



Bushfire Development Report

for the Wonthaggi North East
Precinct Structure Plan

Prepared for
Bass Coast Shire Council & Victorian Planning Authority

October 2018

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Cover image: Looking southeast into the PSP from the corner of Fuller Road and Heslop Road.

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1 Summary

Bass Coast Shire Council and the Victorian Planning Authority are currently finalising the Wonthaggi North East Precinct Structure Plan (WNEPSP) to guide the future urban development of the land immediately to the north and east of the existing township.

The WNEPSP is wholly within a Bushfire Prone Area (BPA) and partially covered by the Bushfire Management Overlay (BMO). The PSP constitutes settlement planning and, as such, Clause 13.02 *Bushfire* of the Bass Coast Planning Scheme requires that bushfire risk be considered (Bass Coast Planning Scheme, 2018b).

The WNEPSP site is exposed to classified Grassland (pasture) in all directions beyond the PSP boundary, and to Woodland and Scrub in a number of places, most notably the Wonthaggi Bushland Reserve to the west. Several reserves will be created within the PSP area that are also likely to comprise classified vegetation and require a bushfire planning response.

Key points:

- The entire WNEPSP is within a designated BPA and a small area near the western boundary is covered by the BMO.
- The site is adjacent to the established township area of Wonthaggi, that includes areas that would be rated as BAL-Low using the AS 3959-2009 site assessment methodology.
- Grassland, Woodland and Scrub adjacent to the WNEPSP comprises a bushfire hazard that must be considered in the development and use of the precinct.
- A number of waterway, drainage and other bushland reserves are to be created within the WNEPSP area which are likely to comprise a bushfire hazard that must be considered in the development of land adjacent to them.
- The terrain within and around the WNEPSP area is in the 'Flat land and all upslopes' slope class and benign from a bushfire perspective.
- To achieve the BAL-12.5 rating required for settlement growth by Clause 13.02 *Bushfire*, buildings will need to be setback 19m from classified Grassland, 27m from classified Scrub and 33m from classified Woodland. These areas have been identified and mapped.
- Large areas of the WNEPSP are available for BAL-12.5 development.
- Part of the area covered by the BMO may be suitable for application of Schedule 1 to the BMO in the Bass Coast Planning Scheme. This area is, however, significantly constrained by its proximity to the Wonthaggi Bushland Reserve to the west and the proposed waterway reserve to the east, which limit the land available for residential development.
- Much of the WNEPSP area is likely to be rendered low threat by the planned urban development and may become eligible for excision from the BPA as development proceeds.

2 Introduction

This Bushfire Development Report has been prepared for Bass Coast Shire Council and the Victorian Planning Authority (VPA), to assess how development in the Wonthaggi North East Precinct Structure Plan (WNEPSP) 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, Clause 44.06 *Bushfire Management Overlay (BMO)* and associated Clause 53.02 *Bushfire Planning* in the Bass Coast Planning Scheme.

Bass Coast Shire Council and the VPA are currently finalising the WNEPSP to guide the future urban development of the land. It is anticipated that the precinct will eventually accommodate approximately 10,000 people in 4,350 new homes, raising the total population of Wonthaggi to 16,000 over the next 30 to 50 years (VPA, 2017).

The PSP area currently supports a variety of land uses. The land is zoned according to existing or, in some places, anticipated use:

- Low Density Residential Zone (LDRZ) reflecting current usage in parts of the northwest of the PSP;
- General Residential Zone (GRZ) reflecting anticipated use in parts of the northwest of the PSP, and also covering the Powlett Ridge Estate currently under development in the eastern section of the PSP;
- Commercial 2 Zone (C2Z) on the northern side of the Bass Highway east of Carneys Road that reflects anticipated use;
- Industry 1 and 3 Zones (INZ1, INZ3) incorporating the existing industrial area and some adjoining land south of the Bass Highway;
- Mixed Use Zone (MUZ) to the north of the Bass Highway; and
- Farm Zone (FZ) covering the balance of the PSP, generally the northern and eastern edges of the PSP area.

It is anticipated that the remaining FZ land within the WNEPSP area will be re-zoned to Urban Growth Zone (UGZ).

The entire PSP area is a designated Bushfire Prone Area (BPA). Approximately 22.5ha of land (3.6% of WNEPSP area), within 150m of the Woodland/Scrub vegetation in the Wonthaggi Bushland Reserve, is also covered by the Bushfire Management Overlay (BMO).

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

- *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);

- *Planning Permit Applications – Bushfire Management Overlay, Technical Guide* (DELWP, 2017b); and
- *Bushfire State Planning Policy Amendment VC140, Planning Advisory Note 68*, (DELWP, 2018a).

3 Overview of study area

The WNEPSP area wraps around the northern and eastern boundary of the current Wonthaggi township (see Figure 1), in the Bass Coast Shire local government area (LGA). The precinct comprises approximately 633ha of land, generally bounded by:

- The existing township and Carneys Road to the west;
- An irregular line that follows cadastral boundaries south of the industrial area located to the east of Carneys Road;
- Sharrock Road in the southeast;
- A line that follows cadastral boundaries north, from the end of Sharrock Road to a point near the junction of the Korumburra-Wonthaggi Road and Heslop Road;
- Heslop Road to the north; and
- Fuller Road to the northwest (see Figure 1).

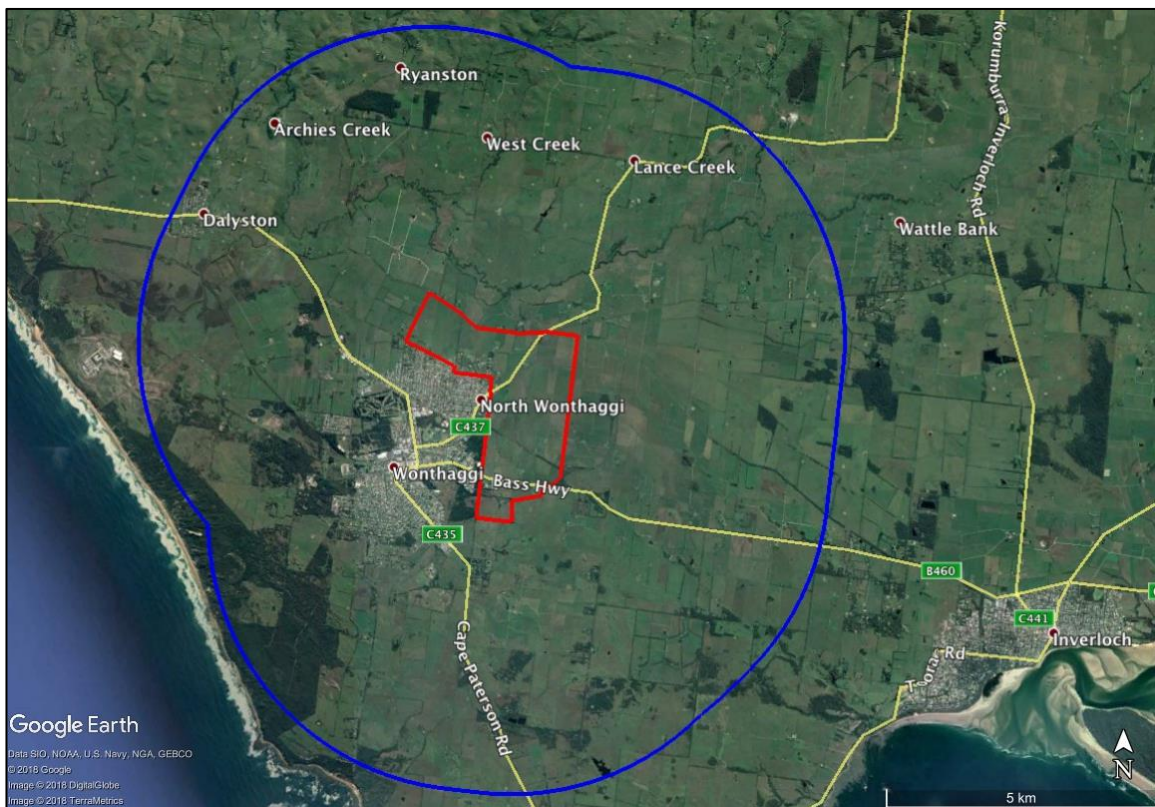


Figure 1 - Precinct location (WNEPSP area in red outline, 5km buffer in blue outline (Google Earth imagery date 04-04-2017)).

Key features of the WNEPSP include:

- A residential area comprising approximately 4,350 new homes;
- A potential government school;
- Sports fields;

- A local community facility and convenience centre, including small scale shopping, that will form the Wonthaggi North Community Hub;
- A network of local parks and trails; and
- Drainage reserves and retarding basins (VPA, 2017).

The proposed future urban structure of the precinct is shown in Figure 2 and Map 1.

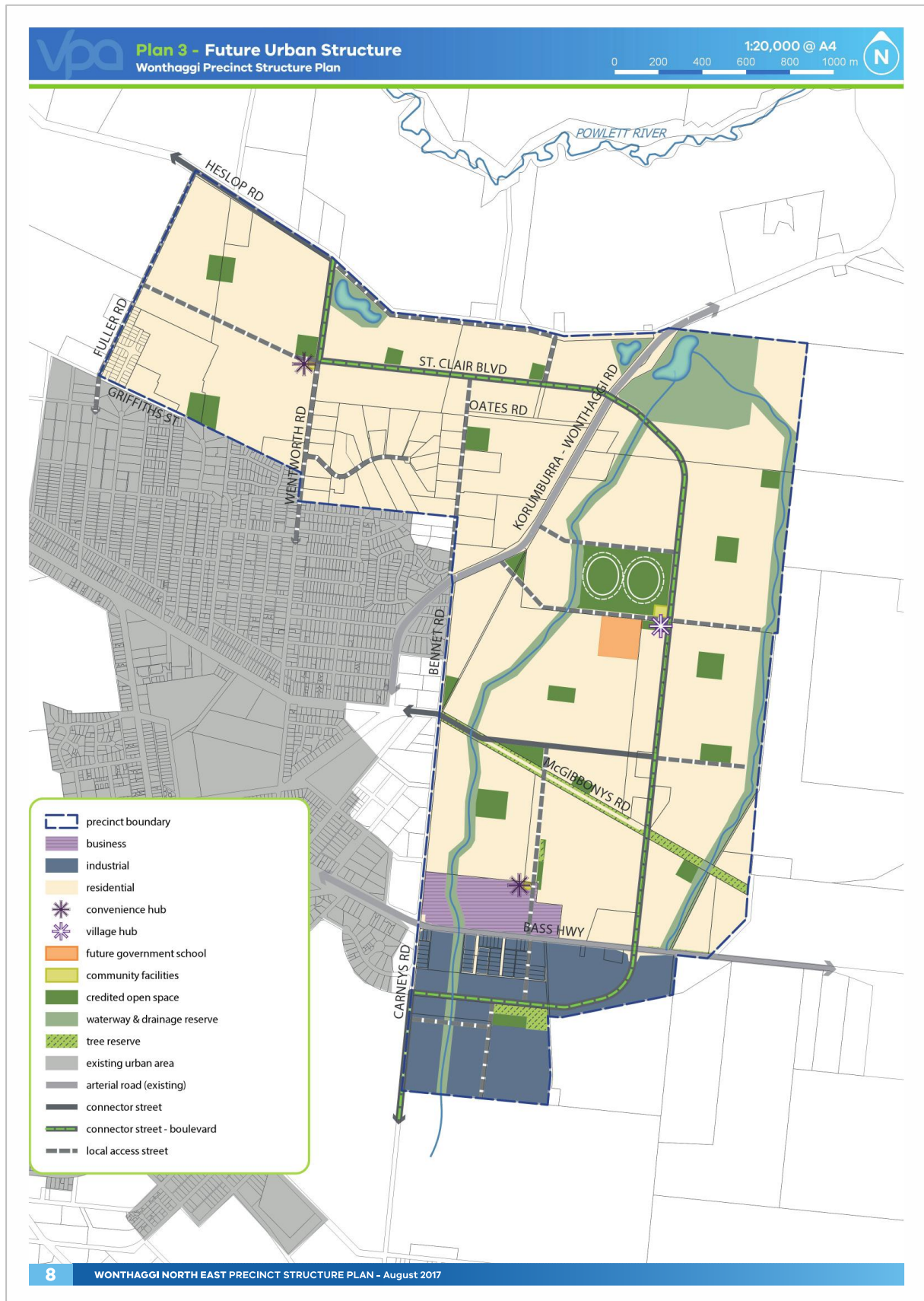


Figure 2 – Proposed future urban structure (VPA, 2017).



Map 1 - WNEPSP study area, future urban structure, and extent of BMO.

4 Bushfire planning and building controls

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

4.1 Planning Policy Framework (PPF)

4.1.1 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. However, in bushfire affected areas, it states that the protection of human life must be prioritised over all other policy considerations (Bass Coast Planning Scheme, 2018a).

4.1.2 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*' (Bass Coast Planning Scheme, 2018b). 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*' (Bass Coast Planning Scheme, 2018b).

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; and
- 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 WNEPSP 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/m², which is commensurate with a BAL-12.5 construction standard.

The maximum 12.5kW/m² 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'* (Bass Coast Planning Scheme, 2018b).

A detailed response to the strategies in Clause 13.02 is provided in Section 6.4.

4.2 Local Planning Policy Framework (LPPF)

4.2.1 Clause 21.07 High Growth Regional Centre

The Municipal Strategic Statement (MSS) at Clause 21.07-2 *Wonthaggi* in the Bass Coast Planning Scheme¹, identifies Wonthaggi as a high growth regional centre, references the Wonthaggi Strategic Framework Plan and encourages residential growth to the north and east of the existing township. There is no reference to bushfire (Bass Coast Planning Scheme, 2016a).

4.2.2 Clause 21.04-5 Environmental Hazards

Fire is listed as an environmental hazard and the following objectives and strategies are established (Bass Coast Planning Scheme, 2016b):

- | | |
|--------------------|--|
| Objective 1 | To ensure new development is designed to lessen the risk of fire. |
| Strategy 1.1 | Encourage development to be sited, designed and constructed to minimise the impact of emergency conditions arising from fire. |
| Strategy 1.2 | Encourage the location of accessways, fencing and dams to maximise fire fighting potential and minimise the interface with fire fighting measures. |

¹ 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 Bass Coast Planning Scheme.

- Objective 2** To restrict and control development on land prone to wildfire.
- Strategy 2.1 Discourage development on land prone to wildfire and ensure that development does not increase the risk of an environmental hazard.

It is considered that there is not a significant bushfire risk to the WNEPSP area and that the existing planning and building controls that relate to bushfire will facilitate an appropriate design response that will adequately mitigate the risk.

4.2.3 Clause 21.04-6 Climate Change

Increased risk of bushfire is identified as an issue associated with predicted climate change and strategies are provided to improve understanding of the effects of climate change and apply appropriate planning controls to ensure responsive development in areas affected by environmental hazards (Bass Coast Planning Scheme, 2017).

It is considered that the existing planning and building controls that relate to bushfire will facilitate an appropriate design response to adequately mitigate the current and foreseeable future bushfire risk.

4.3 Bushfire Management Overlay

The purposes of Clause 44.06 *Bushfire Management Overlay (BMO)* are:

- *To implement the Municipal Planning Strategy and the Planning Policy Framework.*
- *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* (Bass Coast Planning Scheme, 2018c).

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.

Section 5 of this report includes a bushfire hazard site and landscape assessment in accordance with the BMO application requirements.

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.

The extent of BMO coverage of the precinct and surrounding land is shown in Map 1 and Map 9. The BMO covers approximately 3.6% of the precinct, generally comprising land within 150m of the Wonthaggi Bushland Reserve and the scrubland west of Carneys Road in the south of the PSP. This reflects relatively recent BMO mapping introduced into the Bass Coast Planning Scheme by amendment GC13, which was gazetted on 3rd October 2017.

A schedule to the BMO may specify substitute approved measures, additional alternative measures and additional or substitute decision guidelines (Bass Coast Planning Scheme, 2018d). Part of the proposed residential area in the precinct, which is currently within the BMO, may be suitable for application of the BMO1 (see Map 9 and Section 6.3).

4.4 Bushfire Prone Area (BPA)

BPAs are those areas subject to or likely to be subject to bushfire, as determined by the Minister for Planning. The entire WNEPSP is currently designated as a BPA (see Map 5, which shows the extent of BPA (and BMO) coverage around the precinct and in the surrounding landscape).

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 3² buildings, 'Specific Use Bushfire Protected Buildings'³ and associated class 10A buildings⁴ 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.

Applicable classes of buildings in a BPA must be constructed to a minimum Bushfire Attack Level (BAL)-12.5, or higher, as determined by a site assessment, planning permit, 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 (see Appendix D for an explanation of BALs).

In a BPA not subject to the BMO, larger developments and certain vulnerable uses, including applications for subdivision of more than 10 lots, 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 identified bushfire risk.*
- *Ensure new development can implement bushfire protection measures without unacceptable biodiversity impacts' (Bass Coast Planning Scheme, 2018b).*

² 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.

³ 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.

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

There are no significant obstacles to future development in the WNEPSP complying with the applicable strategies at Clause 13.02 and the building regulations invoked in a BPA.

Reliably low threat or non-vegetated areas will be created as urban development of the PSP progresses.

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. Land becomes eligible for excision if it satisfies state-wide 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).

4.5 Other controls

4.5.1 Zoning

A change in zoning from Farm Zone to Urban Growth Zone will not have any significant bushfire safety implications. Whilst it will facilitate more intensive development, the PSP is to be designed such that future development will not be exposed to RHF above 12.5kW/m², which is commensurate with a BAL-12.5 construction standard.

4.5.2 Precinct Structure Plan

The WNEPSP includes two requirements in response to bushfire (VPA, 2017).

Requirement 24 states that *'for the purposes of Clause 56.06-7, the requirements of the relevant fire authority are, unless otherwise approved by the CFA:*

- *Constructed roads must be a minimum of 7.3 metres trafficable width where cars park on both sides, or:*
 - *A minimum of 5.4 metres in trafficable width where cars may park on one side only.*
 - *A minimum of 3.5 metres width no parking and 0.5 metres clearance to structures on either side, and if this width applies, there must be passing bays of at least 20 metres long, 6.0 metres wide and located not more than 200 metres apart.*
- *Roads must be constructed so that they are capable of accommodating a vehicle of 15 tonnes for the trafficable road width.*

- *The average grade of a road must be no more than 1 in 7 (14.4% or 8.1°).*
- *The steepest grade on a road must be no more than 1 in 5 (20% or 11.3°) with this grade continuing for no more than 50 metres at any one point.*
- *Dips on the road must have no more than 1 in 8 grade (12.5% or 7.1°) entry and exit angle.*
- *Constructed dead end roads more than 60 metres in length from the nearest intersection must have a turning circle with a minimum radius of 8.0 metres (including roll over curbs if they are provided) (VPA, 2017).*

Requirement 25 requires that *‘before the commencement of works for a stage of subdivision, a Construction Management Plan that addresses bushfire risk management must be submitted to and approved by the Responsible Authority and the CFA.*

The Construction Management Plan must specify, amongst other things:

- *Measures to reduce the risk from fire within the surrounding rural landscape and protect residents from threat of fire.*
- *A separation buffer, consistent with the separation distances specified in AS3959-2009, between the edge of development and non-urban areas.*
- *How adequate opportunities for access and egress will be provided for early residents, construction workers and emergency vehicles (VPA, 2017).*

This requirement helps to ensure that bushfire risk is managed during the construction period.

4.5.3 Overlays

Apart from the BMO, none of the existing or likely future overlay controls are anticipated to have any direct implications for bushfire safety.

5 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 (Bass Coast Planning Scheme, 2018b). 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 within approximately 1 kilometre from a site;*
- *Neighbourhood conditions - meaning conditions within 400 metres of a site; and,*
- *The site for the development’* (Bass Coast Planning Scheme, 2018b).

This section includes a bushfire assessment at:

- The wider landscape scale, for up to 20km around the site (see Figure 15 and Map 5);
- The local landscape scale extending up to 5km from the site (see Figure 1, Figure 15, Map 5 and Map 6); and
- The neighbourhood and site scale up to 400m around the precinct boundary (see Map 1, Map 2, Map 3, Map 4 and Figure 16).

The BPA invokes AS 3959-2009 *Construction of buildings in bushfire prone areas*, which requires a site assessment of the vegetation and topography up to 100m around a building (Standards Australia, 2011). In BMO areas the assessment zone extends up to 150m; and for vulnerable uses and larger developments in a BPA a 150m assessment zone may also be required (DELWP, 2018a).

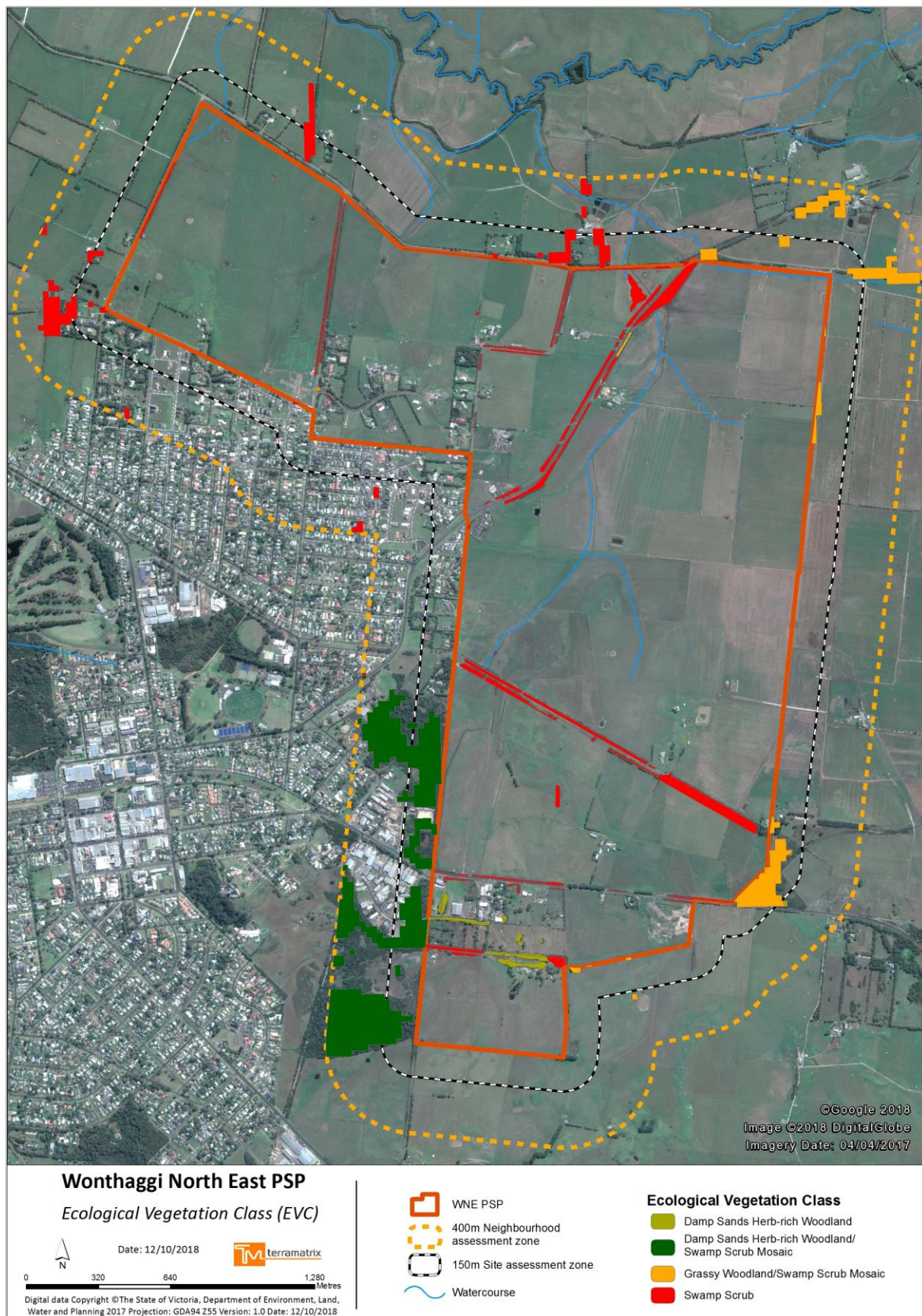
Map 1, Map 2, Map 3 and Map 4 show a 150m assessment zone around the boundary of the proposed development areas in the WNEPSP covered by the BMO and a 100m assessment zone around the remaining development areas.

5.1 Vegetation

Classified vegetation is vegetation that is deemed hazardous from a bushfire perspective and is classified in accordance with the AS 3959-2009 methodology.

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 should be based on the likely fire behaviour that it will generate, and for settlement planning purposes, the long-term structure of the vegetation in its mature state⁵.

⁵ Under the BMO 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.



Map 2 – EVCs in and within 400m of the WNEPSP area (from BL&A, 2017 and NatureKit Victoria).

5.1.1 Grassland

Grassland is the predominant vegetation type within the PSP area, and in the 100m site assessment zone adjacent to the northern and eastern boundaries of the PSP (see Map 3, Figure 3 and Figure 4).

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. Settlement planning should apply a conservative and precautionary approach, and assume Grassland areas will be unmanaged and classifiable, unless there is reasonable assurance they will be managed in a low threat state, no more than 100mm high, in perpetuity.



Figure 3 – Looking west from Sharrock Road, at Grassland in the south eastern part of the WNEPSP area.



Figure 4 – Looking southwest from the corner of Heslop Road and Wentworth Road, at Grassland in the north western part of the WNEPSP area.

5.1.2 Woodland

Small areas of remnant treed vegetation north of Heslop Road and along Fuller Road (see Figure 6) accord best with the BMO/AS 3959-2009 Woodland group, comprising the Woodland or Open Woodland vegetation types, 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).

Woodland also occurs adjacent to the western boundary of the WNEPSP area in the Wonthaggi Bushland Reserve, towards the top of the small hill behind St Joseph's School (see Figure 5). DELWP mapping of EVCs identifies this vegetation as EVC 925 Damp Sands Herb-rich Woodland/Swamp Scrub Mosaic⁶ (see Map 2).

The DELWP EVC/Bioregion Benchmark for Vegetation Quality Assessment in the Gippsland Plain bioregion does not include EVC 925 Damp Sands Herb-rich Woodland/Swamp Scrub Mosaic, but a summary of EVC 3 Damp Sands Herb-rich Woodland is presented below and Swamp Scrub is described in the next section. BL&A (2017) identified Damp Sands Herb-rich Woodland as occurring in the southern part of the WNEPSP area, typically with a canopy of Coast Manna-gum.

⁶ It is noted that the DELWP extant EVC mapping has been undertaken at statewide scale and is based on a modelled extent of native vegetation. It may not therefore, accurately represent actual EVCs present in the study area. However, any more accurate, site specific mapping of native vegetation will not change the bushfire hazard assessment.

EVC 3 Damp Sands Herb-rich Woodland – 15% benchmark canopy cover

'A low, grassy or bracken dominated eucalypt forest or open woodland to 15 m tall with a large shrub layer and ground layer rich in herbs, grasses and orchids. Occurs mainly on flat or undulating fertile, relatively well-drained, deep sandy or loamy topsoils over heavier subsoils (duplex soils).' (DSE, 2004a).

BL&A (2017) also identified small patches of EVC 175 Grassy Woodland, dominated by Swamp Gum, on road reserves in the north of the WNEPSP area, namely on Fuller Road, Wentworth Road and Korumburra-Wonthaggi Road (see Map 2).

EVC 175 Grassy Woodland – 15% benchmark canopy cover

'A variable open eucalypt woodland to 15 m tall or occasionally Sheoak woodland to 10 m tall over a diverse ground layer of grasses and herbs. The shrub component is usually sparse. It occurs on sites with moderate fertility on gentle slopes or undulating hills on a range of geologies.' (DSE, 2004b).

Areas of 'potentially classifiable' Woodland are shown in Map 3. It should be noted that this mapping has been undertaken to inform the WNEPSP development. It is for strategic planning purposes only and should not be used for determining BALs for BPA compliance or statutory planning purposes e.g. BMO applications.

The only significantly large area of Woodland is in the Wonthaggi Bushland Reserve. Other patches are small enough to be excluded from consideration in their own right and are instead incorporated in the surrounding Grassland.



Figure 5 – Small area of Woodland in the Wonthaggi Bushland Reserve, on the top of the small hill behind St Joseph's School.



Figure 6 – Looking south down Fuller Road, which marks the north western boundary of the PSP area. The vegetation on the road reserve has a Woodland structure but is too narrow to classify as Woodland.

5.1.3 Scrub

Vegetation in the southern part of the Wonthaggi Bushland Reserve and on many road reserves, in particular Korumburra-Wonthaggi Road, Sharrock Road and McGibbonys Road (see Map 2, Map 3, Figure 8 and Figure 9) best accords with the Scrub group of AS 3959-2009. Scrub comprises areas with shrubs that have an average height of >2m, with 10–>30% foliage cover (Standards Australia, 2011).

Scrub also occurs in parts of the Wonthaggi Bushland Reserve (see Figure 7, Figure 10 and Figure 11).

DELWP EVC mapping identifies the areas of Scrub as comprising EVC 925 Damp Sands Herb-rich Woodland/Swamp Scrub Mosaic or EVC 924 Grassy Woodland/Swamp Scrub Mosaic. More detailed mapping of EVCs within the PSP area differentiates between EVC 53 Swamp Scrub and the associated Woodland EVCs (BL&A, 2017). The Swamp Scrub is generally dominated by a dense cover of Swamp Paperbark (BL&A, 2017), and is described in the EVC/Bioregion Benchmark for Vegetation Quality Assessment in the Gippsland Plain bioregion as:

EVC 53 Swamp Scrub – 50% benchmark canopy cover

*‘Closed scrub to 8 m tall at low elevations on alluvial deposits along streams or on poorly drained sites with higher nutrient availability. The EVC is dominated by Swamp Paperbark *Melaleuca ericifolia* (or sometimes Woolly Tea-tree *Leptospermum lanigerum*) which often forms a dense thicket, out-competing other species. Occasional emergent eucalypts may be present. Where*

light penetrates to ground level, a moss/lichen/liverwort or herbaceous ground cover is often present. Dry variants have a grassy/herbaceous ground layer.' (DSE, 2004b).



Figure 7 – Looking southwest from the southern end of Carneys Road, at Scrub in the southern section of the Wonthaggi Bushland Reserve adjacent to the southwestern corner of the WNEPSP area.



Figure 8 – Looking north up Sharrock Road, showing tall Scrub.



Figure 9 – Looking west at Scrub at the eastern end of the closed section of McGibbons Road.



Figure 10 – Looking north from Mullin Parade at Scrub, dominated by Swamp Paperbark, in the Wonthaggi Bushland Reserve.



Figure 11 – Scrub/Woodland mosaic in the Wonthaggi Bushland Reserve, south of the end of Jean Dennis Road.

5.1.4 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 100m⁷ 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 condition⁸, maintained lawns, golf courses, maintained public reserves and parklands, vineyards, orchards, cultivated gardens, commercial nurseries, nature strips and windbreaks’ (Standards Australia, 2011).*

⁷ 150m in BMO areas.

⁸ 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 all of the proposed residential areas will be either non-vegetated or comprise low threat vegetation such as maintained lawns, roadsides or cultivated gardens. It is also reasonable to assume that the proposed local parks (see Map 1 and Figure 2) will be managed in a low threat state.



Figure 12 – Grassland being transformed into low threat or non-vegetated area through urban development, near the corner of McGibbonys Road and Stirling Street.

5.2 Future vegetated form

It is assumed that all classified vegetation outside of the WNEPSP area will remain, including the Wonthaggi Bushland Reserve to the west and southwest and the pasture that abuts the PSP area in other directions.

Urban development of the WNEPSP area will result in the removal of most classified vegetation from within the precinct boundary (see Figure 12). Some areas of native vegetation are to be retained and a number of reserves are to be created within the WNEPSP area, which may involve re-vegetation at some locations. Areas that could potentially comprise classified vegetation, and which may not be low threat are described below.

McGibbonys Road shared trail

The eastern end of McGibbonys Road is already closed, and it is proposed that the western end also be closed to cars to provide a shared trail. The proposed reserve will be 40m wide, incorporating a shared trail 16m wide and a 12m vegetated reserve on either side (see Figure 13). The existing Scrub vegetation will be retained and enhanced, although the PSP refers to vegetation at ground level to be managed to provide sight lines through the reserve (VPA, 2017).

It is proposed that the reserve be directly fronted by dwellings in some places and bordered by a road in others (VPA, 2017). Future buildings will be required to be setback from the Scrub commensurate with a BAL-12.5 construction standard (see Section 6.1.3).

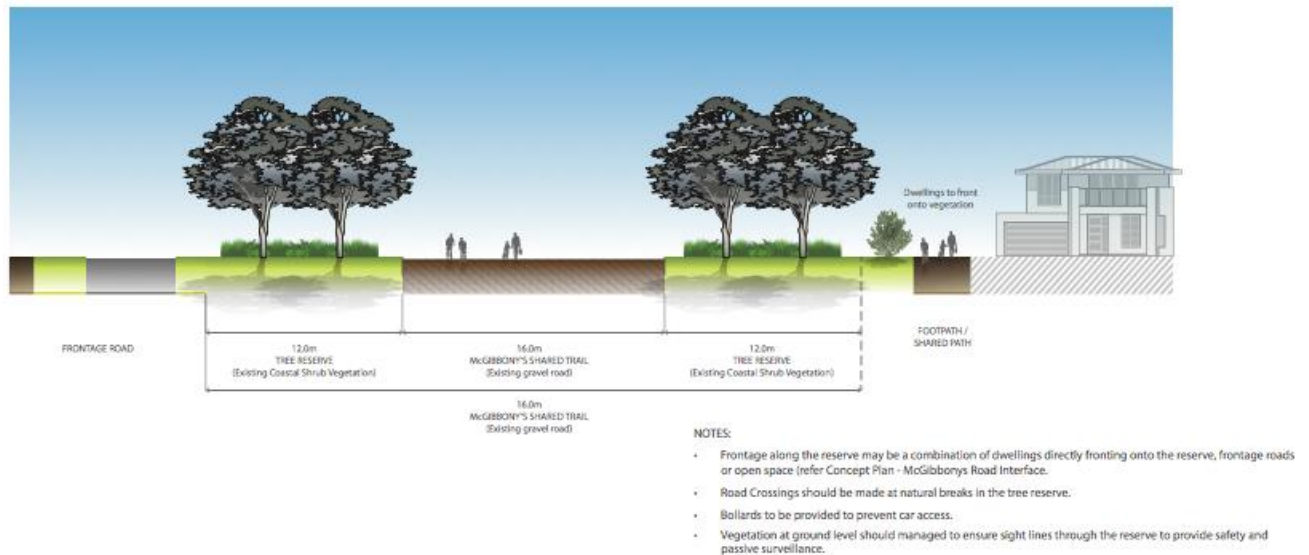


Figure 13 - McGibbons Road shared trail.

Southern tree reserve

A tree reserve of approximately 2.45ha will be established south of St Clair Boulevard in the industrial zone. This will protect an existing area of Damp Sands Herb-rich Woodland.

The tree reserve will be contiguous to Grassland outside of the WNEPSP area and, for the purpose of this bushfire study, it is assumed that this reserve will remain classified Woodland and that future buildings will need to be setback from it (see Section 6.1.5).

Northwestern drainage reserve

An area of approximately 3.7ha, immediately east of the junction of Wentworth Road and Heslop Road will be set aside as a drainage reserve. It is understood that the reserve will contain a waterbody (of unknown permanence) and be at least partially re-vegetated. The reserve will be adjacent to the Grassland north of Heslop Road, beyond the northern boundary of the PSP.

For the purpose of this bushfire assessment, it is assumed that vegetation in this drainage reserve will be classified Scrub and that future buildings will need to be setback from it (see Section 6.1.4).

Northeastern drainage reserves

Two drainage reserves are to be established in the northeast corner of the precinct. The smaller reserve (approx. 1.67ha) is to be located immediately southwest of the junction of Heslop Road and Korumburra-Wonthaggi Road, and the larger (approx. 21haha) to the east of Korumburra-Wonthaggi Road.

The larger eastern reserve will be fed by two waterways that drain from the southern end of the PSP area (see Map 1 and Figure 2).

It is understood that both reserves will contain a waterbody (of unknown permanence) and be at least partially re-vegetated. The reserves will be adjacent to the Grassland beyond the northern boundary of the PSP.

For the purpose of this bushfire assessment, it is assumed that vegetation in these drainage reserves will be classified Scrub and that future buildings will need to be setback from them (see Section 6.1.4).

Waterways

The two waterways will be within linear reserves, extending for 30m each side of the watercourse (60m total width). The waterway reserves will be managed by Bass Coast Shire Council and the intent is to re-vegetate them, at least in part. The eastern reserve will run along the eastern boundary of the WNEPSP area and will be immediately adjacent to classified Grassland.

The proposed interfaces with the waterways are shown in Figure 14. It should be noted that the schematic under represents the reported width of the waterway reserves.

For the purpose of this bushfire assessment, it is assumed that vegetation in these waterway reserves will be classified Scrub and that future buildings will need to be setback from them (see Section 6.1.4). The proposed residential interface incorporates a 7.3m wide carriageway, 3.0m wide nature strip and 1.5m wide pedestrian path. This provides 11.8m of the setback required for adjacent buildings.

There will also be a 3.0m wide shared path within the vegetated buffer, which could form part of the requisite setback if adjacent to the road.

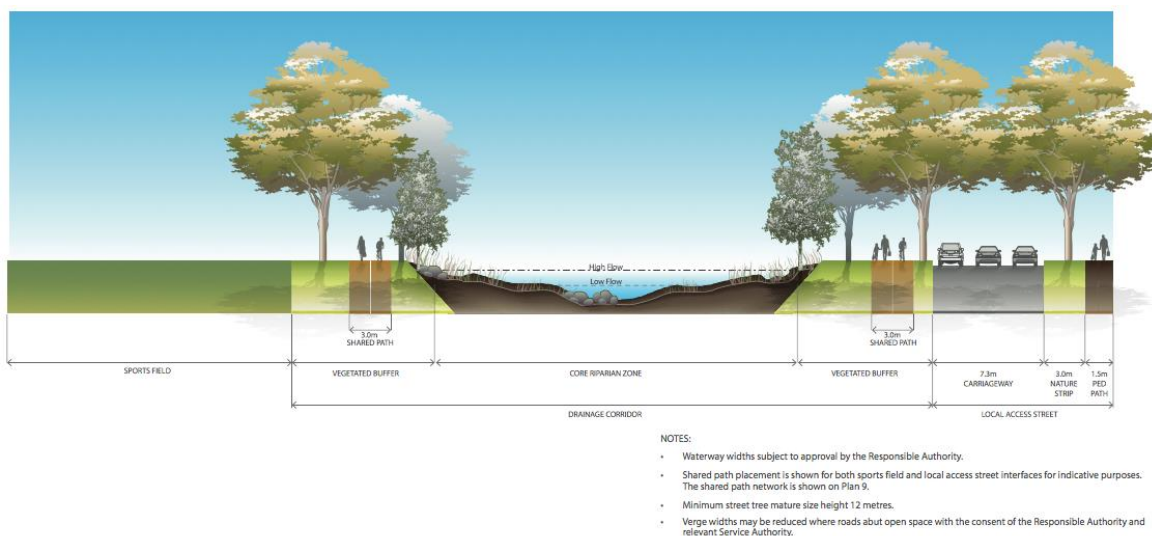


Figure 14 - Waterway interface (VPA, 2017).

Road reserves

Whilst a number of road reserves will retain native vegetation, it is considered that only two will be substantial enough to be considered potentially hazardous vegetation. The road reserves of the Korumburra-Wonthaggi Road, particularly the southern reserve south of Heslop Road, will retain a cover of Scrub.

An area of Scrub, partially on the Sharrock Road reserve, is to be retained that is adjacent to Scrub and Grassland beyond the eastern boundary of the PSP.

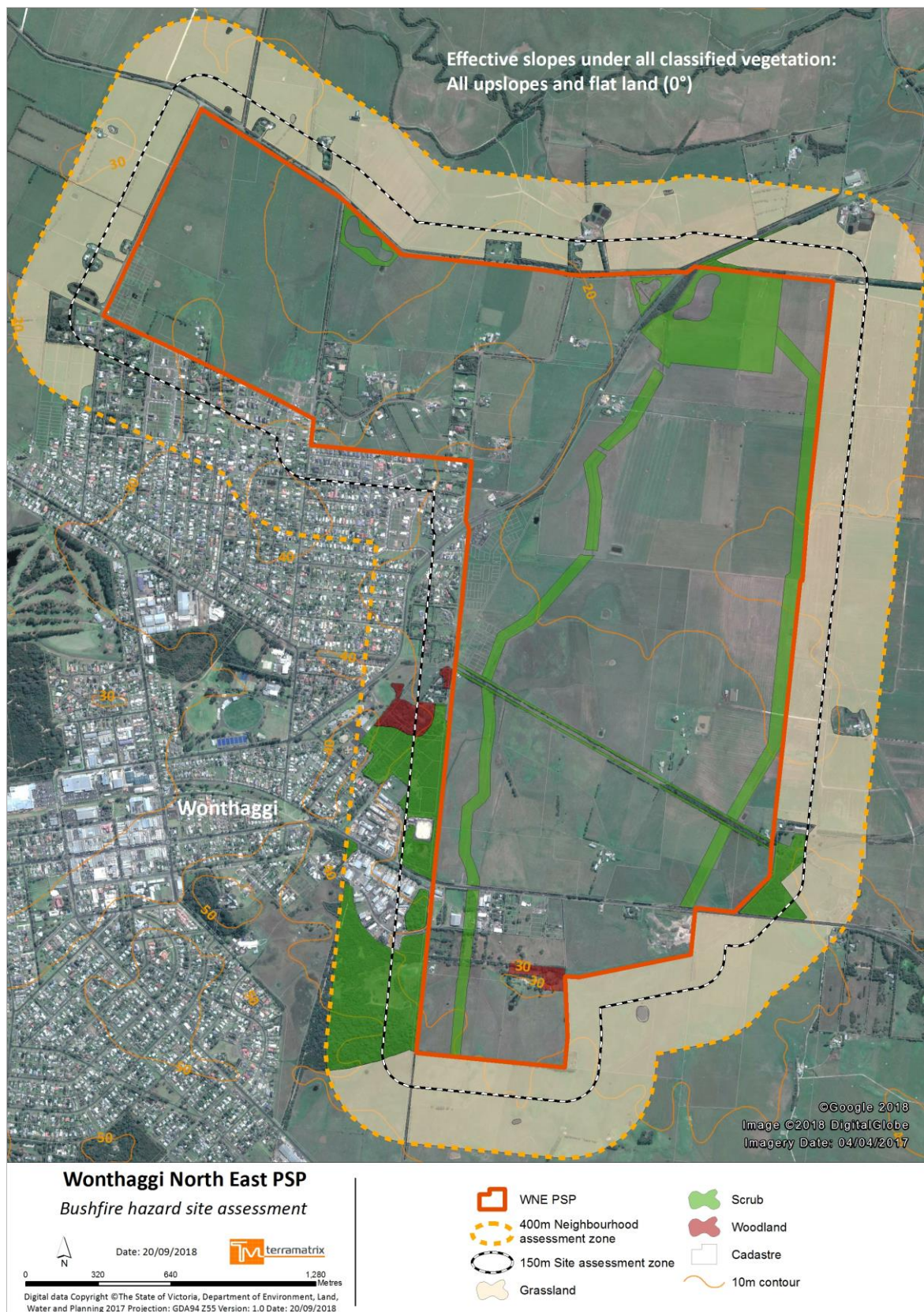
5.3 Topography

AS 3959-2009 requires that the 'effective slope' be identified to determine the BAL and applicable vegetation setback distances. This is the slope of the land under classified vegetation that will most significantly influence the bushfire attack on a building. Two broad types apply:

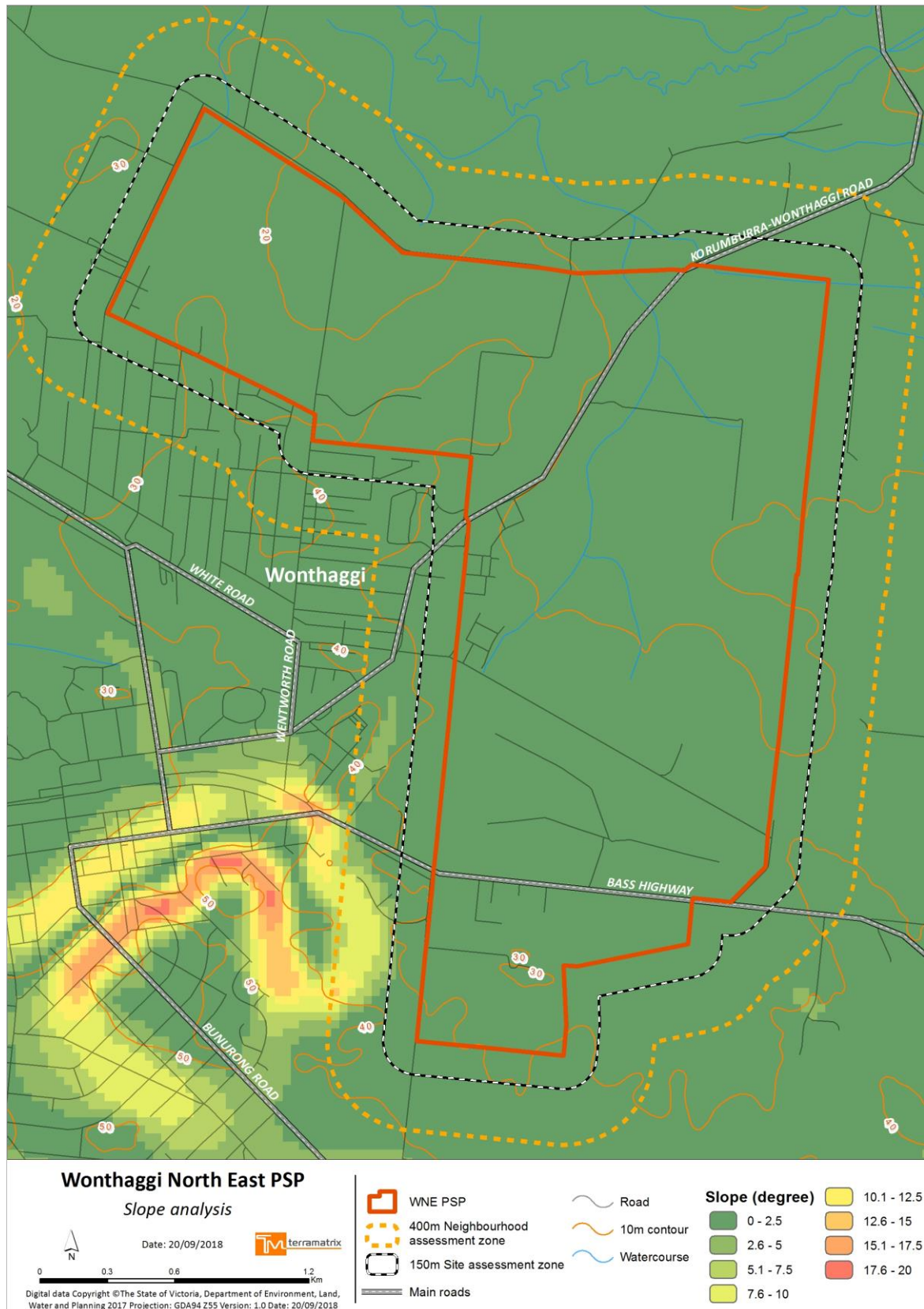
- Flat and/or Upslope - land that is flat or on which a bushfire will be burning downhill in relation to the development. Fires burning downhill (i.e. on an upslope) will generally be moving more slowly with a reduced intensity.
- Downslope - land under the classified vegetation on which a bushfire will 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°.

With the exception of the hill of the Wonthaggi Bushland Reserve, behind St Joseph's School (which is an Upslope in relation to future development in the PSP), land in the precinct and surrounding landscape is flat, or gently sloping (see Map 4), without significant changes in elevation that would appreciably influence bushfire behaviour.

For the purposes of determining BALs and defensible space/vegetation setback distances for future development, the applicable slope class is 'All upslopes and flat land'.



Map 3 - Vegetation classification as per AS 3959-009 – vegetation to be retained/created in the PSP and existing vegetation within 400m.



Map 4 - Slopes in and within 400m of the WNEPSP area.

5.4 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.

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 range⁹ 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 WNEPSP 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. 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 system¹⁰.

⁹ The GFDI ranges for each FDR in Table 1 may vary in some jurisdictions.

¹⁰ In Alpine areas of Victoria an FFDI 50 applies for determining BALs using Method 1 of AS 3959-2009.

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	

5.5 Landscape assessment

5.5.1 Location description and context

The WNEPSP area wraps around the northern and eastern boundary of the current Wonthaggi township (see Map 1, Map 5 and Figure 1), which comprises a low threat urban-residential landscape.

Land to the north, east and south of the precinct is primarily pastoral and is a relatively low bushfire threat.

The only substantial areas of Woodland and Scrub are to the southwest of Wonthaggi, including the narrow coastal strip that extends from Kilcunda to the northwest to Cape Paterson to the south (see Map 5). Whilst southwesterly winds, associated with the passage of a cold front, can be an important component of extreme bushfire weather, the WNEPSP is shielded from a fire approach from this direction by the existing urban area of Wonthaggi.

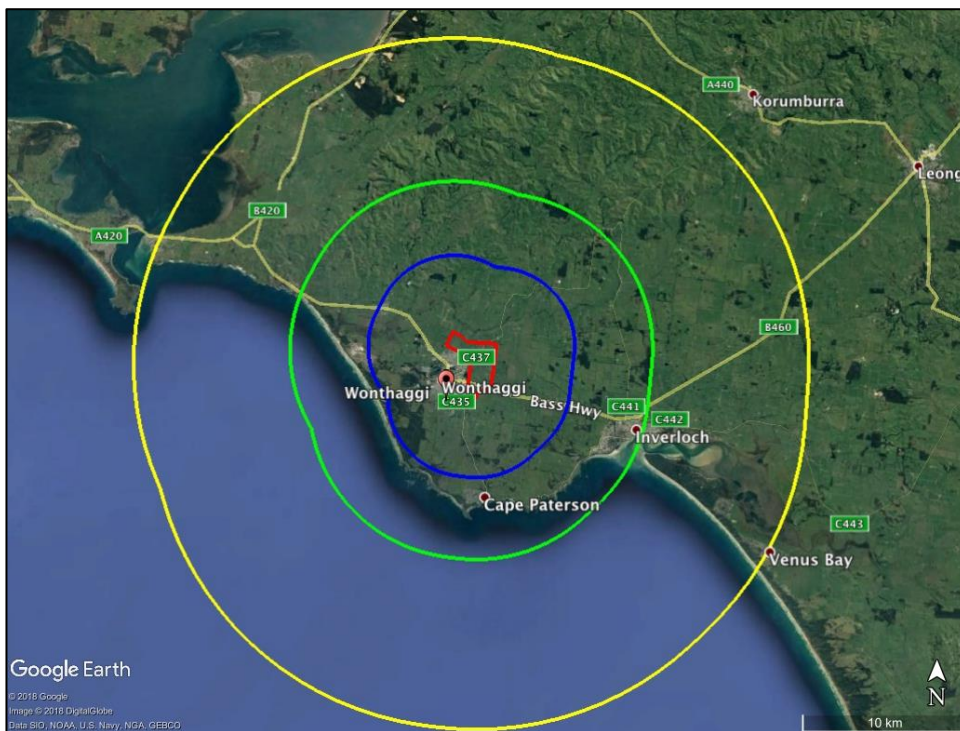
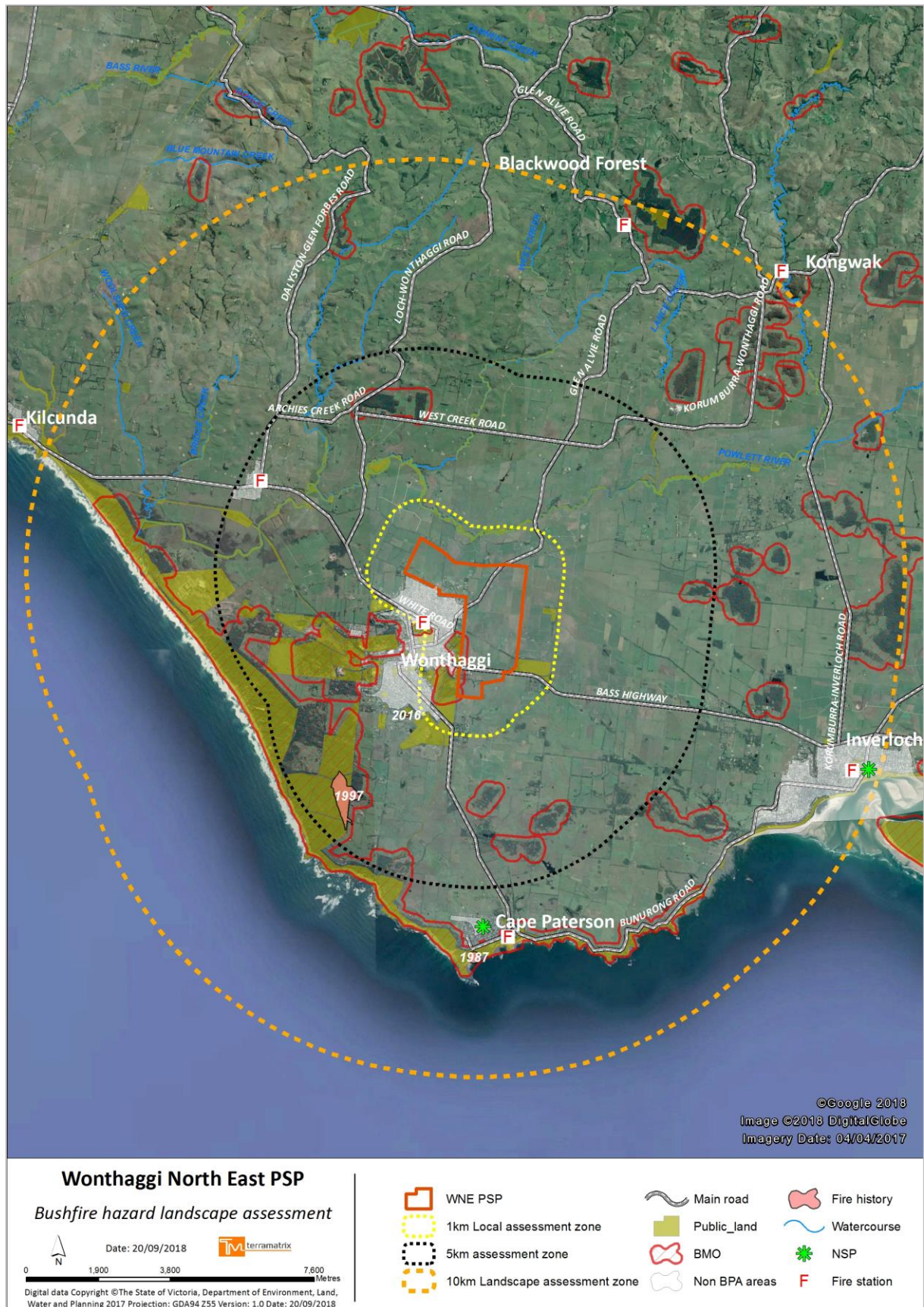


Figure 15 – Location and landscape context of the precinct. A 5km buffer of the precinct is shown in blue outline, a 10km buffer in green outline and a 20km buffer in yellow outline.




Map 5 - Bushfire hazard landscape assessment.

5.5.2 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 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 3959-2009 presumptions (see Table 2).

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"> • There is little vegetation beyond 150 metres of the site (except grasslands and low-threat vegetation). • Extreme bushfire behaviour is not possible. • The type and extent of vegetation is unlikely to result in neighbourhood-scale destruction of property. • Immediate access is available to a place that provides shelter from bushfire. 	<ul style="list-style-type: none"> • 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. • 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. • Access is readily available to a place that provides shelter from bushfire. This will often be the surrounding developed area. 	<ul style="list-style-type: none"> • 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. • Bushfire can approach from more than one aspect. • The site is located in an area that is not managed in a minimum fuel condition. • Access to an appropriate place that provides shelter from bushfire is not certain. 	<ul style="list-style-type: none"> • The broader landscape presents an extreme risk. • Evacuation options are limited or not available.
			

The landscape setting of the WNEPSP area accords best with the low risk Landscape Type 1. Apart from the relatively small area of Woodland and Scrub within the Wonthaggi Bushland Reserve, immediately west, there is little hazardous vegetation beyond 150 metres of the precinct except grassland.

The Wonthaggi Bushland Reserve is relatively small and would therefore not support a large, 100m wide bushfire moving at a quasi-steady-state rate of forward spread directly at buildings, as envisaged in the AS 3959-2009 methodology.

Access for people in the precinct would be readily available to reliably low threat or non-vegetated areas that can provide shelter from bushfire.

5.5.3 Regional bushfire risk assessments and plans

Gippsland Regional Strategic Fire Management Plan (RSFMP) 2014-2024

Regional Fire Management Planning Committees have prepared ten-year Regional Strategic Fire Management Plans, which were developed around the concept of resilience and have a strategic focus on preventing and minimising the impact of bushfire. The plans identify broad fire management risks across the eight regions covering Victoria and identify strategies for addressing the issues.

The Bass Coast LGA is included in the Gippsland RSFMP. No specific issues are identified pertaining to the study area, although the RSFMP notes the population growth through the southwest of the region, including Wonthaggi and the need for Regional policy to manage population growth including identifying priority locations for encouraging growth (Gippsland Regional Strategic Fire Management Planning Committee, 2014).

Regional Bushfire Planning Assessment (RBPA) Gippsland 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 – Gippsland Region* covers the Bass Coast Shire LGA. It does not identify any bushfire issues for the precinct or surrounding area. The only bushfire issue identified for Wonthaggi is that South Dudley and the western edge of Wonthaggi interface with an area containing vegetation (Identified area code 4-009) (DPCD, 2012). The report further notes that the highest bushfire risk is associated with the coastal settlements in the north-west of the municipality (DPCD, 2012).

Bass Coast Shire Council Municipal Fire Management Plan (MFMP)

The Bass Coast Shire Council MFMP aligns closely with the Gippsland RSFMP objectives and vision for fire management. In relation to bushfire risk at Wonthaggi, the MFMP identifies the western outskirts of the town; and lists implementation of the BMO and BPA controls as generic bushfire risk treatments (BCSC, 2012).

DELWP Fire Operations Plan

The *Fire Operations Plan 2017/18 to 2019/20 Gippsland Region* sets out where and when fuel management activities are planned to occur in the region.

Fire Management Zones (FMZs) are areas of public land where fire is used for specific asset, fuel and overall forest and park management objectives (FFMV, 2018). Four different FMZs are defined for Victoria, with each FMZ differing in its intended fuel treatment aims and associated performance measures. Although the name of the zone indicates the primary purpose for that zone, multiple goals may be achieved when undertaking activities in a given zone. For example, a burn undertaken primarily for land management purposes may also have asset protection results (FFMV, 2018).

- **Asset Protection Zone** - Aim to reduce fuel through planned burning or other methods approximately every 5 to 7 years.
- **Bushfire Moderation Zone** - Aim to reduce fuel through planned burning or other methods approximately every 8 to 15 years. Length of time between planned burns in some areas can vary due to ecological considerations.
- **Landscape Management Zone** - Planned burning will focus on maintaining and improving ecosystem resilience, and fuel management will also be undertaken for risk reduction.
- **Prescribed Burning Exclusion Zone** - No planned burning, mainly to protect particular areas that can't tolerate fire (FFMV, 2018).

The type and location of FMZs in the land surrounding the site is shown in Map 6. Part of the Wonthaggi Bushland Reserve is designated as a Bushfire Moderation Zone and part as a Landscape Management Zone. The associated map of works for Latrobe District (Southern) indicates that mechanical fuel management also occurs within the Wonthaggi Bushland Reserve adjacent to the WNEPSP (see Figure 16).

The Scrub adjacent to the southeastern corner of the WNEPSP, near Sharrock Road, is also designated a Landscape Management Zone (see Map 6).

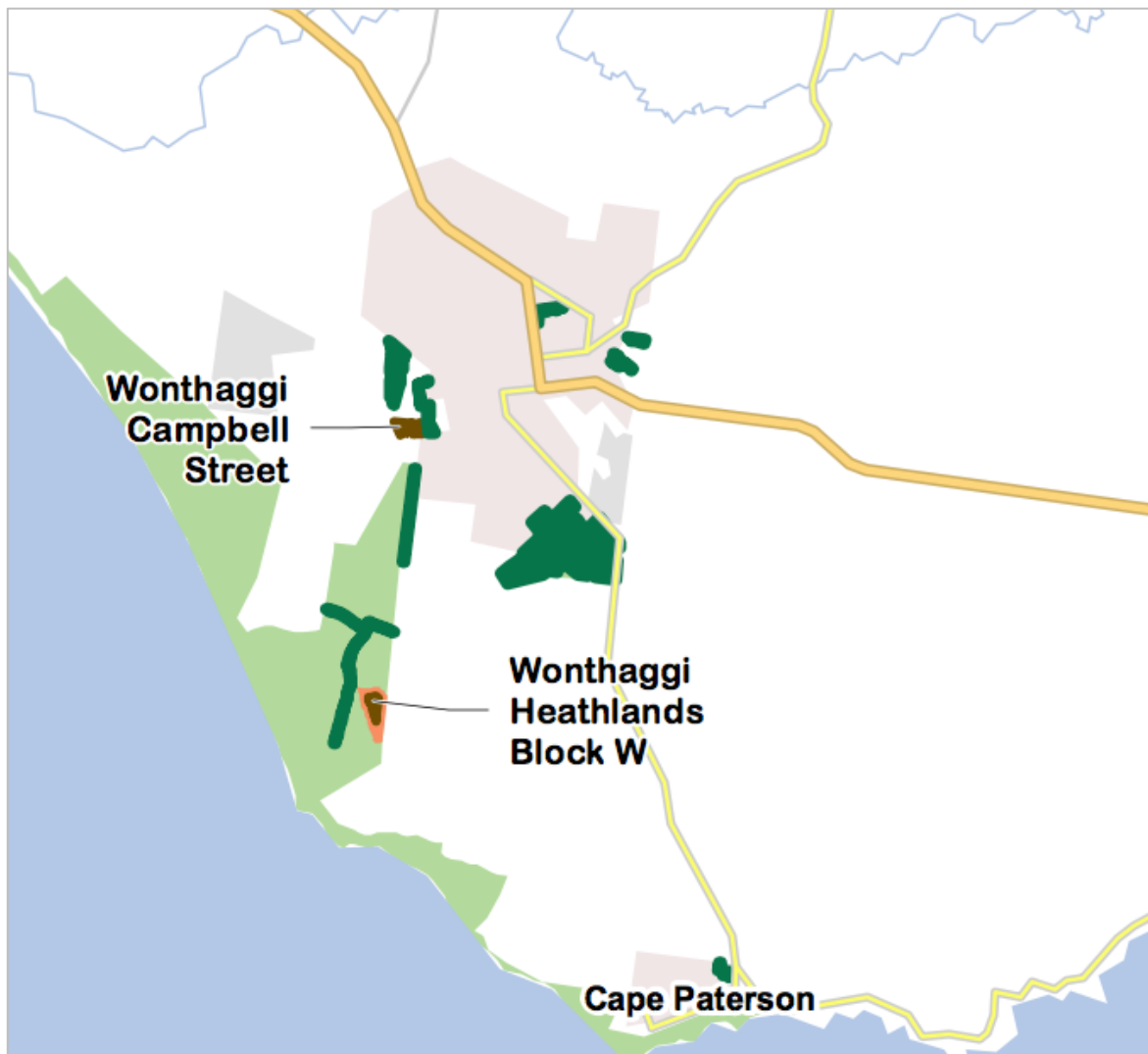
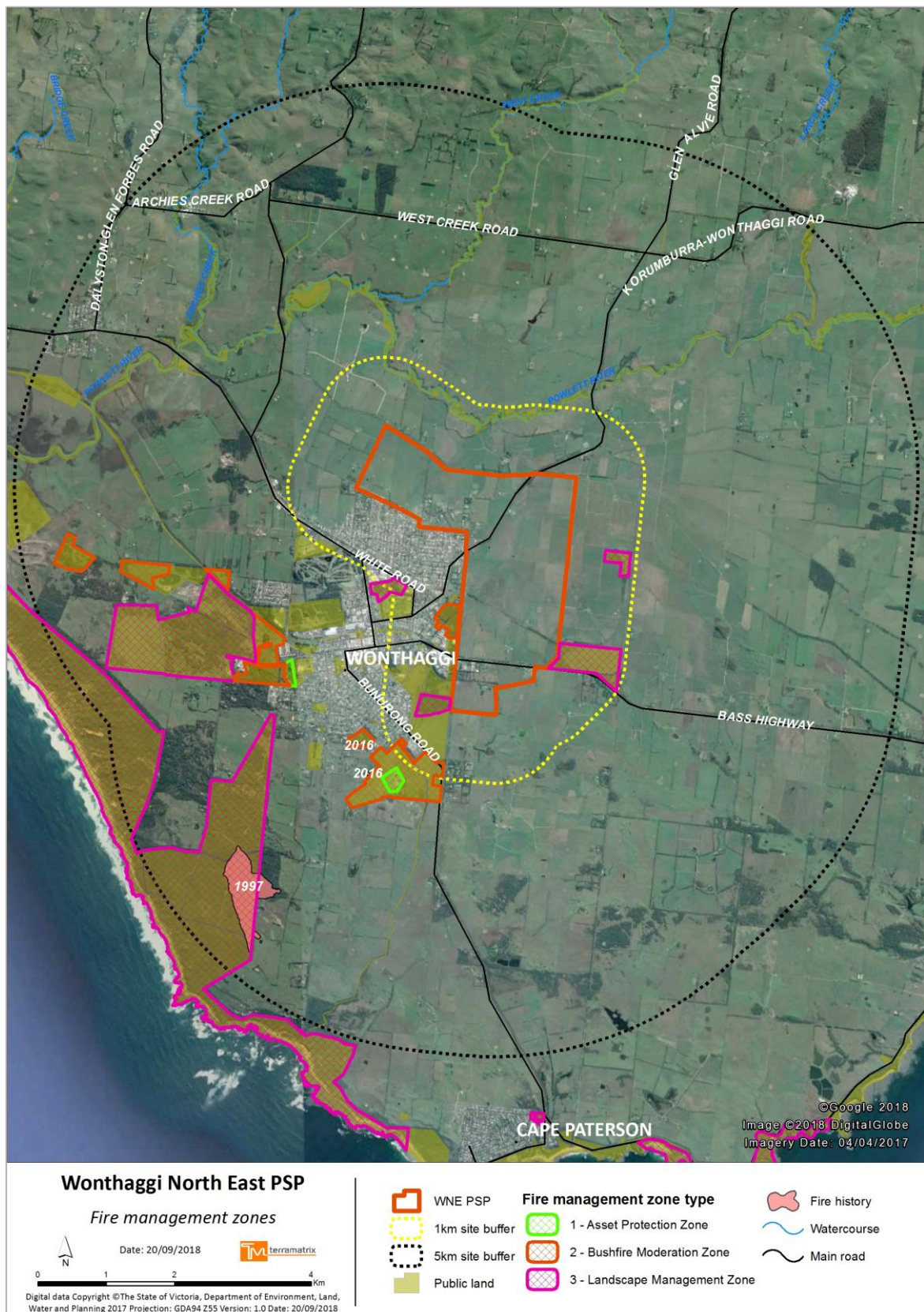


Figure 16 - Extract of Fire Operations Plan Latrobe District (Southern). Dark green shading indicates vegetation modification (FFMV, 2017).



Map 6 - Public land fire management zones (FFMV, 2016).

6 Planning and design response

This section identifies how future development can respond to the bushfire risk, including the requirements of Clause 13.02, Clause 44.06 and associated Clause 53.02 in BMO areas, published CFA guidance and the building regulations applicable to construction in a BPA (see Map 4).

6.1 Building setbacks

6.1.1 BAL-12.5 setback distances

Future dwellings, and other buildings requiring a BAL, will need to be sufficiently setback¹¹ from classified vegetation to enable a BAL-12.5 construction standard. The setbacks required for Grassland, Woodland and Scrub, based on the hazard assessment in Section 5 and determined using the simple Method 1 procedure of AS 3959-2009, are shown in Table 3 below and on Map 7, Map 8 and Map 9.

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
	Scrub	27m

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 5.1.4), 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 (2,500m²) 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.

¹¹ 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).

In parts of the WNEPSP area covered by the BMO, the setbacks comprise defensible space¹² that would need to be managed to the standards stipulated in Table 6 to Clause 53.02-5, as detailed in Appendix A of this report.

6.1.2 Vegetation beyond the PSP boundary

Development close to the perimeter of the WNEPSP will need to respond to classified vegetation beyond the PSP boundary, including providing the requisite setbacks to achieve BAL-12.5 (see Section 6.1.1).

Most of the PSP is bounded by Grassland, including to the northwest beyond Fuller Road, to the north beyond Heslop Road, and beyond most of the eastern and southern boundaries.

Exceptions are to the west, where the Wonthaggi Bushland Reserve comprises Scrub and a small area of Woodland; to the southeast where Scrub is adjacent to Sharrock Road; and to the southwest where Scrub borders the existing industrial area.

It has been proposed that land within the WNEPSP area adjacent to the Wonthaggi Bushland Reserve be used as sports grounds for a school outside the PSP. This use is supported as the large low threat area of the sports grounds will buffer residential development to the east from the bushfire hazard.

6.1.3 McGibbonys Road shared trail

As identified in Section 5.2, the proposed McGibbony Road Shared Trail will be 40m wide, incorporating a shared trail 16m wide and a 12m vegetated reserve on either side (see Figure 13).

Assuming the vegetation is not managed in a low threat state, then this configuration will constitute classified vegetation under AS 3959-2009 and adjacent dwellings will need to be setback 27m from it to achieve a BAL-12.5 rating (see Map 9).

Provision of a road interface could contribute to this setback, but would need to be supplemented, with a mandated setback of the buildings within the residential lots, to achieve the requisite 27m.

6.1.4 Drainage reserves and waterways

As identified in Section 5.2, wetlands and other water and drainage areas, including the proposed drainage reserves in the north of the precinct, may not be low threat and could potentially

¹² Defensible space is defined at Clause 73.01 of the Bass Coast Planning Scheme as 'An area of land around a building where vegetation is modified and managed to reduce the effects of flame contact and radiant heat associated with bushfire' (Bass Coast Planning Scheme, 2018e).

comprise classified vegetation if they do not meet one or more of the exclusion criteria of AS 3959-2009. Their size and setback from buildings and other patches of classified vegetation, and how the naturally occurring and/or planted vegetation within them is managed during the fire danger period, will determine whether they are excludable as non-hazardous vegetation.

Ponds with reliably open water or wet areas and little or no vegetation may be deemed low threat. However, seasonally inundated wetlands that may be dry and vegetated during the fire danger period could comprise classifiable Grassland, Scrub or Woodland, from which 19m, 27m or 33m setbacks respectively would be required for BAL-12.5 buildings.

The two proposed waterway reserves will be 60m in width and are assumed to contain classified Scrub. A 27m setback will be required for adjacent dwellings (see Map 8 and Map 9), this could be partially met by the proposed frontage road (comprising a reliably low threat area of at least 11.8m, see Figure 14), but would need to be supplemented, with a mandated setback of the buildings within the residential lot, to achieve the requisite 27m. Alternatively, a strip of the vegetated buffer could be managed as low threat vegetation (e.g. to the BMO defendable space standard at Table 6 of Clause 53.02 of the Bass Coast Planning Scheme) to provide the additional setback required.

The western waterway reserve is relatively close to the area covered by the BMO. It is possible that, following re-vegetation, it may cause the BMO coverage to be extended, i.e. if DELWP hazard mapping 'fills in' the area between the Woodland/Scrub in the Wonthaggi Bushland Reserve and the 60m wide strip of re-vegetated Scrub. It is recommended that consultation occur with DELWP regarding this possibility.

6.1.5 Southern tree reserve

As identified in Section 5.2, the southern tree reserve will comprise approximately 2.45ha of Woodland and be contiguous to classified Grassland to the east. Future buildings will need to be setback a minimum of 33m from the Woodland to achieve a BAL-12.5 rating (see Map 9).

6.1.6 Perimeter roads

The WNEPSP will be bounded by classified Grassland to the northwest, north, east and south. A portion of the western boundary will be adjacent to Woodland and Scrub in the Wonthaggi Bushland Reserve.

Much of this interface will incorporate an existing perimeter road, e.g. Fuller Road, Heslop Road and Carneys Road, which should be incorporated into the low threat setbacks required for future dwellings. The existing road formations and, in some cases managed nature strips, could provide most or all of the BAL-12.5 19m setback required from Grassland.

Within the WNEPSP area, perimeter roads around significant areas of retained vegetation should be incorporated into subdivision design where possible, to achieve BAL-12.5 separation distances for future development from any potentially hazardous vegetation, and to facilitate property protection and firefighting (see Figure 17). In particular, consideration should be given to the configuration of the setbacks from the drainage reserves and the eastern waterway reserve, which will be contiguous to classified Grassland beyond the WNEPSP boundary.

The setback for BAL-12.5 construction would need to be 33m in response to Woodland, 27m in response to Scrub or 19m in response to Grassland (see Table 3).

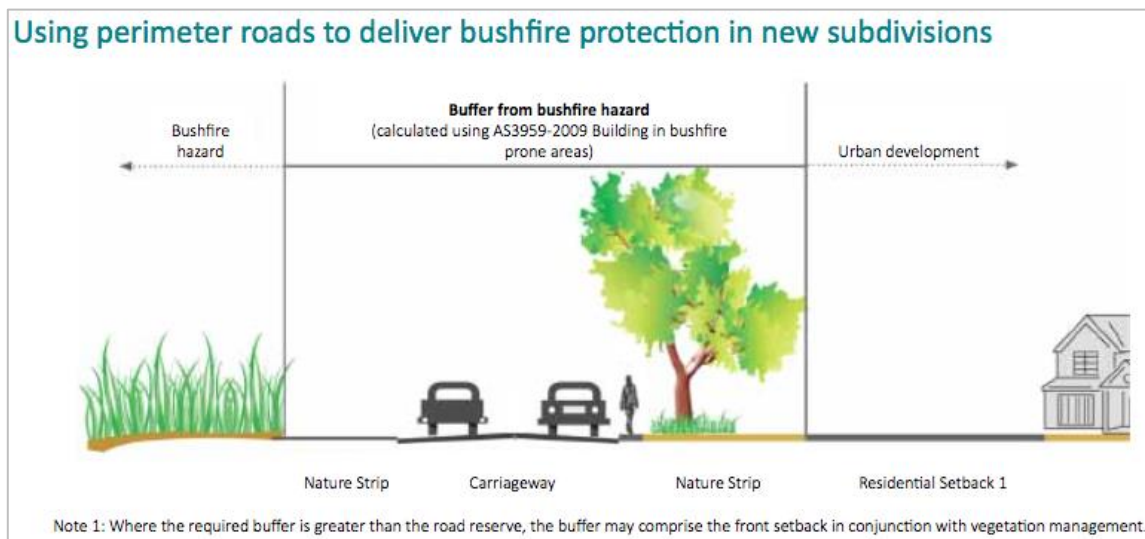
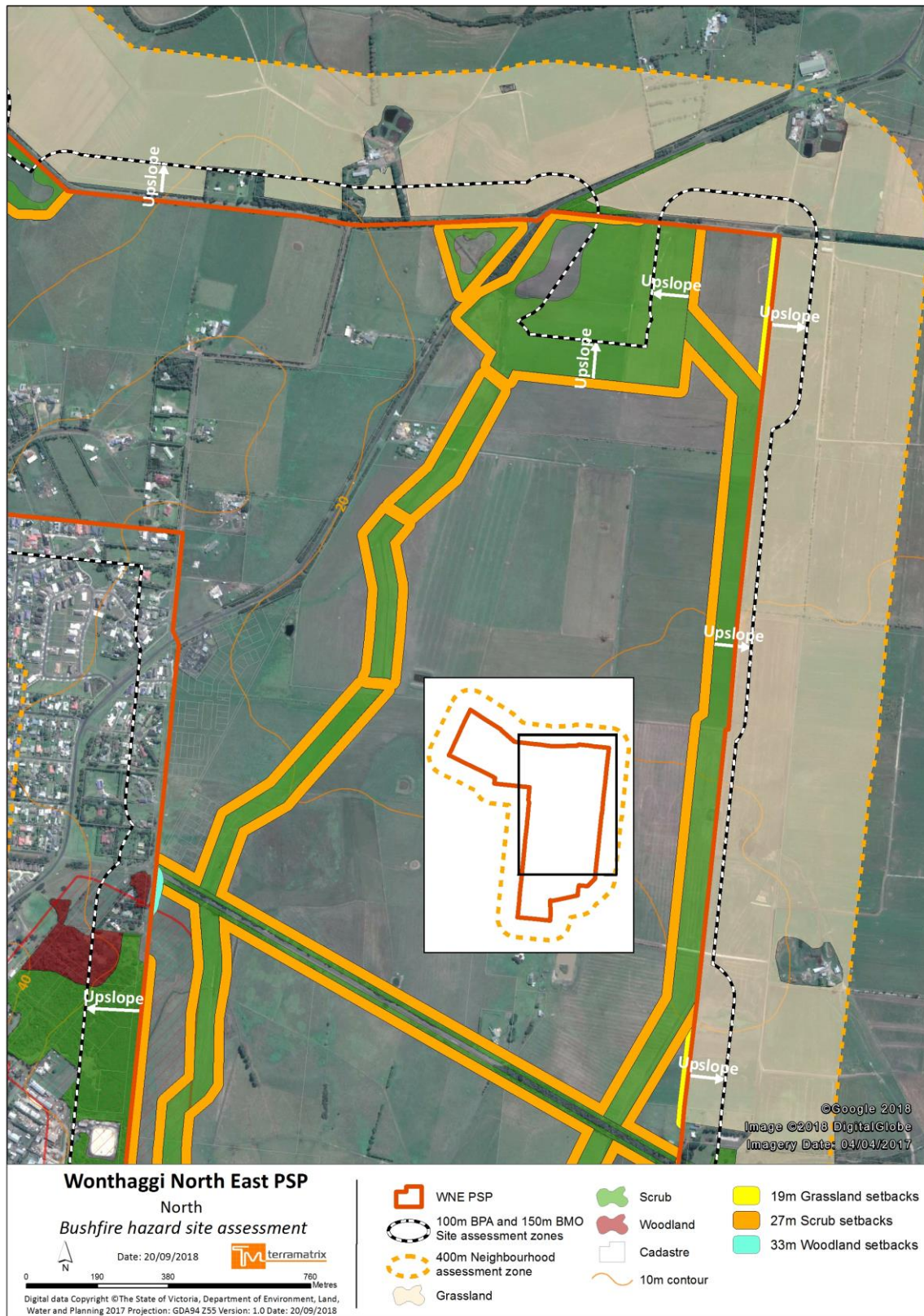


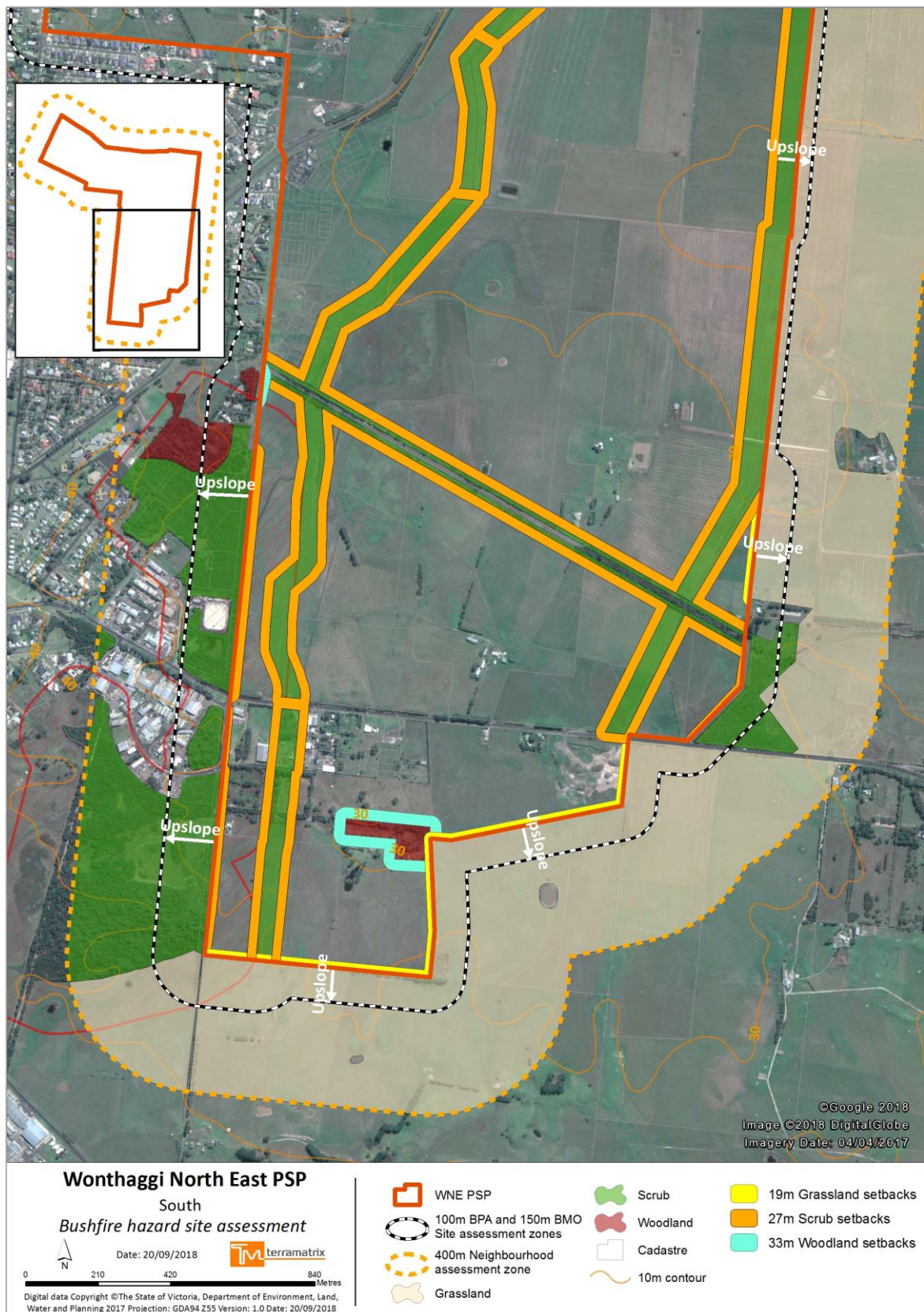
Figure 17 - Illustration of a perimeter road to provide required development setbacks (DELWP, 2015a).



Map 7 - BAL-12.5 setbacks from classified vegetation for the northwestern section of the WNEPSP area.



Map 8 – BAL-12.5 setbacks from classified vegetation for the northeastern section of the WNEPSP area.



Map 9 - BAL-12.5 setbacks from classified vegetation for the southern section of the WNEPSP area.

6.2 Excision of areas from the BPA

It is likely that as development progresses, much of the land within the WNEPSP area will become eligible to be excised from the BPA. 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 state-wide hazard mapping criteria, including that they would 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 will be a consideration (DELWP, 2015b).

Areas of the WNEPSP that may be eligible for excision as urban development progresses are:

- Land more than 60m from classified Grassland, i.e. from the pasture outside the WNEPSP area; and
- Land more than 300m from classified Woodland or Scrub in the Wonthaggi Bushland Reserve, along the McGibbons shared trail and in the waterway and drainage reserves.

It is recommended that more detailed analysis occur once the future urban form, and the nature of re-vegetation in the reserves, has been confirmed.

Excision from the BPA would enable BAL-LOW construction in these areas.

6.3 BMO schedule

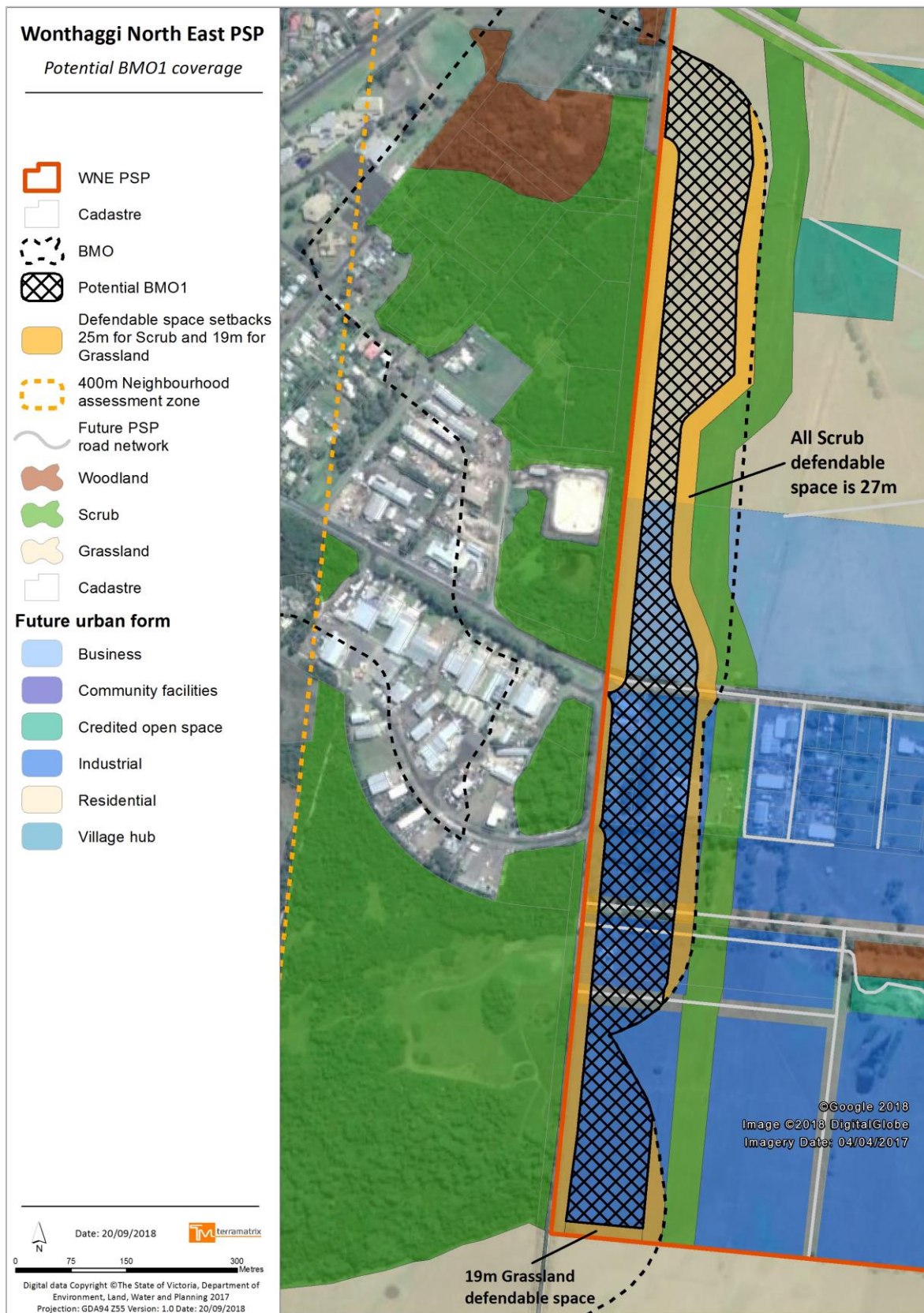
The BMO affects a small area of the WNEPSP, within approximately 150m of the Woodland and Scrub of the Wonthaggi Bushland Reserve adjacent to the western boundary of the PSP area (see Map 1 and Map 9).

As future dwellings and other buildings are to be 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 12.5kW/m²), it is considered that the small area of future residential development that would be affected by the BMO will be suitable for application of the existing BMO1 schedule in the Bass Coast Planning Scheme.

This potential BMO1 area in the WNEPSP is shown in Map 9. It is considered appropriate for BMO1 coverage as:

- The bushfire hazard in the Wonthaggi Bushland Reserve will remain, and require a planning response, following development of the precinct;
- The simplified application requirements of the BMO1 apply to applications to construct or extend one dwelling on a lot, which is therefore applicable to the proposed residential area in the WNEPSP; and
- Future dwellings and other buildings are to be located where a BAL-12.5 construction standard applies, hence the BMO1 requirements, which include a BAL-12.5 construction standard, are appropriate.

It should be noted, however, that setbacks will also be required from the western waterway reserve, assuming it is re-vegetated. In some places, this significantly constrains the area that is available for development with BAL-12.5 buildings. The use of this area as additional public open space or similar may be more appropriate.



Map 9 - BMO coverage and potential BMO1 area.

6.4 Clause 13.02 Bushfire

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

6.4.1 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

As identified in Section 5.5, the WNEPSP area is in a low-moderate bushfire risk location.

The protection of human life can be prioritised by:

- Applying the existing building regulations for construction in a BPA;
- Complying with the requirements of Clause 53.02 for any development in the BMO; 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 12.5kW/m²).

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.

If future buildings are setback sufficiently from any hazardous vegetation such that they achieve a BAL-12.5, or lower, the risk can be deemed to be acceptably mitigated.

The nearest *lowest* risk location is the urban-residential and township area of Wonthaggi immediately adjacent to the precinct that are not in the BPA (see Map 1 and Map 5).

It is noted that only approximately 3.6% of the precinct is covered by the BMO (see Map 1, Map 9 and Section 4.3).

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.

6.4.2 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, as appropriate, additional guidance provided in *Planning Practice Note 64 Local planning for bushfire protection* (DELWP, 2015a), *Planning Advisory Note 68 Bushfire State Planning Policy Amendment VC140* (DELWP, 2018a) and *Planning Permit Applications – Bushfire Management Overlay, Technical Guide* (DELWP, 2017b).

The type and extent of (hazardous) vegetation within and around the precinct has been identified. Classification is 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.

Publicly available 10m contour data for the area was accessed which, along with the site assessment, determined that the land is essentially flat and therefore benign from a bushfire perspective.

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 5.4.

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 Section 4.4) and is shown in Map 5. This is based on the most recent BPA mapping for the state, which was gazetted 16th May 2018.

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

BMO coverage reflects relatively recent BMO mapping introduced into the Bass Coast Planning Scheme by amendment GC13, which was gazetted on 3rd October 2017 (see Map 1 and Map 9).

As discussed in Section 6.3, the small area of the WNEPSP affected by the BMO may be suitable for application of Schedule 1 to the BMO.

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 5).

At the local scale, the assessment follows the BMO methodology for classifying vegetation and topography within a 150m assessment zone, and for this study extending out to 400m around the site where appropriate.

At the landscape scale a 20km, 5km and 1km radius of the site has been applied (see Figure 1, Figure 15 and Map 5) in accordance with guidance about assessing risk for planning scheme amendments provided in the Planning Advisory Note 68 (DELWP, 2018a) 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.

CFA have not been consulted on the development of this report. It is recommended that they be provided with v1.0 of this report and their recommendations can be incorporated into an updated report as appropriate.

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 coverage, 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. Relevant regional bushfire plans have been identified, reviewed and incorporated into this assessment as appropriate.

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 identified in this report, including BMO compliance where applicable and, in the BPA, the building regulations.

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 WNEPSP area.

6.4.3 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/m² 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 5.1.4 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 of the Wonthaggi township immediately adjacent to the precinct that are not a designated BPA (see Map 5).

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:

- Future buildings are setback from hazardous vegetation to enable BAL-12.5 construction, an appropriate water supply for fire-fighting is provided via a conventional reticulated hydrant system, and appropriate access/egress for emergency vehicles and residents is provided via a conventional residential road network;
- Development in the BMO complies with the applicable requirements of Clause 53.02 of the Bass Coast Planning Scheme; and
- 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, either within the precinct or on the current northern and eastern edge of Wonthaggi, is, in fact, likely to be reduced by the development of additional low threat or non-vegetated land associated with the proposed future urban land use.

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 (see Map 7, Map 8 and Map 9), are implemented, then construction can achieve a BAL not exceeding BAL-12.5.

If, in the future, parts of the WNEPSP area are excised from the BPA then buildings in non-BPA parts of the precinct could be constructed to BAL-LOW.

6.4.4 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

There are no apparent biodiversity impacts associated with the findings of this bushfire assessment.

6.4.5 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'* (Bass Coast Planning Scheme, 2018b).

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'* (Bass Coast Planning Scheme, 2018b).

Future development applications in the BPA, can achieve acceptable bushfire safety if:

- Setbacks for future development from classified vegetation are provided 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 unmanaged vegetation 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.

Note that access standards for driveways and static water supply apply in BMO areas (see details in Appendix C and D).

7 Conclusion

This study has assessed the bushfire hazard in and around the WNEPSP area, in accordance with Clause 13.02 in the Bass Coast Planning Scheme, the BMO/AS 3959-2009 methodology invoked by the Victorian planning and building system, and additional guidance provided in DELWP planning and advisory notes, including:

- *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);
- *Planning Permit Applications – Bushfire Management Overlay*, Technical Guide (DELWP, 2017b); and
- *Bushfire State Planning Policy Amendment VC140*, Planning Advisory Note 68, (DELWP, 2018a).

The assessment also fulfills the requirement of *Ministerial Direction 11 Strategic Assessment of Amendments*, that a planning scheme amendment addresses any relevant bushfire risk (Direction No. 11, 2013).

The entire WNEPSP area is currently a designated BPA. Land within approximately 150m of the Woodland and Scrub in the Wonthaggi Bushland Reserve adjacent to the western boundary of the PSP area, comprising approximately 3.6% of the precinct, is also covered by the BMO.

The WNEPSP area is in a low bushfire risk landscape. In the directions from which a bushfire threat typically arises (north, northwest, west or southwest) the landscape is generally pastoral or comprises the urban area of the existing township.

If future buildings are setback sufficiently from any hazardous vegetation such that they achieve a construction standard of BAL-12.5 or lower, then the bushfire risk can be deemed to be acceptably mitigated.

There are low risk urban-residential and township areas immediately adjacent to the precinct that are not in the BPA and which offer protection from any bushfire that may occur.

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'.

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, aerial imagery and site assessment. The classification is based on the current and likely future state of the vegetation. Vegetation in the Wonthaggi Bushland Reserve is classifiable as Woodland or Scrub,

whilst areas of open pasture >100mm high, with less than 10% overstorey foliage cover, comprise Grassland.

The proposed drainage and waterway reserves and the McGibbonys Road shared trail are likely to comprise classified Scrub, and the southern tree reserve will remain Woodland. Urban development adjacent to these areas will be required to provide setbacks commensurate to enable a BAL-12.5 construction standard for future buildings.

Applicable setbacks for BAL-12.5 construction in BPA and BMO parts of the precinct are shown in the following table.

Slope class	Vegetation	BAL-12.5 setback distance (defendable space)
All upslopes and flat land	Grassland	19m
	Woodland	33m
	Scrub	27m

If parts of the WNEPSP become eligible for excision from the BPA as urban development permanently removes the bushfire hazard, BAL-LOW would apply, i.e. no specific construction requirements for bushfire protection.

Schedule 1 to the BMO (BMO1) could be appropriate to part of the small area of the WNEPSP affected by the BMO. The BMO1 bushfire protection measures include a BAL-12.5 construction standard for a dwelling, with defendable space for 30m or to the property boundary, whichever is the lesser distance. Development of this area of land with BAL-12.5 buildings is, however, constrained by the proximity of the Wonthaggi Bushland Reserve to the west and the proposed waterway reserve to the east, and use a public open space or similar might be more appropriate than residential development.

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. The proposed perimeter roads shown in the future urban structure plan are supported and should be incorporated where possible, to achieve the BAL-12.5 separation distances for future development from any potentially hazardous vegetation, and to facilitate property protection and firefighting.

Access standards for driveways apply in BMO areas (see details in Appendix C).

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 at Clause 56.09-3. In BMO parts of the precinct an additional static water supply will be required (see details in Appendix B).

The risk to existing residents will be reduced by the development of additional low threat or non-vegetated land.

Neither the existing or future zones or overlays (apart from the BMO) have any significant bushfire safety implications, and the existing bushfire controls in the planning and building system can be deemed adequate to address bushfire risk.

8 Appendices

8.1 Appendix A: Defendable space vegetation management standards

As per Table 6 to Clause 53.02-5:

'Defendable space is provided and is managed in accordance with the following requirements:

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

Unless specified in a schedule or otherwise agreed in writing to the satisfaction of the relevant fire authority' (Bass Coast Planning Scheme, 2018d).

8.2 Appendix B: BMO Water supply requirements

Table 4 from Clause 53.02-5 - Capacity, fittings and access (Bass Coast Planning Scheme, 2018d)

Capacity, fittings and access			
Lot sizes (square meters)	Hydrant available	Capacity (litres)	Fire authority fittings and access required
Less than 500	Not applicable	2,500	No
500-1,000	Yes	5,000	No
500-1,000	No	10,000	Yes
1,001 and above	Not applicable	10,000	Yes

Note 1: A hydrant is available if it is located within 120 metres of the rear of the building

Fire Authority Requirements

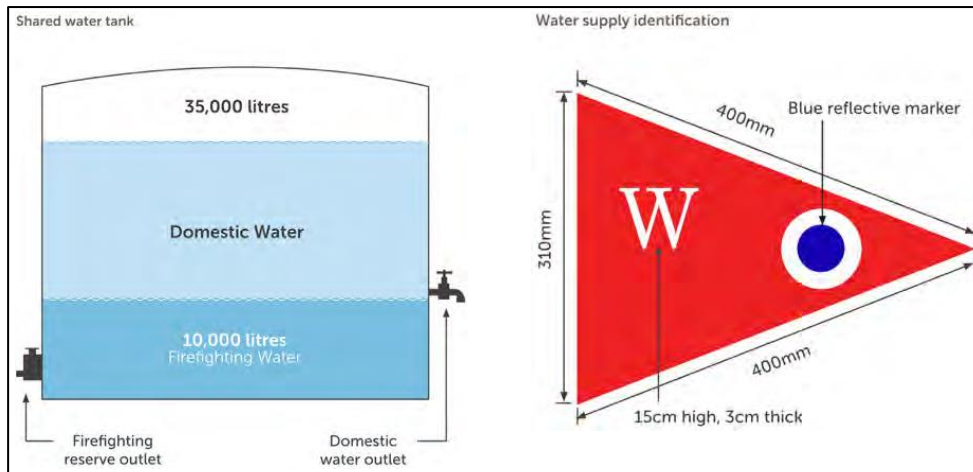
'Unless otherwise agreed in writing by the relevant fire authority, the water supply must:

- Be stored in an above ground water tank constructed of concrete or metal.*
- Have all fixed above ground water pipes and fittings required for firefighting purposes made of corrosive resistant metal.*
- Include a separate outlet for occupant use.*

Where a 10,000 litre water supply is required, fire authority fittings and access must be provided as follows:

- Be readily identifiable from the building or appropriate identification signage to the satisfaction of the relevant fire authority.*
- Be located within 60 metres of the outer edge of the approved building.*
- The outlet/s of the water tank must be within 4 metres of the accessway and unobstructed.*
- Incorporate a separate ball or gate valve (British Standard Pipe (BSP 65 millimetre) and coupling (64 millimetre CFA 3 thread per inch male fitting).*
- Any pipework and fittings must be a minimum of 65 millimetres (excluding the CFA coupling)' (Bass Coast Planning Scheme, 2018d).*

The water supply may be provided in the same water tank as other water supplies provided they are separated with different outlets. See figure below illustrating signage and an example of outlets where fire fighting water will be in the same tank as water for other use.



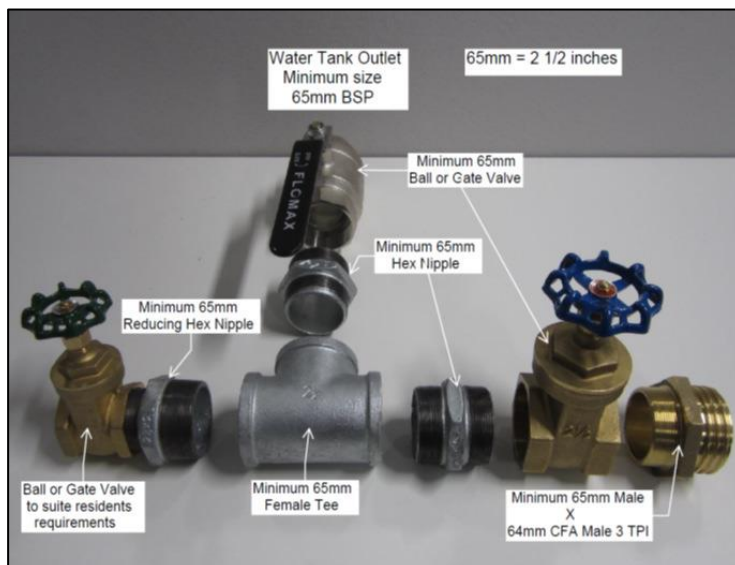
(DELWP, 2017b)

CFA Fittings (CFA, 2014)

'If specified within Table 4 to Clause 53.02-5 (if fire brigade access to your water supply is required), CFA's standard BMO permit conditions require the pipe work, fittings and tank outlet to be a minimum size of 64 mm.

65 mm BSP (British Standard Pipe) is the most common size available. A 65 mm fitting is equivalent to the old 2 1/2 inch. A 65 mm BSP (2 1/2 inch) fitting exceeds CFA's requirements and will therefore comply with CFA's standard permit conditions for the BMO.

The diagram below shows some common tank fittings available at most plumbing suppliers which meet the connection requirements. It includes a 65 mm tank outlet, two 65 mm ball or gate valves with a 65 mm male to 64 mm CFA 3 threads per inch male coupling. This is a special fitting which allows the CFA fire truck to connect to the water supply. An additional ball or gate valve will provide access to the water supply for the resident of the dwelling'.



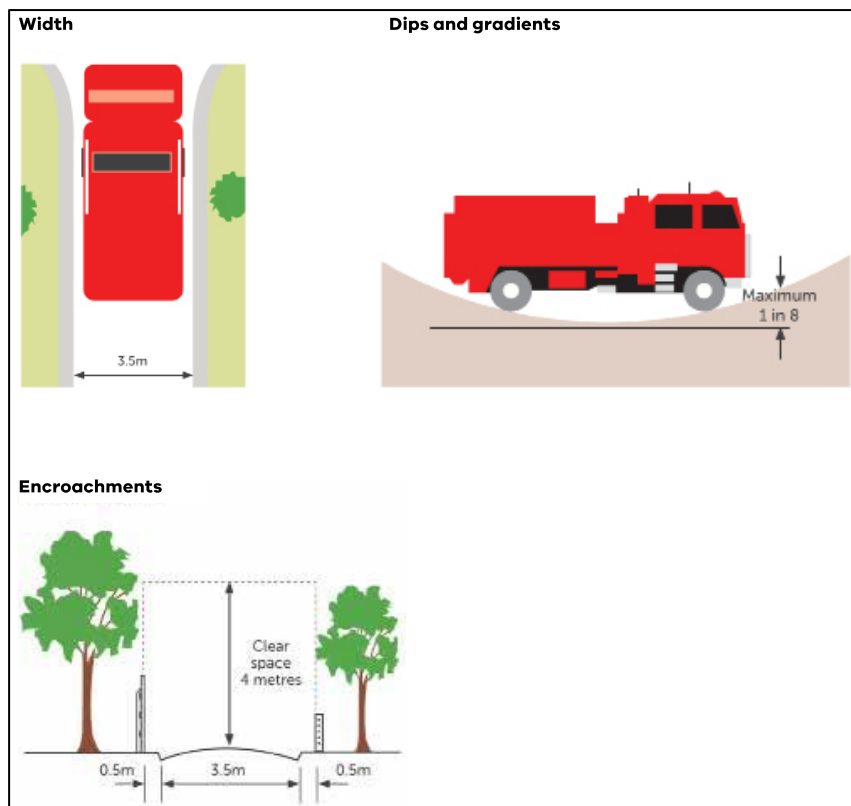
8.3 Appendix C: BMO Access requirements

Driveways less than 30m long have no specific requirements unless access to the water supply outlet is required, in which case the following apply as appropriate.

Access between 30m and 100m in length

Where the length of access is greater than 30 metres the following design and construction requirements apply (*the length of access should be measured from a public road to either the building or the water supply outlet, whichever is longer* (Bass Coast Planning Scheme, 2018e)):

- Curves must have a minimum inner radius of 10 metres.
- The average grade must be no more than 1 in 7 (14.4%) (8.1°) with a maximum of no more than 1 in 5 (20%) (11.3°) for no more than 50 metres.
- Dips must have no more than a 1 in 8 (12.5%) (7.1°) entry and exit angle.
- A load limit of at least 15 tonnes and be of all-weather construction.
- Provide a minimum trafficable width of 3.5 metres.
- Be clear of encroachments for at least 0.5 metres on each side and at least 4 metres vertically.
- A cleared area of 0.5 metres is required to allow for the opening of vehicle doors along driveways.
- Dips must have no more than a 1 in 8 (12.5 per cent) (7.1 degrees) entry and exit angle.

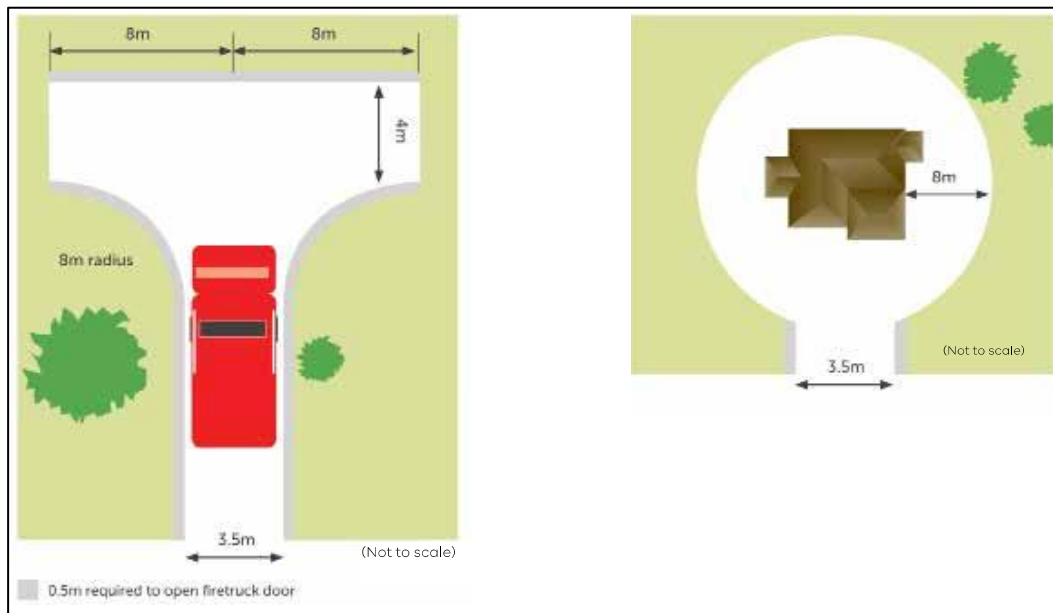


(DELWP, 2017b)

Access between 100m and 200m in length

In addition to the 30m-100m requirements above, a turning area for fire fighting vehicles must be provided close to the building by one of the following:

- a turning circle with a minimum radius of 8 metres
- a driveway encircling the dwelling
- other vehicle turning heads such as a T or Y head which meet the specification of Austroad Design for an 8.8 metre service vehicle.

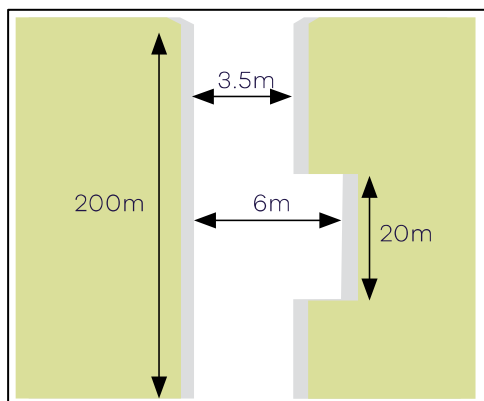


(DELWP, 2017b)

Access greater than 200m in length

In addition to the requirements above, passing bays are required at least every 200 metres that are:

- a minimum of 20 metres long
- with a minimum trafficable width of 6 metres.



(DELWP, 2017b)

8.4 Appendix D: BAL construction standards

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 ² pain to humans after 10 to 20 seconds exposure. Critical conditions at 10kW/m ² 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 ²	At 12.5kW/m ² 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 ²	At 19kW/m ² 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 ²	At 29kW/m ² 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 ²	At 42kW/m ² ignition of cotton fabric after 5 seconds exposure (without piloted ignition).
BAL- FZ (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 ²	At 45kW/m ² ignition of timber in 20 seconds (without piloted ignition).

Adapted from Standards Australia (2011).

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