Plan *Bannockburn Structure Plan*

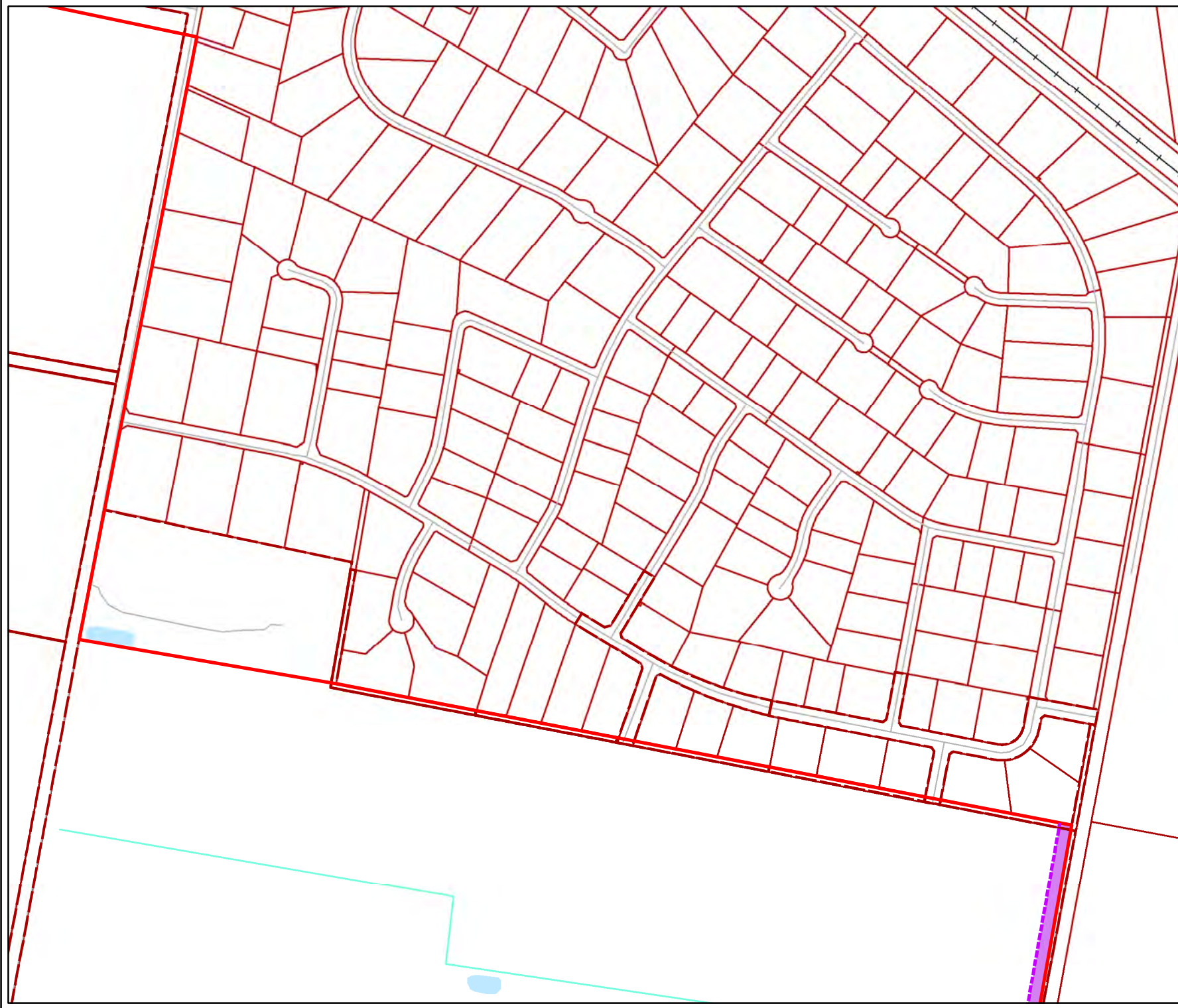


Map Scale: 1:8,000 @ A4  
Coordinate System: GDA2020 MGA Zone 54



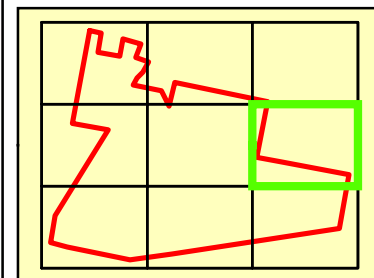
VicMap Data: The State of Victoria does not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that the State of Victoria shall bear no responsibility or liability whatsoever for any errors, faults, defects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

13530\_6\_Management\_Plan\_G20\_MB 2/04/2020 psorensen



## Legend

- Study Area
- Property
- BAL-12.5 separation distances**
  - Grassland > 19m (Upslope/Flat land)
- Other features**
  - Property boundaries
  - Permanent Waterbody
  - Minor Watercourse
  - Minor Road



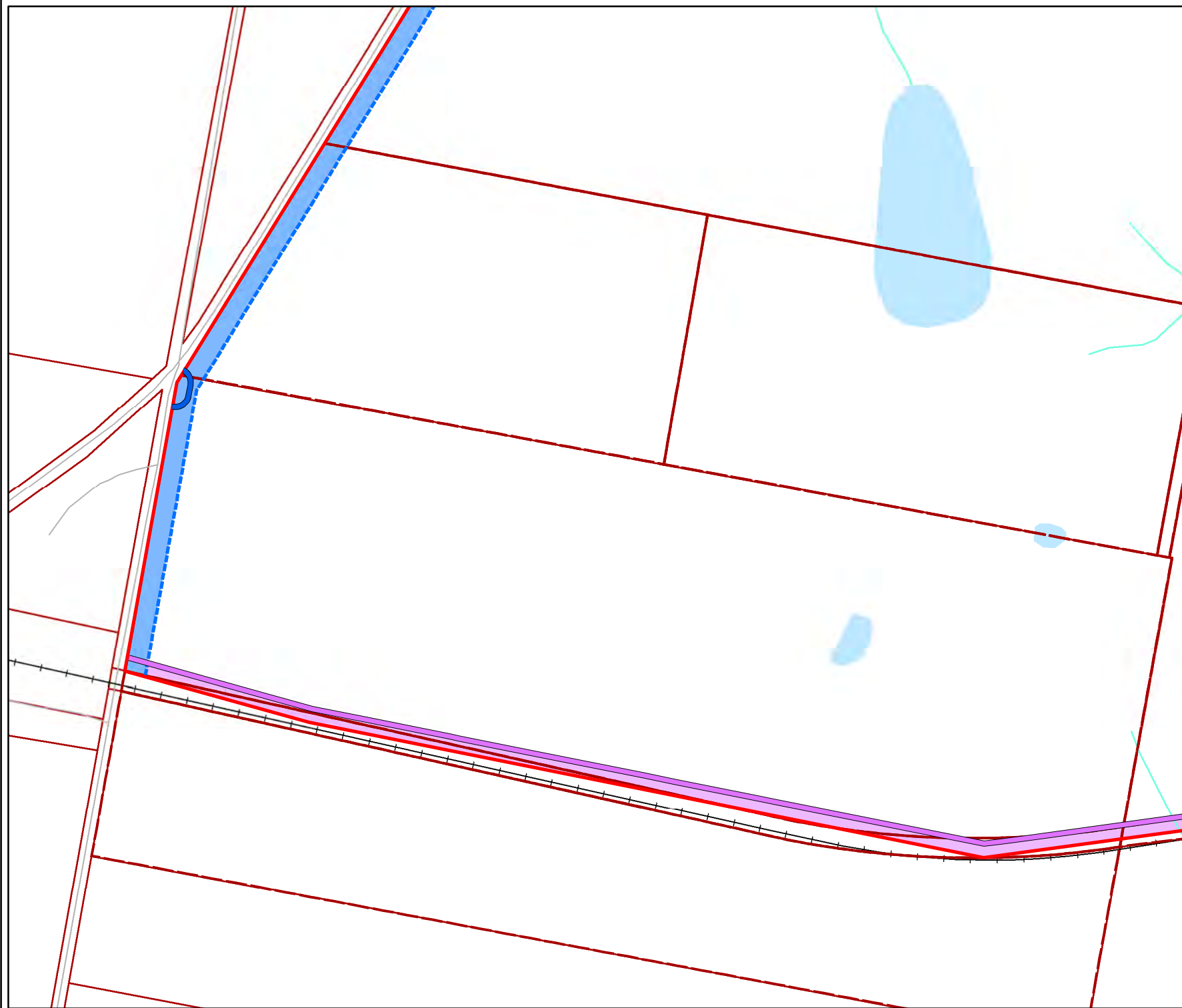
## Attachment 6f Bushfire Management Plan *Bannockburn Structure Plan*



Map Scale: 1:8,000 @ A4  
Coordinate System: GDA2020 MGA Zone 54



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

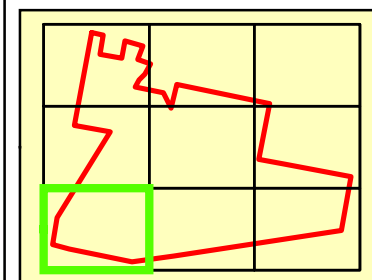
- Study Area
- Property

### BAL-12.5 separation distances

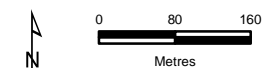
- Grassland > 22m (Downslope >0-5 degrees)
- Woodland > 33m (Upslope / Flat land)
- Woodland > 41m (Downslope >0-5 degrees)

### Other features

- Property boundaries
- Permanent Waterbody
- Minor Watercourse
- Minor Road



## Attachment 6g Bushfire Management Plan *Bannockburn Structure Plan*

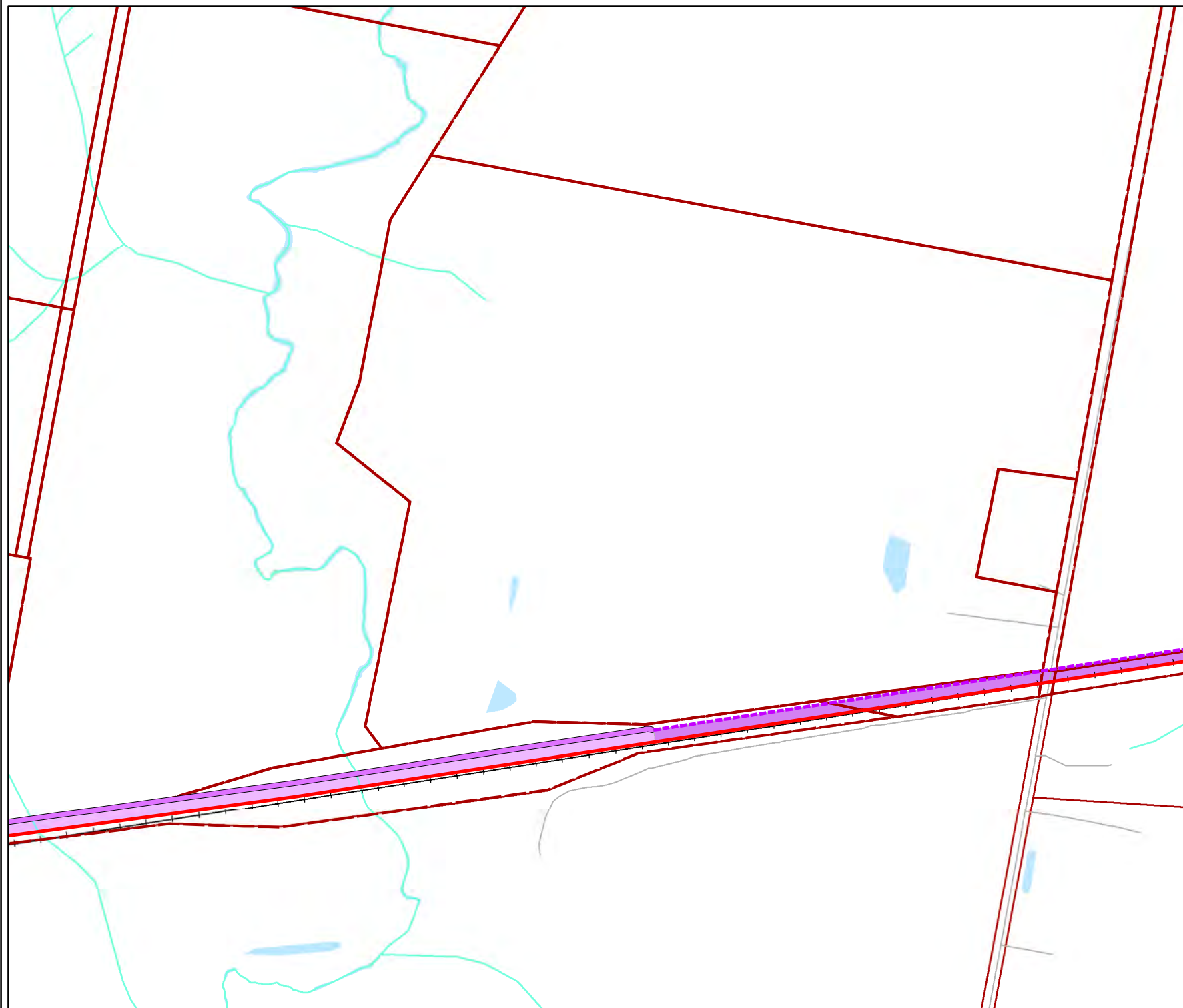


Map Scale: 1:8,000 @ A4  
Coordinate System: GDA2020 MGA Zone 54



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.



13530\_6\_Management\_Plan\_G20\_MB 2/04/2020 psorensen







## Legend

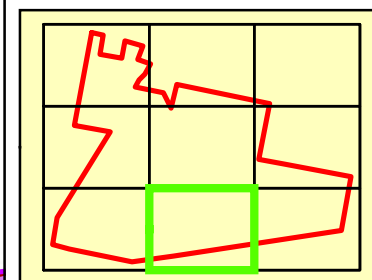
-  Study Area
-  Property

## BAL-12.5 separation distances

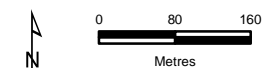
-  Grassland > 19m (Upslope/Flat land)
-  Grassland > 22m (Downslope >0-5 degrees)

## Other features

-  Property boundaries
-  Permanent Waterbody
-  Minor Watercourse
-  Minor Road



## Attachment 6h Bushfire Management Plan *Bannockburn Structure Plan*

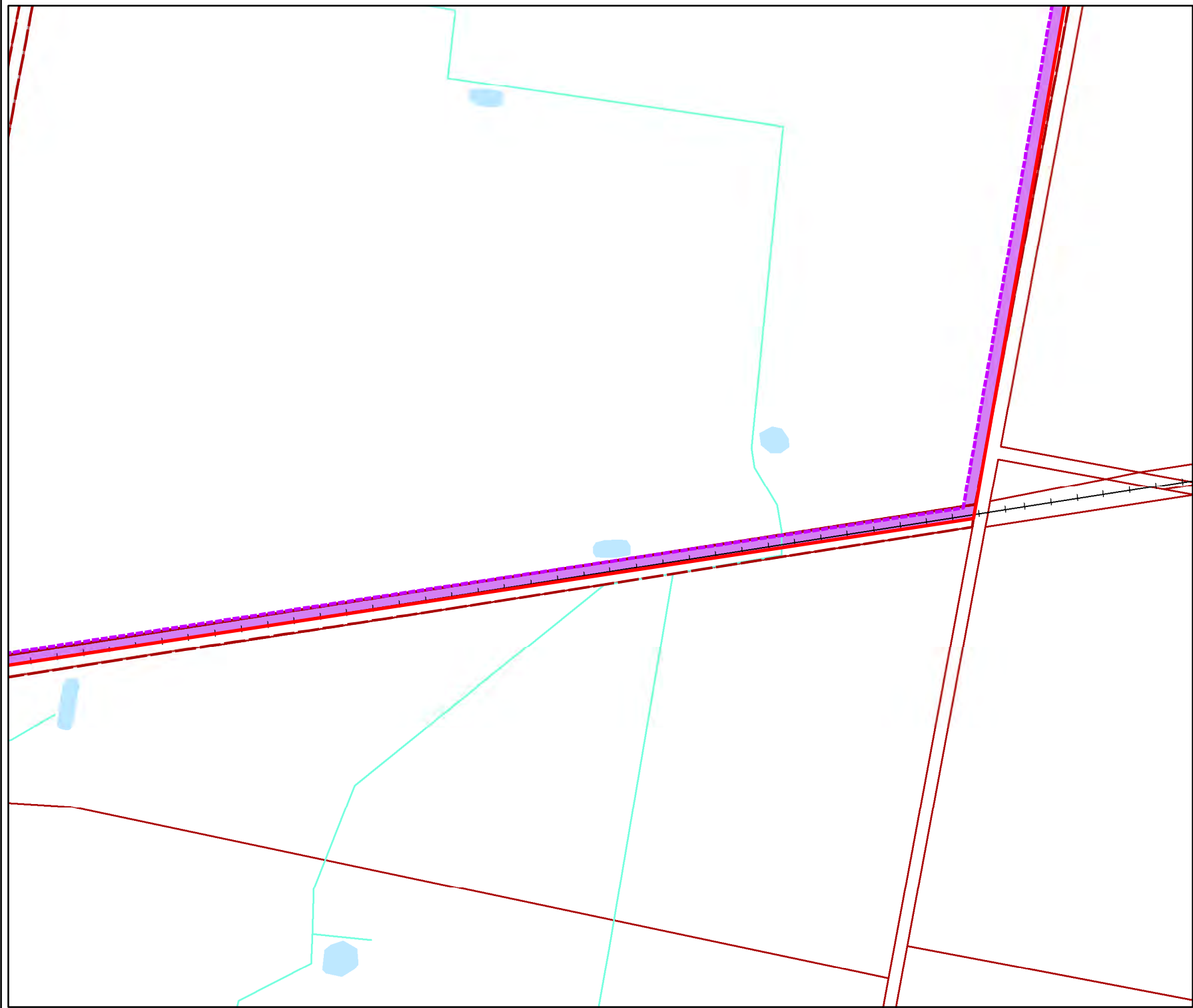


Map Scale: 1:8,000 @ A4  
Coordinate System: GDA2020 MGA Zone 54

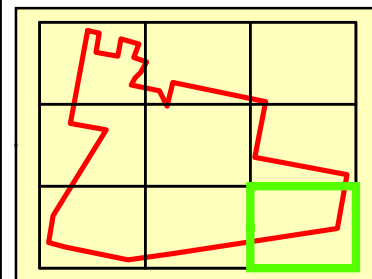


VicMap Data: The State of Victoria does not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that the State of Victoria shall bear no responsibility or liability whatsoever for any errors, faults, defects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

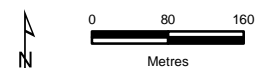
13530\_6\_Management\_Plan\_G20\_MB 2/04/2020 psorensen



- Legend**
- Study Area
  - Property
  - BAL-12.5 separation distances**
    - Grassland > 19m (Upslope/Flat land)
  - Other features**
    - Property boundaries
    - Permanent Waterbody
    - Minor Watercourse
    - Minor Road



**Attachment 6i**  
**Bushfire Management Plan**  
*Bannockburn Structure Plan*



Map Scale: 1:8,000 @ A4  
Coordinate System: GDA2020 MGA Zone 54



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.