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Bushfire Development Report
UPDATE

for the Shepparton South East
Precinct Structure Plan

Prepared for
the City of Greater Shepparton

July 2023

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Cover image: Looking north across the Broken River, near the southern precinct boundary.

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Version Control

Version	Date	Comments	Name
0.1	2018-08-06	Analysis, mapping and report compilation	Hamish Allan Manager, Bushfire Planning and Design
0.1	2018-08-07	Peer review	Jon Boura Managing Director
1.0	2018-08-07	Bushfire Development Report (BDR)	To client
1.1	2018-08-30	BDR with minor amendments to incorporate client and CFA comments.	To client
2.0	2022-03-30	DRAFT Update BDR with updated content including responses to CFA comments	To client
2.1	2022-05-02	Final BDR with content updated to reflect Place Based Plan changes	To client
3.0	2023-06-05	Amended BDR with content updated including with Place Based Plan changes	To client

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MAPS

1 Introduction

This Bushfire Development Report has been prepared for the City of Greater Shepparton. It assesses how development in the Shepparton South East Precinct Structure Plan (SSEPSP) 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 13.02-1S *Bushfire* and, where appropriate, Clause 44.06 *Bushfire Management Overlay (BMO)* and associated Clause 53.02 *Bushfire Planning* in the Greater Shepparton Planning Scheme.

The VPA and the Greater Shepparton City Council (GSCC) are currently preparing the SSEPSP, including a Development Contributions Plan (DCP) / Infrastructure Contributions Plan (ICP), to guide the future residential development of the land. It is anticipated that the precinct will accommodate approximately 6,500 people. The PSP is expected to be the subject of a planning scheme amendment that will rezone most or all of the precinct from Farm Zone (FZ) to Urban Growth Zone (UGZ) (GSCC, 2018a; VPA, 2018).

Only a relatively small area in the south of the precinct, comprising approximately 22% of the SSEPSP area, is a designated Bushfire Prone Area (BPA). Land within approximately 150m of the treed vegetation along the Broken River, comprising approximately 14% of the precinct, 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, 2018a);
- *Planning Permit Applications – Bushfire Management Overlay,* Technical Guide (DELWP, 2017); and
- *Bushfire State Planning Policy Amendment VC140,* Planning Advisory Note 68, (DELWP, 2018b).

This version of the report has been requested by the VPA and includes:

- The most recent Place Based Plan (VPA, 2023).
- Further information in response to the CFA's 'Submission To Precinct Structure Plan' letter to the VPA, dated 17th December 2021 (CFA, 2021).
- Updated content and references reflecting changes in the planning scheme provisions, practice and advisory notes, and other materials since the previous versions of the report, including changes to the National Construction Code (NCC).
- Updated mapping, including the most recent aerial imagery, cadastre and Bushfire Prone Area mapping, and an additional analysis map of potentially hazardous vegetation around the precinct (see Map 3).

2 Overview of study area

The SSEPSP area comprises approximately 385ha of land generally bounded by:

- Benalla Road (Midland Highway) to the north;
- The Broken River to the south;
- Doyles Road (Shepparton Alternative Route) to the east; and
- Existing residential development to the west (VPA, 2018) (see Figure 1 and Map 1).

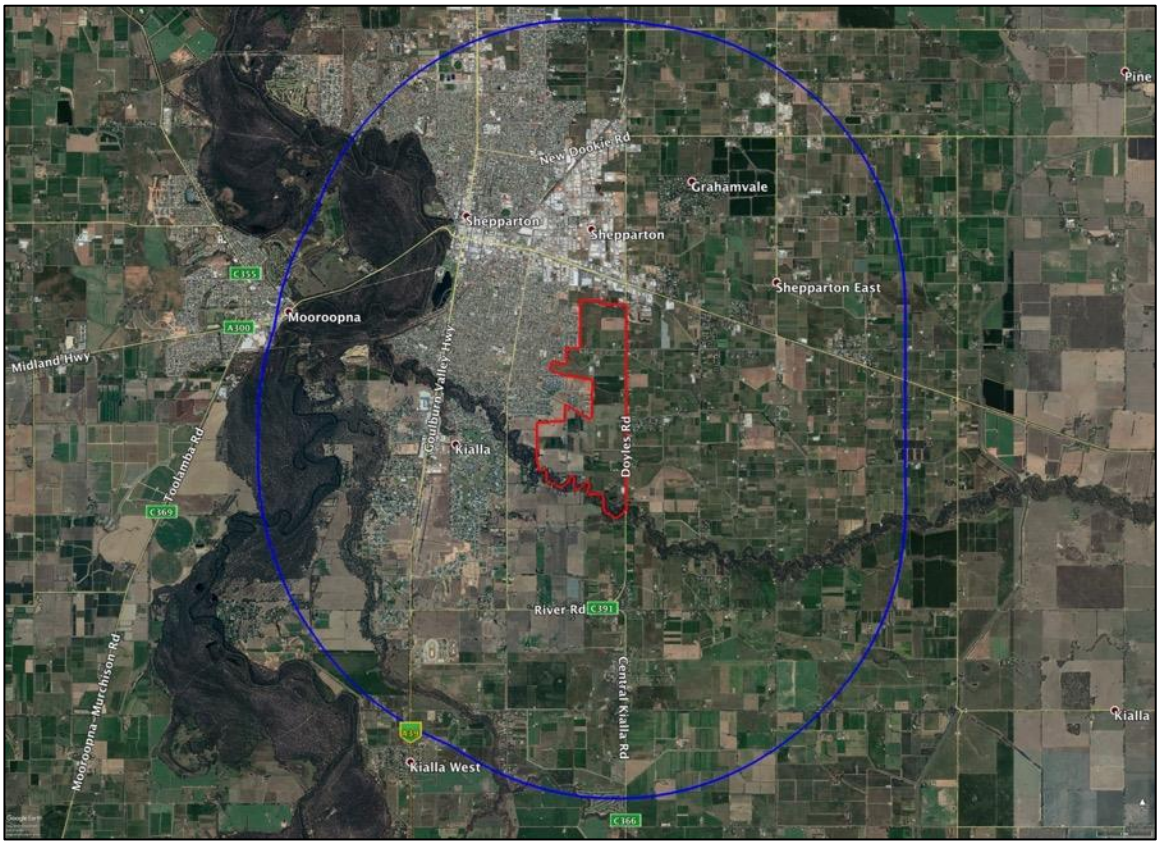


Figure 1 - Precinct location (SSEPSP area in red outline, 5km buffer in blue outline (Google Earth imagery date 2017-10-14 and 2018-03-13).

The precinct is located north of the Broken River, immediately adjacent to the established or establishing residential areas of southeast Shepparton, in the City of Greater Shepparton local government area (LGA).

Key features of the SSEPSP include:

- A residential area comprising approximately 2,500 lots;
- A local convenience centre for small scale shopping opportunities;
- A new community centre and a potential primary school;
- Six new retarding basins, many of which adjoin parks to create open space networks; and

- Reserves associated with the existing Goulburn- Murray Water drains that will be converted into landscaped paths to connect the open space network and community facilities (VPA, 2018).

The proposed place based plan for the precinct is shown in Figure 2 and Map 1.

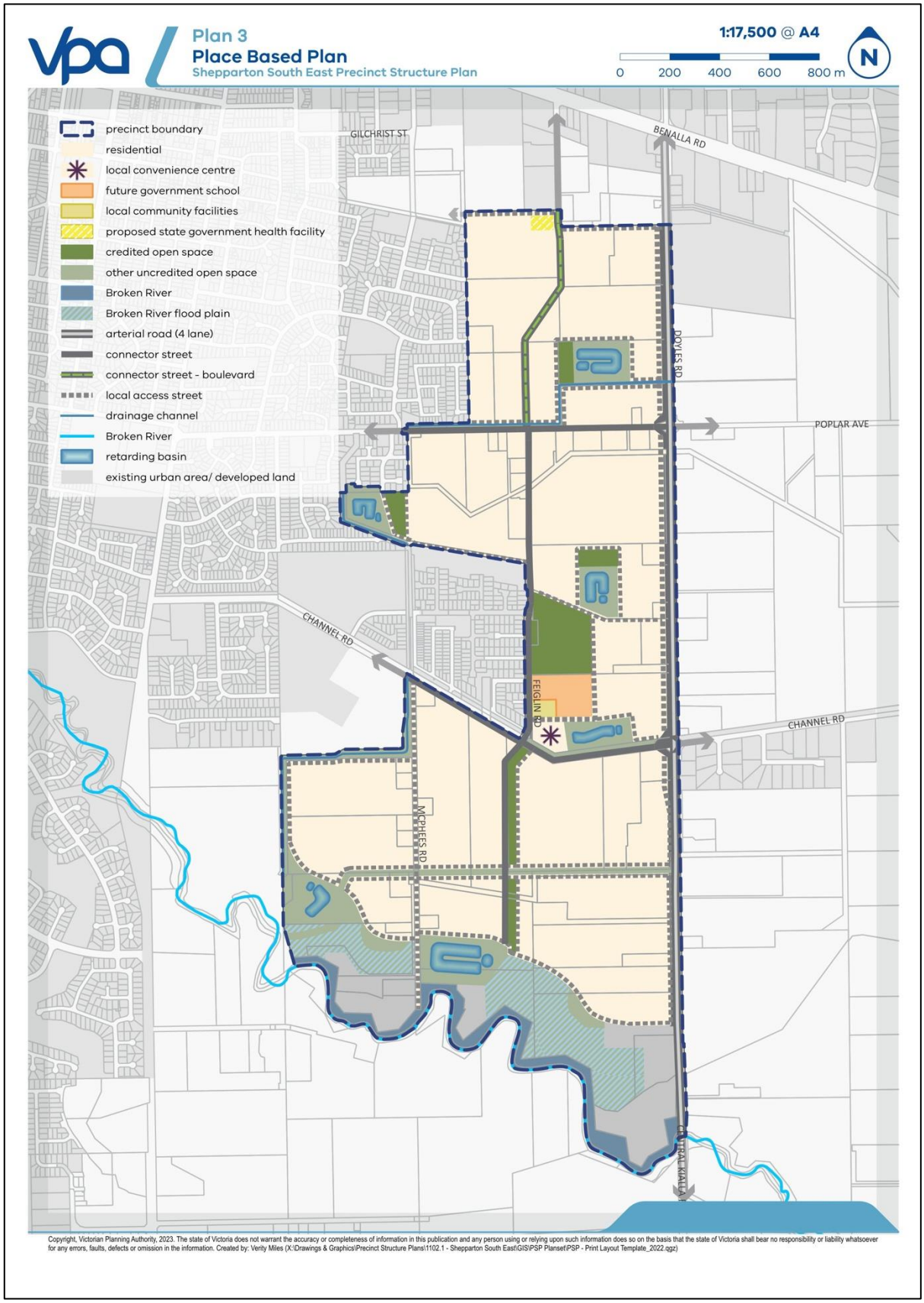
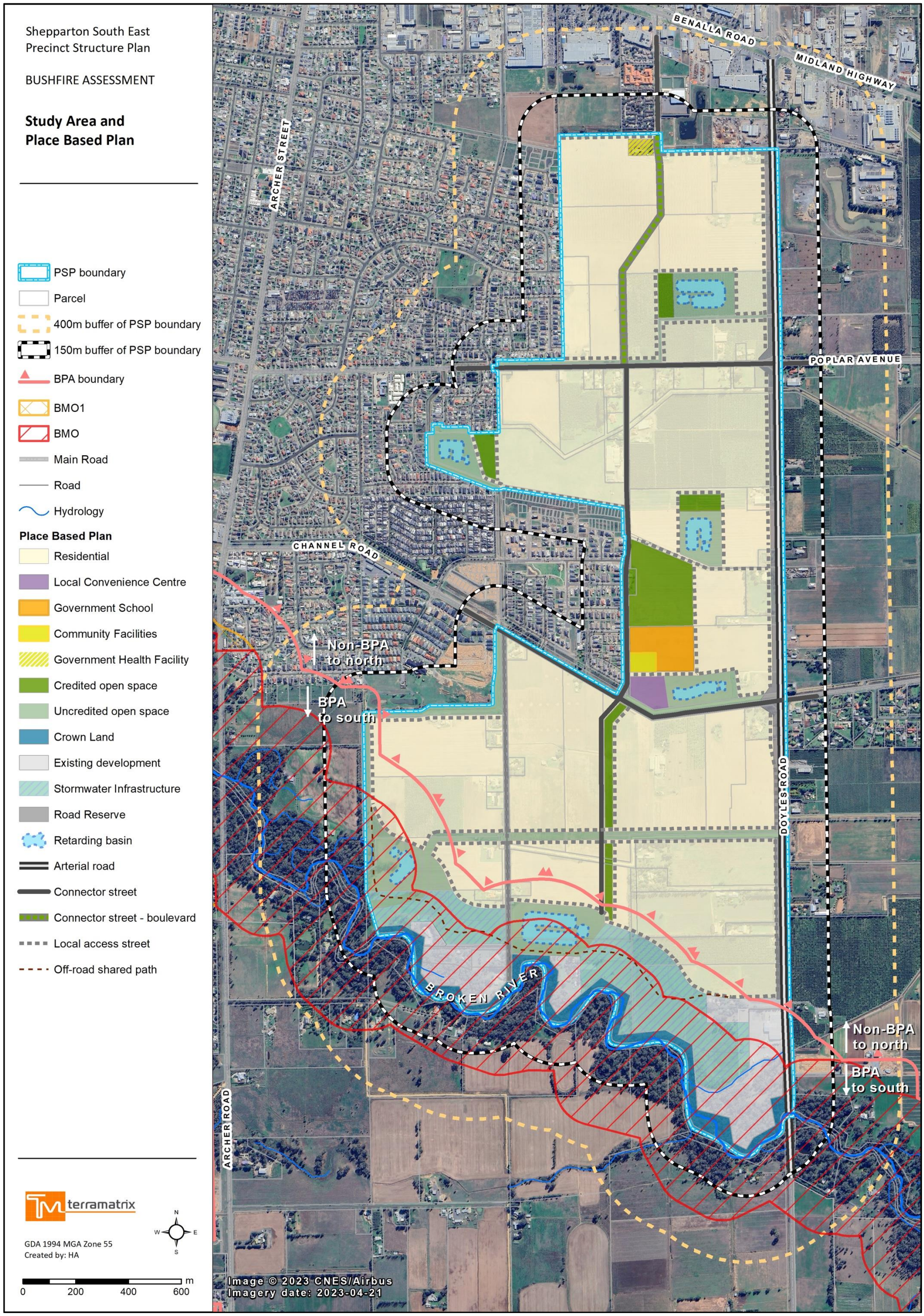


Figure 2 – Proposed place based plan (VPA, 2023).



Map 1 – SSEPSP study area, place based plan and extent of current bushfire controls.

3 Bushfire planning and building controls

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

3.1 Clause 13.02-1S-1S Bushfire Planning

Clause 13.02-1S has the objective '*To strengthen the resilience of settlements and communities to bushfire through risk based planning that prioritises the protection of human life*' (Greater Shepparton Planning Scheme). 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 13.02-1S 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'* (Greater Shepparton Planning Scheme).

Key strategies are stipulated in Clause 13.02-1S, 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 SSEPSP area. It is considered that development can appropriately prioritise the protection of human life, and meet the objectives of Clause 13.02-1S,

by ensuring future dwellings and other development will not be exposed to RHF above 12.5kW/m^2, which is commensurate with a BAL-12.5 construction standard.

The maximum 12.5kW/m^2 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 3959-2018*' (Greater Shepparton Planning Scheme).

A detailed response to the strategies in Clause 13.02-1S is provided in Section 5.2.

3.2 Clause 44.06 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'* (Greater Shepparton Planning Scheme).

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 (DELWP, 2019).

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);
- 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 3959-2018 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 4 of this report includes a bushfire hazard site and landscape assessment in accordance with the BMO application requirements (see also Map 4 and Map 5).

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.

A schedule to the BMO may specify substitute approved measures, additional alternative measures and additional or substitute decision guidelines (Greater Shepparton Planning Scheme).

The extent of BMO coverage of the precinct and surrounding land is shown in Map 1, Map 4 and Map 5. The BMO covers approximately 14% of the precinct, generally comprising land within 150m of remnant treed vegetation along the Broken River. This reflects BMO mapping introduced into the Greater Shepparton Planning Scheme by amendment GC13, which was gazetted on 3rd October 2017.

Schedule 1 to the BMO (BMO1) applies to residential areas to the west of the precinct[1] that are sufficiently distant from the treed vegetation along the Broken River, such that only ember attack and relatively low levels of radiant heat would be expected. 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.

[1] As well as to other lower risk parts of the Greater Shepparton LGA.

The small area of proposed residential development in the precinct that is currently within the BMO, will likely be suitable for application of the BMO1 (see Map 5 and Section 5.2.2).

3.3 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 (Greater Shepparton Planning Scheme).

3.4 Bushfire Prone Area (BPA)

BPAs are those areas subject to or likely to be subject to bushfire, as determined by the Minister for Planning. Only approximately 22% of the precinct is currently designated as a BPA, comprising the land within approximately 300m of treed vegetation along the Broken River (see Map 1, Map 4 and Map 5, which show 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 2022 (NCC), require specific design and construction standards for Class 1, 2 and 3[2] buildings, certain Class 9 and 4 buildings[3], and Class 10A buildings[4] or decks adjacent to, or connected with, these classes of buildings.

For Class 1 buildings (dwellings) and associated Class 10A buildings or decks, the applicable performance requirement in the NCC is:

'A Class 1 building or a Class 10a building or deck associated with a Class 1 building that is constructed in a designated bushfire prone area must be designed and constructed to—

(a) reduce the risk of ignition from a design bushfire with an annual exceedance probability not more than 1:50 years; and

(b) take account of the assessed duration and intensity of the fire actions of the design bushfire; and

(c) be designed to prevent internal ignition of the building and its contents; and

(d) maintain the structural integrity of the building for the duration of the design bushfire (ABCB, 2023).

[2] Class 1, 2 and 3 buildings are defined in the NCC 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] Applicable Class 9 buildings are Class 9a health-care buildings, Class 9b early childhood centres, primary and secondary schools, Class 9c residential care buildings, and any Class 4 parts of a building associated with these Class 9 buildings.

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

The performance requirement for Class 1, 2 and 3 buildings and associated Class 10a buildings and decks, is deemed to be satisfied by design and construction in accordance with AS 3959-2018 *Construction of buildings in bushfire prone areas*. For Class 1 buildings and associated decks, the NASH Standard – *Steel Framed Construction in Bushfire Areas* (NASH, 2021) is also deemed to satisfy the performance requirement.

More onerous performance measures apply to certain Class 9 buildings.

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 3959-2018, which range from BAL-LOW, which has no bushfire construction requirements, to BAL-FZ (Flame Zone) where flame contact with a building is expected (see Appendix 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 13.02-1S 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'* (Greater Shepparton Planning Scheme).

There are no significant obstacles to future development in the SSEPSP complying with the applicable strategies at Clause 13.02-1S and the building regulations invoked in a BPA. The extent of current BPA coverage is relatively minor, and additional reliably low threat or non-vegetated areas will be created as development progresses. However, as the extent of hazardous vegetation along the Broken River is not likely to change, the extent of BPA coverage will likely remain the same.

DTP 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 statewide hazard mapping criteria, including that the land needs to be:

- At least 300m from areas of classified vegetation (except grassland) larger than 4ha in size; and
- At least 150m from areas of classified vegetation (except grassland) 2 to 4ha in size; and
- At least 60m from areas of unmanaged grassland more than 2ha in size (DELWP, 2019).

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, 2019).

3.5 Other controls

3.5.1 Zoning

A change in zoning from Farm Zone to Urban Growth Zone (or other zone) will not have any significant bushfire safety implications. Whilst it will facilitate more intensive development, most of the development will occur outside the BPA and only a very small area of residential development is likely to occur within the BMO area.

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

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

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

Given potential for grassfire risk to the SSEPSP area, at least during the construction period, it would be prudent to require this measure as a condition of subdivision permits.

3.5.2 Overlays

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

4 Bushfire hazard assessment

One of the bushfire hazard identification and assessment strategies in Clause 13.02-1S, is to use the best available science to identify the hazard posed by vegetation, topographic and climatic conditions (Greater Shepparton Planning Scheme). 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'* (Greater Shepparton Planning Scheme).

This section includes a bushfire assessment at:

- The wider landscape scale, for up to 20km around the site (see Figure 11 and Map 4);
- The local landscape scale extending 1km and up to 5km from the site (see Figure 1 and Map 4); and
- The neighbourhood and site scale up to 400m around the precinct boundary (see Maps 2, 3 and 5).

The BPA invokes AS 3959-2018 *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, 2020). 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 and Map 2 show a 150m assessment zone around the precinct boundary, and Map 3 and Map 5 show a 100m BAL assessment zone around proposed residential/commercial/education areas, and 150m around the precinct.

4.1 Vegetation

Classified vegetation is vegetation that is deemed hazardous from a bushfire perspective and is classified in accordance with the AS 3959-2018 methodology.

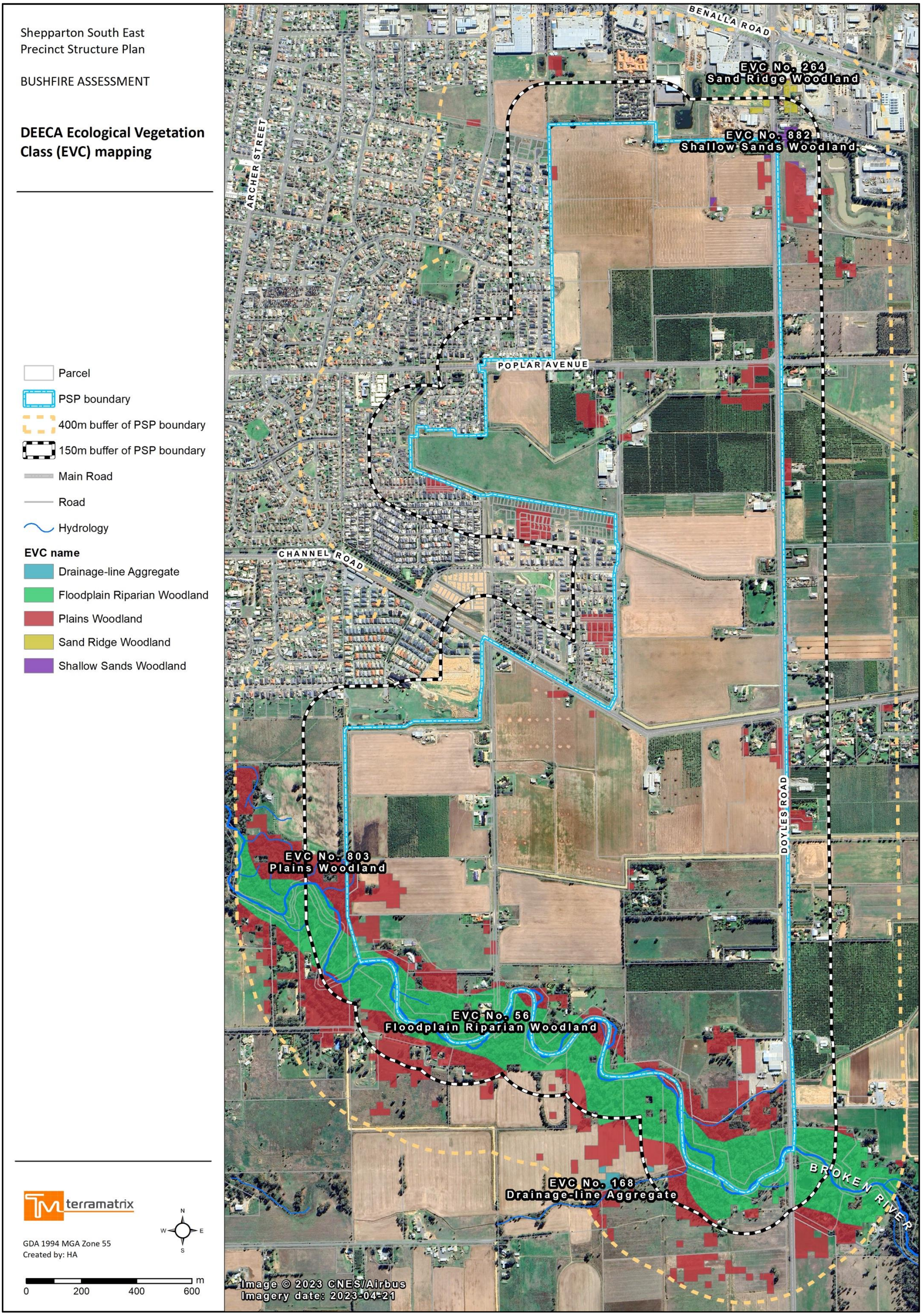
The classification system is not directly analogous to Ecological Vegetation Classes (EVCs) but uses a generalised description of vegetation based on the AUSLIG (Australian Natural Resources Atlas: No. 7 - Native Vegetation) classification system. The classification should be based on the likely fire behaviour that it will generate, and for settlement planning purposes, the long-term structure of the vegetation in its mature state[5].

[5] Under the BMO the long term mature state of the vegetation is considered, however for determining a BAL using AS 3959-2018 the assessment is at a 'point in time', which should, does not necessarily, take into account future changes in the vegetation.

Shepparton South East
Precinct Structure Plan

BUSHFIRE ASSESSMENT

DEECA Ecological Vegetation Class (EVC) mapping



Map 2 - DEECA modelled EVC mapping.

4.1.1 Woodland

The areas of remnant treed vegetation accord best with the BMO/AS 3959-2018 Woodland group, comprising the Woodland or Open Woodland vegetation types, which have the following typical characteristics:
'*Trees up to 30 m high; 10%–30% foliage cover dominated by eucalypts and/or callitris with a prominent grassy understorey. May contain isolated shrubs*' (Standards Australia, 2020).

In the BMO and AS 3959-2018 methodology, Woodland is presumed to have an understorey fuel load of 15t/ha and a total fuel load of 25t/ha, whereas the more hazardous Forest classification has a presumed understorey and total fuel load of 25t/ha and 35t/ha respectively.

Whilst in places overstorey foliage cover may arguably exceed 30%, the fuel hazard posed by remnant vegetation in and around the precinct is commensurate with a Woodland classification. This is consistent with DEECA modelled EVC mapping and EVC benchmark descriptors.

Map 2 shows the DEECA mapping of EVCs in and within 400m around the precinct boundary, which identifies that the majority of Woodland along the Broken River is likely to comprise Floodplain Riparian Woodland or Plains Woodland[6]. See also Map 3 and Map 5 showing Woodland or potential Woodland areas.

EVC 56 Floodplain Riparian Woodland – 20% benchmark canopy cover

'An open eucalypt woodland or open forest to 20 m tall over a medium to tall shrub layer with a ground layer consisting of amphibious and aquatic herbs and sedges. Occurs along the banks and floodplains of the larger meandering rivers and major creeks, often in conjunction with one or more floodplain wetland communities. Elevation and rainfall are relatively low and soils are fertile alluviums subject to periodic flooding and inundation' (DSE, 2004a).

EVC 803 Plains Woodland – 15% benchmark canopy cover

'An open, eucalypt woodland to 15 m tall occurring on a number of geologies and soil types. Occupies fertile clays and clay loam soils on flat or gently undulating plains at low elevations in areas with <600 mm annual rainfall. The understorey consists of a few sparse shrubs over a species-rich grassy and herbaceous ground layer and chenopods are often present' (DSE, 2004b).

In both of these EVCs, the bark hazard posed by the Eucalypt component, does not exceed a High rating and will not significantly contribute to ember attack or fire behaviour (Hines *et al.*, 2010).

Areas of 'potentially classifiable' Woodland are shown in Map 3 and Map 5. It should be noted that the mapping has been undertaken to inform the SSEPSP development. It is for strategic

[6] It is noted that the DEECA 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.

planning purposes only and should not be used for determining BALs for BPA compliance or statutory planning purposes e.g. BMO applications.

It is noted that most of the Woodland is more than 150m from proposed residential development areas and can, therefore, be deemed non-hazardous for BMO/BAL assessment purposes (see Section 3.2).

Figure 3 – Looking west at Woodland along the Broken River in the southeast corner of the precinct.

Figure 4 – Looking west along the Broken River at the southern end of McPhees Road.

Figure 5 – Woodland vegetation west of Archer Street.

Figure 6 - Woodland in the reserve to the west of the precinct, south of Broken River Drive.

4.1.2 Grassland

Areas of grassy vegetation greater than 100mm high with an overstorey foliage cover of less than 10%, are classifiable in the Grassland group of AS 3959-2018, which is defined as '*All forms* (of vegetation) *including areas with shrubs and trees, if overstorey foliage cover is less than 10%'* (Standards Australia, 2020).

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.

Open pasture and other areas where tree cover is below 10% can be classified as Grassland. These areas are likely to include the proposed large drainage reserve in the south of the precinct (see Map 5). As a conservative and precautionary approach, Map 3 shows all of the drainage reserves as 'potentially hazardous vegetation' with minimum development setbacks from them identified. It is considered likely however, that many, or all of them, will comprise non-hazardous vegetation managed to minimise fire risk, at least during the fire danger period.

Figure 7 – Grassland to the west of McPhees Road, likely to be in the large drainage reserve proposed in the south of the precinct.

Figure 8 – Looking north along the western precinct boundary, north of Poplar Avenue, at Grassland interface with existing development. The channel and adjacent land in the foreground is proposed to become part of a drainage reserve.

4.1.3 Excluded vegetation and non-vegetated areas

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

(a) *'Vegetation of any type that is more than 100m[7] from the site.*

(b) *Single areas of vegetation less than 1 ha in area and not within 100m of other areas of vegetation being classified vegetation.*

(c) *Multiple areas of vegetation less than 0.25 ha in area and not within 20 m of the site, or each other or of other areas of vegetation being classified vegetation.*

(d) *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 vegetation.*

(e) *Non-vegetated areas, that is, areas permanently cleared of vegetation, including waterways, exposed beaches, roads, footpaths, buildings and rocky outcrops.*

(f) *Vegetation regarded as low threat due to factors such as flammability, moisture content or fuel load. This includes grassland managed in a minimal fuel condition, mangroves and other saline wetlands, maintained lawns, golf courses (such as playing areas and fairways), maintained public reserves and parklands, sporting fields, vineyards, orchards, banana plantations, market gardens (and other non-curing crops), cultivated gardens, commercial nurseries, nature strips and windbreaks.*

NOTES:

1 Minimal fuel condition means there is insufficient fuel available to significantly increase the severity of the bushfire attack (recognizable as short-cropped grass for example, to a nominal height of 100 mm).

2 A windbreak is considered a single row of trees used as a screen or to reduce the effect of wind on the leeward side of the trees' (Standards Australia, 2020).

It is reasonable to assume that following development, all the proposed residential areas will be either non-vegetated or comprise low threat vegetation such as maintained lawns, roadsides and cultivated gardens.

It is also reasonable to assume that the most or all the proposed local parks will be managed in a low threat state (see Map 3).

[7] 150m in BMO areas.

Shepparton South East
Precinct Structure Plan

BUSHFIRE ASSESSMENT

Potentially Hazardous Vegetation & BAL setbacks

- PSP boundary
- BMO area
- Bushfire Prone Area
- Parcel (approved or proposed)
- Main Road
- Minor Road
- Hydrology

Place Based Plan

- Residential
- Local Convenience Centre
- Government School
- Community Facilities
- Government Health Facility
- Credited open space
- Uncredited open space
- Crown Land
- Existing development
- Stormwater Infrastructure
- Road Reserve
- Retarding basin
- Arterial road
- Connector street
- Connector street - boulevard
- Local access street
- 100m BAL assessment area around residential, commercial or educational land use areas.
- 150m BMO assessment area around residential land uses.

Potentially hazardous vegetation

- Woodland
- Grassland (outside precinct)
- Grassland (within precinct & 100m BAL assessment area)
- 19m setback for BAL-12.5 from potential Grassland
- 33m setback for BAL-12.5 from potential Woodland

Note: BAL constructions standards are only required within the BPA.

Non-hazardous vegetation is regarded as low threat due to factors such as flammability, moisture content or fuel load. This includes grassland managed <100mm high, mangroves and other saline wetlands, maintained lawns, golf courses (such as playing areas and fairways), maintained public reserves and parklands, sporting fields, vineyards, orchards, banana plantations, market gardens (and other non-curing crops), cultivated gardens, commercial nurseries, nature strips and windbreaks.

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GDA 1994 MGA Zone 55
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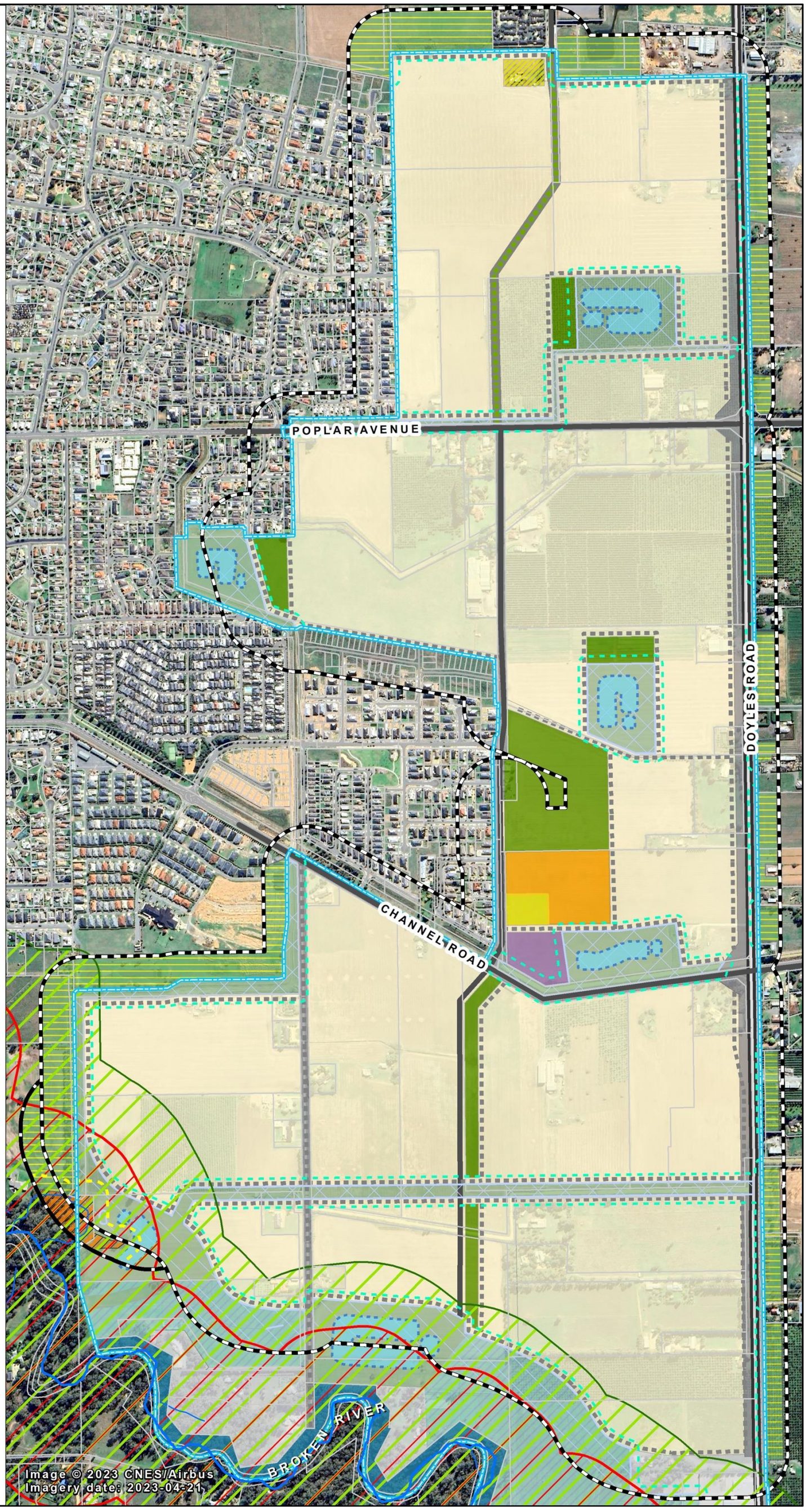


Map 3 - Bushfire controls and potentially hazardous vegetation.

Figure 9 – Existing orchard area south of Channel Road, which will become a residential area. The AS 3959-2018/BMO methodology excludes orchards from classification and considers them to be 'low threat' vegetation.

Figure 10 – Residential development underway to the west of the precinct, south of Channel Road, which will comprise low threat vegetation or non-vegetated land.

Areas that could potentially comprise classified vegetation, and which may not be low threat, include the proposed drainage reserves. The structure, size and setback from development of any revegetation within them, and how the vegetation is managed during the fire danger period, will determine whether they are non-hazardous vegetation.

Ponds or other water sensitive urban design (WSUD) features with reliably open water or wet areas and little or no vegetation may be deemed low threat. Large, seasonally inundated wetlands or WSUD features that may be dry and vegetated during the fire danger period could, however, comprise classifiable Grassland or Shrubland. However, except for the large southern

drainage reserve, most if not all of the drainage/WSUD areas are likely to be outside the BPA and/or not large enough to comprise a bushfire hazard that necessitates a planning, building or other design response (see Section 5.1.3).

4.2 Topography

AS 3959-2018 requires that the 'effective slope' be identified to determine the BAL and applicable vegetation setback distances. This is the slope of the land under 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 embankments immediately adjacent to the Broken River, land in the precinct and surrounding landscape is flat, or gently sloping, without significant changes in elevation that would appreciably influence bushfire behaviour. Whilst the embankments of the Broken River rise steeply, the length of slope, on both sides of the river, is relatively short.

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

4.3 Fire weather

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

The FFDI and GFDI can also be used for predicting fire behaviour, the difficulty of suppression and were used for forecasting daily Fire Danger Ratings (FDRs). The FFDI/GFDI were replaced by the Fire Behaviour Index (FBI) for the new Australian Fire Danger Rating System (AFDRS) adopted by all jurisdictions on 1st September 2022. Table 1 displays the new FDRs, their FBI range, the anticipated fire behaviour and recommended actions for each FDR.

The new AFDRS and FBIs do not correlate directly with the FFDI/GFFDI indices that are still applied in the planning and building system. However, the benchmark FFDI 100 used to represent a 'one size fits all' model of extreme fire weather conditions (and the threshold for the previous ‘Code Red’ FDR), is considered analogous to the new FBI 100 ‘Catastrophic’ FDR.

Note that these extreme conditions have been exceeded during significant fire events, including at some locations in Victoria on 'Black Saturday' 2009 and are not necessarily the *worst-case* conditions for any particular location, including the CoGS.

Additionally, in southern and eastern Australia, since the 1950s there has been an increase in the length of the fire season and an increase in extreme fire weather (CSIRO/BOM, 2022). The trend of a longer fire season and increased number of elevated fire weather days is projected to continue. Climate change is contributing to these changes in fire weather, including increases in temperature, reduced relative humidity and associated reductions to fuel moisture content (CSIRO/BOM, 2022).

Climate change trends associated with the risk of bushfire, support the adoption of a precautionary and conservative approach in identifying and responding to the risk. However, currently neither the CFA nor DTP have a published policy on FFDI recurrence intervals. There is, therefore, no compelling reason to apply a different FFDI/GFDI from the FFDI 100/GFDI 130 threshold used throughout non-Alpine areas of Victoria in the planning and building system[8].

Table 1 - Fire Danger Ratings (Source: BOM, 2022).

Forest Behaviour Index	Fire Danger Rating (FDR)	Fire Behaviour	Action
>=100	Catastrophic	If a fire starts and takes hold, lives are likely to be lost.	○ These are the most dangerous conditions for a fire. ○ Your life may depend on the decisions on you make, even before there is a fire. ○ For your survival, do not be in bushfire risk areas. ○ Stay safe by going to a safer location early in the morning or the night before. ○ If a fire starts and takes hold, lives and properties are likely to be lost. ○ Homes cannot withstand fires in these conditions. You may not be able to leave and help may not be available.
50-99	Extreme	Fires will spread quickly and be extremely dangerous.	○ These are dangerous fire conditions. ○ Check your bushfire plan and that your property is fire ready. ○ If a fire starts, take immediate action. If you and your property are not prepared to the highest level, go to a safer location well before the fire impacts. ○ Reconsider travel through bushfire risk areas. ○ Expect hot, dry and windy conditions. ○ Leaving bushfire risk areas early in the day is your safest option.
24-49	High	Fires can be dangerous.	○ There is a heightened risk. Be alert for fires in your area.

[8] In Alpine areas of Victoria an FFDI 50 applies for determining BALs using Method 1 of AS 3959-2018.

Forest Behaviour Index	Fire Danger Rating (FDR)	Fire Behaviour	Action
			○ Decide what you will do if a fire starts. ○ If a fire starts, your life and property may be at risk. The safest option is to avoid bushfire risk areas.
12-23	Moderate	Most fires can be controlled.	○ Stay up to date and be ready to act if there is a fire.

4.4 Landscape assessment

4.4.1 Location description and context

The precinct is located on the southeastern outskirts of Shepparton (see Figure 11 and Map 4). It is identified as a major residential growth area for Shepparton in the Shepparton South Framework Plan at Clause 02.04 in the Municipal Planning Strategy (Greater Shepparton Planning Scheme).

Large areas of land to the north, west and, to a lesser extent, southwest of the precinct comprise a low threat urban-residential landscape. These are the directions in Victoria typically associated with the predominant wind direction during severe or higher fire danger weather (Long, 2006). Land to the east of the precinct is primarily pastoral or horticultural and is also largely low threat. The low bushfire risk in these directions is evidenced by the lack and pattern of BPA coverage.

The bushfire hazard in the surrounding landscape is largely confined to areas of remnant vegetation associated with the Broken River, Goulbourn River and Seven Creeks.

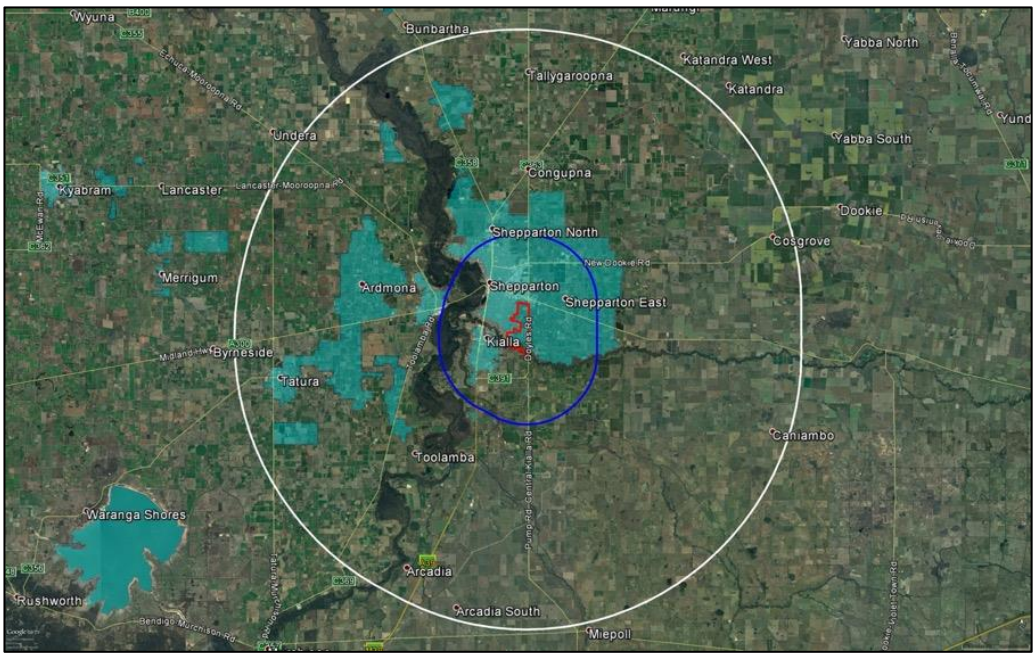


Figure 11 – Location and landscape context of the precinct. A 5km buffer of the precinct is shown in blue outline, a 20km buffer in white outline. Non-BPA land is shown in light blue shading.

Map 4 - Bushfire hazard landscape assessment.

4.4.2 Landscape risk

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

The four types range from low risk landscapes where there is little hazardous vegetation beyond 150m of a site and extreme bushfire behaviour is not credible, to extreme risk landscapes with limited or no evacuation options, and where fire behaviour could exceed BMO/AS 3959-2018 presumptions (see Table 2).

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

Broader Landscape Type 1	Broader Landscape Type 2	Broader Landscape Type 3	Broader Landscape Type 4
• *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.*	• *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.*	• *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.*	• *The broader landscape presents an extreme risk.* • *Evacuation options are limited or not available.* • *Fires have hours or days to grow and develop before impacting.*
I N C R E A S I N G R I S K →			

The landscape setting of the SSEPSP area accords best with the low risk Landscape Type 1. Apart from the remnant vegetation associated with the Broken River, there is little hazardous vegetation beyond 150 metres of the precinct, up to approx. 2km from it, except for Grassland.

In the directions from which a bushfire threat typically arises (north, northwest, west or southwest) the landscape is generally developed and comprises low-threat vegetation or non-vegetated land, as reflected by the BPA coverage (see Map 4).

The vegetated river corridor is relatively small and narrow and, therefore, may not support a large, 100m wide bushfire moving at a quasi-steady-state rate of forward spread directly at buildings, as envisaged in the BMO and AS 3959-2018 methodology. Additionally, the hazard lies to the south of the precinct, a direction not often associated with a severe fire threat in Victoria, although it is acknowledged that southwest approaches following a cool change, can pose a bushfire threat (Long, 2006).

Access for people in the precinct is readily available to reliably low threat or non-vegetated areas that can provide shelter from bushfire. These places of relative safety are the immediately abutting developed residential areas that are not designated as a Bushfire Prone Area.

4.4.3 Regional bushfire risk assessments and plans

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

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 Greater Shepparton LGA is in the Goulburn Valley sub-region of the Hume RSFMP. No issues are identified pertaining to the study area, although the RSFMP notes there is population expansion on the edges of major regional cities, including Shepparton, and that these patterns of human settlement have increased the amount of urban rural interface land that requires intensive fire management (Hume Regional Strategic Fire Management Planning Committee, 2011).

Regional Bushfire Planning Assessment (RBPA) Hume Region

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

The *Regional Bushfire Planning Assessment – Hume Region* covers the City of Greater Shepparton LGA. It does not identify any bushfire issues for the precinct or surrounding area. It notes that the natural landscape of the municipality and wider region has been modified significantly as a result of pastoral and irrigation activities, and that areas of remnant native vegetation are primarily limited to watercourses, road reserves and public land, including residential lots that directly adjoin riparian corridors (DPCD, 2012).

Greater Shepparton City Council Municipal Emergency Management Plan (MEMP) and **Municipal Fire Management Strategy (MFMS)**

The Greater Shepparton City Council MFMS states it aligns closely with the Hume RSFMP objectives and vision for fire management (GSCC, 2021). There is no specific information in the strategy pertinent to the precinct, only broad statements relating to bushfire risk.

The Municipal Emergency Management Plan (MEMP) rates the risk of a large regional bushfire as 'High', based on a Consequence rating of 'Moderate' and a Likelihood rating of 'Possible/Likely' (GSCC, 2019). The MEMP recognises though, that in recent history there have only been a small number of major fires in the municipality (GSCC, 2019).

5 Planning and design response

This section identifies how future development can respond to the bushfire risk, including the requirements of Clause 13.02-1S, 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).

5.1 Building setbacks

5.1.1 BAL-12.5

Within the BPA part of the site, future dwellings and other buildings requiring a BAL, will need to be sufficiently setback[9] from classified vegetation to enable a BAL-12.5 construction standard. The setbacks required in response to Grassland and Woodland, based on the hazard assessment in Section 4 and determined using the simple Method 1 procedure of AS 3959-2018, are shown in Table 3 below.

Table 3 - Building setbacks for BAL-12.5.

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

As a conservative and precautionary approach, Map 3 identifies areas of 'potentially hazardous vegetation' within and around the precinct, including showing all of the proposed drainage reserves as potential Grassland, with minimum development setbacks as above, illustrated.

Note that in non-BPA parts of the precinct, application of these setbacks for dwellings from any large areas of long (hazardous) grass is also a prudent measure. Setbacks can be achieved by one or more of the following measures:

- Roads between reserves and lots (see Section 5.1.4);
- Defined building envelopes to provide some or all of a setback within lots; and
- Non-vegetated land and/or managed vegetation within a reserve, to achieve the setback within the perimeter of the reserve, rather than external to the reserve.

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

a) Eaves and roof overhangs.
b) Rainwater and domestic fuel tanks.
c) Chimneys, pipes, cooling or heating appliances or other services.
d) Unroofed pergolas.
e) Sun blinds (Standards Australia, 2020).

Note that areas of unmanaged vegetation that meet one or more of the exclusion criteria below are deemed to be low threat vegetation (see Section 4.1.3):

- Single areas of vegetation less than 1ha in area and at least 100m from other areas of classified vegetation;
- Multiple areas less than 0.25ha (2,500m^2) 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.

In parts of the study area covered by the BMO, the setbacks comprise defendable space[10] 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.

5.1.2 BAL-LOW

Note that outside the BPA, future buildings can be constructed to a BAL-LOW standard i.e. no specific construction requirements apply (see Section 3.4, Map 5 and Appendix D).

5.1.3 Drainage reserves or other WSUD features

As identified in Section 4.1.3, wetlands and other water and drainage areas, including proposed drainage reserves within the precinct, may not be low threat and could potentially comprise classified vegetation if they do not meet one or more of the exclusion criteria of AS 3959-2018. Their location (i.e. in or outside the BPA), their size and setback from buildings and other patches of 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. As a conservative and precautionary approach, Map 3 shows all of the drainage reserves as 'potentially hazardous vegetation' with minimum development setbacks from them identified. It is considered likely however, that many, or all of them, will comprise non-hazardous vegetation managed to minimise fire risk, at least during the fire danger period.

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 (or Shrubland), from which 19m setbacks would be required for BAL-12.5 buildings.

A minimum 19m setback from the proposed large drainage reserve, to run east-west in the south of the precinct, can be achieved by the proposed perimeter road along the edge of the reserve,

[10] Defendable space is defined at Clause 73.01 of the Greater Shepparton 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'* (Greater Shepparton Planning Scheme).

which will separate future residential development from vegetation in the reserve (see place based plan in Figure 2).

5.1.4 Perimeter roads

The proposed perimeter roads shown in the place based plan (see Figure 2) are supported and 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 12).

Where any development abuts Woodland areas, the setback would need to be 33m for BAL-12.5 construction (see Table 3), again this should incorporate a perimeter road where appropriate. A good example of a perimeter road providing development setbacks from Woodland, can be seen along Broken River Drive, to the west of the precinct (see Figure 13).

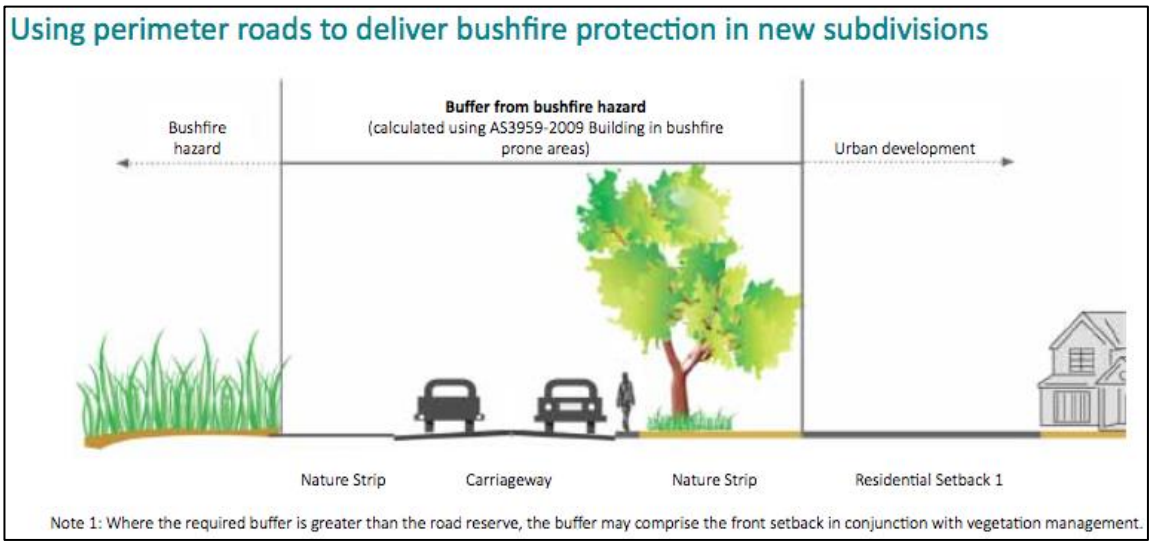
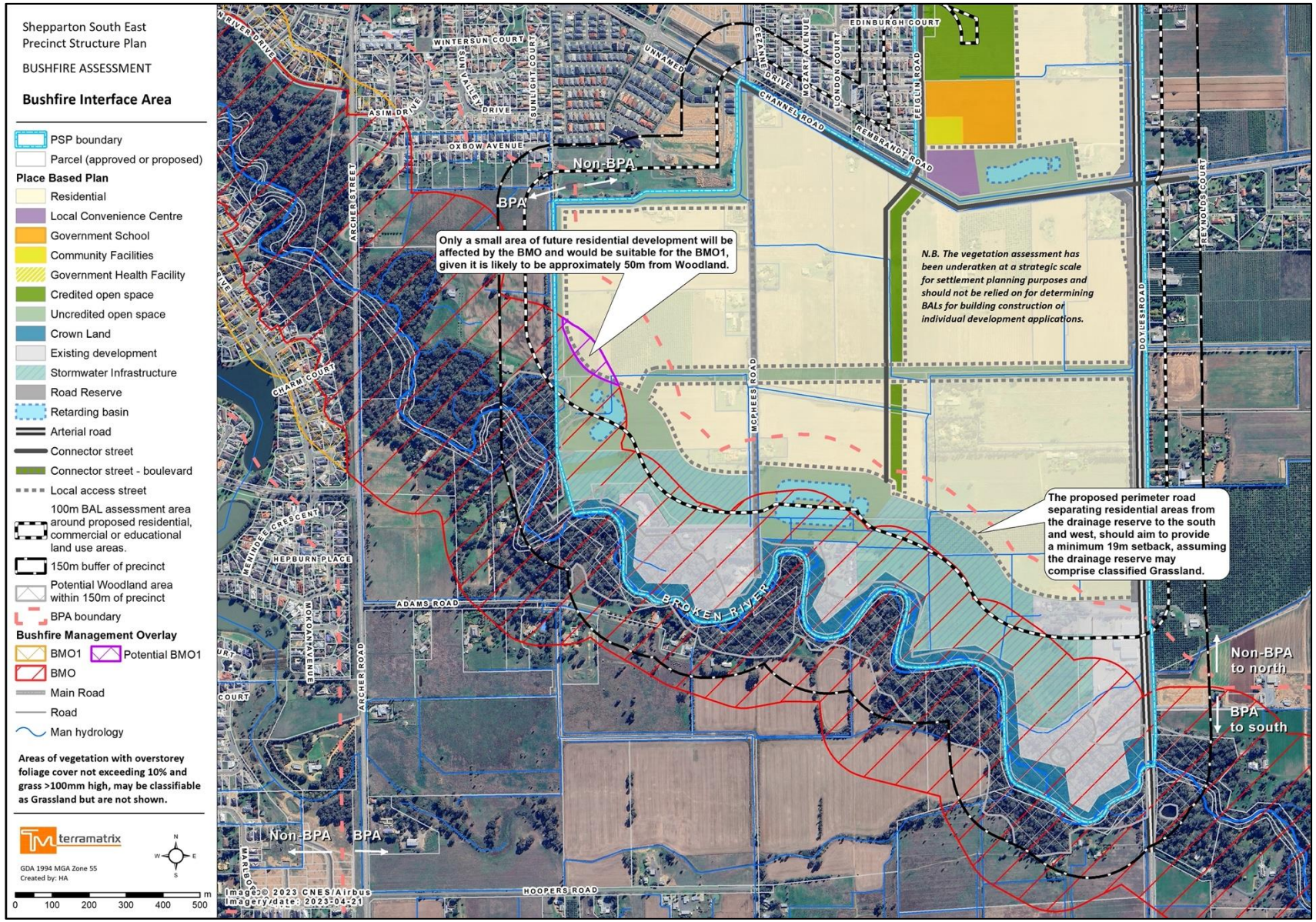


Figure 12 - Illustration of a perimeter road to provide required development setbacks (DELWP, 2015).

Figure 13 – Residential development interface with Woodland, north of the Broken River, along Broken River Drive to the west of the SSEPSP area.



Map 5 – Bushfire hazard interface map.

5.2 Clause 13.02-1S Bushfire Planning

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 13.02-1S.

5.2.1 Protection of human life strategies

Clause 13.02-1S 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 4.4, the SSEPSP area is in a low bushfire risk location. The protection of human life can be prioritised by application of the existing building regulations for construction in a BPA and by ensuring future dwellings and other buildings are located where a BAL-12.5 construction standard (or BAL-LOW) can be achieved (i.e. providing setbacks for future buildings from unmanaged vegetation, such that radiant heat impacting upon the buildings can be expected to be below 12.5kW/m^2).

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

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 locations are the urban-residential and township areas immediately adjacent to the precinct that are not in the BPA (see Map 4).

It is noted that only 22% of the precinct is designated as a BPA (see Map 5 and Section 3.4).

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

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

The CFA provide principles to guide strategic planning and the consideration of and response to bushfire risk:

- *'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.*

Design out risk and for reduction, resilience and response' (CFA, 2023).

It is considered that development of the precinct can appropriately implement the strategies in Clause 13.02-1S that aim to prioritise protection of human life and will, therefore, meet the CFA strategic planning principles for bushfire.

5.2.2 Bushfire hazard identification and assessment strategies

Clause 13.02-1S-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 potential hazards in accordance with the commonly accepted methodologies of AS 3959-2018 and, as appropriate, additional guidance provided in *Planning Practice Note 64 Local planning for bushfire protection* (DELWP, 2015), *Planning Advisory Note 68 Bushfire State Planning Policy Amendment VC140* (DELWP, 2018) and *Planning Permit Applications – Bushfire Management Overlay,* Technical Guide (DELWP, 2017).

The type and extent of potentially 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 the topography is benign from a bushfire perspective.

In relation to climatic conditions and fire weather, the AS 3959-2018 default FFDI 100/GFDI 130 benchmark used in the Victorian planning and building system, has been applied as discussed in Section 4.3.

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

The extent of BPA coverage has been considered (see Section 3.4) and is shown in Map 1, Map 4 and Map 5. This is based on the most recent BPA mapping for the area.

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

BMO coverage reflects BMO mapping introduced into the Greater Shepparton Planning Scheme by amendment GC13, which was gazetted on 3rd October 2017 (see Map 1 and Map 4).

It is considered that the small area of future residential development that would be affected by the BMO (see the area highlighted in Map 5), will be suitable for application of the existing BMO1 schedule.

The BMO1 currently applies to residential areas to the west of the precinct (and elsewhere in the City of Greater Shepparton (see Section 3.2 and Map 5)) that do not abut any large areas of remnant treed vegetation and are, therefore, sufficiently setback from remnant treed vegetation, such that they are likely only to be subject to ember attack and are not at risk of flame contact or higher levels of RHF (i.e. above 12.5kW/m^2).

This relatively small, potential BMO1 area in the precinct, is shown in Map 5 as a 'Potential BMO1' area. It is considered appropriate for BMO1 coverage due to:

- It is approximately 50m from remnant patches of treed vegetation along the river, which is consistent with the setbacks for existing BMO1 affected lots to the west of the precinct, north and south of the river;
- The simplified application requirements of the BMO1 apply to applications to construct or extend one dwelling on a lot, which is consistent with, and therefore applicable to, the proposed residential area in the precinct; and
- The BMO1 requirements include a BAL-12.5 construction standard, which is commensurate with, and an appropriate response to, credible bushfire attack mechanisms that could be anticipated in the precinct under the severe or higher fire weather conditions presumed in the BMO methodology and the hazard posed by the vegetation and topography.

Considering and assessing the bushfire hazard on the basis of:

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

The hazard has been assessed and described at the regional, municipal and local (site and neighbourhood) scale (see Section 4).

At the local scale, the assessment follows the 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 (see Map 2).

At the landscape scale a 20km, 5km and 1km radius of the site has been applied (see Figure 1, Figure 11 and Map 4) in accordance with guidance about assessing risk for planning scheme amendments provided in the Planning Advisory Note 68 (DELWP, 2018) and Planning Practice Note 64 (DELWP, 2015).

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

The CFA reviewed v1.0 of this report and '…is in agreement with...' the report subject to:

- *'Include mapped area showing proposed BMO1 schedule*
- *Acknowledge that CFA have met with council and VPA to provide input in the SSEPSP'* (CFA, 2018).

Subsequent to that agreement and advice, CFA provided additional comments (CFA, 2021), which this report has incorporated.

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.

DTP advisory and practice notes, Clause 13.02-1S, 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 and strategies 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 13.02-1S are successfully implemented as identified in this report, including BMO compliance in the minor areas of BMO coverage and, in the BPA, the building regulations that relate to bushfire.

5.2.3 Settlement planning strategies

Clause 13.02-1S 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 3959-2018 Construction of Buildings in Bushfire-prone Areas (Standards Australia, 2009).

The site is a low risk location. Applicable distances for dwellings or other buildings to be setback from classifiable vegetation, such that RHF is calculated to be below 12.5kW/m^2, 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. Note that no BAL construction standard is required for buildings outside the BPA.

See also the exclusion criteria and setback distances in Section 4.1.3 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 3959-2018 Construction of Buildings in Bushfire-prone Areas (Standards Australia, 2009) where human life can be better protected from the effects of bushfire.

The lest risk locations, where BAL-LOW can be achieved, are those areas that are not a designated BPA (see Map 1). There is ready access to these areas and only 22% of the precinct, along the southern boundary of the PSP area, is designated as a BPA.

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. [SEP]

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 provided via a conventional reticulated hydrant system, and appropriate access/egress for emergency vehicles and residents provided via a conventional residential road network.
- It is ensured that any hazardous vegetation retained or re-established, does not create an increase in the hazard exposure for existing residents.

The risk to existing residents is, in fact, likely to be reduced by the development of additional low threat or non-vegetated land associated with the proposed place based plan.

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 3959-2018'

If the setback distances from any hazardous vegetation, as identified in this report, are implemented, then construction can achieve a BAL not exceeding BAL-12.5. Buildings in non-BPA parts of the precinct can be constructed to BAL-LOW.

5.2.4 Areas of high biodiversity conservation value

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

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

5.2.5 Use and development control in a Bushfire Prone Area

Clause 13.02-1S 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'* (Greater Shepparton Planning Scheme).

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'* (Greater Shepparton Planning Scheme).

Future development can achieve acceptable bushfire safety if:

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

6 Conclusion

This study has assessed the bushfire hazard in and around the SSEPSP area, in accordance with Clause 13.02-1S in the Greater Shepparton Planning Scheme, the BMO/AS 3959-2018 methodology invoked by the Victorian planning and building system, and additional guidance provided in DTP planning and advisory notes, including:

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

The assessment is considered to fulfil the requirement of *Ministerial Direction 11 Strategic Assessment of Amendments,* that a planning scheme amendment addresses any relevant bushfire risk (Direction No. 11, 2018).

Only a relatively small area in the south of the precinct, representing approximately 22% of the SSEPSP area, is a designated BPA. Land within approximately 150m of the treed vegetation along the Broken River, comprising approximately 14% of the precinct, is also covered by the BMO. It is noted that the majority of land within BMO and BPA coverage is proposed as open space or comprises existing development.

The SSEPSP 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 developed and comprises low-threat vegetation or non-vegetated land, as reflected by the BPA coverage.

The vegetated river corridor is relatively small and narrow and, therefore, unlikely to support a large, 100m wide bushfire moving at a quasi-steady-state rate of forward spread directly at buildings, as envisaged in the BMO/AS 3959-2018 methodology. Therefore, 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 risk can be deemed to be acceptably mitigated.

There are low risk urban-residential and township areas immediately adjacent to the precinct that are also not in the BPA and 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 3959-2018 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. Areas of treed remnant vegetation along the Broken River are classifiable as Woodland, whilst areas of open pasture >100mm high, with less than 10% overstorey foliage cover, comprise Grassland.

Wetlands or other water and drainage areas in the BPA, including the proposed drainage reserves to the south of the precinct, could potentially comprise classified vegetation if they do not meet one or more of the exclusion criteria of AS 3959-2018. Their location (i.e. in or outside the BPA), their size and setback from buildings and other patches of 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 (or Shrubland), from which 19m setbacks would be required for BAL-12.5 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

In non-BPA parts of the precinct, BAL-LOW will apply i.e. no specific construction requirements for bushfire protection.

Schedule 1 to the BMO (BMO1), applies to residential areas to the west of the precinct that are sufficiently distant from the treed vegetation along the Broken River, that only ember attack and relatively low levels of radiant heat would be expected. 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. The small area of proposed residential development in the precinct that is currently within the BMO, will likely be suitable for application of the BMO1

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 place based 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.

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.

7 Appendices

7.1 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' (Greater Shepparton Planning Scheme).

7.2 Appendix B: BMO Water supply requirements

Table 4 from Clause 53.02-5 - Capacity, fittings and access (Greater Shepparton Planning Scheme)

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

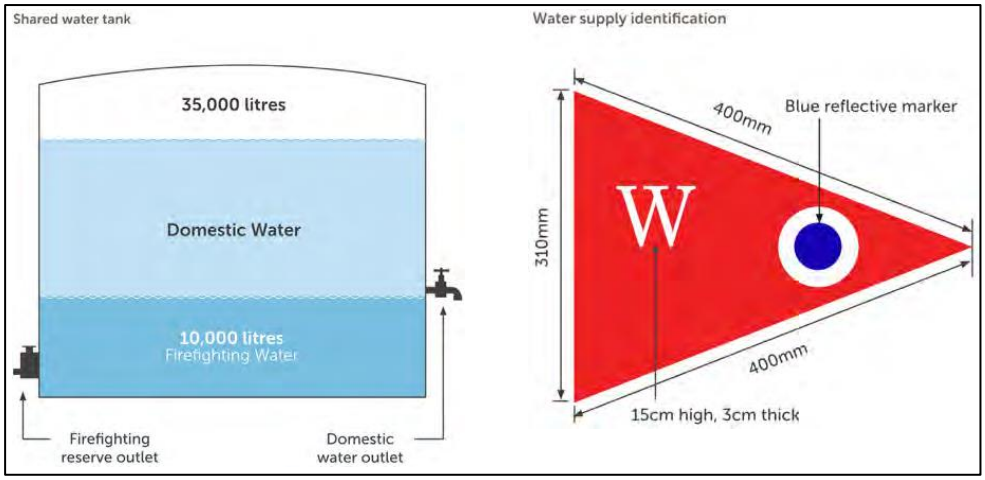
'Unless otherwise agreed in writing by the relevant fire authority, the water supply must:

- *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)'* (Greater Shepparton Planning Scheme).

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.



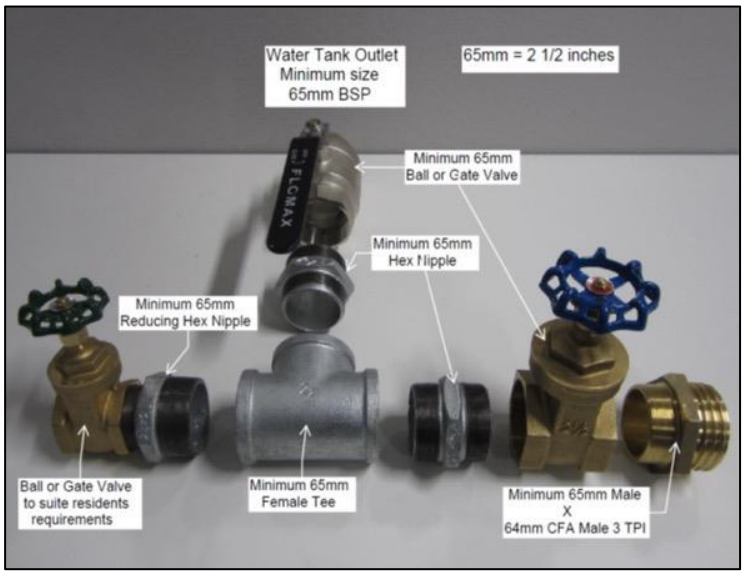
(DELWP, 2017)

CFA Fittings (CFA, 2022b)

'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 21/2 inch. A 65 mm BSP (21/2 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'.



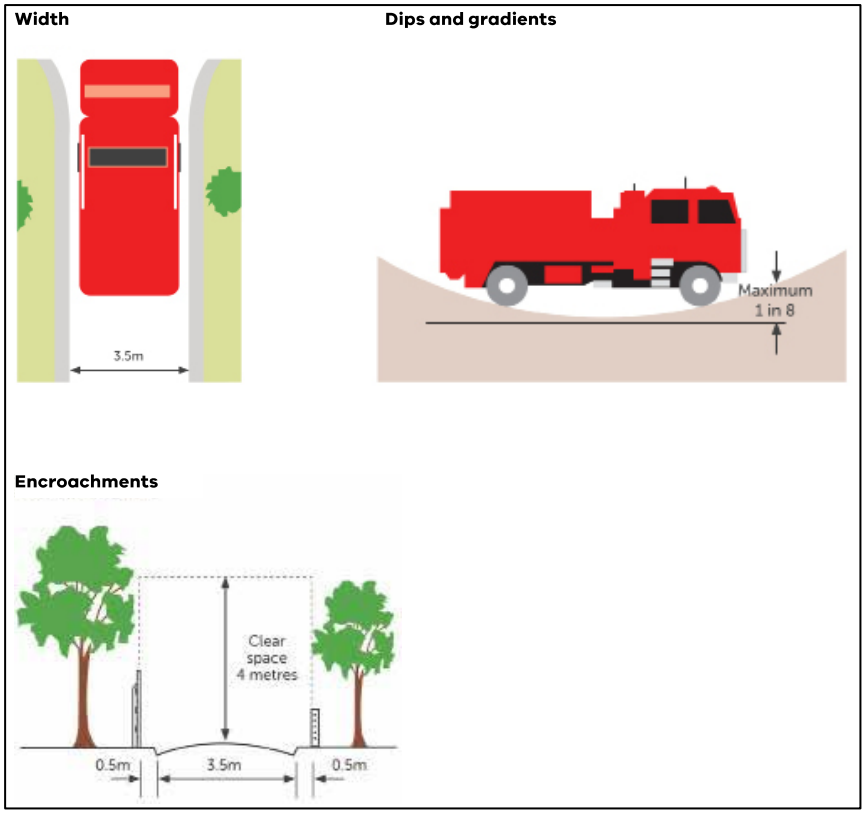
7.3 Appendix C: BMO Access requirements

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* (Greater Shepparton Planning Scheme)):

- 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.

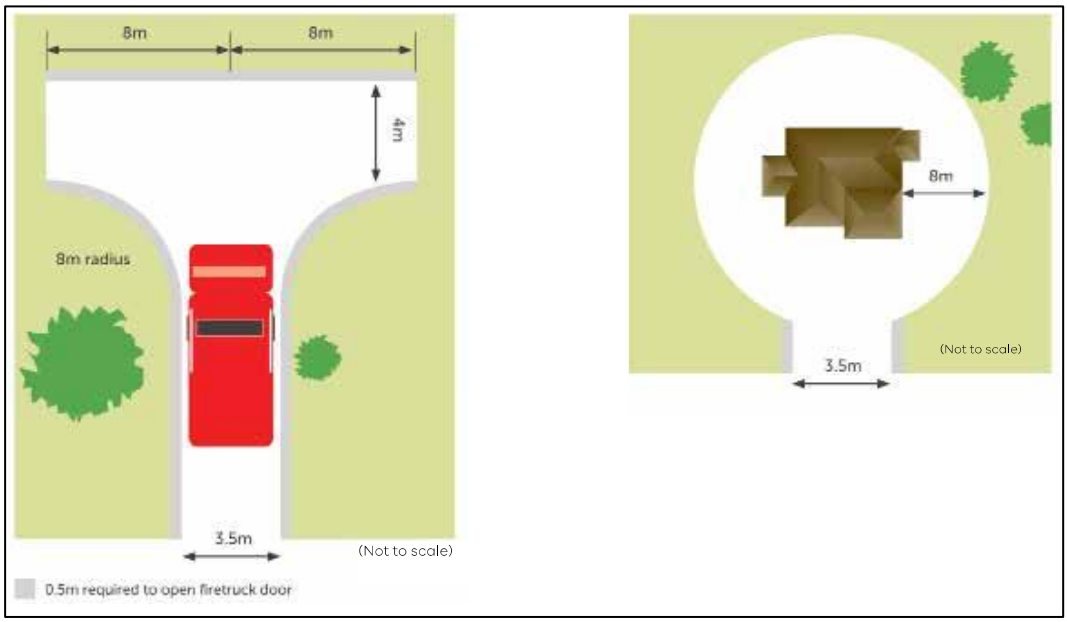


(DELWP, 2017)

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.

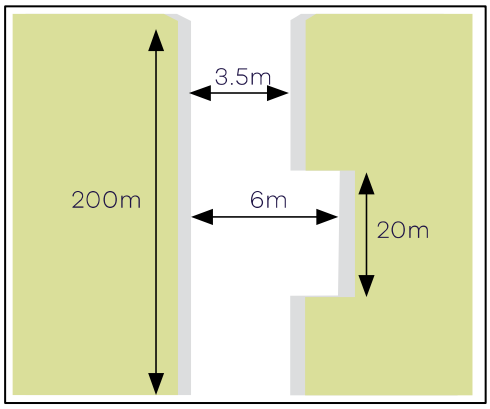


(DELWP, 2017)

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, 2017)

7.4 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, 2020.

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