



# Bushfire Development Report

for the Beveridge North West  
Precinct Structure Plan

Report prepared for  
the Victorian Planning Authority (VPA)

July 2019

[WWW.TERRAMATRIX.COM.AU](http://WWW.TERRAMATRIX.COM.AU)

Terramatrix project code: VPA-2019-01 Beveridge NW PSP

Cover image: Looking south-southeast across the Beveridge NW PSP.

### Accountability

Stage	Date completed	Name	Title
Site assessment	2019-02-08	Hamish Allan	Manager, Bushfire Planning and Design
Analysis & report preparation	2019-02-21	Hamish Allan	Manager, Bushfire Planning and Design
Peer review	2019-02-22	Jon Boura	Managing Director

### Version Control

Version	Date issued	Comments	Issued by
1.0	2019-02-22	Bushfire Development Report (BDR) to client	Hamish Allan
1.1	2019-07-24	Amended BDR incorporating VPA feedback and responding to CFA comments	Hamish Allan

**Terramatrix Pty. Ltd.**

ACN 129 163 373

ABN 44 129 163 373

PO Box 1391

Collingwood VIC 3066

P: 03 9417 2626

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

**Copyright**

Unless otherwise agreed in writing, this report is the intellectual property of Terramatrix. It is designed to be used exclusively by the person that commissioned it. Permission must be sought prior to the reproduction of any portion of this document and every effort made to ensure proper referencing of this document.

**Disclaimer**

This report may be of assistance to you and has been made with careful consideration and with the best information available to Terramatrix at the time of writing. Before relying on information in this report, users should carefully evaluate the accuracy, completeness and relevance of the information provided for their purposes. Terramatrix Pty Ltd, its directors and employees do not guarantee that it is without flaw or omission of any kind or is wholly appropriate for your particular purposes and therefore disclaim all liability for any error, loss or other consequence that may arise from you relying on any information in this report.

## Contents

<b>1</b>	<b>INTRODUCTION .....</b>	<b>4</b>
<b>2</b>	<b>BUSHFIRE PLANNING AND BUILDING CONTROLS .....</b>	<b>6</b>
2.1	Clause 71.02-3 Integrated Decision Making .....	6
2.2	Clause 13.02 Bushfire .....	6
2.3	Local Planning Policy Framework (LPPF) .....	7
2.4	Bushfire Prone Area (BPA) .....	7
2.5	Other controls .....	9
2.5.1	Zoning .....	9
2.5.2	Overlays .....	10
<b>3</b>	<b>BUSHFIRE HAZARD ASSESSMENT .....</b>	<b>11</b>
3.1	Vegetation.....	11
3.1.1	Grassland .....	11
3.1.2	Woodland .....	13
3.1.3	Excluded vegetation and non-vegetated areas.....	18
3.2	Topography .....	19
3.3	Fire weather .....	22
3.4	Landscape assessment.....	23
3.4.1	Location description and context.....	23
3.4.2	Landscape risk.....	23
3.4.3	Regional bushfire risk assessments and plans .....	28
<b>4</b>	<b>PLANNING AND DESIGN RESPONSE .....</b>	<b>30</b>
4.1	BAL construction standard.....	30
4.1.1	Small areas of Woodland or other classified vegetation .....	30
4.2	Drainage reserves.....	33
4.3	Perimeter Roads.....	33
4.3.1	Old Sydney Road Interface.....	34
4.4	Clause 13.02 Bushfire .....	36
4.4.1	Protection of human life strategies .....	36
4.4.2	Bushfire hazard identification and assessment strategies.....	37
4.4.3	Settlement planning strategies.....	40

4.4.4	Areas of high biodiversity conservation value .....	41
4.4.5	Use and development control in a Bushfire Prone Area.....	42
<b>5</b>	<b>CONCLUSION.....</b>	<b>43</b>
<b>6</b>	<b>APPENDIX - BALS EXPLAINED.....</b>	<b>45</b>
<b>7</b>	<b>REFERENCES .....</b>	<b>46</b>

### **Summary of key findings**

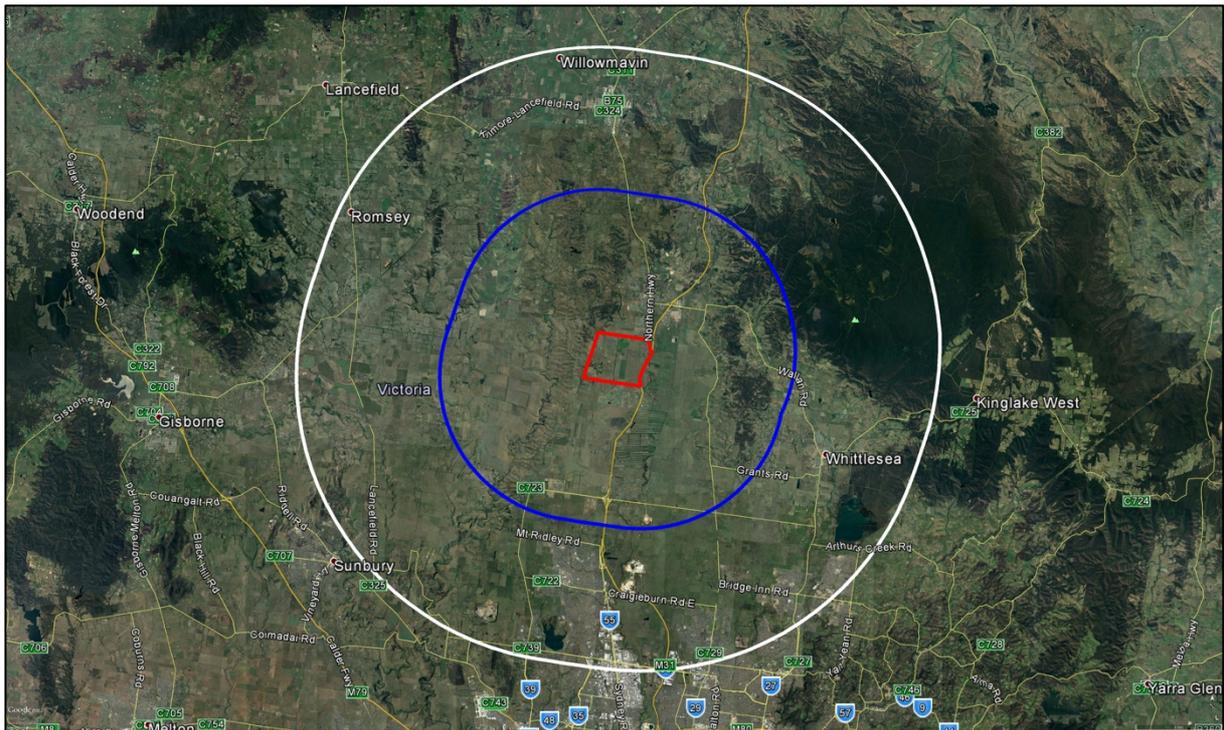
- *The Beveridge North West PSP area is in a relatively low-moderate bushfire risk location. The risk will lessen as development in and around the precinct occurs.*
- *Future dwellings in the precinct, and other buildings requiring a BAL, should be able to be sufficiently setback from classified vegetation to enable a BAL-12.5 construction standard.*
- *The BAL-12.5 setbacks required in response to Grassland and Woodland are 19m and 33m respectively.*
- *No setbacks will be needed from smaller or isolated areas of unmanaged vegetation that lack connectivity with larger areas and meet one or more of the exclusion criteria for low threat vegetation in AS 3959-2018.*
- *At this stage in the precinct planning process it is not possible to be certain about the exact location, size or future state of all vegetation in the precinct, and hence, the definitive location and extent of applicable setbacks required.*
- *As development in the precinct commences, this level of detail can be resolved and finalised through the subdivision and development approvals process. i.e. the final details about future areas of classifiable vegetation and appropriate development setbacks from them, can be defined as part of the planning permit and building approvals stage of precinct development.*
- *The proposed planning scheme amendment giving effect to the PSP, will include an application requirement that all subdivision/development permits provide a Site Management Plan that addresses bushfire risk during, and where necessary, after construction, which is approved by the Responsible Authority.*
- *A perimeter road should be provided between future development and the Hilltops and Spring Hill Reserves to the north. The complex interface with Hilltops Reserve should be simplified. This is especially warranted due to the hazard being to the northwest, from where it is more likely a bushfire may approach under severe or higher fire weather conditions.*
- *Where possible a service road should be considered adjacent and parallel to the Old Sydney Road reserve to ensure sufficient separation from dwellings on lots fronting the service road/Old Sydney Road.*
- *The creation of lots that back onto the Old Sydney Road reserve or any other large area of hazardous vegetation, should be avoided.*
- *The CFA have been consulted by reviewing and commenting on a draft version of this Bushfire Development Report. Their input and feedback have been incorporated into this report and will further inform the final PSP.*

# 1 Introduction

This Bushfire Development report has been prepared for the Victorian Planning Authority (VPA), to assess how the proposed development of the Beveridge North West Precinct Structure Plan (BNWPSP) area between Old Sydney Road and the Hume Freeway, Beveridge VIC 3753, can respond to the bushfire risk and the applicable Victorian planning and building controls that relate to bushfire, in particular the objective and applicable strategies of the Planning Policy Framework (PPF) at Clause 13.02 *Bushfire* in the Victoria Planning Provisions (Mitchell Planning Scheme, 2018a).

The precinct is in a designated Bushfire Prone Area (BPA). BPAs are those areas subject to or likely to be subject to bushfires, as determined by the Minister for Planning. Higher hazard land within a BPA that may be subject to extreme bushfire behaviour, is covered by the Bushfire Management Overlay (BMO). No part of the precinct is affected by the BMO.

The VPA are currently preparing the draft BNWPSP. The BNWPSP area comprises approximately 1,279ha of land in the northern growth corridor of Melbourne, approximately 3km south of Wallan (see Figure 1). The precinct is bound by the Hume Freeway to the east, Old Sydney Road to the west, Camerons Lane to the south, and the Wallan South PSP area to the north (see Figure 2).



**Figure 1 - Beveridge North West PSP area (site in red outline, 10km buffer in blue outline and 20km buffer in white outline).**

The precinct is anticipated to accommodate a residential community of approximately 30,000 people and provide a series of parks, sporting reserves, primary schools, a secondary school, community facilities, and four local town centres (see Figure 2) (VPA, 2014; VPA, 2018).

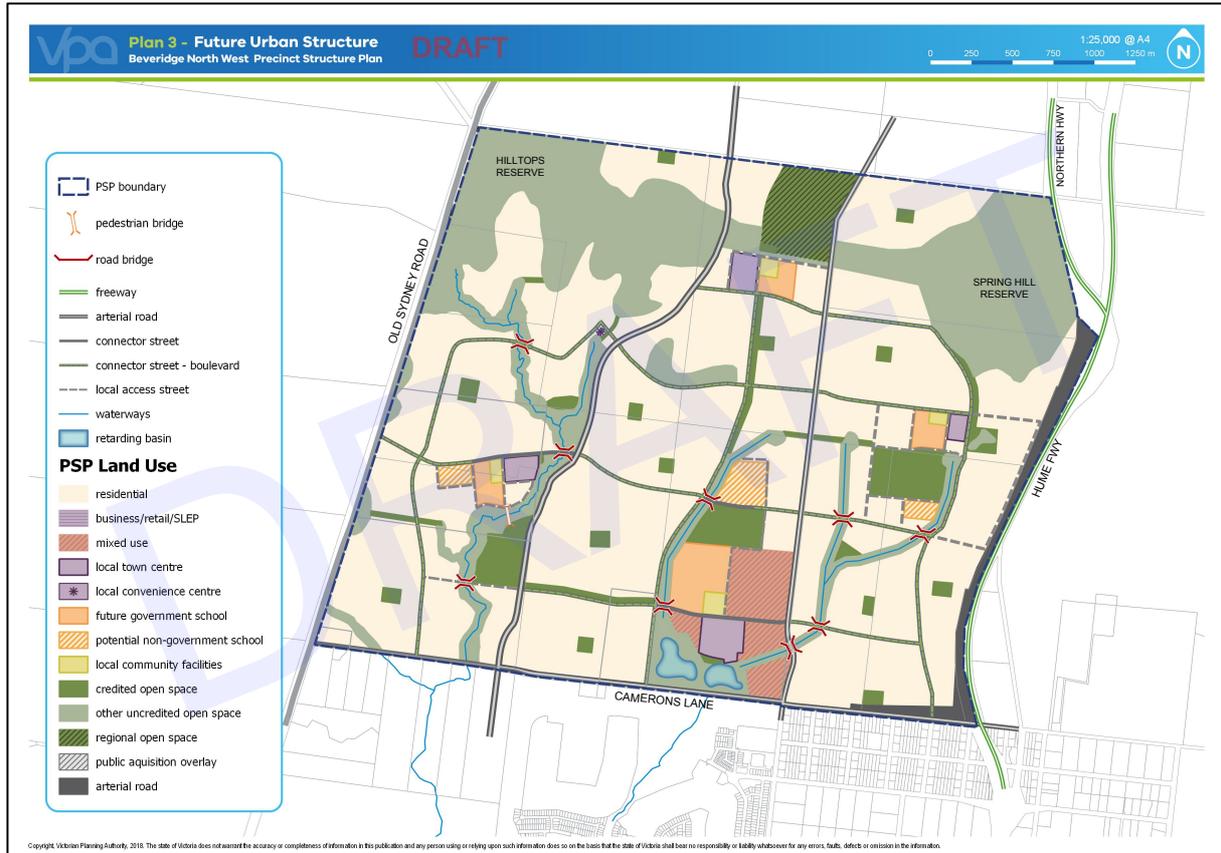


Figure 2 - BNWSPS Draft Future Urban Structure (VPA, 2018).

This report assesses the bushfire hazard and identifies how development of the precinct can appropriately mitigate any bushfire risk, and respond to and comply with the applicable bushfire planning and building controls. It has been prepared in accordance with applicable guidance for the assessment of, and response to, bushfire risk, provided in:

- *Bushfire State Planning Policy Amendment VC140*, Planning Advisory Note 68 (DELWP, 2018a);
- *Local planning for bushfire protection*, Planning Practice Note 64 (DELWP, 2015a);
- *Planning Permit Applications Bushfire Management Overlay Technical Guide* (DELWP, 2017);
- and
- *AS 3959-2018 Construction of buildings in bushfire prone areas* (Standards Australia, 2018).

## 2 Bushfire planning and building controls

This section summarises the applicable planning and building controls that relate to bushfire. Section 4 describes how planning and design for the PSP can respond to and comply with the controls.

### 2.1 Clause 71.02-3 Integrated Decision Making

Clause 71.02-3 states that planning and responsible authorities should endeavour to integrate policies and balance conflicting objectives in favour of net community benefit and sustainable development. However, in bushfire affected areas, the protection of human life must be prioritised over all other policy considerations (Mitchell Planning Scheme, 2018b).

### 2.2 Clause 13.02 Bushfire

Clause 13.02 has the objective '*To strengthen the resilience of settlements and communities to bushfire through risk based planning that prioritises the protection of human life*' (Mitchell Planning Scheme, 2018a). The policy must be applied to all planning and decision making under the Planning and Environment Act 1987, relating to land which is:

- Within a designated Bushfire Prone Area;
- Subject to a Bushfire Management Overlay; or
- Proposed to be used or developed in a way that may create a bushfire hazard.

Clause 13.02 requires priority to be given to the protection of human life by:

- '*Prioritising the protection of human life over all other policy considerations.*
- '*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.*
- '*Reducing the vulnerability of communities to bushfire through consideration of bushfire risk in decision-making at all stages of the planning process*' (Mitchell Planning Scheme, 2018a).

Key strategies are stipulated in Clause 13.02, which require that strategic planning documents, planning scheme amendments and development plan approvals properly assess bushfire risk and include appropriate bushfire protection measures. This also applies to planning permit applications for:

- Subdivisions of more than 10 lots;
- Accommodation;
- Child care centre;
- Education centre;
- Emergency services facility;
- Hospital;
- Indoor recreation facility;
- Major sports and recreation facility;

- Place of assembly; and
- Any application for development that will result in people congregating in large numbers.

Development should not be approved 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'* (Mitchell Planning Scheme, 2018a).

This study assesses the hazard and identifies the bushfire protection measures that will be required for future development in the BNWPSP area. It is considered that development can appropriately prioritise the protection of human life, and meet the objectives of Clause 13.02, by ensuring future dwellings and other development will not be exposed to RHF above 12.5kW/m<sup>2</sup>, which is commensurate with a BAL-12.5 construction standard.

The maximum 12.5kW/m<sup>2</sup> safety threshold is required in settlement planning as the upper limit for acceptable risk. Responsible authorities must *'Not approve 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 3959-2009'* (Mitchell Planning Scheme, 2018a).

A detailed response to the strategies in Clause 13.02 is provided in Section 4.

### 2.3 Local Planning Policy Framework (LPPF<sup>1</sup>)

Clause 21.04-5 *Bushfire* in Mitchell Shire Council's Municipal Strategic Statement (MSS), recognises that extensive areas of the Shire are prone to bushfires. Identified strategies to minimise the risk to life property and the environment are to:

- *'Ensure that the design, siting and layout of subdivision increase protection from fire.*
- *Ensure that use and development include adequate fire protection measures'* (Mitchell Planning Scheme, 2013).

The bushfire hazard to the BNWPSP is limited to Grassland and small areas of Woodland, and it is considered that the existing planning and building controls that relate to bushfire will facilitate an appropriate design response that adequately mitigates the risk and meets the requirements of Clause 21.04-5.

### 2.4 Bushfire Prone Area (BPA)

The entire precinct in a Bushfire Prone Area (BPA) (see Map 5). BPAs are those areas subject to or likely to be subject to bushfire, as determined by the Minister for Planning. Those areas of highest bushfire risk within the BPA are designated as BMO areas.

---

<sup>1</sup> It is noted that the LPPF will be translated into the PPF as the Municipal Planning Strategy, as proposed by VC148 (DELWP, 2018b). However, at the time of preparing this report the LPPF and MSS are components of the Mitchell Planning Scheme.

In a BPA, the Building Act 1993 and associated Building Regulations 2018, through application of the National Construction Code (NCC), require bushfire protection standards for class 1, 2 and 3<sup>2</sup> buildings, 'Specific Use Bushfire Protected Buildings'<sup>3</sup> and associated class 10A buildings<sup>4</sup> or decks. The applicable performance requirement in the NCC is:

*'A building that is constructed in a designated bushfire prone area must, to the degree necessary, be designed and constructed to reduce the risk of ignition from a bushfire, appropriate to the —*

- (a) potential for ignition caused by burning embers, radiant heat or flame generated by a bushfire; and*
- (b) intensity of the bushfire attack on the building'* (ABCB, 2016).

Compliance with AS 3959-2018<sup>5</sup> *Construction of buildings in bushfire prone areas* (Standards Australia, 2018) is 'deemed-to-satisfy' the performance requirement.

Applicable buildings must be constructed to a minimum Bushfire Attack Level (BAL)-12.5, or higher, as determined by a site assessment or planning scheme requirement.

A BAL is a means of measuring the severity of a building's potential exposure to ember attack, radiant heat and direct flame contact. There are six BALs defined in AS 3959-2018, which range from BAL-LOW, which has no bushfire construction requirements to BAL-FZ (Flame Zone) where flame contact with a building is expected (see Appendix 1).

Larger developments and certain vulnerable uses in a BPA (see Section 2.2) are also required by Clause 13.02 *Bushfire* to:

- *'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'* (Mitchell Planning Scheme, 2018a).

There are no significant obstacles to future development in the BNWPSP complying with the applicable strategies at Clause 13.02 and the building regulations invoked by the BPA coverage. Reliably low threat or non-vegetated areas will be created as development progresses, which will likely result in the urbanised parts of the precinct being removed from BPA.

---

<sup>2</sup> Class 1, 2 and 3 buildings are defined in the Building Code of Australia (BCA), and are generally those used for residential accommodation, including houses and other dwellings, apartments, hotels and other buildings with a similar function or use.

<sup>3</sup> Specific Use Bushfire Protected Buildings are defined in the Victorian *Building Regulations 2018*, they generally comprise 'vulnerable' uses and include schools, kindergartens, childcare facilities, aged care facilities and hospitals.

<sup>4</sup> Class 10a buildings are defined in the BCA as non-habitable buildings including sheds, carports, and private garages.

<sup>5</sup> AS 3959-2009 was superseded by AS 3959-2018 in November 2018 and invoked in the NCC in May 2019, therefore, all references in this report to AS 3959 refer to the 2018 version.

DELWP review and excise areas from the BPA approximately every 6 months, particularly in growth areas such as the BNWPSP area, where the hazard will be removed as urban development occurs.

Land becomes eligible for excision if it satisfies statewide hazard mapping criteria, including that the land needs to be:

- At least 300m from areas of classified vegetation (except grassland) larger than 4ha in size; and
- At least 150m from areas of classified vegetation (except grassland) 2 to 4ha in size; and
- At least 60m from areas of unmanaged grassland more than 2ha in size (DELWP, 2015b).

For isolated areas of vegetation greater than 1ha but less than 2ha, the shape of the area and connectivity to any other hazardous vegetation is a further consideration (DELWP, 2015b).

## 2.5 Other controls

### 2.5.1 Zoning

Most of the BNWPSP land is zoned Urban Growth Zone (UGZ), with some areas of Rural Conservation Zone (RCZ) in the north and, to a lesser extent, west of the precinct. The main drainage line through the site is zoned Urban Floodway Zone (UFZ). The existing or potential future zoning does not have any significant bushfire safety implications. Whilst the UGZ, or another urban residential zone, will facilitate more intensive development in a BPA, the existing building and planning controls will be able to appropriately mitigate the relatively low bushfire risk. As identified above, as development progresses, some areas within the precinct will become eligible for excision from the BPA.

It is noted that in many PSP growth areas, UGZ schedules include a requirement that an application for residential subdivision, includes a Site Management Plan that addresses bushfire risk during, and where necessary, after construction, including:

- The staging of development and the likely bushfire risks at each stage;
- An area of land between the development edge and non-urban areas consistent with the separation distances specified in AS 3959-2018, where bushfire risk is managed;
- The land management measures to be undertaken by the developer to reduce the risk from fire within any surrounding rural or undeveloped landscape to protect residents and property from the threat of grassfire and bushfire; and
- How adequate opportunities for access and egress will be provided for early residents, construction workers and emergency vehicles.

Whilst this requirement helps to ensure that bushfire risk is managed during the construction period, larger subdivisions (i.e. >10 lots) should be able to demonstrate bushfire risk will be mitigated in a Clause 13.02 bushfire response/application.

### **2.5.2 Overlays**

Neither existing, nor anticipated future overlay controls, have any appreciable implications for bushfire safety. It is noted that the Bushfire Management Overlay (BMO) applies to some land to the northwest of the precinct, associated with remnant treed vegetation in that direction. The nearest BMO area is, however, at least 250m away. Whilst the BMO coverage reflects the increased hazard associated with the treed vegetation, and is in directions often associated with severe or higher fire danger conditions, the risk is relatively low and is not considered a constraint to future development in the precinct.

Additionally, it is noted that residential parts in the northwest of the precinct would be further setback from the BMO area outside the precinct, by the proposed Hilltop Reserve (see Map 1). Although vegetation in the Hilltop Reserve may itself comprise a bushfire hazard, this is not likely to amount to more than a grassland hazard and the mitigation measures proposed in Section 4 can reduce the risk to an acceptable level.

### 3 Bushfire hazard assessment

One of the bushfire hazard identification and assessment strategies in Clause 13.02 is to use the best available science to identify the hazard posed by vegetation, topographic and climatic conditions.

The basis for the hazard assessment should be:

- *‘Landscape conditions - meaning the conditions in the landscape within 20 kilometres and potentially up to 75 kilometres from a site;*
- *Local conditions - meaning conditions in the area within approximately 1 kilometre from a site;*
- *Neighbourhood conditions - meaning conditions in the area within 400 metres of a site; and*
- *The site for the development’* (Mitchell Planning Scheme, 2018b).

This section includes a bushfire assessment at:

- The wider landscape scale, for at least 20km around the site (see Figure 1 and Map 4);
- The local landscape scale extending up to 1km from the site (see Map 5);
- The neighbourhood scale up to 400m around the precinct boundary to identify any risk arising around the site beyond the BAL assessment zone (see Map 1); and
- The site scale, for 100m around the precinct to determine likely future BALs (see Map 1).

The BPA coverage invokes AS 3959-2018, which requires a site assessment of the vegetation and topography up to 100m around a building, for the purposes of determining the applicable BAL construction standard for that building (Standards Australia, 2018).

#### 3.1 Vegetation

Vegetation within a 100m BAL assessment zone around the site has been classified in accordance with the AS 3959-2018 methodology. Classified vegetation is vegetation that is deemed hazardous from a bushfire perspective.

The classification system is not directly analogous to Ecological Vegetation Classes (EVCs) but uses a generalised description of vegetation based on the AUSLIG (Australian Natural Resources Atlas: No. 7 - Native Vegetation) classification system. The classification is largely based on the structural characteristics of the vegetation at maturity, but the key determinant should be the likely fire behaviour that it will generate.

The classification is based on the current and likely future state of the vegetation according to the proposed future urban structure.

##### 3.1.1 Grassland

The dominant vegetation hazard is Grassland within and around the precinct. Grassland is defined as all forms of vegetation (except Tussock Moorlands) including situations with shrubs and trees, if overstorey foliage cover is less than 10% (includes pasture and cropland) (Standards Australia, 2018).

Grassland is considered hazardous and therefore classifiable, when it is not managed in a minimal fuel condition. Minimal fuel condition means there is insufficient fuel available to significantly increase the severity of the bushfire attack (e.g. short-cropped grass, to a nominal height of 100 mm) (Standards Australia, 2018). Grassland areas should be assumed to be unmanaged and classifiable unless there is ‘reasonable assurance’ that they will be managed in perpetuity, in a low threat state, no more than 100mm high.

The large areas of Grassland that currently occur to the north, east and south of the precinct, are a short to medium term hazard, as the abutting precincts in these directions are proposed to be developed. Most or all of the land to the north, south and east will, therefore, be transformed into non-vegetated areas or areas of low threat vegetation (see Figure 10).

Extensive areas of Grassland to the west and northwest (and Woodland associated with the BMO coverage) are likely to remain in their current state, as this land is beyond the Urban Growth Boundary. It should be noted that vegetation further than 100m from a building is not considered hazardous for determining BALs in accordance with AS 3959-2018.

Any areas of unmanaged Grassland within the precinct will be hazardous and classifiable if they do not meet one or more of the exclusion criteria under which land can be deemed to be non-hazardous (see Section 3.1.3).

It is considered that most, or all, of the proposed Hilltops and Spring Hill Reserves, and potentially, some other reserves if they are not managed in a minimal fuel condition, will comprise classified Grassland. Such areas will need to be sufficiently separated (setback) from future development by low threat or non-vegetated land, i.e. 19m for BAL-12.5 construction of future buildings (see Section 4.1). If natural recruitment over time, and/or active revegetation, occurs within the reserves, they may comprise Woodland, for which greater setbacks for development would be required (see discussion below).



**Figure 3 - Looking northeast from Camerons Lane at Grassland in and beyond the precinct.**



**Figure 4 - Looking east-southeast at Grassland in the proposed Hilltops and Spring Hill Reserves.**



**Figure 5 - Treed vegetation with a grassy understorey to the north of the precinct is classifiable as Grassland if overstorey foliage cover does not exceed 10% and the understorey fuel hazard does not increase significantly as a result of natural recruitment or revegetation.**

### **3.1.2 Woodland**

Areas of tree and shrub vegetation within and around the precinct, where overstorey foliage cover exceeds 10%, may be classifiable within the Woodland group of AS 3959-2018 if they do not meet one or more of the exclusion criteria (see Section 3.1.3). Woodland is defined as vegetation with trees 10-30m tall, 10–30% foliage cover dominated by eucalypts (and/or callitris) with a prominent grassy understorey, and may contain isolated shrubs (Standards Australia, 2018).

Areas of existing Woodland include remnant vegetation along the eastern side of Old Sydney Road, adjacent to the northwestern corner of the precinct (see Map 1 and Figure 6). DELWP extant vegetation mapping identifies this as Ecological Vegetation Class (EVC) No. 22 Grassy Dry Forest, which has a benchmark canopy cover of 30% and is described as:

*'Occurs on a variety of gradients and altitudes and on a range of geologies. The overstorey is dominated by a low to medium height forest of eucalypts to 20m tall, sometimes resembling an open woodland with a secondary, smaller tree layer including a number of Acacia species. The understorey usually consists of a sparse shrub layer of medium height. Grassy Dry Forest is characterised by a ground layer dominated by a high diversity of drought-tolerant grasses and herbs, often including a suite of fern species'* (DSE, 2004a).

Based on the proposed extent of the Hilltops Reserve, this vegetation will be sufficiently distant from future development not to be an influence on BAL construction standards. Whilst it may generate a localised increase in ember attack, the key influence on BALs is likely to be Grassland in the Hilltops Reserve between the Woodland and future buildings.

Planted copses of trees and shrubs along Old Sydney Road, drainage lines and other parts of the precinct are also potentially classifiable as Woodland, if they do not meet one or more of the exclusion criteria for low threat vegetation.



**Figure 6 - Woodland in Old Sydney Road reserve abutting the northwest of the precinct.**



**Figure 7 - Looking west at Woodland abutting the northwest of the precinct along, and on the hills beyond, Old Sydney Road.**



**Figure 8 - Looking north from Camerons Lane along a proposed drainage line reserve, at vegetation that may comprise classified Woodland.**

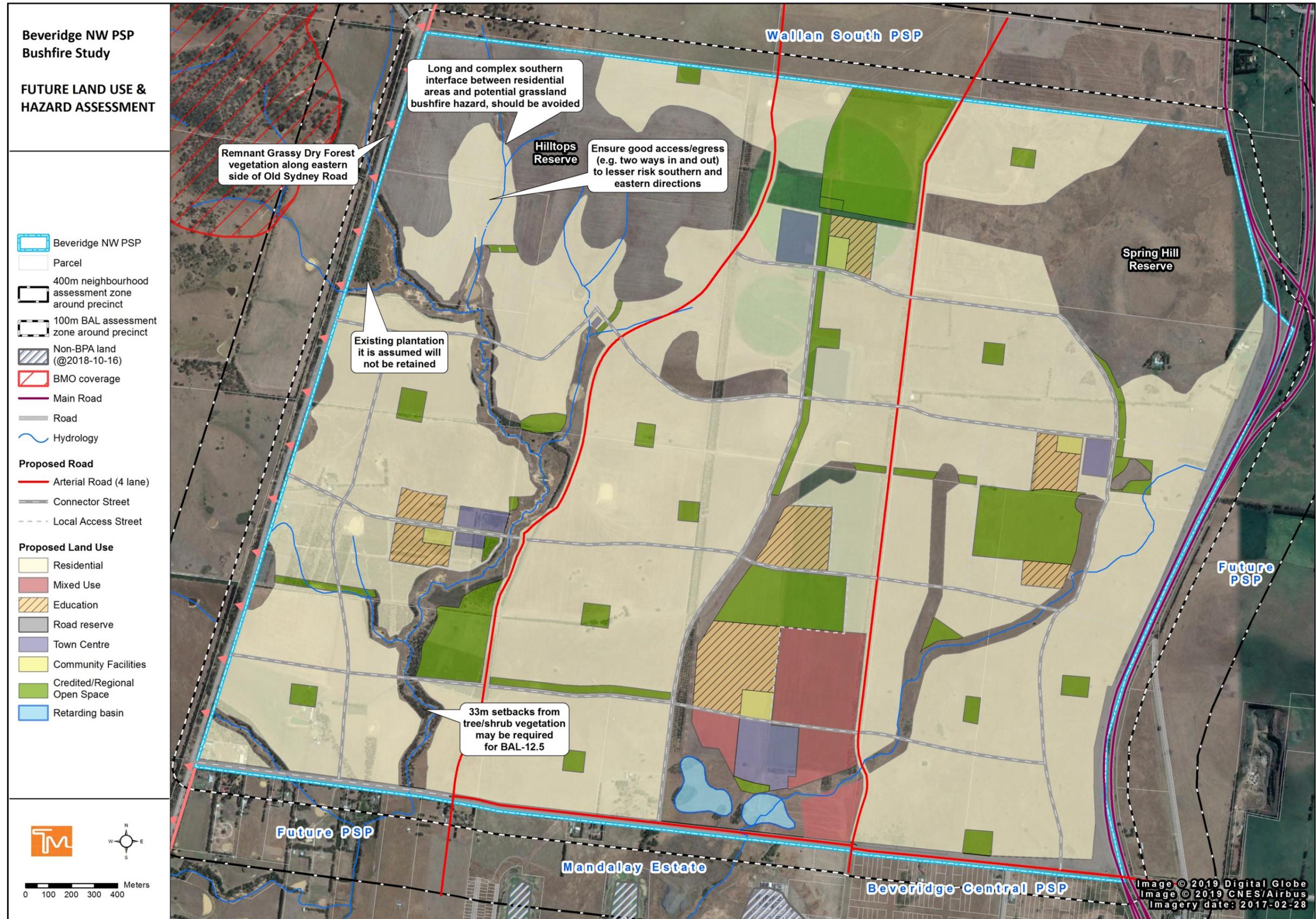


**Figure 9 - Looking north at a planted copse of trees in the proposed retarding basin to the south of the precinct, which may potentially comprise Woodland (or Forest) if it is retained.**

The proposed drainage (or other) reserves may comprise classifiable Grassland (or Woodland or Shrubland) if larger areas of remnant or planted vegetation are retained within them or created through natural recruitment or revegetation. Potentially applicable exclusion criteria that could be applied to ensure classified vegetation does not occur in proximity to buildings, are the small patch criteria for:

- Single areas of vegetation less than 1 ha in area and not within 100m of other areas of classified vegetation;
- Multiple areas of vegetation less than 0.25ha in area and not within 20m of the site/building, or each other, or of other areas of classified vegetation; and
- Strips of vegetation less than 20m in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20m of the site/building or each other, or other areas of classified vegetation.

The proposed retarding basin ponds (see Map 1) or other water sensitive urban design (WSUD) features with reliably open water or wet areas and little or no vegetation may be deemed non-vegetated or low threat. Large, seasonally inundated wetlands or WSUD features that may be dry and vegetated during the fire danger period could, however, comprise classifiable Grassland or Shrubland. Note that the applicable BAL-12.5 setbacks for Shrubland are the same as for Grassland.



Map 1 - Bushfire hazard site and neighbourhood assessment map.

### 3.1.3 Excluded vegetation and non-vegetated areas

Areas of low threat vegetation and non-vegetated areas can be excluded from classification in accordance with Section 2.2.3.2 of AS 3959-2018, if they meet one or more of the following criteria:

- a) *‘Vegetation of any type that is more than 100m from the site.*
- b) *Single areas of vegetation less than 1 ha in area and not within 100m of other areas of vegetation being classified vegetation.*
- c) *Multiple areas of vegetation less than 0.25ha in area and not within 20m of the site, or each other, or of other areas of vegetation being classified vegetation.*
- d) *Strips of vegetation less than 20m in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20m of the site or each other, or other areas of vegetation being classified vegetation.*
- e) *Non-vegetated areas, that is, areas permanently cleared of vegetation, including waterways, exposed beaches, roads, footpaths, buildings and rocky outcrops.*
- f) *Vegetation regarded as low threat due to factors such as flammability, moisture content or fuel load. This includes grassland managed in a minimal fuel condition, mangroves and other saline wetlands, maintained lawns, golf courses (such as playing areas and fairways), maintained public reserves and parklands, sporting fields, vineyards, orchards, banana plantations, market gardens (and other non-curing crops), cultivated gardens, commercial nurseries, nature strips and windbreaks’ (Standards Australia, 2018).*

It is reasonable to assume all future residential areas in the precinct will comprise low threat vegetation with maintained lawns and cultivated gardens. Similarly, it is likely that all of the proposed open space reserves shown in the draft future urban structure as credited or regional open space, will be low threat. Non-vegetated areas will include the roads, driveways and structures.



**Figure 10 – Looking south at development underway to the south of Camerons Lane, which will comprise low threat and non-vegetated land.**

## 3.2 Topography

AS 3959-2018 requires that the 'effective slope' be identified to determine the BAL and applicable vegetation setback distances. This is the slope of the land under the classified vegetation<sup>6</sup> that will most significantly influence the bushfire attack on a building. Two broad types apply:

- Flat and/or Upslope - land that is flat or on which a bushfire will be burning downhill in relation to the development. Fires burning downhill (i.e. on an upslope) will generally be moving more slowly with a reduced intensity.
- Downslope - land under the classified vegetation on which a bushfire will be burning uphill in relation to the development. As the rate of spread of a bushfire burning on a downslope (i.e. burning uphill towards a development) is significantly influenced by increases in slope, downslopes are grouped into five classes in 5° increments from 0° up to 20°.

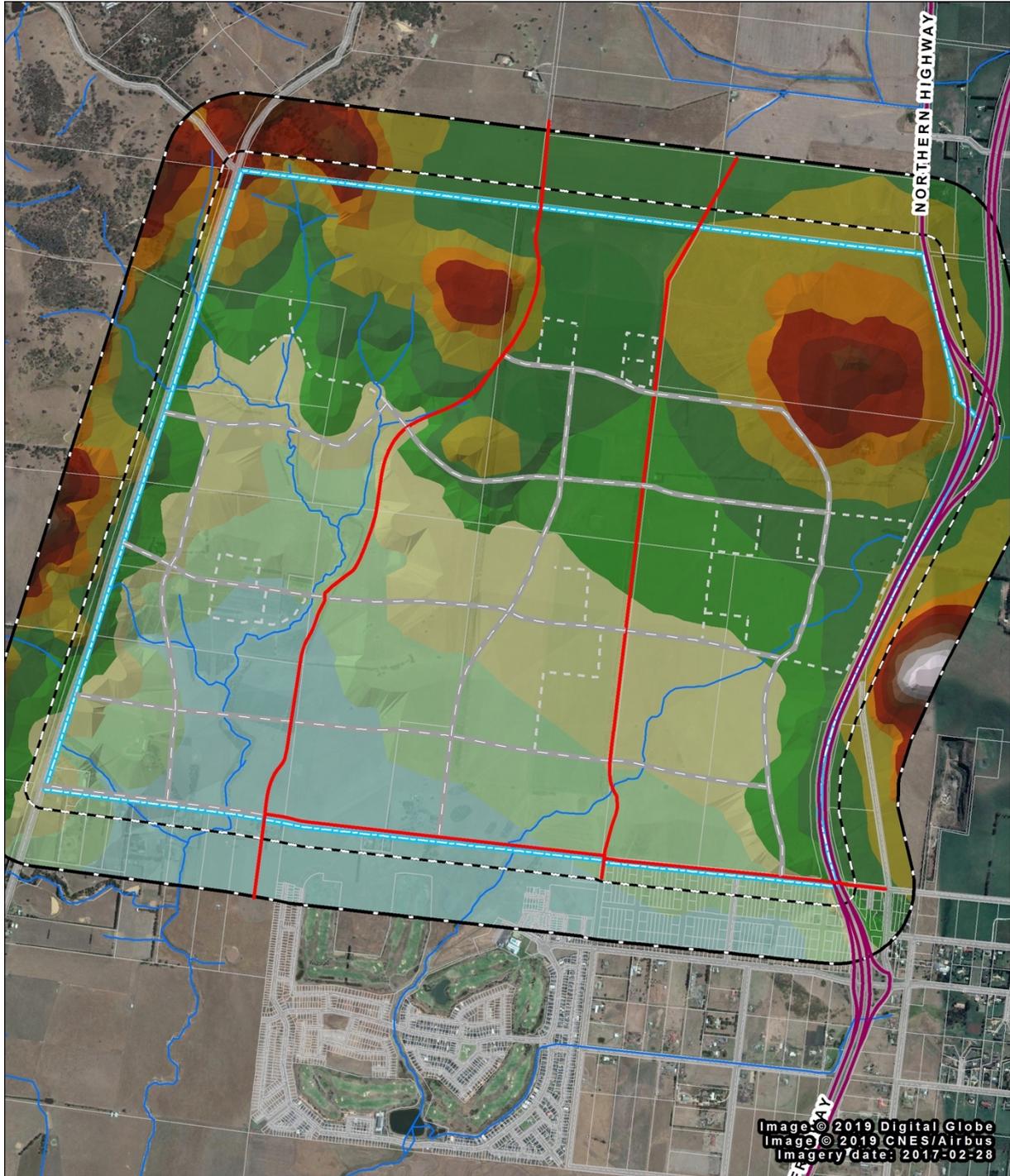
The topography was analysed by site assessment and by creating an elevation model for the site and the land 400m around it, using a GIS TIN (Triangulated Irregular Network) generated from publicly available 10m contour data (see Map 2).

The terrain on the site and in the surrounding landscape is relatively benign from a bushfire perspective, being predominantly flat, or relatively gently sloping or undulating (see Map 3).

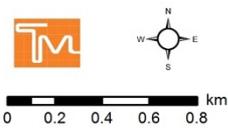
The slopes that may influence bushfire behaviour are all upslopes in relation to the future development, comprising the hills to the west and the slopes in the proposed Hilltops and Spring Hill Reserves that lead down towards development areas. For the purposes of determining BALs and vegetation setback distances for future buildings, the applicable slope class is 'All upslopes and flat land'.

---

<sup>6</sup> The slope of the land between the classified vegetation and the building is called the site slope, which in the method 1 procedure of AS 3959-2018, is assumed to be the same as the effective slope.



**Beveridge NW PSP  
Bushfire Study  
ELEVATION**



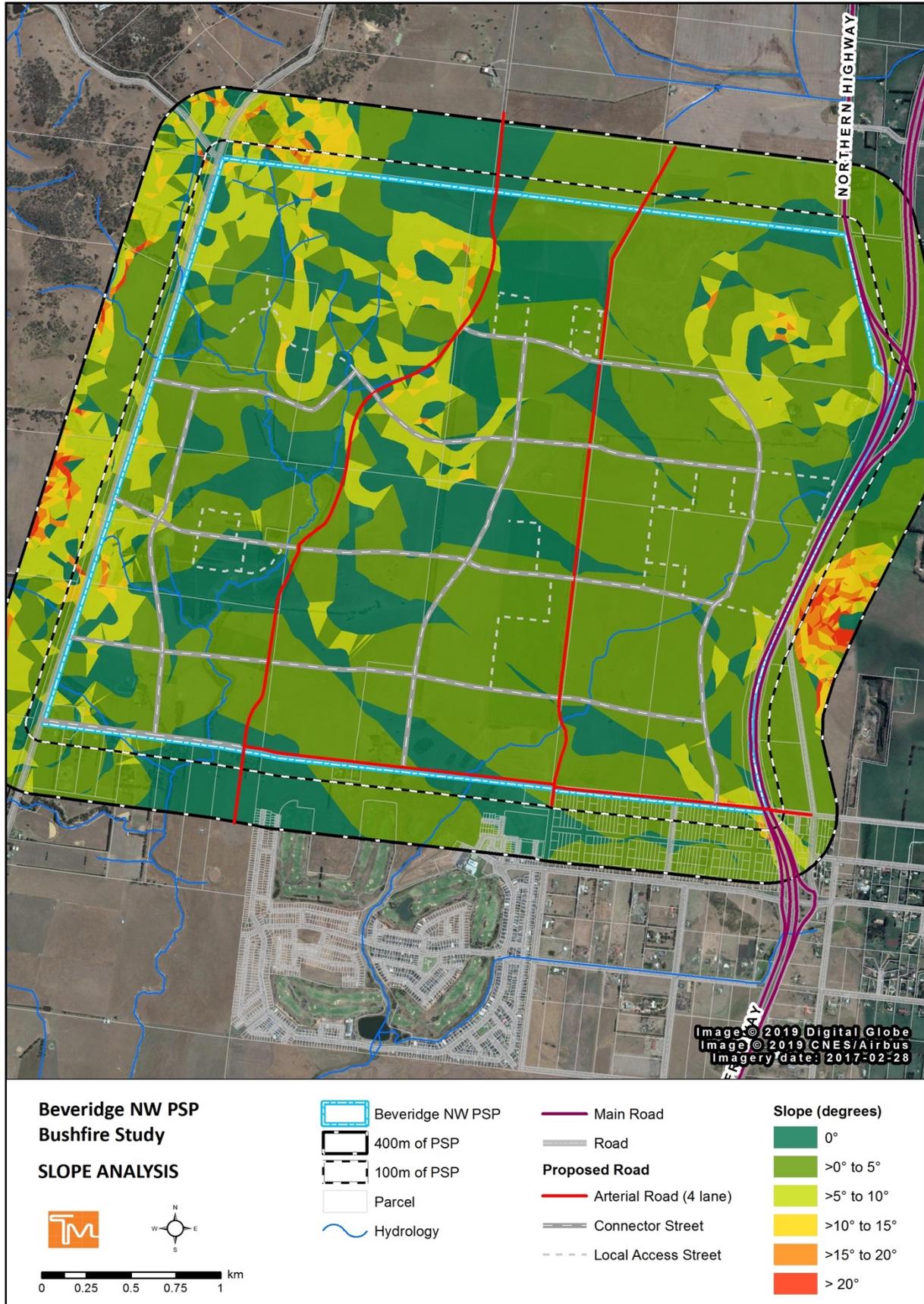
- Beveridge NW PSP
- 400m of PSP
- 100m of PSP
- Main Road
- Road
- Parcel
- Hydrology

- Arterial Road (4 lane)
  - Connector Street
  - Local Access Street
- Elevation (m)**
- 390 - 400
  - 380 - 390

- 370 - 380
- 360 - 370
- 350 - 360
- 340 - 350
- 330 - 340
- 320 - 330
- 310 - 320
- 300 - 310
- 290 - 300
- 280 - 290
- 270 - 280
- 260 - 270

Image © 2019 Digital Globe  
Image © 2019 CNES/Airbus  
Imagery date: 2017-02-28

Map 2 - Elevation map of the precinct and 400m neighbourhood assessment zone.



Map 3 - Slope map of the precinct and 400m neighbourhood assessment zone (N.B. slope classes shown are not differentiated into downslopes or upslopes).

### 3.3 Fire weather

The Forest Fire Danger Index (FFDI) and the Grassland Fire Danger Index (GFDI) represent the level of bushfire threat based on weather (and fuel) conditions. An FFDI 100/GFDI 130 is applied in non-alpine areas of Victoria by the building system, to establish building setback distances from classified vegetation in accordance with AS 3959-2018.

The indices are also used for predicting fire behaviour including the difficulty of suppression, forecasting Fire Danger Ratings (FDRs) and determining an appropriate level of preparedness for emergency services. Table 1 displays the FDRs, their FFDI range<sup>7</sup> and the description of conditions for each FDR.

Note that the benchmark of an FFDI 100 represents a 'one size fits all' model of extreme fire weather conditions for the state, but which has been exceeded during some significant fire events, including at some locations in Victoria on 'Black Saturday' 2009. Therefore, it is important to note that this is not necessarily the *worst-case* conditions for any particular location, including the BNWPSP area.

It should also be noted that under various climate change scenarios, the frequency and severity of elevated fire danger days across south-east Australia is forecast to increase (Lucas *et al.*, 2007). Especially in eastern and southern Australia, there has been an increase in the length of the fire weather season and a greater number of higher risk days (CSIRO/BOM, 2018). There is a 'high confidence' that climate change will result in a harsher fire weather climate for the Southern Slopes Victoria West sub-region that the BNWPSP area is in; with a 'low confidence' in the magnitude of the expected change (CSIRO/BOM, 2019).

Currently CFA and DELWP have no published policy on FFDI recurrence intervals. There is, therefore, no compelling reason to apply a different FFDI/GFDI from the FFDI 100/GFDI 130 threshold used throughout non-Alpine areas of Victoria in the planning and building system<sup>8</sup>.

---

<sup>7</sup> The GFDI ranges for each FDR in Table 1 may vary in some jurisdictions.

<sup>8</sup> In alpine areas of Victoria an FFDI 50 applies for determining BALs using Method 1 of AS 3959-2018.

**Table 1 - Fire Danger Ratings (Source: AFAC, 2017; CFA 2017).**

Forest Fire Danger Index	Grassland Fire Danger Index	Fire Danger Rating (FDR)	Description of conditions
100+	150+	Code Red	The worst conditions for a bush or grass fire. Homes are not designed or constructed to withstand fires in these conditions. The safest place to be is away from high risk bushfire areas.
75-99	100-149	Extreme	Expect extremely hot, dry and windy conditions. Fires will be uncontrollable, unpredictable and fast moving. Spot fires will start, move quickly and will come from many directions. Homes that are situated and constructed or modified to withstand a bushfire, that are well prepared and actively defended, may provide safety. You must be physically and mentally prepared to defend in these conditions.
50-74	50-99	Severe	Expect hot, dry and possibly windy conditions. If a fire starts and takes hold, it may be uncontrollable. Well prepared homes that are actively defended can provide safety. You must be physically and mentally prepared to defend in these conditions.
25-49		Very High	If a fire starts, it can most likely be controlled in these conditions and homes can provide safety. Be aware of how fires can start and minimise the risk. Controlled burning off may occur in these conditions if it is safe – check to see if permits apply.
12-24		High	
0-11		Low – Moderate	

### 3.4 Landscape assessment

#### 3.4.1 Location description and context

The Beveridge North West precinct is located in the northern metropolitan growth area, approximately 3km south of Wallan and 12km north of Mickleham and Craigieburn (see Figure 1 and Map 4). The Urban Growth Boundary (UGB) runs along Old Sydney Road, which forms the western boundary of the precinct. The eastern boundary is the Hume Freeway, with Camerons Lane to the south and the Wallan South PSP area to the north.

The surrounding landscape, in all directions, is overwhelmingly rural and pastoral, although to the east, north and south it is being transformed by residential development typical of the urban growth areas around Melbourne.

#### 3.4.2 Landscape risk

To assist in assessing landscape risk, four 'broader landscape types', representing different landscape risk levels, are described in the DELWP technical guide *Planning Applications Bushfire Management Overlay*. These are intended to streamline decision-making and support more consistent decisions based on the landscape risk (DELWP, 2017).

The four types range from low risk landscapes where there is little hazardous vegetation beyond 150m of a site and extreme bushfire behaviour is not credible, to extreme risk landscapes with limited or no evacuation options, and where fire behaviour could exceed BMO/AS 3959 assumptions (see Table 2).

**Table 2 - Landscape risk typologies (from DELWP, 2017).**

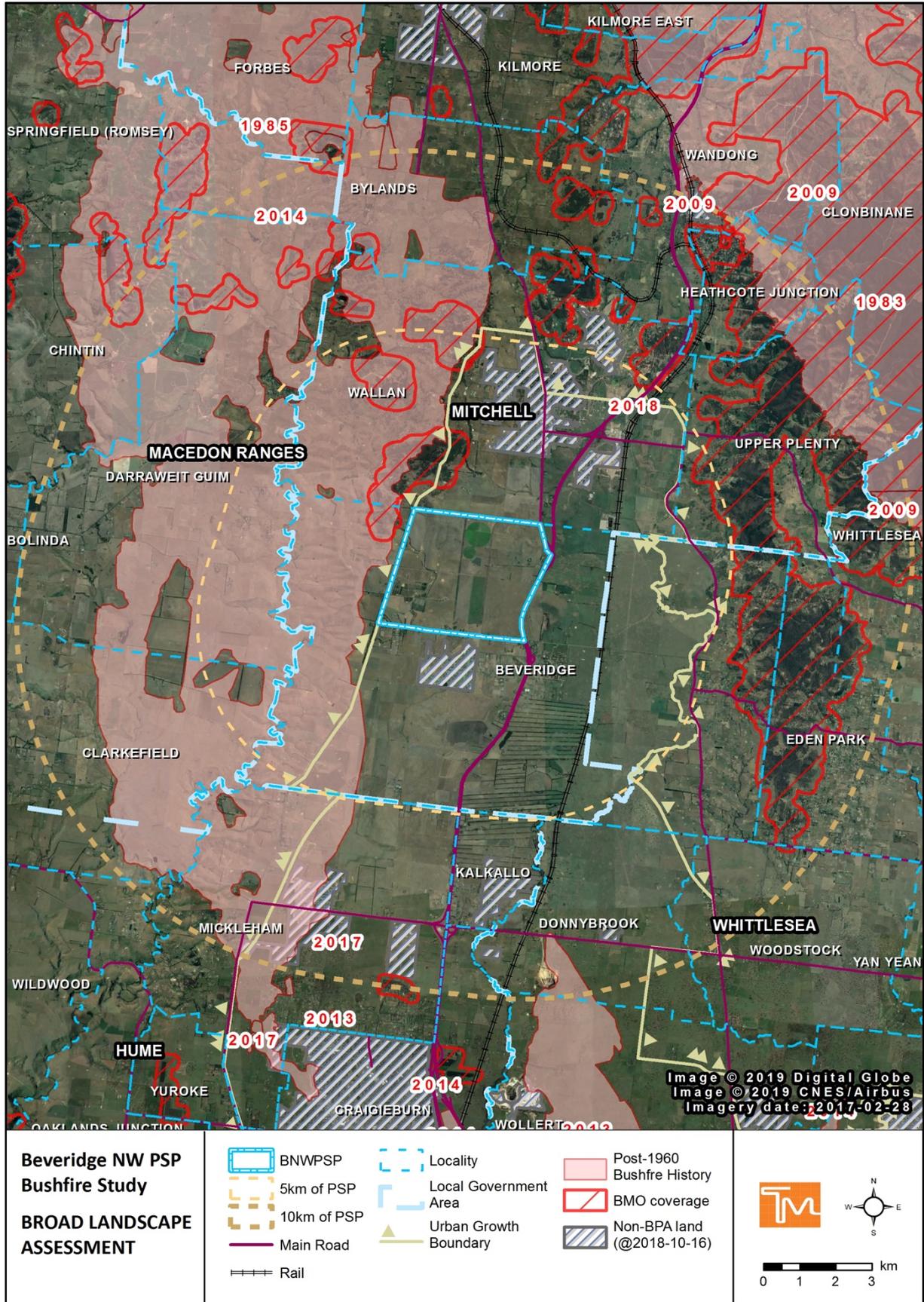
Broader Landscape Type 1	Broader Landscape Type 2	Broader Landscape Type 3	Broader Landscape Type 4
<ul style="list-style-type: none"> <li>• There is little vegetation beyond 150 metres of the site (except grasslands and low-threat vegetation).</li> <li>• Extreme bushfire behaviour is not possible.</li> <li>• The type and extent of vegetation is unlikely to result in neighbourhood-scale destruction of property.</li> <li>• Immediate access is available to a place that provides shelter from bushfire.</li> </ul>	<ul style="list-style-type: none"> <li>• The type and extent of vegetation located more than 150 metres from the site may result in neighbourhood-scale destruction as it interacts with the bushfire hazard on and close to a site.</li> <li>• Bushfire can only approach from one aspect and the site is located in a suburban, township or urban area managed in a minimum fuel condition.</li> <li>• Access is readily available to a place that provides shelter from bushfire. This will often be the surrounding developed area.</li> </ul>	<ul style="list-style-type: none"> <li>• The type and extent of vegetation located more than 150 metres from the site may result in neighbourhood-scale destruction as it interacts with the bushfire hazard on and close to a site.</li> <li>• Bushfire can approach from more than one aspect.</li> <li>• The site is located in an area that is not managed in a minimum fuel condition.</li> <li>• Access to an appropriate place that provides shelter from bushfire is not certain.</li> </ul>	<ul style="list-style-type: none"> <li>• The broader landscape presents an extreme risk.</li> <li>• Fires have hours or days to grow and develop before impacting.</li> <li>• Evacuation options are limited or not available.</li> </ul>
			

The broader landscape best accords with Landscape Type 3. A large fire as envisaged in the BMO/AS 3959 model could impact the precinct; and has occurred relatively recently to the west of Old Sydney Road (see Map 4). However, the predominant hazard is grassland and, whilst long fire runs in the directions of highest risk<sup>9</sup> are possible, they are largely through a cleared, agricultural/pastoral landscape.

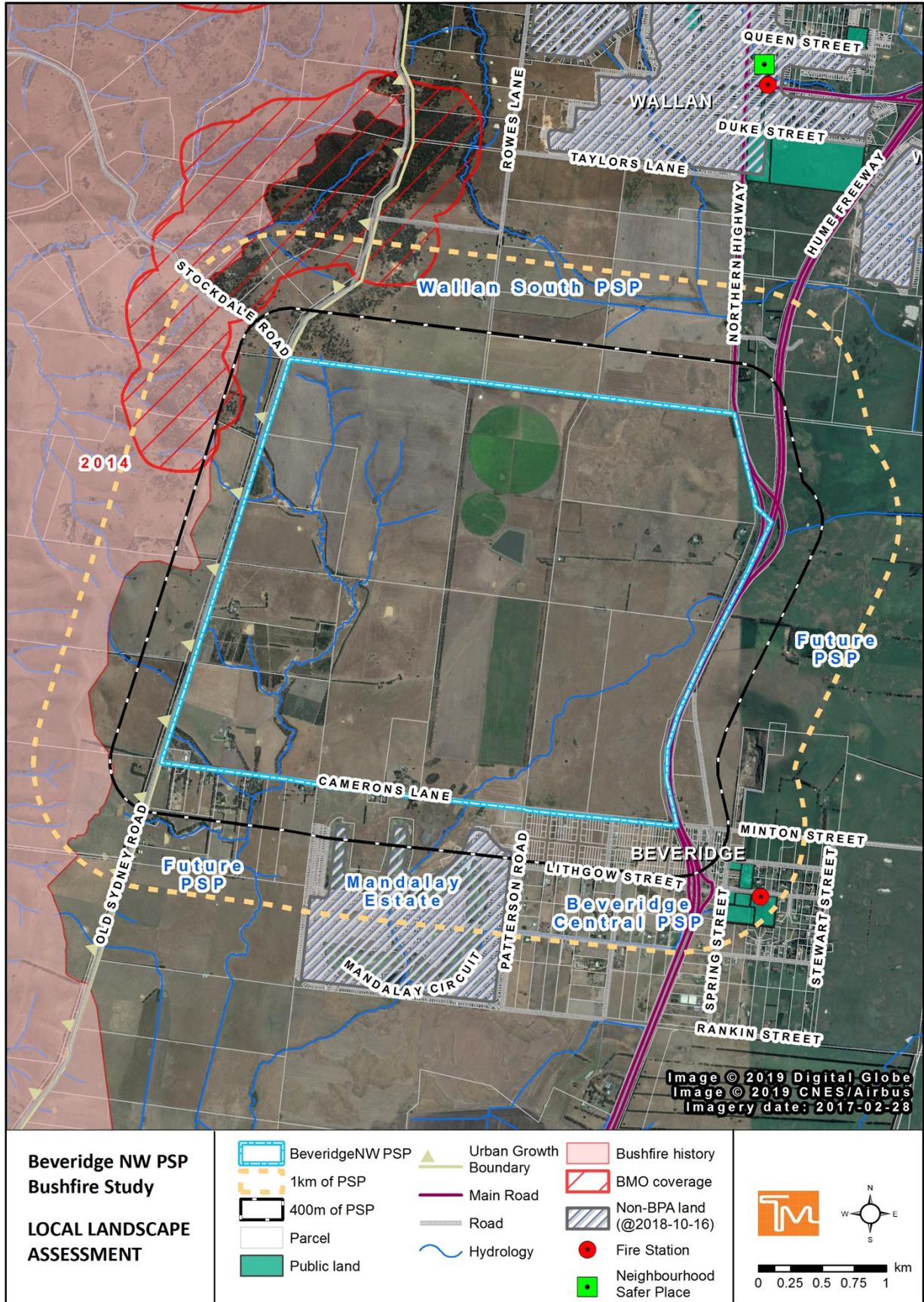
A large grassfire could be fast moving and unpredictable. However, as development proceeds to the north, south and east and the land becomes urbanised, the risk will lessen considerably due to elimination of the hazard and establishment of easy access to reliably low threat areas. An existing area of BAL-LOW (i.e. land not in the designated BPA) currently occurs 300m to the south at the Mandalay development and 2.5km to the north in Wallan (see Map 5).

<sup>9</sup> i.e. from the north, northwest, west and to a lesser degree, southwest; directions typically associated with severe or higher fire weather in Victoria (Long, 2006).

Whilst the rate of spread of a fire in the areas of Woodland vegetation to the northwest would lessen, the intensity of the fire and size and density of embers generated, would increase due to the greater fuel load and bark hazard in this vegetation. Notwithstanding, the Woodland is distant enough from the site to not influence BAL outcomes and, if development can be setback adequately from any Woodland or Grassland areas within or adjacent to the precinct, acceptable safety commensurate with a BAL-12.5 construction standard can be achieved.



Map 4 - Bushfire Hazard Broad Landscape Assessment Map.



Map 5 - Bushfire Hazard Local Landscape Assessment Map.

### 3.4.3 Regional bushfire risk assessments and plans

#### **Hume Regional Strategic Fire Management Plan (RSFMP) 2011-2021**

The Hume Regional Fire Management Planning Committee has prepared a ten-year Regional Strategic Fire Management Plan, developed around the concept of resilience, and with a strategic focus on preventing and minimising the impact of bushfire. The plan identifies broad fire management risks across the region and identifies strategies for addressing the issues. The Mitchell LGA is in the Lower Hume sub-region and the description of grassfire risk is appropriate to the precinct.

*'The main bushfire threat west of the Hume Freeway is a fast moving grassfire. While grassfires may have lower flame heights and lower intensity than forest fires, the combination of open ground and fine fuels can produce very fast moving destructive fires. This speed can catch people and stock in the open without protection from the fire.'*

*Weather conditions and climate also impact on fire management. For example, the Hume Region has a long bushfire danger period with fire danger restrictions usually in place from November until mid-April, depending on the prevailing weather conditions. The region also has a pattern of spring rainfall that promotes grass growth accompanied by hot dry summers, resulting in high fuel loads.*

*The usual weather pattern during the summer months is north westerly winds accompanied by high daytime temperatures, low relative humidity and a south westerly wind change later in the day. This has a particular fire risk in that a fire that is burning during the day will turn direction; and what was the side of the fire will become a large fire front when the wind change happens' (Hume Regional Strategic Fire Management Planning Committee, 2011).*

#### **Regional Bushfire Planning Assessment (RBPA) Hume Region**

As part of the response to the 2009 Victorian Bushfires Royal Commission, Regional Bushfire Planning Assessments (RBPAs) were undertaken across six regions that covered the whole of Victoria. The RBPAs provide information about 'identified areas' where a range of land use planning matters intersect with a bushfire hazard to influence the level of risk to life and property from bushfire. The RBPAs state that *'This information should be addressed as part of strategic land use and settlement planning at the regional, municipal and local levels'* (DPCD, 2012).

The *Regional Bushfire Planning Assessment – Hume Region* covers the Mitchell Shire Council local government area and recognises that the precinct and other growth area land around it is zoned for future urban growth. Land to the west is in Identified area no. 46-009; *'Open grasslands are a known bushfire hazard on the western and north-western boundary of land in the Urban Growth Boundary, as well as to the western side of Wallan'*.

**Mitchell Shire Municipal Fire Management Plan (MFMP)**

The MFMP aligns with the RSFMP and notes the extensive fire history in the Mitchell Shire LGA.

The plan notes the risk to people and residences who live in a grassland environment, being impacted by fire on high and above FDR days. The likelihood rating of this event is 'Almost certain' and the risk rating 'High' (MSC, 2016).

A range of treatments are prescribed in the MFMP to mitigate identified risks, including for the Beveridge area, roadside slashing along Old Sydney Road and Camerons Lane.

## 4 Planning and design response

This section identifies how future development can respond to the bushfire risk, including the requirements of Clause 13.02, published CFA guidance and the building regulations applicable to construction in a BPA.

### 4.1 BAL construction standard

To satisfy key settlement planning strategies of Clause 13.02, the future dwellings in the precinct, and other buildings requiring a BAL (see Section 2.4), should be sufficiently setback<sup>10</sup> from classified vegetation to enable a BAL-12.5 construction standard. The setbacks required in response to Grassland and Woodland, based on the hazard assessment in Section 3 and determined using the simple Method 1 procedure of AS 3959-2018, are shown in Table 3 below.

**Table 3 - Building setbacks for BAL-12.5.**

Slope class	Vegetation	Vegetation setback distance (defendable space)
All upslopes and flat land	Grassland	19m
	Woodland	33m

Indicative locations of potential setbacks based on possible future areas of potentially classifiable vegetation, are shown in Map 6.

#### 4.1.1 Small areas of Woodland or other classified vegetation

Note that Map 6 is indicative only, as at this stage in the precinct planning process it is not possible to be certain about the exact location, size or future state of all vegetation in the precinct, and hence, the definitive location and extent of applicable setbacks required.

It should be noted that no setbacks will be needed from smaller or isolated areas of unmanaged vegetation that lack connectivity with larger areas and meet one or more of the exclusion criteria for low threat vegetation (see Section 3.1.3).

It is considered that as development in the precinct commences, this level of detail can be resolved and finalised through the subdivision and development approvals process. i.e. the final details about

<sup>10</sup> The setback distance is measured from the edge of the classified vegetation to the external wall of the building, or for parts of the building that do not have external walls (including carports, verandas, decks, landings, steps and ramps), to the supporting posts or columns. The following parts of a building are excluded:

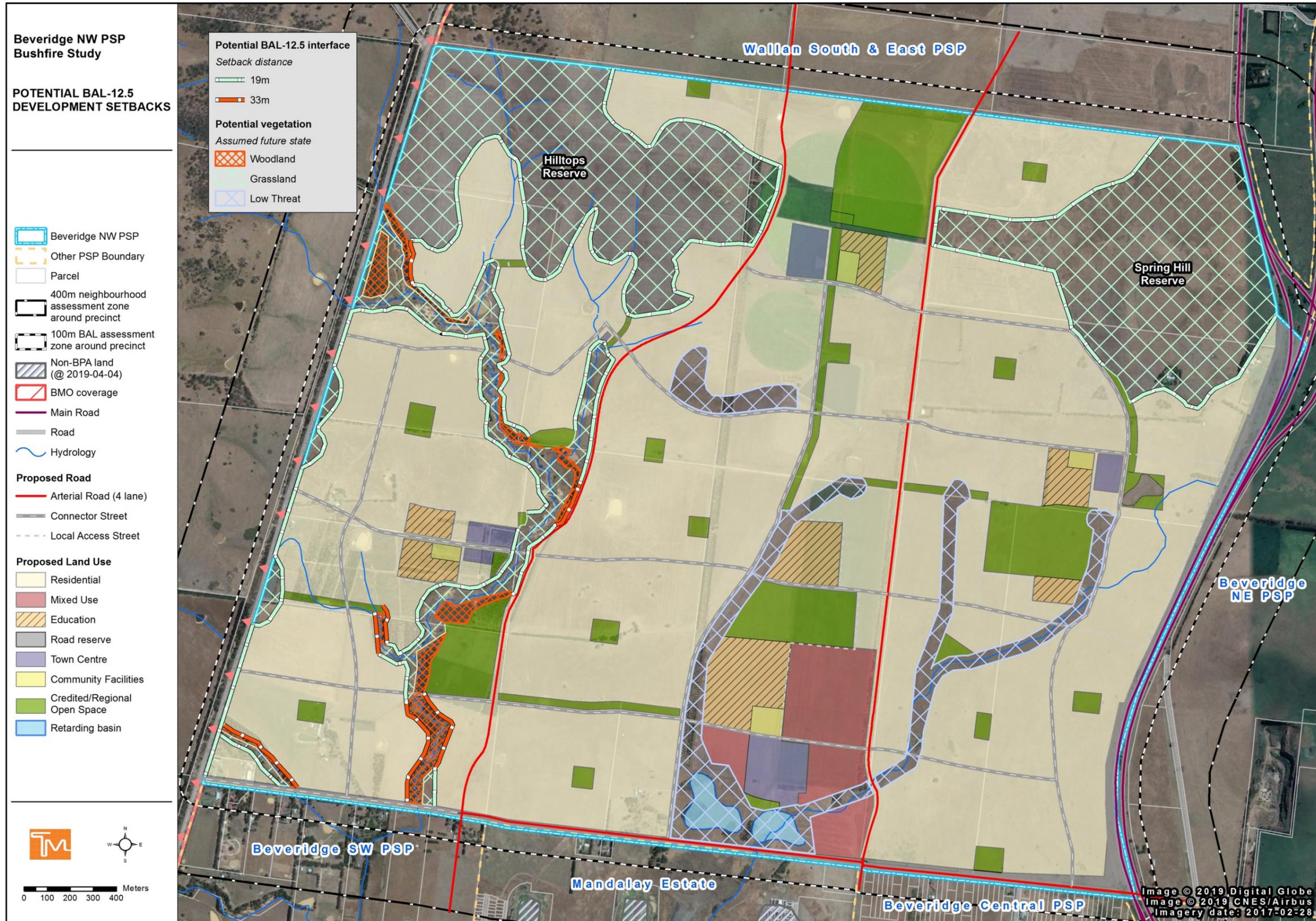
- a) Eaves and roof overhangs.
- b) Rainwater and domestic fuel tanks.
- c) Chimneys, pipes, cooling or heating appliances or other services.
- d) Unroofed pergolas.
- e) Sun blinds (Standards Australia, 2018).

future areas of classifiable vegetation and appropriate development setbacks from them, can be defined as part of the planning permit and building approvals stage of precinct development.

To this end, it is noted that the proposed planning scheme amendment giving effect to the PSP, will include the following application requirement for all subdivision/development permits:

*'A Site Management Plan that addresses bushfire risk during, and where necessary, after construction, which is approved by the Responsible Authority. The plan must specify, amongst other things:*

- *The staging of development and the likely bushfire risks at each stage;*
- *An area of land between the development edge and non-urban areas consistent with the separation distances specified in AS 3959-2018, where bushfire risk is managed to enable the development, on completion, to achieve a BAL-12.5 construction standard in accordance with AS3959-2018;*
- *The land management measures to be undertaken by the developer to reduce the risk from fire within any surrounding rural or undeveloped landscape to protect residents and property from the threat of grassfire and bushfire; and*
- *How adequate opportunities for access and egress will be provided for early residents, construction workers and emergency vehicles' (VPA, 2019)*



Map 6 - Potential BAL-12.5 setbacks.

## 4.2 Drainage reserves

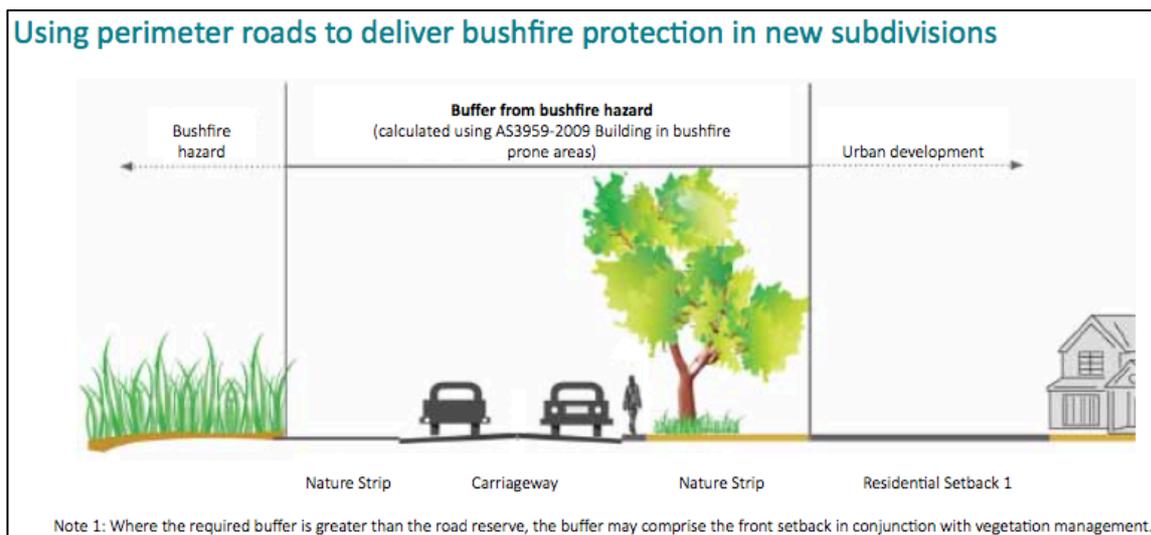
The proposed drainage reserves may comprise classifiable Grassland if they are not managed in a low threat state, or Woodland (or Shrubland) if larger areas of remnant or planted vegetation are retained within them or created through natural recruitment or revegetation. Exclusion criteria that could potentially be applied to ensure classified vegetation does not occur in proximity to buildings, are the small patch criteria for:

- Single areas of vegetation less than 1ha in area and not within 100m of other areas of classified vegetation;
- Multiple areas of vegetation less than 0.25ha in area and not within 20 m of the site/building, or each other, or of other areas of classified vegetation; and
- Strips of vegetation less than 20m in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20m of the site/building or each other, or other areas of classified vegetation.

The proposed retarding basin ponds (see Map 1) or other water sensitive urban design (WSUD) features with reliably open water or wet areas and little or no vegetation may be deemed non-vegetated or low threat. Large, seasonally inundated wetlands or WSUD features that may be dry and vegetated during the fire danger period could, however, comprise classifiable Grassland or Shrubland. Note that the applicable BAL-12.5 setbacks for Shrubland are the same as for Grassland.

## 4.3 Perimeter Roads

Perimeter roads are a highly desirable design feature; to achieve, or contribute to, BAL setbacks, separate future development from hazardous vegetation with a ‘hard’ non-vegetated edge, facilitate access/egress and property protection and fire fighting (see Figure 11).



**Figure 11 - Illustration of a perimeter road to provide required development setbacks (DELWP, 2015a).**

A perimeter road should be provided between future development and the Hilltops and Spring Hill Reserves to the north (see notation in Map 1). This appears to be easily achievable for the simpler interface with Spring Hill reserve. However, it is recommended that the complex (i.e. long and windy) interface with Hilltops Reserve, be simplified to lessen the length of the interface, and hence the number of dwellings, south of what is likely to be a Grassland hazard in Hilltops Reserve. This is especially warranted due to the hazard being to the northwest, from where it is more likely a bushfire may approach under severe or higher fire weather conditions. A simple road network should be provided with at least two ways in and out in directions away from the hazard.

#### ***4.3.1 Old Sydney Road Interface***

An indicative cross section for Old Sydney Road is shown in Figure 12. It is likely that this treatment will provide a minimum 19m setback for future development from the Grassland hazard to the west of Old Sydney Road (i.e. commensurate with a BAL-12.5 construction standard in response to Grassland on flat or upslope land in accordance with AS 3959-2018).

Additionally, where possible a service road should be considered within the precinct, adjacent and parallel to the Old Sydney Road reserve to ensure sufficient separation from dwellings on lots fronting the service road/Old Sydney Road. The creation of lots that back onto the road reserve or any other large area of hazardous vegetation, should be avoided.

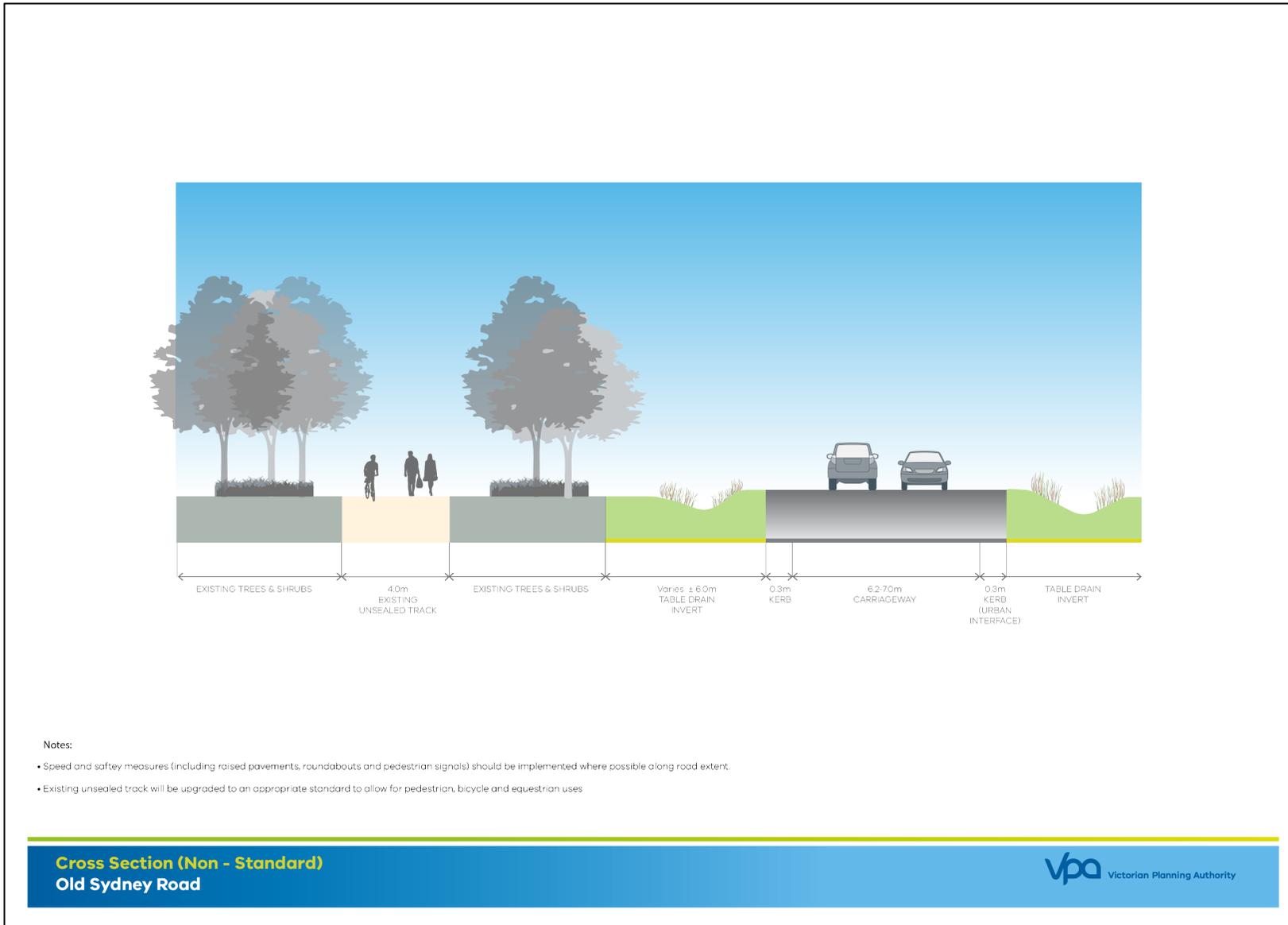


Figure 12 - Proposed Old Sydney Road interface.

## 4.4 Clause 13.02 Bushfire

The applicable strategies stipulated in Clause 13.02 are detailed in the following sub-sections, and a summary response is provided about how the proposed development can respond to the strategies.

### 4.4.1 Protection of human life strategies

Priority must be given to the protection of human life.

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

The precinct is in a relatively low-moderate bushfire risk location. The risk will lessen as development in and around the precinct occurs. Accordingly, the protection of human life can be prioritised by adopting the measures recommended in this report and through application of the existing building regulations for construction in a BPA, including ensuring future dwellings and other buildings are located where a BAL-12.5 construction standard can be achieved (i.e. achieving setbacks for future buildings from unmanaged vegetation, such that radiant heat can be expected to be below 12.5kW/m<sup>2</sup>).

#### ***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.***

As identified in Section 3.4, the site is in a lesser risk landscape. Therefore, if future buildings are setback sufficiently from any hazardous vegetation such that they achieve a BAL no higher than BAL-12.5, the risk can be deemed to be acceptable.

The nearest *lowest* risk locations are considered to be the urban-residential and township areas that are not in the BPA (see Map 1 and Map 5).

Once development has occurred, reliably low threat urban areas within the precinct will become eligible for excision from the BPA if they satisfy the exclusion criteria (see Section 2.4).

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

This report provides the basis for incorporating bushfire risk into decision making associated with planning development in the precinct.

The CFA consider that community resilience to bushfire will be strengthened (and hence, presumably, vulnerability to bushfire will be reduced) when a strategic planning proposal demonstrates that Clause 13.02 strategies have been applied, and where a proposal takes advantage of existing settlement patterns so that new development will not expose the community to increased risk from bushfire.

The CFA provide principles to respond to Clause 13.02 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.*
- *Avoid development in areas where planned bushfire protection measures may be incompatible with other environmental objectives’ (CFA, 2015).*

It is considered that development of the precinct can appropriately implement the strategies in Clause 13.02 that aim to prioritise protection of human life and will, therefore, meet the CFA strategic planning principles for bushfire.

#### **4.4.2 Bushfire hazard identification and assessment strategies**

The bushfire hazard must be identified and an appropriate risk assessment be undertaken.

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

This report identifies the hazard in accordance with the commonly accepted methodologies of AS 3959-2018 and, as appropriate, additional guidance provided in *Planning Practice Note 64 Local planning for bushfire protection* (DEWLP, 2015a) and *Planning Advisory Note 68 Bushfire State Planning Policy Amendment VC140* (DEWLP, 2018).

The type and extent of (hazardous) vegetation within, and up to 400m around, the precinct has been identified and classified into AS 3959-2018 vegetation groups. Classification was based on the anticipated long-term state of the vegetation, EVC mapping, aerial imagery, site assessment, published guidance on vegetation assessment for bushfire purposes and experience with the fuel hazard posed by the vegetation types that occur within the region.

GIS analysis of publicly available 10m contour data for the area was undertaken, including creating a Digital Elevation Model (DEM) of the topography (see Map 2), and determining slopes, extending to 1km around the precinct (see Map 3).

In relation to climatic conditions and fire weather, the AS 3959 default FFDI 100/GFDI 130 benchmark used in the Victorian planning and building system, has been applied as discussed in Section 3.3.

***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 extent of BPA coverage has been considered (see Sections 2.4) and is shown in Map 4 and Map 5. This is based on the most recent BPA mapping for the precinct, which was published 4<sup>th</sup> April 2019.

***Applying the Bushfire Management Overlay in planning schemes to areas where the extent of vegetation can create an extreme bushfire hazard.***

As identified in Section 2.5.2, no part of the BNWPSP area is covered by the BMO. Only a small area of BMO occurs within the 400m neighbourhood assessment zone around the precinct (see Map 5). This is considered appropriate and reflects relatively recent statewide BMO mapping introduced into the Mitchell Planning Scheme by amendment GC13, which was gazetted on 3<sup>rd</sup> October 2017.

***Considering and assessing the bushfire hazard on the basis of:***

- ***Landscape conditions - meaning the conditions in the landscape within 20 kilometres and potentially up to 75 kilometres from a site;***
- ***Local conditions - meaning conditions in the area within approximately 1 kilometre from a site;***
- ***Neighbourhood conditions - meaning conditions in the area within 400 metres of a site; and***
- ***The site for the development.***

The hazard has been assessed and described at the site, neighbourhood and local scale (see Section 3, Map 1 and Map 5).

At the site scale, the assessment follows the AS 3959-2018 methodology applied in a BPA, of classifying vegetation and topography within 100m of a building, and for this study, extending 100m around the precinct.

At the broader landscape scale a 20km, 10km and 5km radius of the site has been applied (see Section 3.4, Figure 1 and Map 4) in accordance with guidance about assessing risk for planning scheme amendments in the Planning Advisory Note 68 (DEWLP, 2018) and Planning Practice Note 64 (DELWP, 2015a).

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

The CFA have been consulted by reviewing and commenting on a draft version of this Bushfire Development Report. Their input and feedback have been incorporated into this report and will further inform the final PSP, including:

- Ensuring appropriate setbacks are provided for any larger areas of Woodland or other hazardous vegetation in or adjacent to the precinct (see Section 4.1.1 and Map 6)
- Ensuring an appropriate interface and development setback is provided along Old Sydney Road (see Section 4.3.1 and Figure 12)
- Ensuring an appropriate interface and development setbacks are provided to the Hilltop Reserve including providing a perimeter road and avoiding lots backing onto the reserve or any other large area of hazardous vegetation (see Section 4.3 and Map 1).

***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.***

DELWP advisory and practice notes, Clause 13.02, and the building regulations invoked by the BPA coverage, including the bushfire hazard landscape assessment, specify the general requirements and standards for assessing the risk. These have been used in this report as appropriate and bushfire protection measures have been identified commensurate with the risk.

***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.***

If the objectives and strategies of Clause 13.02 are successfully implemented, as discussed in this report, and the building regulations for construction in a BPA are complied with, then the risk can be deemed to be acceptably mitigated such that development can proceed.

The CFA specify that areas where development should not proceed could 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.*
- *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).*

None of these criteria or characteristics are applicable to the BNWPSA area.

It is noted that the proposed planning scheme amendment giving effect to the PSP, will include an application requirement that all subdivision/development permits provide *‘A Site Management Plan that addresses bushfire risk during, and where necessary, after construction...’* (VPA, 2019).

#### 4.4.3 Settlement planning strategies

Settlement planning must strengthen the resilience of settlements and communities and prioritise protection of human life.

***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 3959-2009 Construction of Buildings in Bushfire-prone Areas (Standards Australia, 2009).***

The applicable distances for dwellings or other buildings to be setback from classifiable vegetation, such that RHF is calculated to be below 12.5kW/m<sup>2</sup>, and BAL 12.5 dwellings could potentially be sited, are provided in Table 4. Taking into consideration the assessment of landscape risk, implementation of these setbacks and BAL-12.5 construction of new buildings in the BPA, can be deemed to acceptably mitigate the risk.

**Table 4 – Applicable building setback distances for BAL-12.5 construction.**

Vegetation	Slope class	Building setback distance
Grassland	All upslopes and flat land	19m
Woodland	All upslopes and flat land	33m

See also the exclusion criteria and setback distances in Section 3.1.3 for small patches or strips of vegetation to be deemed low threat.

***Ensuring the availability of, and safe access to, areas assessed as a BAL-LOW rating under AS 3959-2009 Construction of Buildings in Bushfire-prone Areas (Standards Australia, 2009) where human life can be better protected from the effects of bushfire.***

The nearest *lowest* risk locations are considered to be those areas in the surrounding landscape which are not in a designated Bushfire Prone Area (BPA). These comprise the urban-residential and township areas of Wallan to the north and others to the south of the precinct (see Map 4 and Map 5).

As identified in Section 2.4, once development has occurred, reliably low threat urban areas within the precinct will become eligible for excision from the BPA if they satisfy the exclusion criteria.

***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.***

***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 reduce bushfire risk overall.***

There will be no increase in risk to existing residents or community infrastructure if:

- Development can achieve vegetation setbacks from hazardous vegetation to enable BAL-12.5 construction, provide an appropriate water supply for fire-

fighting via a conventional reticulated hydrant system, and appropriate access/egress for emergency vehicles and residents via a conventional residential road network.

- It is ensured that any hazardous vegetation retained or re-established, does not create an increase in the hazard exposure for existing residents.

The risk to existing residents will in fact be reduced by the development of additional urban residential areas and associated low threat or non-vegetated land. As identified above, this will eventually create BAL-LOW areas with the potential to be excised from the BPA, if they are sufficiently distant from any hazardous vegetation.

***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 appropriately assesses and addresses the risk at a range of scales.

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

No alternative low risk development locations have been identified or assessed as part of this study.

***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 3959-2009'***

If the vegetation setback distances from any hazardous vegetation, as identified in this report are implemented, then construction can achieve a BAL not exceeding BAL-12.5. Future development and excision from the BPA of some parts of the precinct, would enable BAL-LOW.

#### ***4.4.4 Areas of high biodiversity conservation value***

***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 'Scattered Tree Assessment, Beveridge North West (PSP 1059) Victoria' (Ecology & Heritage Partners, 2013) identifies, and proposes to protect or offset, significant native trees. There are no apparent additional biodiversity impacts associated with the findings of this bushfire assessment.

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

Clause 13.02 requires that *'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 recreation facility.*
- *Major sports and recreation facility.*
- *Place of assembly.*
- *Any application for development that will result in people congregating in large numbers'*(Mitchell Planning Scheme, 2018a).

It further states that:

*'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'*(Mitchell Planning Scheme, 2018a).

Future development applications should be able to achieve acceptable safety if:

- Appropriate setbacks for future development from classified vegetation are achieved to enable BAL-12.5 construction in the BPA;
- Adequate access and egress for emergency management vehicles is provided by a residential road network with a perimeter road where possible to assist property defence and fire-fighting; and
- A reliable water supply for fire-fighting is provided, via a conventional reticulated hydrant system, in accordance with the hydrant objective for residential subdivision at Clause 56.09-3.

## 5 Conclusion

This report has assessed the bushfire hazard in and around the Beveridge North West Precinct Structure Plan area, in accordance with Clause 13.02 in the Mitchell Planning Scheme, the AS 3959-2018 methodology invoked by the Victorian building regulations, and additional guidance, as appropriate, provided in *Planning Practice Note 64 Local planning for bushfire protection* (DEWLP, 2015a), *Planning Advisory Note 68 Bushfire State Planning Policy Amendment VC140* (DEWLP, 2018a) and, in relation to the landscape hazard assessment, the DELWP technical guide *Planning Permit Applications Bushfire Management Overlay* (DELWP, 2017).

All of the precinct is currently a designated BPA; however, no part is covered by the BMO.

It is considered that this assessment also fulfills the requirements of *Ministerial Direction 11 Strategic Assessment of Amendments*, which requires that an amendment addresses any relevant bushfire risk (Direction No. 11, 2013).

The landscape is one of low to moderate bushfire risk, which will lessen as development in and to the north, east and south of the precinct occurs. The hazard is largely restricted to Grassland, and bushfire behaviour can reasonably be expected to be within AS 3959-2018 presumptions and design parameters. Accordingly, it is considered that the risk can be mitigated to an acceptable level and that the proposed development is appropriate, if dwellings are separated from hazardous vegetation to allow BAL-12.5 construction, in accordance with the building regulations and Clause 13.02. Any areas excised from the BPA may achieve BAL-LOW.

The type and extent of (hazardous) vegetation within, and up to 400m around, the precinct has been identified and classified into AS 3959-2018 vegetation groups, based on DELWP extant EVC mapping, aerial imagery and site investigation. The classification is based on the current and likely future state of the vegetation and identifies that the hazard is primarily Grassland, which will eventually be confined to the west of the precinct (as land in other directions is developed), and the proposed Reserves in the northern parts of the precinct. Drainage lines may also contain some hazardous vegetation that development may have to respond to.

The terrain in the precinct and the surrounding landscape is relatively benign from a bushfire perspective, being predominantly flat or gently sloping or undulating (see Map 3). Slopes that may influence bushfire behaviour are all upslopes in relation to the future development, comprising the hills to the west and the slopes leading down towards development from the proposed Hilltops and Spring Hill Reserves. For the purposes of determining BALs and vegetation setback distances for future buildings, the applicable slope class is 'All upslopes and flat land'.

It is considered that development can appropriately prioritise the protection of human life and meet the objectives of Clause 13.02, largely by ensuring future dwellings will not be exposed to RHF above 12.5kW/m<sup>2</sup>, which is commensurate with a BAL-12.5 construction standard. This would require a minimum 19m setback from areas of classified Grassland.

Good access and egress for emergency management vehicles and residents, in the event of a bushfire, can be achieved via a conventional urban-residential road network. A perimeter road should be provided between future development and the Hilltops and Spring Hill Reserves to the north. This appears to be easily achievable for the simpler interface with Spring Hill Reserve. However, it is recommended that the complex (i.e. long and windy) interface with Hilltops Reserve, be simplified to lessen the length of the interface, and hence the number of dwellings immediately south of what is likely to be a Grassland hazard. A simple road network should be provided with at least two ways in and out in directions away from the hazard.

A reliable water supply for fire-fighting can be provided via a conventional reticulated hydrant system in accordance with the hydrant objective for residential subdivision.

The risk to existing residents will be reduced by the development of additional urban residential areas and associated low threat or non-vegetated land. This will eventually create BAL-LOW areas with the potential to be excised from the BPA if they are sufficiently distant from hazardous vegetation.

## 6 Appendix - BALs explained

Bushfire Attack Level (BAL)	Risk Level	Construction elements are expected to be exposed to...	Comment
BAL-Low	VERY LOW: There is insufficient risk to warrant any specific construction requirements but there is still some risk.	No specification.	At 4kW/m <sup>2</sup> pain to humans after 10 to 20 seconds exposure. Critical conditions at 10kW/m <sup>2</sup> and pain to humans after 3 seconds. Considered to be life threatening within 1 minute exposure in protective equipment.
BAL-12.5	LOW: There is risk of ember attack.	A radiant heat flux not greater than 12.5 kW/m <sup>2</sup>	At 12.5kW/m <sup>2</sup> standard float glass could fail and some timbers can ignite with prolonged exposure and piloted ignition.
BAL-19	MODERATE: There is a risk of ember attack and burning debris ignited by windborne embers and a likelihood of exposure to radiant heat.	A radiant heat flux not greater than 19 kW/m <sup>2</sup>	At 19kW/m <sup>2</sup> screened float glass could fail.
BAL-29	HIGH: There is an increased risk of ember attack and burning debris ignited by windborne embers and a likelihood of exposure to an increased level of radiant heat.	A radiant heat flux not greater than 29 kW/m <sup>2</sup>	At 29kW/m <sup>2</sup> ignition of most timbers without piloted ignition after 3 minutes exposure. Toughened glass could fail.
BAL-40	VERY HIGH: There is a much increased risk of ember attack and burning debris ignited by windborne embers, a likelihood of exposure to a high level of radiant heat and some likelihood of direct exposure to flames from the fire front.	A radiant heat flux not greater than 40 kW/m <sup>2</sup>	At 42kW/m <sup>2</sup> ignition of cotton fabric after 5 seconds exposure (without piloted ignition).
BAL- FZ (i.e. Flame Zone)	EXTREME: There is an extremely high risk of ember attack and a likelihood of exposure to an extreme level of radiant heat and direct exposure to flames from the fire front.	A radiant heat flux greater than 40 kW/m <sup>2</sup>	At 45kW/m <sup>2</sup> ignition of timber in 20 seconds (without piloted ignition).

Source: derived from AS 3959-2018 (Standards Australia, 2018).

## 7 References

ABCB (2016) *Building Code of Australia, Volumes 1 and 2 of the National Construction Code (NCC)*, Australian Building Codes Board (ABCB). Available at <<http://abcb.gov.au/ncc-online/>>.

AFAC (2017) *Interpret and analyse fire weather information*. Australasian Fire and Emergency Service Authorities Council, East Melbourne.

CFA (2015) *FSG LUP 008 Land Use Planning CFA Land Use Planning Fire Services Guideline*. Country Fire Authority, East Burwood. Available at <<http://www.cfa.vic.gov.au/plan-prepare/strategic-planning/>>.

CFA (2017) *Fire Danger Rating Brochure*. Country Fire Authority, East Burwood. Available at <<https://www.cfa.vic.gov.au/warnings-restrictions/about-fire-danger-ratings>>.

CSIRO/BOM (2018) *State of the Climate 2018* CSIRO and Bureau of Meteorology (BOM), December. Commonwealth of Australia. Viewed February 2019 at <<https://www.csiro.au/en/Research/OandA/Areas/Assessing-our-climate/State-of-the-Climate-2018/Report-at-a-glance>>.

CSIRO/BOM (2019) *Climate Change in Australia Projections for Australia's NRM Regions* Website viewed February 2019 at <<https://www.climatechangeinaustralia.gov.au/en/climate-projections/future-climate/regional-climate-change-explorer>>.

DELWP (2015a) *Local planning for bushfire protection*, Planning Practice Note 64. Department of Environment, Land, Water and Planning, Melbourne. Available at <<https://www.planning.vic.gov.au/publications/planning-practice-notes>>.

DELWP (2015b) *Bushfire Prone Area Mapping Criteria*. Department of Environment, Land, Water and Planning, Melbourne. Available at <<https://www.planning.vic.gov.au/policy-and-strategy/bushfire-protection/building-in-bushfire-prone-areas>>.

DELWP (2017) *Planning Permit Applications Bushfire Management Overlay* Technical Guide. Department of Environment, Land, Water and Planning, Melbourne. Available at <<https://www.planning.vic.gov.au/bushfire-protection/bushfire-management-overlay/technical-information>>.

DELWP (2018a) *Bushfire State Planning Policy Amendment VC140*, Planning Advisory Note 68, Department of Environment, Land, Water and Planning, Melbourne. Available at <<https://www.planning.vic.gov.au/publications/planning-advisory-notes>>.

DELWP (2018b) *Amendment VC148*, Planning Advisory Note 71, Department of Environment, Land, Water and Planning, Melbourne. Available at <<https://www.planning.vic.gov.au/publications/planning-advisory-notes>>.

Direction No. 11 (2013) *Strategic Assessment of Amendments*. Minister for Planning.

DPCD (2012) *Regional Bushfire Planning Assessment – Hume Region*. Department of Planning and Community Development, Melbourne.

DSE (2004a) *EVC 22: Grassy Dry Forest EVC/Bioregion Benchmark for Vegetation Quality Assessment Central Victorian Uplands bioregion*. Department of Sustainability and Environment, Melbourne. Available at <<https://www.environment.vic.gov.au/biodiversity/bioregions-and-evc-benchmarks>>.

Ecology & Heritage Partners (2013) *Scattered Tree Assessment, Beveridge North West (PSP 1059) Victoria* Report prepared for the Metropolitan Planning Authority, November.

Mitchell Planning Scheme (2013) *Clause 21.04-5 Bushfire*. Viewed February 2019 at <<http://planning-schemes.delwp.vic.gov.au/schemes/mitchell>>.

Mitchell Planning Scheme (2018a) *Clause 13.02 Bushfire*. Viewed February 2019 at <<http://planning-schemes.delwp.vic.gov.au/schemes/mitchell>>.

Mitchell Planning Scheme (2018b) *Clause 71.02-3 Integrated Decision Making*. Viewed February 2019 at <<http://planning-schemes.delwp.vic.gov.au/schemes/mitchell>>.

Mitchell Shire Council (2016) *Municipal Fire Management Plan* Available at <<https://www.mitchellshire.vic.gov.au/services/emergency-management/get-fire-ready/how-council-prepares-for-fire-season>>.

Hume Regional Strategic Fire Management Planning Committee (2011) *Hume Regional Strategic Fire Management Plan 2011-2021*. Available at <<https://www.emv.vic.gov.au/publications/regional-strategic-fire-management-plans>>.

Long M (2006) A climatology of extreme fire weather days in Victoria. *Australian Meteorological Magazine*, **55**, 3-18.

Lucas C, Hennessy K, Mills G and Bathos J (2007) *Bushfire Weather in Southeast Australia: Recent Trends and Projected Climate Change Impacts*. Consultancy Report prepared for The Climate Institute of Australia, Bushfire CRC and Australian Bureau of Meteorology, CSIRO Marine and Atmospheric Research.

Standards Australia (2018) *AS 3959-2018 Construction of buildings in bushfire-prone areas*. Standards Australia, North Sydney, New South Wales.

VPA (2018a) *Beveridge North West Precinct Structure Plan Newsletter*, September 2014. Viewed February 2019 at <<https://vpa.vic.gov.au/project/beveridge-north-west/#supporting-documentation>>.

VPA (2018b) *Beveridge North West PSP Draft Future Urban Structure*. Victorian Planning Authority, September.

VPA (2019) personal email communication to Terramatrix from Paul, J., Victorian Planning Authority, 11 July.

Yeo CS, Kepert JD and Hicks R (2014) *Fire danger indices: current limitations and a pathway to better indices*. Bushfire & Natural Hazards CRC, Australia.