



# Bushfire Assessment and Development Report

for the Officer Precinct Structure Plan

Prepared for  
the Victorian Planning Authority

August 2018

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Cover image: Looking south across the Officer PSP area from Oakrind Drive in the northwest part of the precinct.

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## 1 Introduction

This Bushfire Assessment and Development Report has been prepared for the Victorian Planning Authority (VPA), to assess how development in the Officer Precinct Structure Plan (OPSP) area can respond to the bushfire risk and comply with the applicable planning and building controls that relate to bushfire, especially the objectives and strategies of the Planning Policy Framework (PPF) at Clause 13.02 *Bushfire* and, where applicable within the precinct, Clause 44.06 *Bushfire Management Overlay (BMO)* and associated Clause 53.02 *Bushfire Planning* in the Cardinia Planning Scheme.

The VPA are the planning authority for Amendment C232, which proposes to amend the Cardinia Planning Scheme to implement the revised OPSP which was amended in March, 2018 (VPA, 2018a).

The previous OPSP was prepared by Cardinia Shire Council and was gazetted in January 2012 as Amendment C149 to the Cardinia Planning Scheme. A key component of the OPSP is the town centre, which is identified as a major town centre in key strategic planning documents, including Plan Melbourne. The town centre includes:

- New council offices;
- A civic centre; and
- A train station.

However, since approval of Amendment C149 there has been limited private-sector development in the Officer Town Centre. The Minister for Planning has directed the VPA to undertake a review of the OPSP, focusing on the Town Centre, to facilitate the private sector investment required to provide the services and facilities required by the growing community (VPA, 2018a).

*‘The Review Will:*

- 1. consolidate the form and content of the parts of the PSP that relate to the town centre*
- 2. standardise the residential and commercial zones applied by the Urban Growth Zone*
- 3. redraft the Urban Design Framework to reduce duplication with the PSP and increase flexibility.*

*The Review Does Not Intend To:*

- 1. change the Future Urban Structure (layout) of the town centre, e.g. location of roads*
- 2. alter the general intent of the Officer PSP, Urban Growth Zone Schedule or Urban Design Framework’ (VPA, 2018b).*

The Urban Growth Zone Schedule 3 and 4 will be applied to parts of the precinct and Amendment C232 only changes housing densities in the UGZ4 in the town centre.

Since the development of the OPSP, significant changes have been made to the Victorian planning and building controls relating to bushfire, which have implications for future

development. Three planning scheme amendments have introduced revised bushfire planning provisions<sup>1</sup>, including changes to Clause 13.02 *Bushfire*, Clause 44.06 *Bushfire Management Overlay* (BMO) and Clause 53.02 *Bushfire Planning*. The three amendments are:

- VC132, gazetted 19 September 2017, which made largely administrative corrections and relatively minor amendments to the bushfire provisions;
- GC13, gazetted 3 October 2017, which introduced updated BMO mapping across Victoria, including the OPSP area, and introduced new BMO schedules to some municipalities; and
- VC140, gazetted 12 December 2017. This amendment made the PPF more directive and clearer about bushfire risk, including establishing 12.5kW/m<sup>2</sup> as a maximum Radiant Heat Flux (RHF) safety threshold for planning scheme amendments, settlement planning and certain types of development applications in a bushfire prone area, such as vulnerable uses and subdivisions of more than 10 lots.

Note that subsequent to the amendments above, Amendment VC148, which was gazetted on 31 July 2018, has restructured the Victoria planning provisions, including introducing a new Planning Policy Framework (PPF), enabling the future introduction of a Municipal Planning Strategy (MPS) and simplifying the VPP structure. This has not materially affected the bushfire provisions but has renumbered them. This report has been amended to apply the clause numbering and naming introduced by VC148.

This report assesses the bushfire hazard to the precinct and identifies how future development can respond to the bushfire objectives and strategies that now apply in the PPF at Clause 13.02 *Bushfire* and, in BMO areas, the relevant objectives of Clause 53.02 *Bushfire Planning*.

A key purpose of this report is to identify those parts of the study area where RHF is expected not to exceed 12.5kW/m<sup>2</sup> and where, therefore, future dwellings or other buildings could be constructed to a BAL-12.5 construction standard, in accordance with one of the key strategies for settlement planning in Clause 13.02 (Cardinia Planning Scheme, 2018a).

Approximately 98% of the OPSP area<sup>2</sup> is currently a designated Bushfire Prone Area (BPA) and 5% of the precinct is also covered by the BMO<sup>3</sup>.

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<sup>1</sup> The Building Amendment (Specific Use Bushfire Protected Buildings and Other Matters) Regulations 2016 were made on 6 September 2016 to apply bushfire performance standards to the construction of new and significantly modified (by more than 50 per cent of the original volume of the building) 'Specific Use Bushfire Protected Buildings' (see Section 3.4).

<sup>2</sup> Based on the most recent BPA coverage (gazetted 16<sup>th</sup> May 2018) 98% of the precinct is a BPA. Approximately 21.7ha is not designated as a BPA (see Map 4).

<sup>3</sup> Affecting approximately 5.3ha of land in the northwest of the precinct, and 0.7ha further east along the northern precinct boundary (see Map 6).

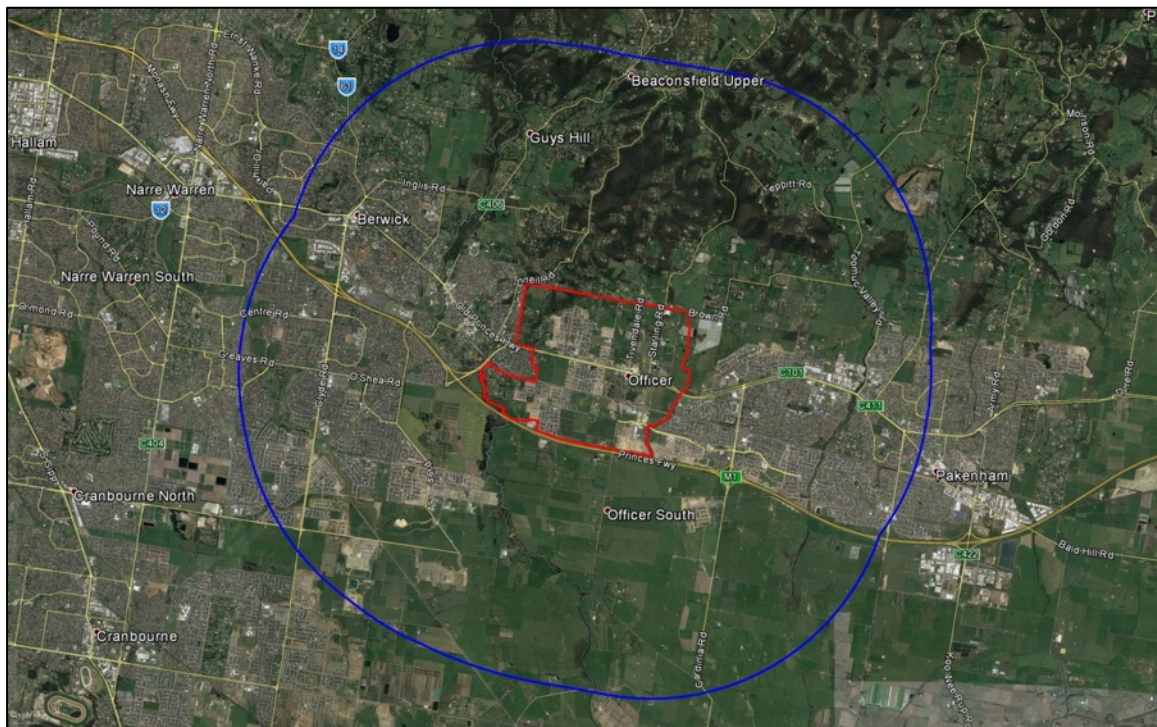
The report has been prepared in accordance with guidance for the assessment of, and response to, bushfire risk, provided in:

- *Bushfire State Planning Policy Amendment VC140*, Planning Advisory Note 68, (DELWP, 2018);
- *Local planning for bushfire protection*, Planning Practice Note 64 (DELWP, 2015a);
- *Strategic Assessment Guidelines for preparing and evaluating planning scheme amendments*, Planning Practice Note 46 (DELWP, 2017a); and, as appropriate,
- *Planning Permit Applications – Bushfire Management Overlay*, Technical Guide (DELWP, 2017b).

## 2 Overview of study area

The precinct comprises approximately 1,020 hectares of land in the Casey-Cardinia growth corridor, bounded by:

- An electricity transmission line easement to the north;
- Gum Scrub Creek to the east;
- Princes Freeway to the south; and
- May Road, Brunt Road (part), Kenilworth Avenue and the Cardinia Creek to the west (VPA, 2018a) (see Figure 1 and Figure 2).



**Figure 1 - Precinct location (OPSP area in red outline, 5km buffer in blue outline (Google Earth imagery date 2017-10-18)).**

The precinct is located in the western part of the Cardinia Shire Council local government area (LGA), in the Casey-Cardinia Growth Area, approximately 50 kilometres southeast of the Melbourne CBD. The majority of the PSP area is within the suburb of Officer, while the area west of Whiteside Road and Brunt Road is located within Beaconsfield.

It is anticipated that the precinct will accommodate approximately 10,000 dwellings and be home to 30,000 residents when fully developed (VPA, 2018c).

The proposed future urban structure of the precinct, highlighting the Officer town centre which is covered by UGZ4, is shown in Figure 2.





**Future Urban Structure**  
Officer Precinct Structure Plan Town Centre Review

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**Figure 2 - OPSP Future Urban Structure highlighting the Town Centre review area (VPA, 2018b).**

### 3 Bushfire planning and building controls

This section summarises the applicable planning and building controls that relate to bushfire.

#### 3.1 Planning Policy Framework (PPF)

##### 3.1.1 Clause 71.02-3 Integrated Decision Making

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

##### 3.1.2 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'* (Cardinia 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'* (Cardinia Planning Scheme, 2018a).

Key strategies are stipulated in Clause 13.02, which require regional growth plans, precinct structure plans and planning scheme amendments to assess the bushfire hazard and respond with 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
- Any application for development that will result in people congregating in large numbers.

This study assesses the hazard and identifies the bushfire protection measures that will be required for future development in the precinct. 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'* (Cardinia Planning Scheme, 2018a).

A detailed response to the strategies in Clause 13.02 is provided in Section 5.2. Note that Terramatrix understands DELWP have advised the VPA that changes to the UGZ3 being made as part of C232 will not result in an intensification of development or a greater risk from bushfire to human life than what has already been approved for the OPSP area.

### **3.2 Local Planning Policy Framework (LPPF)**

The Municipal Strategic Statement at Clause 21.01-3 in the Cardinia LPPF identifies that the protection of life and property from flooding and wildfire are key issues facing the Shire (Cardinia Planning Scheme, 2017a).

### **3.3 Bushfire Management Overlay (BMO)**

The purposes of the BMO are:

- *'To implement the State Planning Policy Framework and Local Planning Policy Framework, including the Municipal Strategic Statement and local planning policies.*
- *To ensure that the development of land prioritises the protection of human life and strengthens community resilience to bushfire.*
- *To identify areas where the bushfire hazard warrants bushfire protection measures to be implemented.*
- *To ensure development is only permitted where the risk to life and property from bushfire can be reduced to an acceptable level'* (Cardinia Planning Scheme, 2017b).



The BMO largely applies to patches of treed vegetation greater than 4ha in size, where head fire intensity has been modelled to be 30,000kW/m or more. It also extends over land 150m around those areas, based on research into house loss from bushfires which has found that 92% of house loss occurs within 150m of the bushfire hazard (DTPLI, 2013).

The BMO requires a planning permit for all subdivision of land, and buildings and works associated with the following uses (some exemptions apply):

- Accommodation (including a dependent person's unit);
- Child care or Education centre;
- Hospital;
- Industry;
- Leisure and Recreation;
- Office;
- Place of assembly;
- Retail premises;
- Service station;
- Timber production; and
- Warehouse.

A BMO application must be accompanied by:

- A *Bushfire hazard site assessment*, including a plan that describes the bushfire hazard within 150m of the site in accordance with the site assessment methodology of AS 3959-2009 *Construction of buildings in bushfire-prone areas* and Clause 44.06;
- A *Bushfire hazard landscape assessment*, including a plan that describes the bushfire hazard of the general locality more than 150m from the site; and
- A *Bushfire management statement*, detailing how the development responds to the bushfire risk and the requirements and objectives of Clauses 44.06 and 53.02.

*Clause 53.02 Bushfire Planning* applies to BMO applications and contains:

- **Objectives:** An objective describes the outcome that must be achieved in a completed development.
- **Approved measures:** An approved measure meets the objective.
- **Alternative measures:** An alternative measure may be considered where the responsible authority is satisfied that the objective can be met. The responsible authority may consider other unspecified alternative measures.
- **Decision guidelines:** The decision guidelines set out the matters that the responsible authority must consider before deciding on an application, including whether any proposed alternative measure is appropriate (Cardinia Planning Scheme, 2017c).

Section 4 of this report includes a bushfire hazard site and landscape assessment in accordance with BMO application requirements (see also Map 2 and Map 4).

The extent of BMO coverage of the precinct and surrounding land is shown in Map 4. This reflects BMO mapping introduced into the Cardinia Planning Scheme by amendment GC13, which was gazetted on 3<sup>rd</sup> October 2017.

### 3.4 Bushfire Prone Area (BPA)

The whole precinct is currently designated as a BPA. BPAs are those areas subject to or likely to be subject to bushfire, as determined by the Minister for Planning (see Map 4, which shows the extent of BPA (and BMO) coverage around the precinct). Those areas of highest bushfire risk within the BPA are designated as BMO areas.

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>4</sup> buildings, 'Specific Use Bushfire Protected Buildings'<sup>5</sup> and associated class 10A buildings<sup>6</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 3959-2009 *Construction of buildings in bushfire prone areas* (Standards Australia, 2011) is 'deemed-to-satisfy' the performance requirement.

In a BPA, 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 3959-2009, which range from BAL-LOW, which has no bushfire construction requirements to BAL-FZ (Flame Zone) where flame contact with a building is expected.

In a BPA not subject to the BMO, larger developments and certain vulnerable uses (see Section 3.1) are required by Clause 13.02 to:

- *'Consider the risk of bushfire to people, property and community infrastructure.*
- *Require the implementation of appropriate bushfire protection measures to address the*

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<sup>4</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>5</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>6</sup> Class 10a buildings are defined in the BCA as non-habitable buildings including sheds, carports, and private garages.

*identified bushfire risk.*

- *Ensure new development can implement bushfire protection measures without unacceptable biodiversity impacts’ (Cardinia Planning Scheme, 2018a).*

There should be no obstacle to future development in the OPSP complying with the building regulations as invoked in a BPA. It is likely that as development progresses, further land within the OPSP area will become eligible to be excised from the BPA (see Section 5.1.2). DELWP review and excise areas from the BPA approximately every 6 months, particularly in growth areas where the hazard is removed as urban development occurs.

Reliably low threat urban areas become eligible for excision if they satisfy statewide hazard mapping criteria, including that they need 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).

### **3.5 Precinct Structure Plan**

The OPSP specifies the following objectives for bushfire risk management:

- *‘Identify land that is subject to adverse impacts from a bushfire.*
- *Avoid development in areas where the fire intensity is too high to allow for the adequate protection of people and buildings.*
- *Ensure that any new lot created minimises the risk from bushfire.*
- *Ensure there is an appropriate interface treatment to bushfire risk areas.*
- *Provide adequate buffers between native vegetation to be retained (refer Officer NVPP 2011) and new development to minimise the need for native vegetation removal to manage fire risk.*
- *Ensure subdivision design responds to the effect of vegetation on the level of fire intensity.*
- *Increase the level of protection from fire through the design, siting and layout of the subdivision.*
- *Ensure that the design and siting of buildings and works improves protection for life and minimises the level of fire impact (including ember attack).*
- *Provide a safe and high level of access for emergency and other vehicles’ (VPA, 2018c).*

The OPSP also defines a ‘Direct Bushfire Impact Zone’ (see Figure 10a in the OPSP), as being that land that is within 100m of the ‘fire threat’ (see Map 6). It imposes a requirement that:

*'All applications for subdivision of land within the Direct Bushfire Impact Zone as outlined in Figure 10a or land identified as an area of bushfire hazard in a bushfire hazard map in the Victorian planning scheme, must provide a detailed fire risk assessment undertaken by a suitably qualified and experienced consultant that supports the subdivision design and siting of development to minimise bushfire risk' (VPA, 2018c).*

The OPSP further states that the following planning and design guidelines must be met:

- *'Respond to any relevant policy in relation to bushfire and fire prevention.*
- *Subdivision and development within the Direct Bushfire Impact Zone (as identified in Figure 10a) must address the objectives and outcomes of bushfire planning in Victoria to the satisfaction of CFA including (but not limited to):*
  - *Siting of development is to minimize bushfire risk.*
  - *Defendable Space is to be provided within the boundaries of each lot, consistent with the requirements for a Bushfire Attack Level (BAL) specified by CFA.*
  - *Buildings are not to be located:*
    - *in Defendable Space; or*
    - *within 30 metres of native vegetation retained in the relevant lot (whichever is greater).*
  - *Building construction standards (BAL rating) are to be determined at subdivision stage and registered to the title of each lot.*
- *The road network is to provide each lot with access to at least two north-south routes to escape a fire threat without moving closer to the fire threat.*
- *Provide water supplies for fire fighting purposes for both residents and firefighters to the satisfaction of CFA (VPA, 2018c).*

It is considered that these requirements and guidelines are now outdated and unnecessarily duplicate, and/or impose additional requirements to, the Victorian planning and building controls that relate to bushfire. The risk from bushfire to development in the precinct, does not warrant specific or additional bushfire related guidelines and requirements in the PSP, i.e. it is considered that the current planning and building controls are adequate and appropriate for identifying and mitigating bushfire risk. Accordingly, it is recommended that the existing guidelines and requirements in the PSP that relate to bushfire be reviewed, including Figure 10a *Strategic Design Principles for Residential Interface to Wildfire Management Overlay* and Figure 10b *Fuel managed buffers*, and potentially deleted.

Additionally, it is recommended that the definition of defendable space in the glossary of the PSP be deleted, or at least amended to replicate the definition of defendable space at Clause 73.01 in the VPP (Cardinia Planning Scheme, 2018).

## 3.6 Other controls

### 3.6.1 Zoning

Neither the existing nor proposed zones have any significant bushfire safety implications, although it is noted that the existing, and proposed as exhibited, UGZ3 schedule requires subdivision applications for land within the area designated as 'Environmental Residential' north of the Princess Highway, to prepare a Fire Risk Assessment (FRA). The FRA must be prepared by a suitably qualified bushfire risk management professional and include:

- *'Identification of the Bushfire Attack Level (BAL) curves generated by the fire threat/s;*
- *An assessment of the BAL standards applicable to each individual building envelope;*
- *Advice about the impact of dwellings in closer proximity to the identified fire threat/s on the requirements for lots within than 100 metres of the fire threat/s, including requirements for defensible space and applicable BAL standards for dwellings'* (Cardinia Planning Scheme, 2013).

It is considered that this requirement is redundant, and it is recommended that it be removed from the OPSP. The updated BMO mapping introduced 3<sup>rd</sup> October 2017 by GC13, the BPA mapping, and associated controls in the planning and building system, should be deemed adequate to address bushfire risk.

It is noted that in other PSPs, a UGZ schedule typically includes a requirement that an application for 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 AS3959-2009, 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 fire; and
- How adequate opportunities for access and egress will be provided for early residents, construction workers and emergency vehicles.

### 3.6.2 Overlays

Apart from the BMO, none of the existing or proposed overlay controls have any direct implications for bushfire safety.

## 4 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 (Cardinia Planning Scheme, 2018a). 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’* (Cardinia Planning Scheme, 2018a).

This section includes a bushfire assessment at:

- The wider landscape scale, for up to 20km around the site (see Figure 13, Figure 14 and Map 4);
- The local landscape scale extending up to 3km from the site (see Map 4);
- The neighbourhood scale up to 400m around the precinct boundary to identify any risk arising around the site beyond the BAL assessment zone (see Maps 1, 2 and 3); and
- The site scale, for 150m around the precinct boundary (see Map 2).

AS 3959-2009 *Construction of buildings in bushfire prone areas* 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, 2011). A site hazard assessment is also required in BMO areas, extending at least 150m around a building, development site or subdivision boundary (DELWP, 2017b). For vulnerable uses and larger developments in a BPA, a 150m assessment zone may also be required (DELWP, 2018).

Note that whilst this study applies a 150m assessment zone, it has been undertaken broadly, at a strategic level, for settlement planning purposes only. The results should not be used for determining the applicable BAL or BMO measures for building compliance, or statutory planning purposes, in relation to a specific site or development application within the precinct.

### 4.1 Vegetation

Vegetation within a 150m assessment zone around the study area has been classified in accordance with the BMO/AS 3959-2009 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 based on the structure of the vegetation in its mature state<sup>7</sup> and the likely fire behaviour that it will generate.

#### 4.1.1 Forest

Areas of remnant treed vegetation, with a well-developed understorey and overall foliage cover greater than 30%, accord best with the AS 3959-2009/BMO Forest group, comprising the Open Forest or Low Open Forest vegetation types, which are defined as:

*'Trees 10–30 m high; 30-70% foliage cover (may include understorey of sclerophyllous low trees and tall scrubs or grass). Typically dominated by eucalypts'* (Standards Australia, 2011).

The Forest areas include patches of vegetation north of the transmission line easement in the northwest of the precinct, which are identified in the Officer Native Vegetation Precinct Plan (ONVPP) (Cardinia Shire Council, 2011) as comprising three Ecological Vegetation Classes (EVCs) as follows (see Maps 1, 2 and 6).

##### **EVC 128 Grassy Forest** – 30% benchmark tree canopy cover

*'Low growing forest to 20 m tall with an understorey of small and medium shrubs and a rich diversity of herbs. Large shrubs and understorey trees may also be conspicuous. Often grows in areas transitional between drier box stringybark forests and taller, herb-rich forests typical of more favourable environments'* (DSE, 2004a).

##### **EVC 902 Gully Woodland** – 20% benchmark tree canopy cover

*'Woodland or open forest to 20 m tall occurring along moderately steep gullies. Soils are mostly colluvial deposits of sands and silts. Characterised by a medium dense small tree and shrub layer above a grassy/sedgy understorey, often rich in herbs within the inter-tussock spaces'* (DSE 2004b).

##### **EVC 937 Swampy Woodland** – 15% benchmark tree canopy cover

*'Open eucalypt woodland to 15 m tall with ground-layer dominated by tussock grasses and/or sedges and often rich in herbs. Occurs on poorly drained, seasonally waterlogged heavy soils, primarily on swamp deposits but extending to suitable substrates within some landscapes of sedimentary origin.'* (DSE, 2004c).

Note that the vegetation groups shown in the maps are based on a combination of the EVC and vegetation mapping for the ONVPP, site assessment and analysis of aerial imagery. Not all areas of vegetation were able to be accessed during the site assessment and, depending on the amount and type of fine fuels present, some vegetation matching these EVCs, may be classifiable

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<sup>7</sup> In BMO areas the long term mature state of the vegetation is considered, however for determining a BAL using AS 3959-2009, the assessment is at a 'point in time', which does not necessarily take into account future changes in the vegetation.



in the lesser hazard Woodland group of AS 3959-2009. As a precaution, where any doubt exists, the vegetation has classified as Forest.



**Figure 3 - Forest vegetation north of Oakrind Drive.**



**Figure 4 – Looking west at interface with Forest vegetation at the end of Oakrind Drive.**



**Figure 5 - Looking west at interface with Forest vegetation north of Kentwell Road.**

Vegetation along the Cardinia Creek in the southwest of the precinct and 150m assessment zone, has also been classified as Forest (see Maps 2 and 7). This vegetation is identified in the ONVPP; as comprising EVC 937 Swampy Woodland and EVC 83 Swampy Riparian Woodland (Cardinia Shire Council, 2011) (see Map 1).

**EVC 83 Swampy Riparian Woodland** – 20% benchmark tree canopy cover

*‘Woodland to 15 m tall generally occupying low energy streams of the foothills and plains. The lower strata are variously locally dominated by a range of large and medium shrub species on the stream levees in combination with large tussock grasses and sedges in the ground layer’ (DSE, 2004d).*



**Figure 6 - Looking south at vegetation along the Cardinia Creek, which has been classified as Forest.**

#### 4.1.2 Woodland

Areas of remnant treed vegetation, with a less developed understorey, where the overall foliage cover is between 10-30%, can be classified in the lesser hazard Woodland group, as Woodland or Open Woodland which are defined as:

*'Trees 10–30 m high; 10–30% foliage cover dominated by eucalypts; understorey or low trees to tall shrubs typically dominated by Acacia, Callitris or Casuarina'* (Standards Australia, 2011).

In the BMO and AS 3959-2009 methodology, Woodland is presumed to have a surface fine fuel load of 15t/ha and an overall fine fuel load of 25t/ha whereas Forest has a presumed surface and overall fine fuel load of 25t/ha and 35t/ha respectively.

The areas of Woodland include the proposed Conservation Reserve to the east of Station Street, in the Township Review Area (see Maps 2 and 5). This vegetation is identified in the ONVPP as Plains Grassy Woodland (see Map 1).

##### **EVC 55 Plains Grassy Woodland** – 20% benchmark tree canopy cover

*'An open, eucalypt woodland to 15 m tall occurring on a number of geologies and soil types. Occupies poorly drained, fertile soils on flat or gently undulating plains at low elevations. The understorey consists of a few sparse shrubs over a species-rich grassy and herbaceous ground layer.'* (DSE, 2004e).



**Figure 7 - Woodland in the proposed Conservation Reserve east of Station Street.**





**Figure 8 - Woodland in the proposed Conservation Reserve east of Station Street**

#### **4.1.3 Scrub**

The shrub vegetation on the proposed Conservation Reserve to the west of Station Street, matches the Closed Scrub vegetation type, which is defined as:

*'Found in wet areas and/or areas affected by poor soil fertility or shallow soils; >30% foliage cover. Dry heaths occur in rocky areas. Shrubs >2 m high. Typical of coastal wetlands and tall heaths'* (Standards Australia, 2011).

The Scrub is surrounded by large areas of classified Grassland.



**Figure 9 - Grassland, and Scrub (in rear of image), in the proposed Conservation Reserve to the west of Station Street.**

#### 4.1.4 Grassland

Areas of grassy vegetation greater than 100mm high with an overstorey foliage cover of less than 10%, are classifiable in the Grassland group of AS 3959-2009, which is defined as '*All forms (of vegetation) including areas with shrubs and trees, if overstorey foliage cover is less than 10%*' (Standards Australia, 2011).

Grassland vegetation is considered hazardous, and therefore classifiable, when it is unmanaged i.e. >100mm tall. In the BMO, Grassland areas are 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.



**Figure 10 – Looking east at treed vegetation north of the Timbertop Estate, which has been classified as Grassland on the basis of credible fire behaviour.**



**Figure 11 – Grassland vegetation in the proposed park to the east of Station Street and south of the railway. If the blackberries are removed and grass is managed in a low threat state (<100m high) this area would not be deemed hazardous.**

#### **4.1.5 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 3959-2009, if they meet one or more of the following criteria:

- i. *‘Vegetation of any type that is more than 100m<sup>8</sup> from the site.*
- ii. *Single areas of vegetation less than 1 ha in area and not within 100m of other areas of vegetation being classified.*
- iii. *Multiple areas of vegetation less than 0.25 ha in area and not within 20 m of the site, or each other.*
- iv. *Strips of vegetation less than 20 m in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20 m of the site or each other, or other areas of vegetation being classified.*
- v. *Non-vegetated areas, including waterways, roads, footpaths, buildings and rocky outcrops.*
- vi. *Low threat vegetation, including grassland managed in a minimal fuel condition<sup>9</sup>, maintained lawns, golf courses, maintained public reserves and parklands, vineyards, orchards, cultivated gardens, commercial nurseries, nature strips and windbreaks’ (Standards Australia, 2011).*

<sup>8</sup> 150m in BMO areas.

<sup>9</sup> Minimal fuel condition means there is insufficient fuel available to significantly increase the severity of the bushfire attack, recognisable as short-cropped grass for example, to a nominal height of 100mm (Standards Australia, 2011).

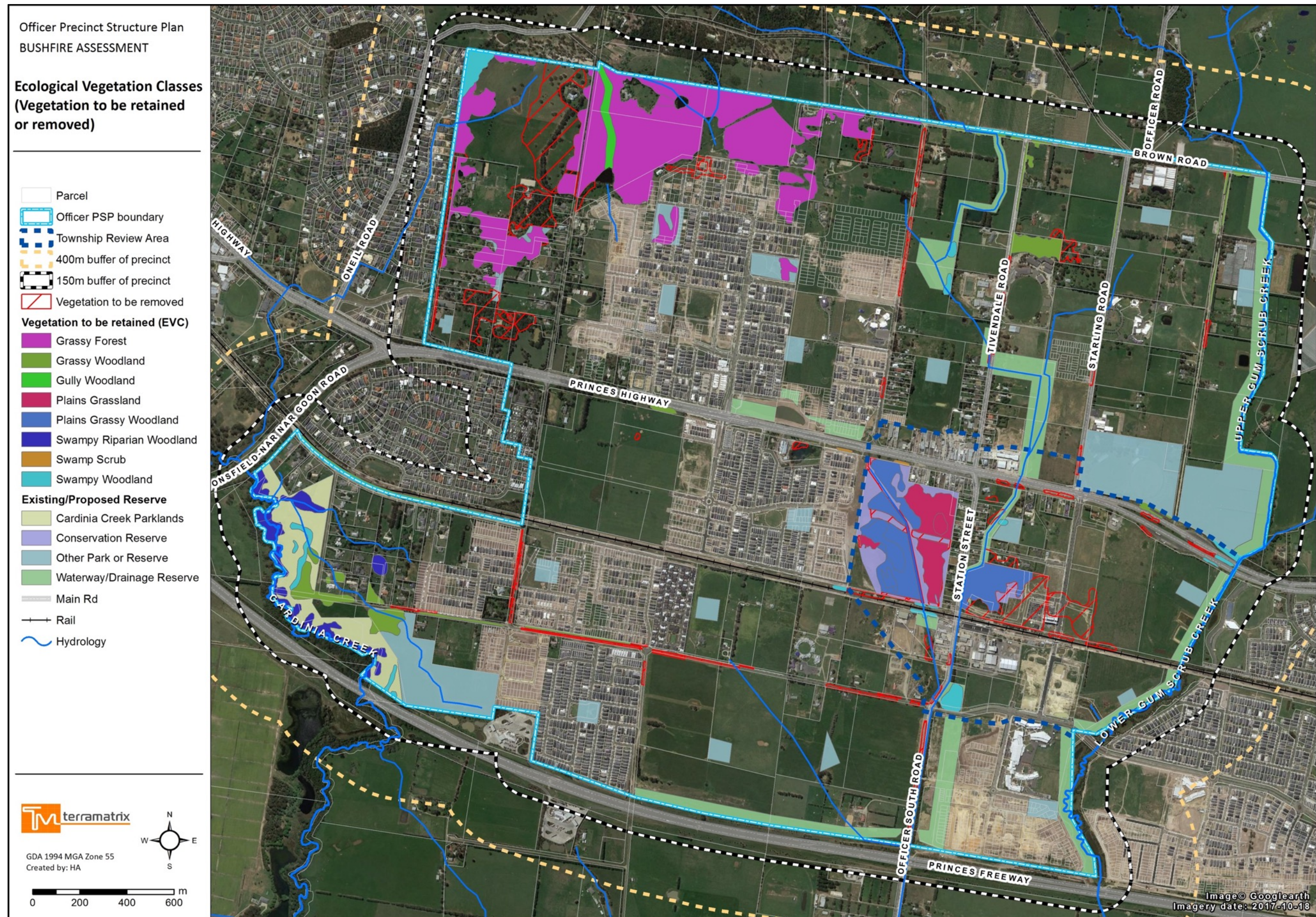
It is reasonable to assume that most of the existing and future urban-residential and township land in the precinct, will be either be non-vegetated or comprise low threat vegetation such as maintained lawns, roadsides or cultivated gardens. It is also assumed that the proposed 'Local Park or Reserve' open space areas will be managed in a low threat state (see Maps 1 and 2). Some larger properties in the precinct are also reliably low threat.

Areas that may not be low threat, which could potentially comprise classified vegetation, include the proposed waterway and drainage reserves. How the vegetation within them is managed during the fire danger period, their size and how far setback they are from development, will determine whether they may be excludable as non-hazardous vegetation.

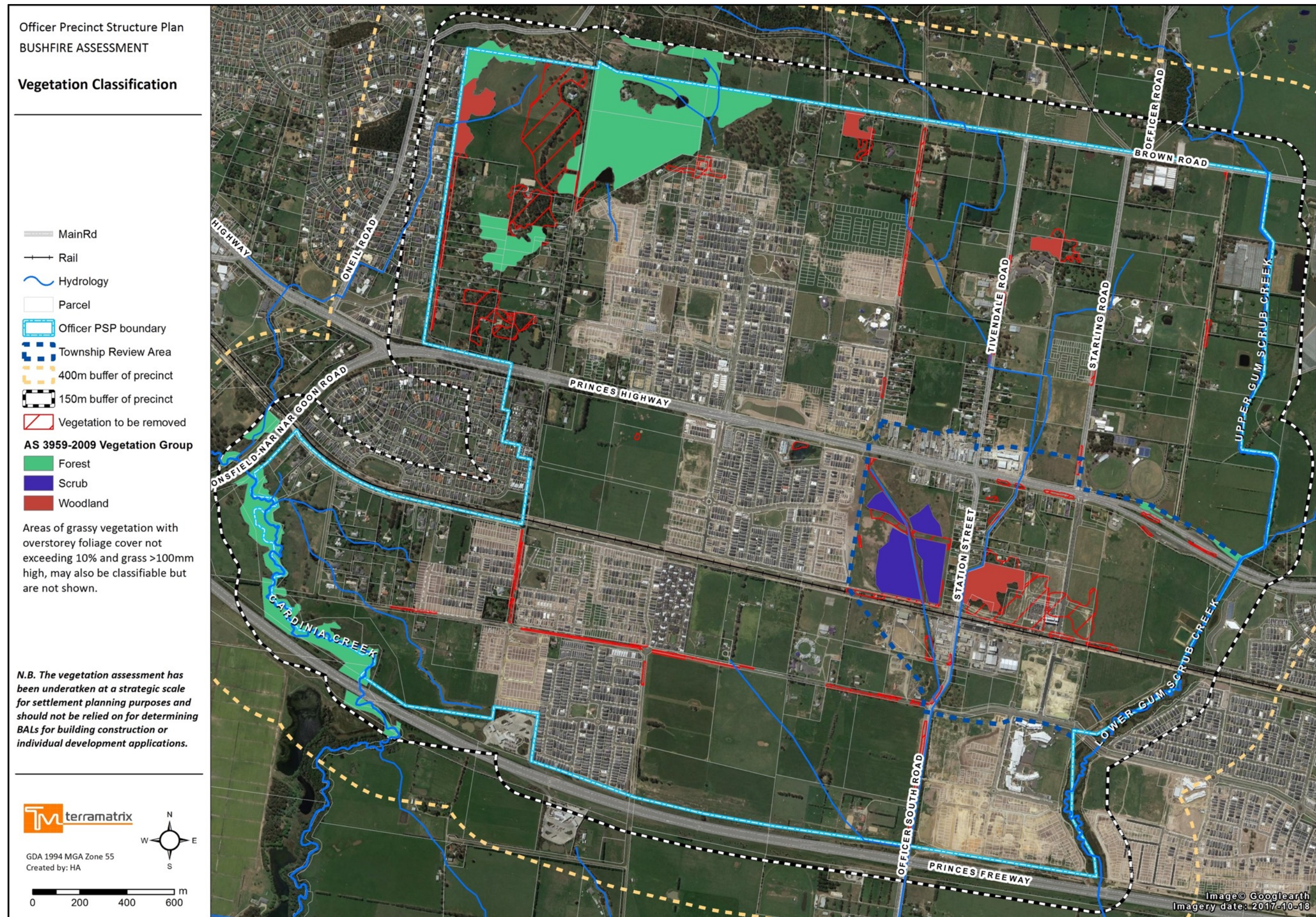


**Figure 12 - Local park in the Timbertop Estate which is considered 'low threat'.**



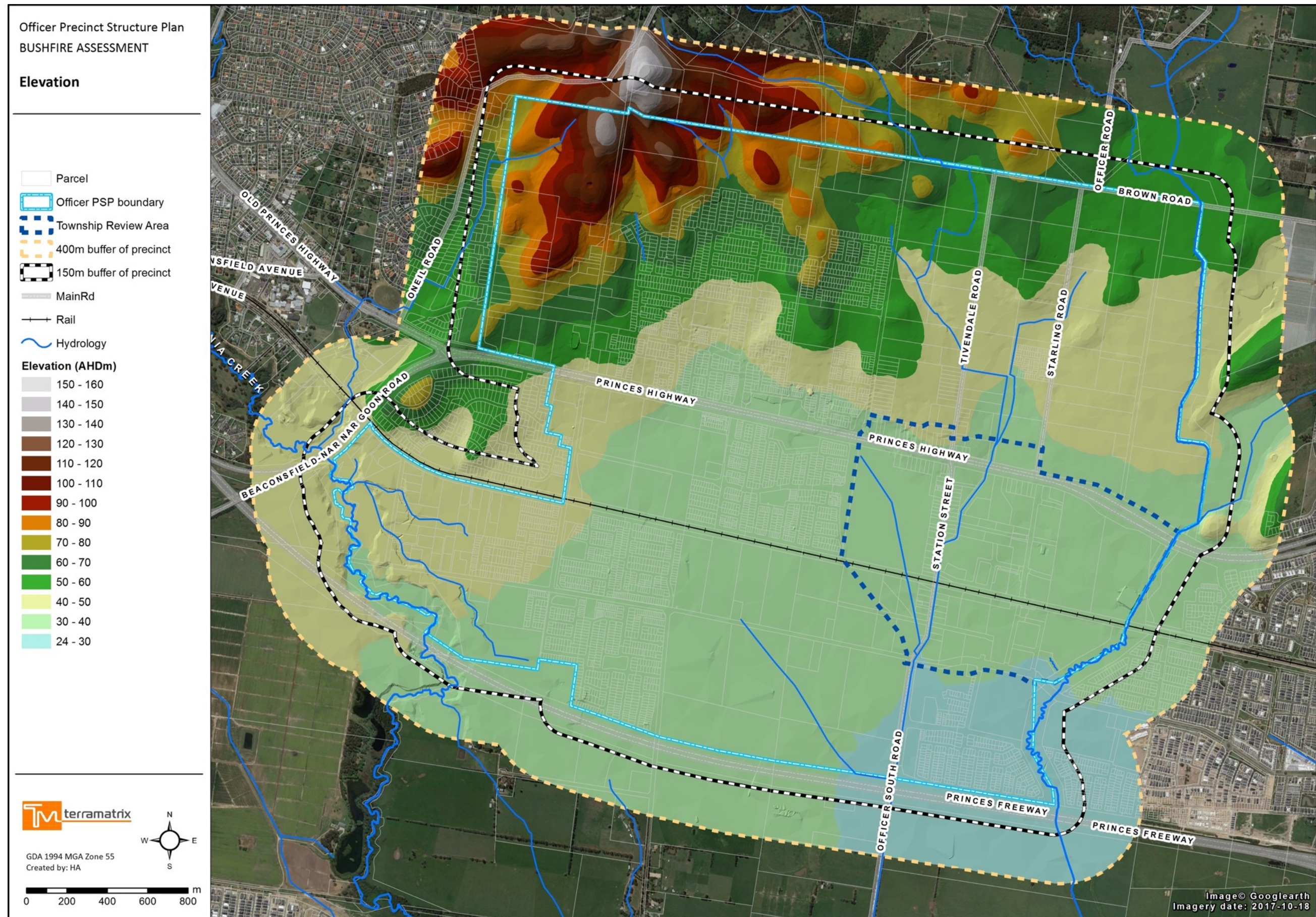






Map 2 – Classification of vegetation in and 150m around the precinct (based on EVC mapping, site assessment and aerial imagery).





Map 3 - Elevation map of the precinct and land 400m around it.



## 4.2 Topography

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 1m contour data (see Map 3).

The BMO and AS 3959-2009 require that the 'effective slope' be identified to determine the BAL and applicable vegetation setback distances. This is the slope of land under the classified vegetation 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 land slopes generally down from the northwest to the southeast. The majority of the precinct is flat or almost flat, with no significant changes in elevation that would exacerbate the bushfire attack. However, north of the transmission line easement in the northwest of the precinct, the land rises more steeply creating undulating hills and gullies. All of the classified vegetation in this area is, however, on an upslope in relation to future and existing development.

Therefore, for the purposes of determining BALs and defensible space/vegetation setback distances, the applicable slope class is considered to be 'All upslopes and flat land'.

## 4.3 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 3959-2009, (and similarly in BMO areas, as one of the inputs to determine the defensible space distances in the Tables to Clause 53.02-5).

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>10</sup> and the description of conditions for each FDR.

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<sup>10</sup> The GFDI ranges for each FDR in Table 1 may vary in some jurisdictions.

**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	

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 OPSP 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 expected to increase (Lucas *et al.*, 2007; Hughes and Steffen, 2013).

Currently CFA and DELWP have no published policy on FFDI recurrence intervals and therefore there is no compelling reason to apply a different FFDI/GFDI for the precinct, to the FFDI 100/GFDI 130 threshold used throughout non-Alpine areas of Victoria in the planning and building system<sup>11</sup>.

<sup>11</sup> In Alpine areas of Victoria an FFDI 50 applies for determining BALs using Method 1 of AS 3959-2009.

## 4.4 Landscape assessment

### 4.4.1 *Location description and context*

The precinct is located in the western part of the Cardinia Shire Council LGA, in the Casey-Cardinia Growth Area, approximately 50 kilometres southeast of the Melbourne CBD. The majority of the PSP area is within the suburb of Officer, while the area west of Whiteside Road and Brunt Road is located within Beaconsfield (VPA, 2018c).

Land to the east, west and south of the precinct is designated for urban or commercial development, albeit with some areas of open space reserved to provide amenity and protect waterways and significant vegetation. Land to the north of the precinct, however, will likely stay more or less in its current rural/semi-rural state, due to the urban growth boundary that forms the northern boundary of the OPSP area (see Figure 13 and Figure 14).

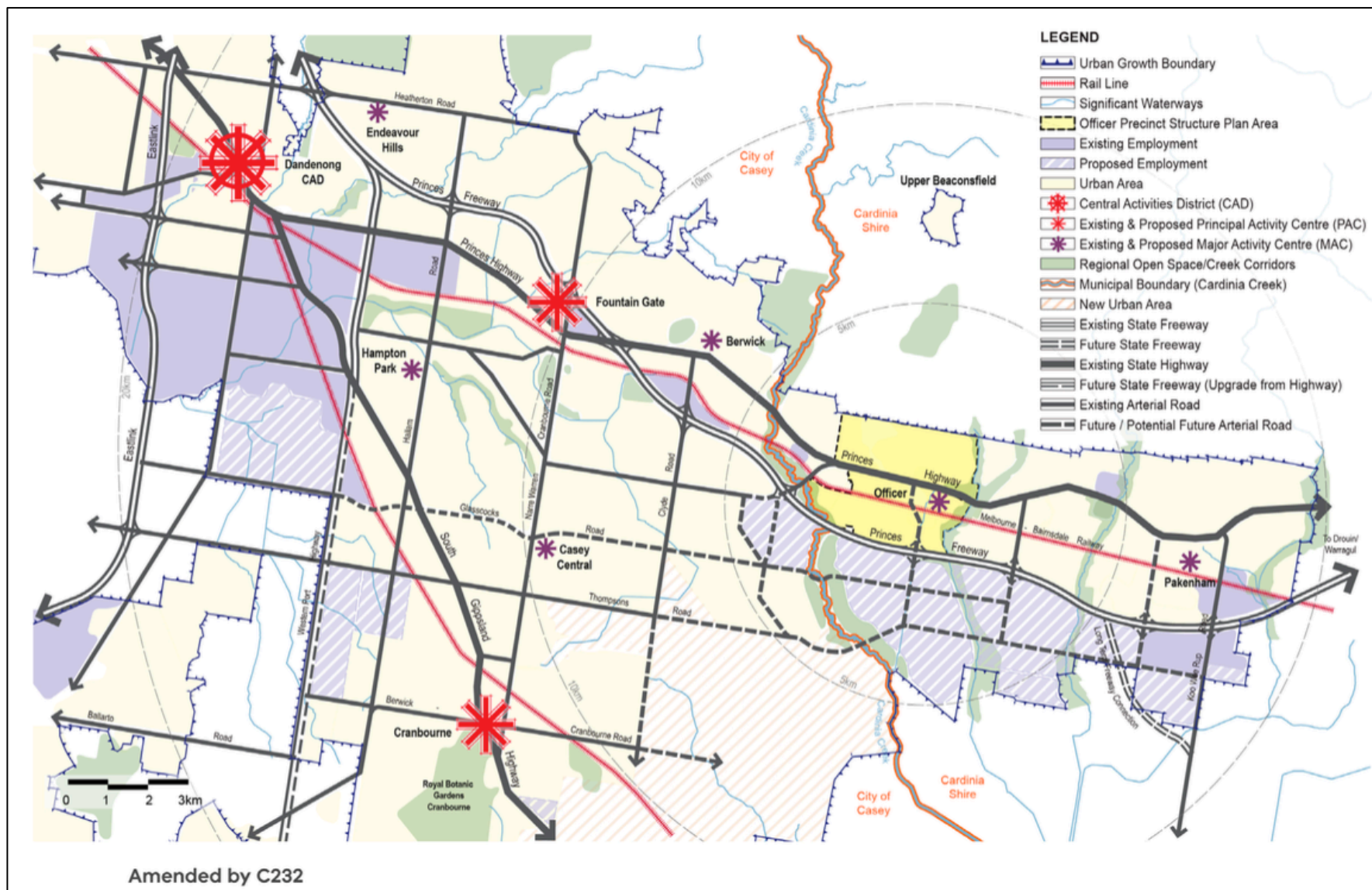


Figure 13 - Regional context (Plan 2 in the OPSP; VPA, 2018c).



#### 4.4.2 Landscape risk

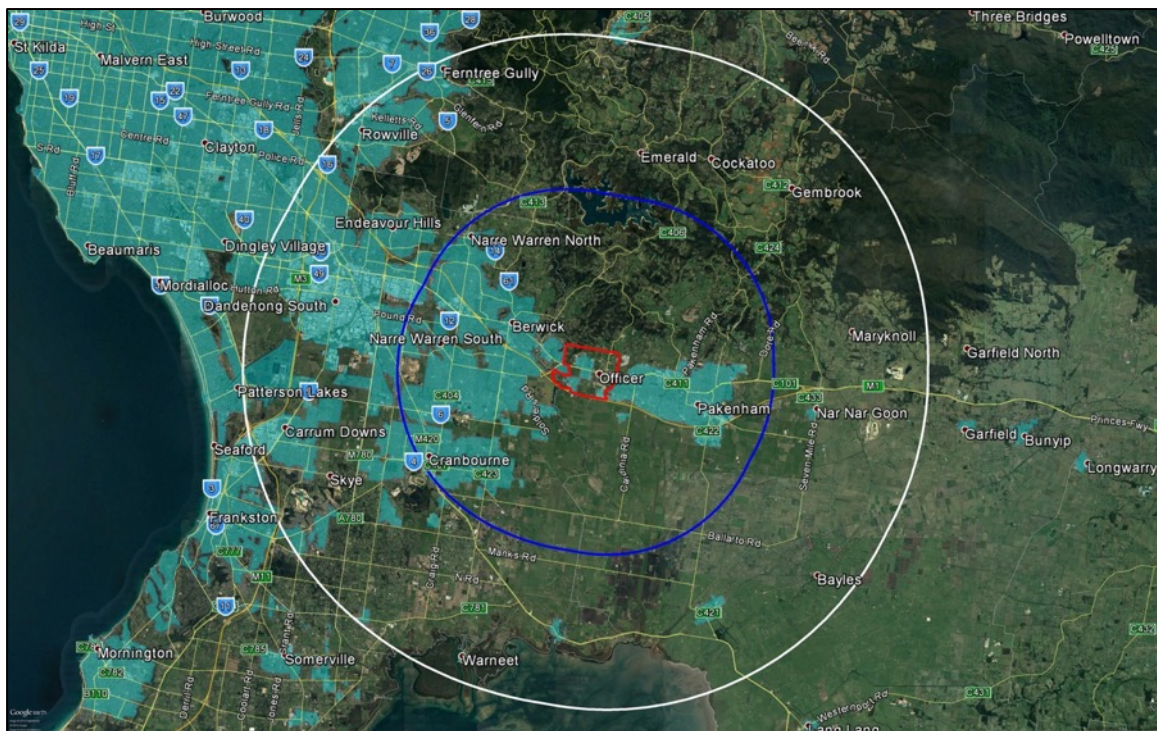
To assist in assessing landscape risk, four 'broader landscape types', representing different landscape risk levels, are described in the DELWP technical guide *Planning Applications Bushfire Management Overlay*. These are intended to streamline decision-making and support more consistent decisions based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

The four types range from low risk landscapes where there is little hazardous vegetation beyond 150m of the 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 3959-2009 presumptions (see Table 2).

To the east, west and south, the landscape accords best with the lesser risk Landscape Types 1 and 2. Apart from the remnant vegetation associated with Cardinia Creek, there is little vegetation beyond 150 metres of the precinct in these directions, except grassland and low-threat vegetation as reflected by the land which has been excised from the BPA in these directions (see Map 4).


The vegetation associated with Cardinia Creek is more hazardous and has been conservatively classified as Forest. However, its narrow width and relatively isolated occurrence, with limited connectivity to larger patches of trees or shrubs, means that it may not support a large, 100m wide bushfire moving at a quasi-steady-state rate of forward spread as envisaged in the BMO/AS 3959-2009 methodology, especially after land either side of the creek has been developed.

To the north of the precinct, the risk is higher, in accord with Broader Landscape Type 3. A large fire could spread towards the site from this direction, potentially under prevailing north or northwesterly winds typically associated with severe fire weather. This is reflected by the BMO coverage of the landscape in this direction. Nevertheless, the landscape for at least 1km to the north is a mosaic of cleared pasture, generally fragmented remnant vegetation, and rural-residential development. Access for people in the precinct is readily available to reliably low threat or non-vegetated areas that provide shelter from bushfire.

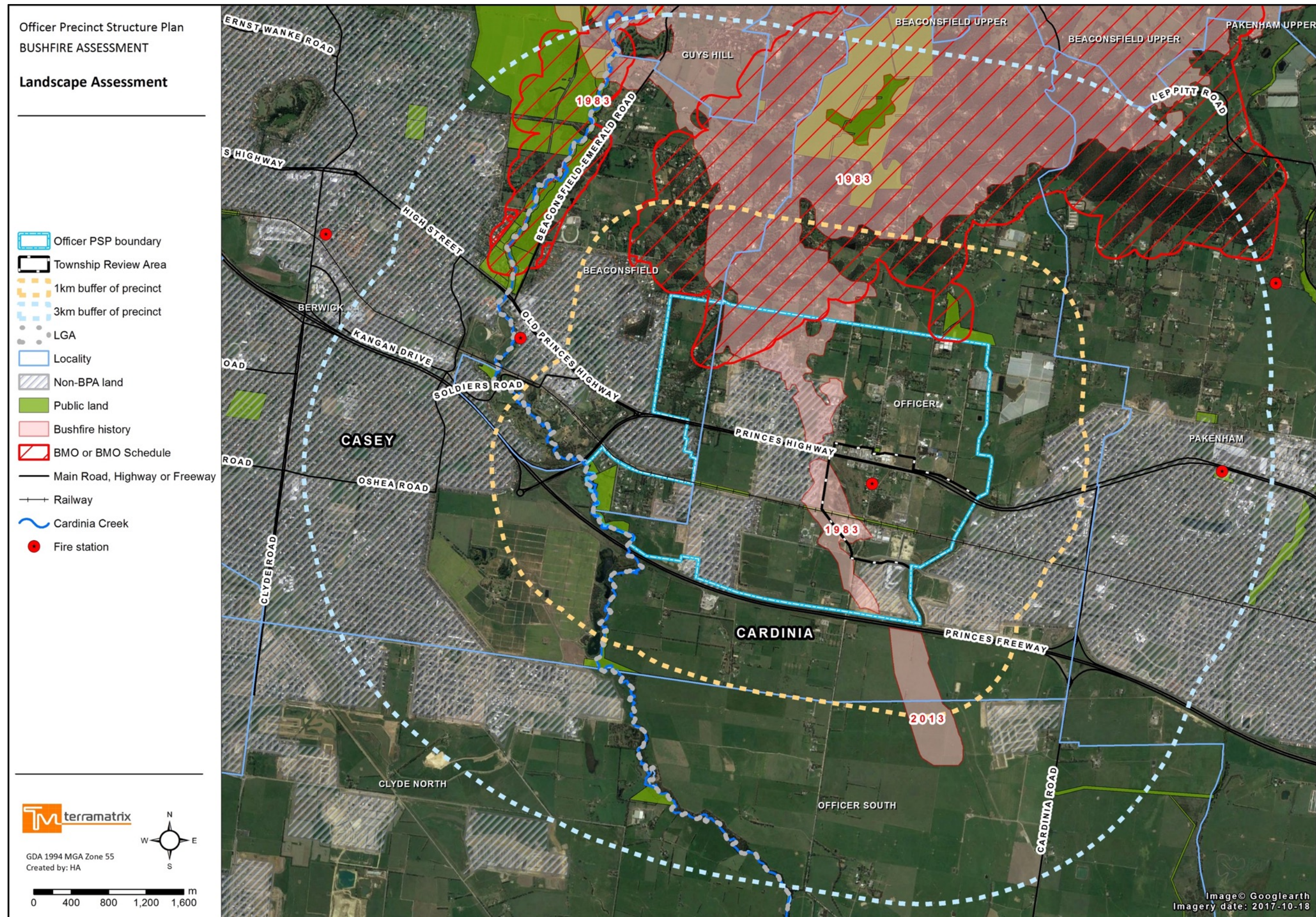


**Figure 14 – Location and landscape context of the precinct. A 10km buffer of the precinct is shown in blue outline, a 20km buffer in white outline. Non-BPA land is shown in light blue shading.**

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

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>• Evacuation options are limited or not available.</li> </ul>
<p style="text-align: center;">I N C R E A S I N G   R I S K</p> 			







#### **4.4.3 Regional bushfire risk assessments and plans**

##### **Strategic Bushfire Management Plan East Central**

For strategic bushfire management planning, DELWP and Parks Victoria have divided Victoria into seven bushfire risk landscapes, based on anticipated bushfire behaviour including weather, fuel hazard and landscape considerations. The OPSP area is in the East Central landscape. No matters are identified for Officer; however, the plan notes the 1983 Ash Wednesday fire that impacted the precinct (DELWP, 2015c). Beaconsfield Upper and Pakenham Upper, 3km to the north and northeast respectively, are identified as ‘high risk’ locations.

##### **Regional Bushfire Planning Assessment (RBPA) Melbourne Metropolitan 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 – Melbourne Metropolitan Region* covers the Cardinia Shire Council LGA. It does not identify any bushfire issues for the precinct or wider area and notes that development will occur around the Officer, Pakenham and Beaconsfield townships as part of the southeast growth corridor. The plan identifies that the Officer precinct is in a ‘Bushfire landscape of consideration’ (DPCD, 2012).

## 5 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.

### 5.1 Building setbacks

#### 5.1.1 BAL-12.5

Based on the hazard assessment in Section 4, for a BAL-12.5 construction standard using the simple Method 1 procedure of AS 3959-2009, future dwellings and other classes of buildings requiring a BAL (see Section 3.4), would need to be setback<sup>12</sup> from classified vegetation the distances in Table 3 below.

**Table 3 - Building setbacks for BAL-12.5, applicable in the BPA and BMO parts of the precinct.**

Slope class	Vegetation	Vegetation setback distance (Defendable space)
All upslopes and flat land	Grassland	19m
	Scrub	27m
	Woodland	33m
	Forest	48m

Note that no setbacks will be needed from areas of unmanaged vegetation that meet one or more of the exclusion criteria for low threat vegetation (see Section 4.1.5), including:

- Single areas of vegetation less than 1ha in area and at least 100m from other areas of classified vegetation;
- Multiple areas less than 0.25ha (2,500m<sup>2</sup>) in area that are at least 20m from a building or each other; and
- Strips of vegetation less than 20m wide that are at least 20m from a building, other strips or any other area of classified vegetation.

<sup>12</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.
- f) Landings, terraces, steps and ramps not more than 1m high (Standards Australia, 2011).

For future development in the Township Review Area that is adjacent to the two proposed conservation reserves, Leber Reserve and Gilbert Reserve (or other small reserve with unmanaged vegetation), the default AS 3959-2009 setbacks, stipulated in Table 3 above, may be able to be reduced. This is due to the shorter length of fire runs possible in these reserves, because of their relatively small size and lack of connectivity with larger areas of hazardous vegetation. At least for the smaller conservation reserve (Leber Reserve) containing classified Woodland (see Map 5), this may mean that a 100m wide fire, moving at a quasi-steady state rate of forward spread (as presumed in AS 3959-2009) could not credibly develop.

Determining whether this is the case and, if so, calculating reduced setbacks, would require further investigation. Consultation and agreement with the CFA about such a performance-based solution would also be required.

Similarly, it may be possible to determine and apply reduced setbacks from vegetation along the Cardinia Creek, due to the somewhat limited potential for a large bushfire to develop and the fact that it would not likely directly impact future development but would instead be a flanking fire moving along the creek.

It is recommended however, that the simpler and more precautionary approach be adopted, which is to design and site future development in accordance with default AS 3959-2009 setbacks.

Note that setbacks along Gum Scrub Creek are not likely to be required due to the absence of any classified vegetation along this waterway (see Section 5.1.3).

### **5.1.2 BAL-LOW**

As development occurs in the precinct, non-vegetated or reliably low threat land sufficiently distant from areas of classified vegetation<sup>13</sup>, should be able to be excised from the BPA, in which case future buildings could be BAL-LOW, i.e. no specific construction requirements would apply. This would need to be in accordance with statewide bushfire hazard mapping criteria for BPA areas and confirmed with DELWP through the BPA excision application process (see Section 3.4).

Areas already excised, based on the most recently published BPA mapping (gazetted 16<sup>th</sup> May 2018) are shown in Maps 4, 5, 6 and 7.

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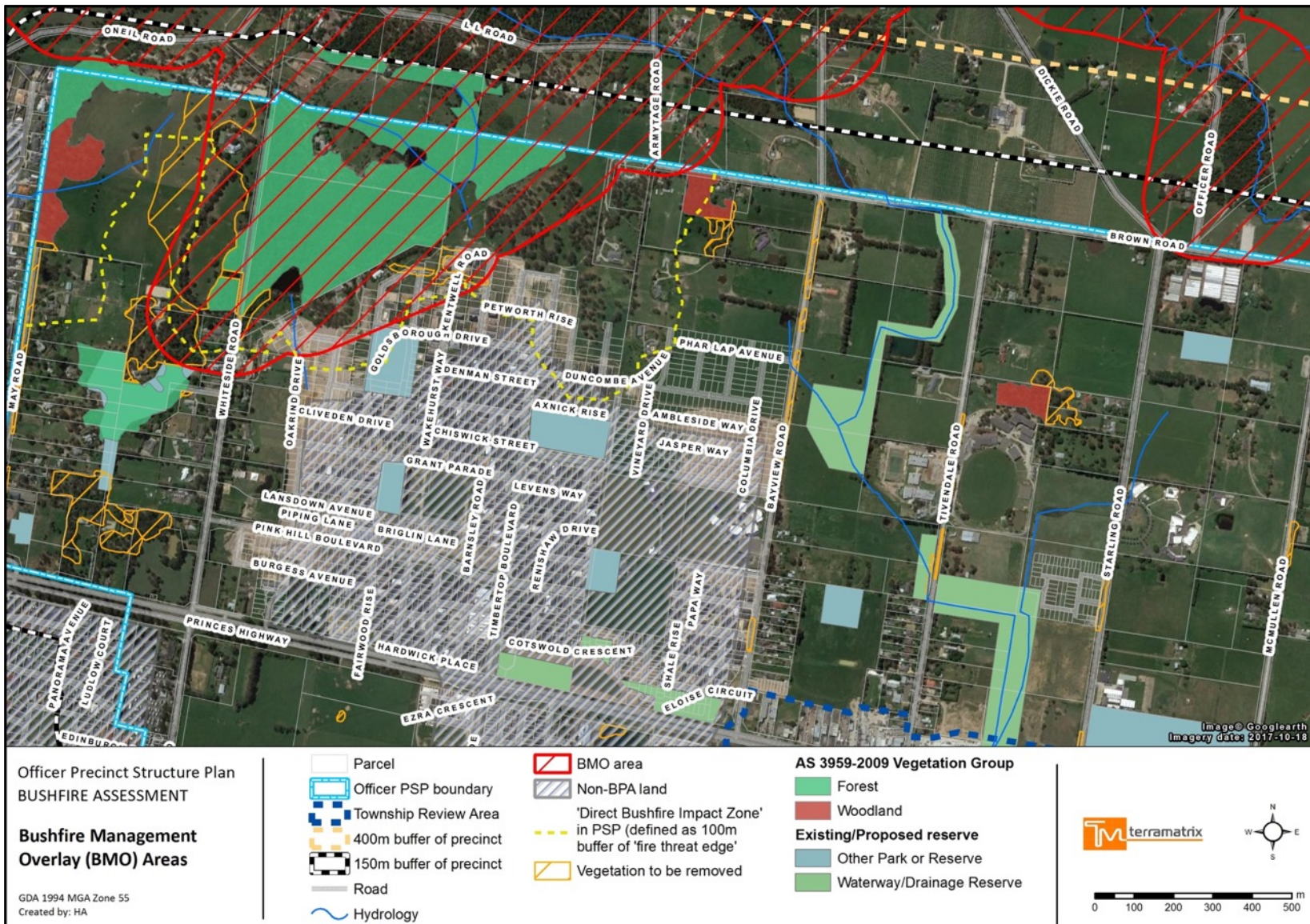
<sup>13</sup> At least 300m from areas of classified vegetation (except grassland) larger than 4ha in size; and at least 150m from areas of classified vegetation (except grassland) 2 to 4ha in size; and at least 60m from areas of unmanaged grassland more than 2ha in size (DELWP, 2015b).





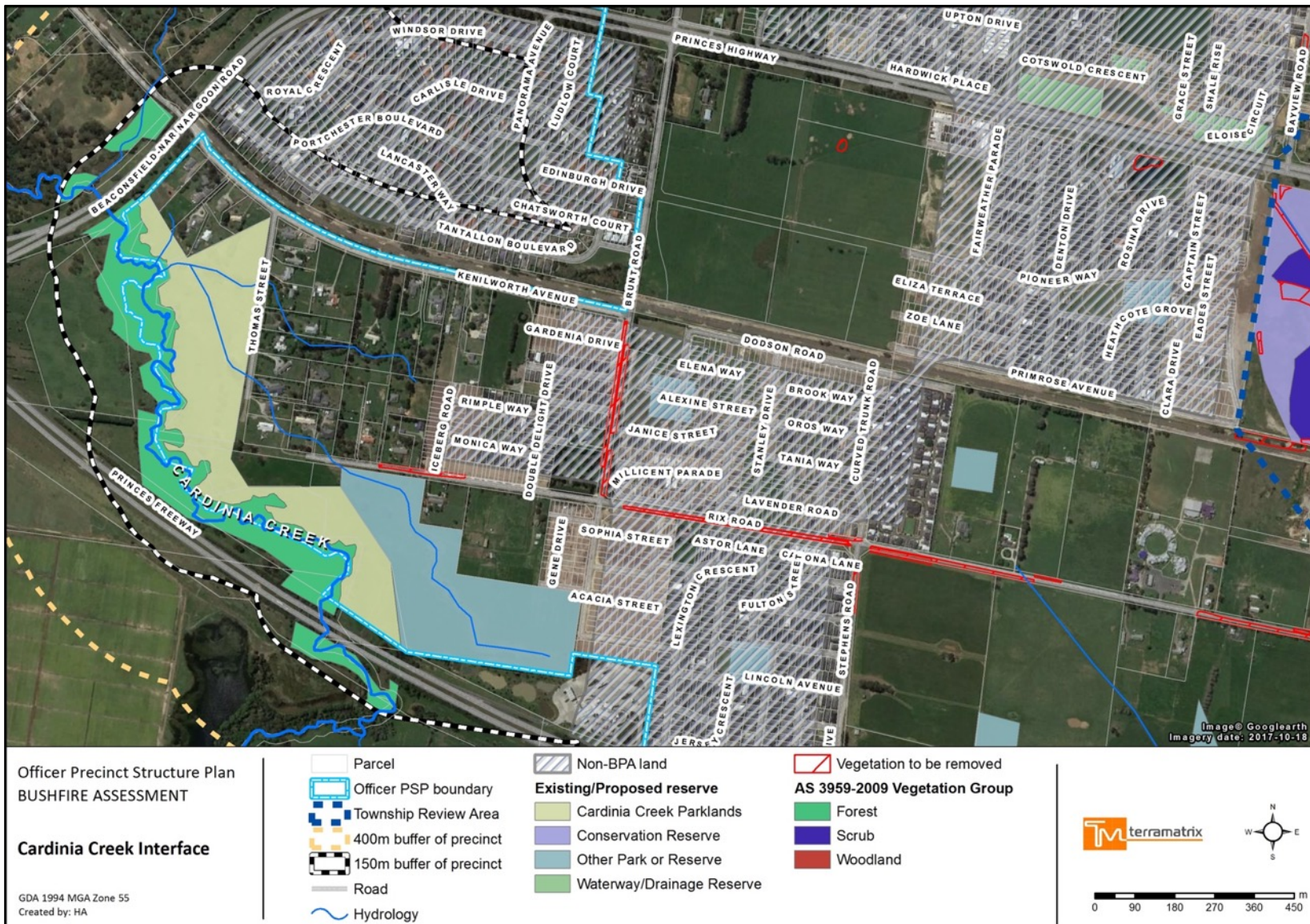
Map 5 - Township Review Area assessment map.





Map 6 - BMO areas assessment map.





Map 7 - Cardinia Creek interface assessment map.

### **5.1.3 Roadside or waterway vegetation**

Roadsides (and narrow waterways or drainage lines) that retain strips of remnant vegetation, or which are to be revegetated, can be excluded from classification as low threat, non-hazardous vegetation if the strips of vegetation are no more than 20m wide and are separated by at least 20m from future buildings and any other narrow strips or other areas of classified vegetation. Vegetation associated with Gum Scrub Creek may meet these criteria.

Small patches of remnant vegetation or revegetation may also be deemed non-hazardous and hence excluded under minimum size threshold criteria:

- Single areas of vegetation less than 1 ha in area and not within 100m of other areas of vegetation being classified; and/or
- Multiple areas of vegetation less than 0.25 ha in area and not within 20 m of the site, or each other.

Note that patches or reserves with remnant trees will not be considered hazardous if vegetation beneath the tree canopies is reliably low threat, including grass managed to less than 100mm high.

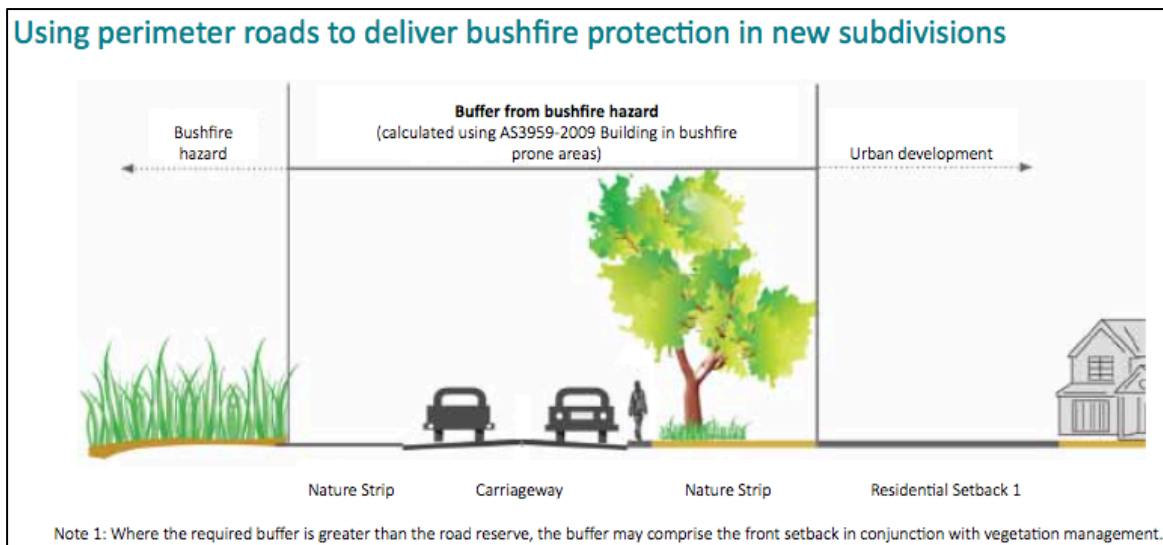


**Figure 15 - Vegetation or revegetation associated with Gum Scrub Creek is likely to meet the exclusion criteria for non-hazardous vegetation.**

### **5.1.4 Perimeter Roads**

Perimeter roads should be incorporated into future development designs where possible, as a useful design feature to separate future development from hazardous vegetation and facilitate property protection and firefighting (see Figure 16).





**Figure 16 - Illustration of a perimeter road to provide required development setbacks (DELWP, 2015a).**

## 5.2 Clause 13.02 Bushfire

The following sub-sections provide a summary response about how development of the precinct can respond to the objectives and strategies for bushfire safety in the PPF at Clause 13.02.

### 5.2.1 Protection of human life strategies

Clause 13.02 requires that the priority be given to protection of human life.

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

Most of the precinct is in a relatively low risk location. The protection of human life can be prioritised by application of the existing building regulations for construction in a BPA and by ensuring future dwellings and other buildings are located where a BAL-12.5 construction standard (or BAL-LOW) can be achieved (i.e. providing setbacks for future buildings from unmanaged vegetation, such that radiant heat impacting upon the buildings can be expected to be below  $12.5\text{kW/m}^2$ ).

In the higher risk northern areas of the precinct, as defined by the application of the BMO, the risk is nevertheless not extreme, and compliance with the BMO objectives for future development can be deemed to appropriately prioritise protection of human life.

#### ***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 4.4, the site is largely in a low or, in BMO parts of the precinct, moderate risk landscape. Therefore, if future buildings are setback sufficiently from any



hazardous vegetation such that they achieve a BAL-12.5, or in BMO areas a BAL in accordance with Clause 53.02, the risk can be deemed to be acceptably mitigated.

The nearest *lowest* risk locations are the urban-residential and township areas within and adjacent to the precinct that are not in the BPA (see Maps 4, 5, 6 and 7).

As development progresses, reliably low threat urban areas within the precinct will become eligible for excision from the BPA if they satisfy the exclusion criteria (see Sections 3.4 and 5.1.2).

***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 for 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.

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

Clause 13.02-1 requires that the bushfire hazard be identified, and 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 3959-2009 and the BMO 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 around the precinct has been identified and classified into AS 3959-2009 vegetation groups. Classification was based on the anticipated long-term state of the vegetation, EVC mapping for the ONVPP, 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 1m contour data for the area was undertaken, including creating a Digital Elevation Model (DEM) of the topography (see Map 3).

In relation to climatic conditions and fire weather, the AS 3959-2009 default FFDI 100/GFDI 130 benchmark used in the Victorian planning and building system, has been applied as discussed in Section 4.3.

***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 3.4 and 5.1.2) and is shown in Maps 5-7. This is based on the most recent BPA mapping for the precinct, which was gazetted 16<sup>th</sup> May 2018.

The extent of BMO coverage has also been considered, based on the most recently published BMO mapping (see Maps 5 and 6).

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

BMO coverage reflects recent statewide BMO mapping introduced into the Cardinia 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 regional, municipal and local (site and neighbourhood) scale (see Section 4).

At the local scale, the assessment follows the AS 3959-2009/BMO methodology, of classifying vegetation and topography within a 150m assessment zone, and for this study extending out to 400m around the site where appropriate (see Maps 1, 2 and 3).

At the landscape scale a 20km, 5km and 1km radius of the site has been applied (see Figures 1, 13 and 14, and Map 4) in accordance with guidance about assessing risk for planning scheme amendments provided 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 author is not aware of any consultation that may have occurred with CFA during the planning process.

***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, Clause 44.06, Clause 53.02 and the building regulations invoked by the BPA and BMO 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.***

The risk can be deemed to be acceptably mitigated such that development can proceed if the objectives and strategies of Clause 13.02 are successfully implemented, as discussed

in this report; and for development in BMO areas, the applicable objectives of Clause 53.02 are met; and elsewhere in the BPA, the building regulations for construction are complied with.

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 OPSP area.

### **5.2.3 Settlement planning strategies**

Clause 13.02 requires that 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, have been identified. Taking into consideration the assessment of landscape risk, implementation of these can be deemed to acceptably mitigate the risk.

See also the exclusion criteria and setback distances in Section 4.1.5 that are necessary 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, where BAL-LOW can be achieved, are those areas in and around the precinct that are not a designated Bushfire Prone Area (BPA).

As identified in Section 3.4 and 5.1.2, 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 in BMO areas meets the objectives of Clause 53.02; and elsewhere
- Future buildings are setback from hazardous vegetation to enable no higher than BAL-12.5 construction, along with providing 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 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 more 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 setback distances from any hazardous vegetation, as identified in this report, are implemented, then construction can achieve a BAL not exceeding BAL-12.5. The excision from the BPA of further parts of the precinct would enable BAL-LOW development in those areas.



#### **5.2.4 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 ONVPP identifies and protects areas of high biodiversity conservation value (Cardinia Shire Council, 2011). There are no apparent additional biodiversity impacts associated with the findings of this bushfire assessment.

#### **5.2.5 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'* (Cardinia 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'* (Cardinia Planning Scheme, 2018a).

Future development applications in the BPA should be able to achieve acceptable bushfire safety if:

- Setbacks for future development from classified vegetation are achieved to enable BAL-12.5 construction;
- Adequate access and egress for emergency management vehicles is provided by a residential road network, including, where possible, a perimeter road between the urban area and adjacent rural land 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.

## 6 Conclusion

This report has assessed the bushfire hazard in and around the OPSP area, in accordance with Clause 13.02 in the Cardinia Planning Scheme, the BMO/AS 3959-2009 methodologies as invoked by the Victorian planning and building system, and 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 assessment also fulfills the requirements of *Ministerial Direction 11 Strategic Assessment of Amendments*, which requires that a planning scheme amendment addresses any relevant bushfire risk (Direction No. 11, 2013).

98% of the precinct is currently a designated BPA and the BMO applies to approximately 5% of the precinct.

The OPSP area is largely in a low or, in BMO parts of the precinct, moderate risk landscape. Therefore, if future buildings are setback sufficiently from any hazardous vegetation such that they achieve a construction standard no higher than BAL-12.5 or, in BMO areas, a BAL in accordance with Clause 53.02, then the risk can be deemed to be acceptably mitigated.

The nearest *lowest* risk locations are the urban-residential and township areas within and adjacent to the precinct that are not in the BPA.

As development progresses, reliably low threat urban areas within the precinct will become eligible for excision from the BPA if they satisfy DELWPs hazard mapping criteria.

The type and extent of (hazardous) vegetation within and around the precinct has been identified and classified into AS 3959-2009 vegetation groups, based on EVC mapping for the ONVPP, aerial imagery and site assessment. The classification is based on the current and likely future state of the vegetation.

Overall the topography on and around the precinct is benign, with no significant changes in elevation or slopes that would significantly exacerbate the bushfire attack. For the purpose of determining BALs and commensurate setbacks from classified vegetation, the applicable slope class is 'All slopes 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. Setbacks based on the type of vegetation and effective slope the development will be exposed to are provided in this report.

If required, further work, including consultation with the CFA, could be undertaken to determine if the default AS 3959-2009 setback distances could be reduced in some locations, such as adjacent to Leber Reserve proposed in the Town Centre Review Area.

In the case of Amendment C232 to the Cardinia Planning Scheme, Clause 13.02 is primarily relevant to the UGZ4, as the VPA consider that proposed changes to the UGZ3 will not result in an intensification of development or a greater risk from bushfire to human life, than what has already been approved.

Good access and egress for emergency management vehicles and residents, in the event of a bushfire, can be achieved via a conventional residential road network.

A reliable water supply for fire-fighting can be provided via a conventional reticulated hydrant system.

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 additional BAL-LOW areas with the potential to be excised from the BPA if they are sufficiently distant from hazardous vegetation.

The risk from bushfire to development in the precinct, does not warrant specific or additional bushfire related guidelines and requirements in the PSP, i.e. it is considered that the current planning and building controls are adequate and appropriate for identifying and mitigating bushfire risk. Accordingly, it is recommended that the need for the existing guidelines and requirements in the PSP that relate to bushfire be reviewed, including Figure 10a *Strategic Design Principles for Residential Interface to Wildfire Management Overlay* and Figure 10b *Fuel managed buffers*.

Additionally, it is recommended that the definition of defensible space in the glossary of the PSP be deleted or amended to be consistent with the definition of defensible space at Clause 73.01 in the VPP.

Neither the existing or proposed zones have any significant bushfire safety implications, although it is noted that the existing, and proposed as exhibited, UGZ3 schedule requires subdivision applications for land within the area designated as 'Environmental Residential' north of the Princess Highway, to prepare a Fire Risk Assessment (FRA). This requirement is considered to be redundant and it should be removed from the PSP. The updated BMO mapping introduced by GC13, the BPA mapping, and associated controls in the planning and building system, should be deemed adequate to address bushfire risk.



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