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# INTERIM REPORT

Approach to bushfire assessment & planning  
Creamery Road Precinct Structure Plan

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## Creamery Road Precinct Structure Plan Approach to Bushfire Planning and Assessment

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## Introduction

The bushfire planning and assessment work for the Creamery Rd Precinct Structure Plan is currently in progress and due for completion in August 2022. Once complete, it will include the following:

- Bushfire Planning Assessment Report which will:
  - describe and analyse the bushfire risk at a landscape, neighbourhood, and site scale
  - provide a range of bushfire protection measures to mitigate bushfire risk
  - outline how the bushfire protection measures provide an effective response to each relevant bushfire planning clause, in particular c13.02-1S (DELWP, 2022)
  - make recommendations on the adoption of bushfire protection measures for the precinct.
- A generalised BAL (radiant heat flux) map which indicates the radiant heat exposure over all areas of the precinct.
- A response to the recommendations and actions of the 2019 NWGGA Bushfire Planning Report (summary at Appendix A).
- Recommended location for an emergency management hub which incorporates ambulance, fire and emergency services.
- Precinct Structure Plan Bushfire Requirements and Guidelines.

This paper is an interim report which outlines the approach being taken to bushfire planning and assessment for the precinct and proposes bushfire mitigation directions. The response acknowledges the requirement for the precinct to achieve a range of objectives, some of which have the potential to increase bushfire risk. Of note are objectives for protecting existing conservation values, provision of tree canopy targets and connected vegetation for biodiversity and amenity, along with broader objectives to maximise the developable area and minimise constraints on developers.

Collectively, the planning directions and measures proposed in this report are intended to respond to the bushfire challenges of the development and satisfy the bushfire planning requirements. This interim report and its review will form the basis for preparation of the final Creamery Road PSP Bushfire Planning and Assessment Report.

## Context

### Bushfire risk and development

It is well recognised that the planning and design of new areas for urban development have a considerable influence on bushfire risk<sup>1</sup>. Bushfire planning for a precinct aims to identify and mitigate risk at the precinct scale, as one component of a multi-scale approach which considers risk and risk mitigation at the broader landscape through to settlement, property, and personal scales.

All of the Creamery Road Precinct is currently within the designated Bushfire Prone Area (BPA), and this broadly identifies it as an area of medium bushfire hazard. There is no Bushfire Management Overlay (BMO) covering the precinct, and the nearest BMO is that which encompasses and surrounds the Dog Rocks Reserve, some 1.7km to the southwest of the precinct.

Bushfire planning requires an analysis of, and response to, the bushfire risk. In broad terms, the risk can be considered a function of interactions between bushfire hazards, exposure, and vulnerability. Bushfire risk is assessed by analysing the likelihood of exposure to a hazard and the potential or probable consequence.

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<sup>1</sup> a useful literature review is included in the report by CSIRO and University of Melbourne *Indicators of Fire Vulnerability* (Opie, March, Leonard, & Newnham, 2014).

The bushfire hazard is largely determined through assessment of the vegetation (fuel), topography, weather, and climate. Bushfire (which includes grassfire) can impact a site by four key mechanisms – flame contact, radiant heat, convective heat, and ember attack. Bushfire generated winds can also impact. A bushfire assessment must consider all sources of potential impact, and the development response is designed accordingly.

### **Bushfire hazards – Creamery Road Precinct**

Key factors in the bushfire hazard assessment are the nature, extent, and location of retained and planned vegetation within and surrounding the Creamery Road Precinct, along with the slope on which that vegetation is situated, and its proximity to planned development.

Vegetation of the Creamery Road precinct and surrounding locality is predominantly characterised by grasslands, with small or linear patches of woodland, forest and scrub occurring within the precinct and/or at the precinct interface. Further afield to the west and south are forests and woodlands associated the Dog Rocks Reserve – a 90 ha patch some 1.9km to the southwest, and the Moorabool river which extends from southeast of the precinct to the northwest and ranging in distance from some 400m to 2.5km. Directly to the north of the precinct are the small lifestyle acreages of Lovely Banks, which generally contain a mix of grazing land and relatively isolated patches of forest and woodland vegetation interspersed with urban fuel elements. To the east is the highly urbanised area of Geelong including Bell Post Hill.

Topography of the precinct and surrounding area varies from gently undulating land to steeper slopes which are generally associated with water courses and drainage lines and these slopes occasionally approach 20 degrees. The area is subject to infrequent extreme weather and occasional periods of prolonged environmental dryness, and both are expected to increase under climate change predictions.

While the bushfire hazard assessment is not yet finalised, preliminary assessment indicates that precinct development will predominantly need to respond to grassfire threat which is derived from retained and planned grassland within the precinct, and externally from grasslands to the west and south. An internal woodland patch and interface vegetation of grassland, scrub and small patches of forest also inform the response. Under elevated fire danger conditions there is also potential for embers originating from a fire in woodlands and forests to the south and west to alight within the precinct resulting in spot fires and subsequent spread. Embers may also be generated from fires originating in scrub and woodland within the precinct.

An interim bushfire hazard exists for earlier phases of development. Much of the precinct is currently grassland, and until this is replaced with low threat vegetation as prescribed for the completed development, it poses a threat. Elements of this grassfire threat may remain until final parcels are developed.

### *Hazard conclusion*

The Creamery Road Precinct, in its current state, is considered to have a relatively moderate level of bushfire risk, noting that some locations within the precinct have a significantly higher risk. Considered location and design of development, as well as buffers and setbacks are required. Careful design of vegetated areas, including location, garden layout, selection of fire-wise plant species and ongoing management will be required to mitigate bushfire risk. Over time, and provided that fire-wise urban development occurs within and adjacent the precinct, the bushfire risk can be expected to reduce over most of the precinct.

## Proposed Bushfire Planning Directions

Below is a list of the key directions for the bushfire precinct planning. Collectively, they are intended to mitigate bushfire risk to an acceptable level, and to do so will influence the design of the precinct and the Future Urban Structure.

### Paramount directions

1. Precinct design and the Future Urban Structure will prioritise the protection of human life over all other policy considerations. This is required under c13.02-1S.
2. All development will be restricted to sites which have a radiant heat exposure from classified vegetation of less than 12.5kW/m<sup>2</sup> at the building façade. This equates to BAL 12.5 or less in accordance with AS3959:2018. This measure is required under c13.02-1S.
3. Relevant actions and directions of the NWGGA Framework Plan 2020 will be appropriately addressed. Appendix A provides the relevant actions and the proposed response.
4. Relevant recommendations and actions from the 2019 NWGGA Bushfire Planning report will be adopted as described in the response report at Appendix B.
5. Bushfire risk management will inform the Future Urban Structure and development in the PSP through relevant requirements and guidelines and through the requirement for submission of a Bushfire Management statement at subdivision.

### Process for assessment and planning

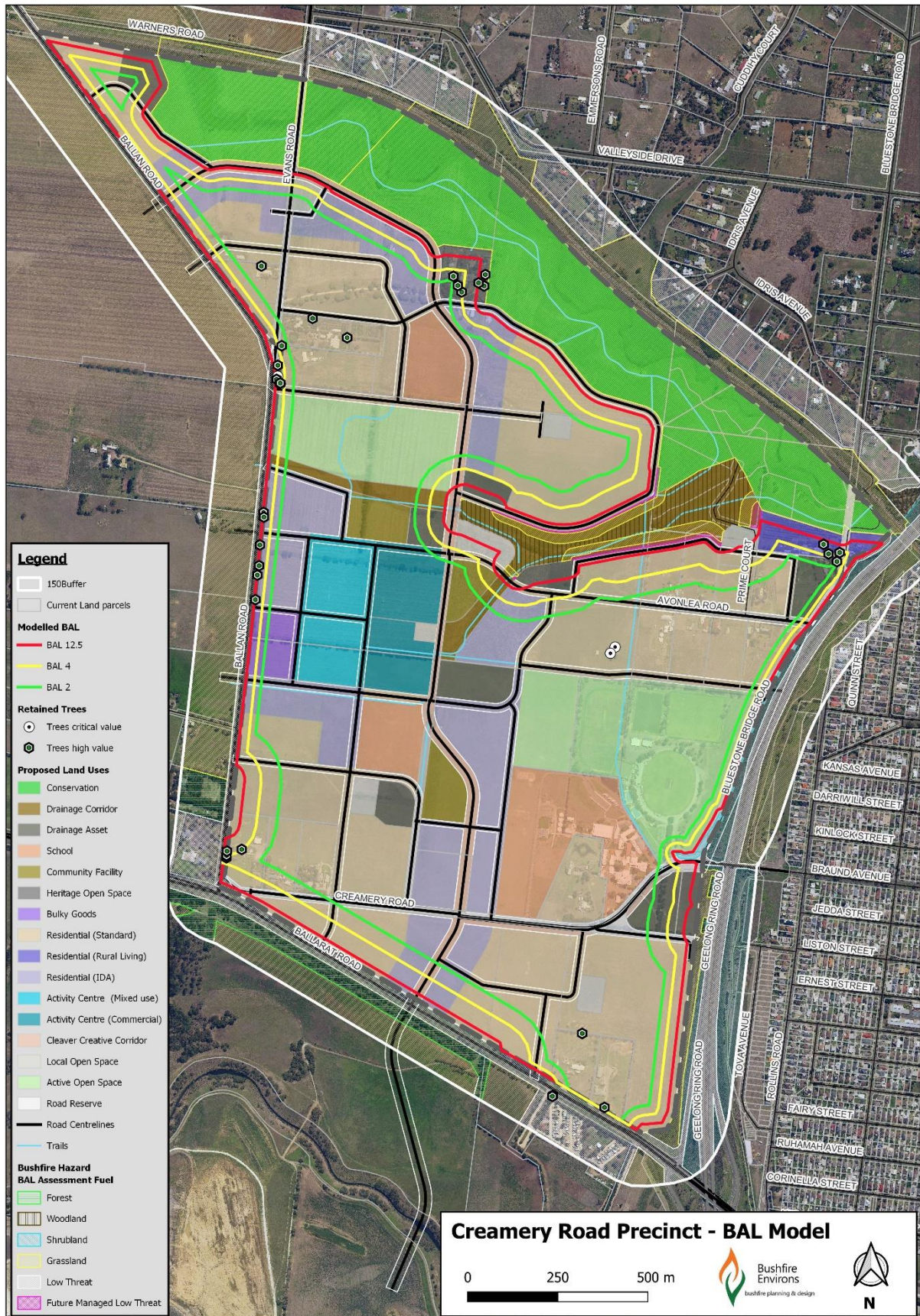
6. Preparation of the final Bushfire Planning Assessment Report will follow the process for responding to clause 13.02-1S Bushfire Planning. It will address the objective each strategy of the clause and consider the specified policies. A suite of appropriate bushfire protection measures will be proposed.

The bushfire hazard assessment will be undertaken and described as outlined in c13.02-1S, at four scales, and as applied to CRPSP: the broader landscape out to 20+km, the local landscape out to 1km, the neighbourhood scale out to 400m, and the site scale out to 150m.

7. The bushfire hazard site assessment adopts a precautionary 150m assessment zone – that is, the site assessment assesses hazards within the precinct and externally out to a distance of 150m from the precinct boundary. Bushfire hazards are identified on Plan A and specified in Table 1.
8. A generalised precinct BAL model map (radiant heat exposure) has been prepared based on the bushfire hazard which will result from the ultimate development of the precinct as described in the Future Urban Structure of April 2022 (figure 1).

The BAL modelling applies the bushfire hazard and vegetation parameters listed in Table 1 to notionally determine areas of radiant heat exposure across the precinct of:

- Below 12.5kW/m<sup>2</sup> – the final area available for development
- Below 4kW/m<sup>2</sup> – the area that could ultimately be considered for excision from the BPA,
- Below 2kW/m<sup>2</sup> – areas that are more suited to developments for vulnerable people and people more susceptible to bushfire risk – for example schools, childcare facilities and retirement villages, and areas that are most suited to providing bushfire shelter.



**Figure 1** Generalised BAL model and bushfire hazard map – based on land use specifications and the Future Urban Structure as of 14 April 2022

## Setbacks and radiant heat (BAL)

- The generalised BAL model map (fig 1) identifies setbacks for development from classified vegetation, based on the planned location, extent, and nature of vegetation at completion of development, as described in version 06c Future Urban Structure of 14 April 2022. It accounts for vegetation type (classification) and fuel load, proximity, and slope, within the precinct and out to 150m from the precinct boundary.

The development setbacks from Cowies Creek Conservation Area and the main east-west drainage corridor have been determined based on vegetation proposed for that land – the type of vegetation and its location. The interface development setbacks have been determined on the basis of the vegetation that existed at 22 March 2022. The BAL model, and therefore precinct setbacks assume that all other vegetation within the precinct and at its interface will be low threat vegetation as defined by AS3959: 2018 (Appendix E). Any changes in plans and assumptions which change the bushfire hazard will necessitate a review of the setbacks. This can be more accurately determined and addressed at the subdivision stage through the submission of Bushfire Management Statements.

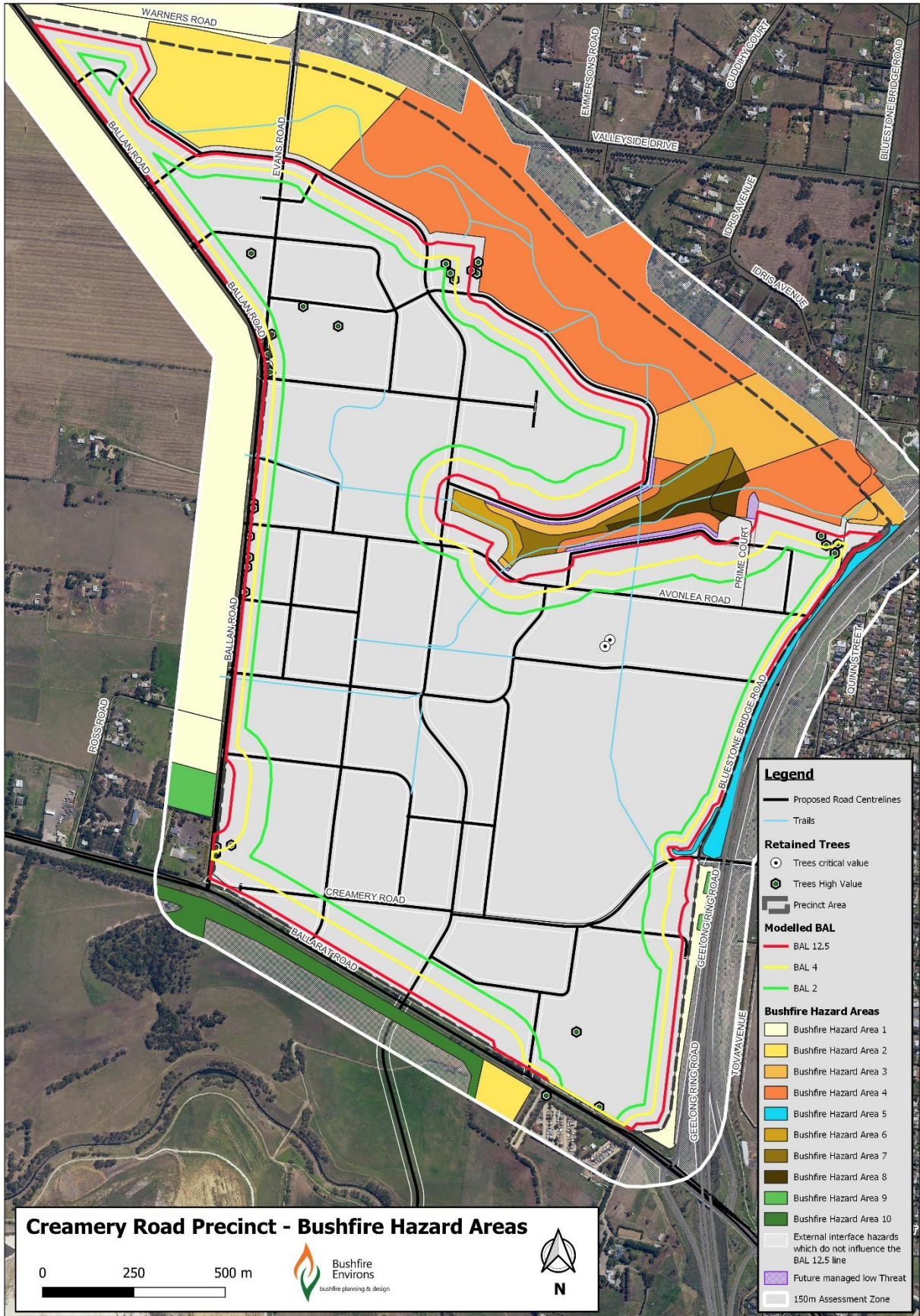
- Setback distances – the distance between the bushfire hazard and facades of buildings will be as required in AS3959: 2018 Construction of Buildings in Bushfire Prone Areas. Setbacks are not required from low threat vegetation, including small patches of native vegetation classified as low threat. Low threat vegetation is defined by AS3959:2018 and included as Appendix E, noting that vegetation need only meet one of the specified criteria to be classified as low threat.
- Habitable buildings near bushfire hazards shown on Plan A must be setback from the hazard in accordance with Table 1. However, a lesser setback may be considered subject to a site-specific assessment of bushfire risk, vegetation classifications and setbacks to the satisfaction of the Responsible Authority and relevant fire authority.

**Table 1** Setbacks for habitable buildings from each Bushfire Hazard Area identified on Plan A to achieve BAL 12.5. Vegetation of each bushfire hazard area must be managed in perpetuity to meet the ascribed vegetation classification, or at a standard to achieve a lower bushfire hazard. AS3959: 2018 provides the specifications for classified vegetation.

Attributes	Bushfire hazard area – as mapped on Plan A									
	area 1	area 2	area 3	area 4	area 5	area 6	area 7	area 8	area 9	area 10
Vegetation classification (AS3959:2018)	grassland	grassland	grassland	grassland	scrub*	woodland	woodland	woodland	forest	forest
Effective slope (degrees)	upslope or flat	>0 to 5 downslope	>5 to 10 downslope	>10 to 15 downslope	>0 to 5 downslope	>0 to 5 downslope	>5 to 10 downslope	>10 to 15 downslope	upslope or flat	>0 to 5 downslope
Setback distance from the hazard (m)	19	22	25	28	10	41	50	60	48	57

The identified bushfire hazard areas are derived from assessment of existing vegetation to be retained and future vegetation proposed, in accordance with the Future Urban Structure of 14 April 2022. Hazards at the precinct interface are included.  
If the location, nature, or extent of vegetation within or surrounding the precinct changes, or if the Future Urban Structure changes the relationship between the hazard and development, Table 1 and Plan A may no longer be accurate.

All other areas of Plan A are assumed to be low threat vegetation as specified in Table 2, or are external interface hazards which do not influence the BAL 12.5, BAL 4 and BAL 2 lines. Setbacks determined for scrub in this instance use an alternative method for radiant heat calculation.



Plan A. Identified Bushfire Hazard Areas - Creamery Rd Precinct

12. Treatment of Setback areas – vegetation on all land occupying the distance between any classified vegetation and building facades – will be managed as Table 6 Vegetation Management Requirements to Clause 53.02 Bushfire Planning (Appendix D).

This represents an enhanced bushfire protection measure which is intended to facilitate the establishment and ongoing maintenance of fuel disruptions between the bushfire hazard and development. Fuel disruptions are a key recommendation of the Bushfire Planning Assessment Report 2019 for NWGGA Greater Geelong Amendment C395 and contribute to delivery of actions identified in the NWGGA Framework Plan 2020, specifically: Creation of fire breaks and fuel reduction and minimisation using appropriate planting and management guidelines.

## Vegetation – planned and retained

13. Vegetation directions and assumptions - Creamery Rd Precinct will be developed on the basis that vegetation outside of the bushfire hazard areas identified on Plan A will be established and managed as low threat.

Two frequently used standards provide specifications for low threat vegetation:

- AS3959:2018 low threat classification, which provides the guidelines for assessing low threat vegetation, for the purpose of undertaking a BAL assessment for a site. Vegetation which meets any of the low threat categories listed is excluded from the BAL assessment.
- Table 6 to c53.02, which provides vegetation management standards for the purpose of creating defendable space around a building in a BMO. Vegetation which meets the specified standard can be included in the area of defendable space required for the building.

Both approaches are frequently used for broader applications. Both approaches require vegetation to be managed at the identified standard in perpetuity. Overall, Table 6 to c53.02 provides more definition and detail, and achieves a higher standard of bushfire threat reduction.

It is proposed that vegetation within Creamery Rd Precinct be managed as specified in table 2.

**Table 2.** Vegetation management requirements

Precinct areas	Vegetation management standard required
Bushfire hazards identified on Plan A. This incorporates all classified vegetation including Cowies Creek Conservation Area and identified parts of the drainage reserve	Managed in perpetuity to achieve the AS3959:2018 vegetation classification ascribed, or a lower bushfire threat classification. Within Cowies Creek Conservation Area, small and well separated patches of woodland or shrubland may be established in accordance with the Cowies Creek Masterplan, provided they are sited so that the radiant heat exposure on the boundaries of the Conservation Area where it abuts development does not exceed that of grassland.
Areas which constitute setbacks between classified vegetation and habitable buildings	Table 6 to c53.02

Precinct areas	Vegetation management standard required
<p>Areas subject to tree canopy targets of greater than 10% in the FUS.</p> <p>This excludes areas of classified vegetation (bushfire hazard) identified on Plan A, which may also have canopy targets.</p>	<p>AS3959:2018 low threat - any of the low threat categories from (a) through to (f) of clause 2.2.3.2, <b>plus</b> all of the following specifications:</p> <ul style="list-style-type: none"> <li>• Fire wise species as determined by the CFA guidelines will be selected for planting.</li> <li>• Trees over 5m in height will be up-pruned to achieve at least a 2m clearance between the lowest branches and ground level.</li> <li>• Grass must be short cropped and maintained during the declared fire danger period.</li> <li>• All leaves and vegetation debris must be removed at regular intervals during the declared fire danger period.</li> <li>• The canopy of trees, or of small clusters of trees must be separated by at least 2m.</li> </ul>
<p>All other areas within the precinct</p>	<p>AS3959:2018 low threat - any of the low threat categories from (a) through to (f) of clause 2.2.3.2.</p>

14. Planned and retained vegetation within the precinct will meet the following prescriptions:

- Cowies Creek Conservation Area (CCCA) will be managed for its conservation values. Vegetation will remain predominantly as AS3959:2018 Grassland, and this aligns with the conservation objectives of the reserve. AS3959 Grassland has a maximum tree cover of 10%.

Patches of a higher percentage tree cover of up to 30% with a grassy understorey (which constitutes AS3959 Woodland) and patches of scrub may be provided at a distance from developable land that imposes less than 12.5kW radiant heat flux on the developable land. Determination of areas within CCCA which can achieve this and be available to be planted as woodland and scrub can be mapped. The type, location and distribution of vegetation will be addressed in the preparation of Cowies Creek Masterplan.

To protect conservation values, all development setbacks required against Cowies Creek Conservation Area will be on developable land, and will not impose on the Conservation Area.

- Identified critical and high value trees may be retained. These consist of individual and small clumps of trees with considerable horizontal separation and are likely to achieve AS3959 low threat specifications. Up-pruning and understorey management, or separation from classified vegetation may be required in some situations, and this will be identified at the subdivision stage through Bushfire Management Statements.
- The main east-west drainage reserve, where it is located between the M1 and the clever and creative corridor will be managed so that all required setbacks are provided on the drainage reserve. Vegetation within this drainage reserve will be:
  - AS3959 classified grassland and/or woodland located at a separation distance to minimise setback requirements on developable land, as indicated on Plan A
  - Vegetation on land between classified vegetation and habitable buildings adjacent the BAL 12.5 line will be as specified in Table 6 to c53.02 (Appendix D).
- At this stage in the planning process, all other land in the precinct, including open space, residential areas and drainage reserves, is assumed to be AS3959: 2018 low threat.

15. Vegetation, its nature, location and extent is to be reviewed at the subdivision and planning permit stage, when there will be more clarity about classifiable vegetation. Classified vegetation will be assessed and required development setbacks specified in accordance with AS3959: 2018.
16. Over time, there is potential for passive or active revegetation to occur within the precinct and at the interface, which may result in the creation of additional areas of bushfire hazard. Vegetation on Council owned land will be managed to ensure that bushfire hazards do not expose developments to radiant heat loads which exceed the bushfire standards for which they have been designed. This will be addressed through the appropriate treatment of vegetation on council land, and/or the application of commensurate development setbacks.

Avoiding the creation of bushfire hazards on private land can be addressed through use of Council's bushfire prevention program.

17. The City of Greater Geelong's Urban Forest Strategy 2015-2025 establishes a 25% tree canopy cover target for urban areas of the municipality, and in response the Creamery Road PSP proposes mandated canopy targets specific to land use types and street typology (City of Greater Geelong, 2022). Canopy targets are required for all land use and road types, and range from 10% in Cowies Creek Conservation Area, drainage reserves and the Midland Highway, up to 50% in local open space and pedestrian streets. Appendix F includes tables detailing the canopy targets for land use and road types, along with a methodology to calculate canopy coverage. A list of example tree species is included in the full report

Achieving specified tree canopy targets while minimising creation of bushfire hazards is a challenge for the Creamery Road Precinct. This will be addressed by specifying vegetation management requirements for areas subject to tree canopy targets of greater than 10% in the FUS, and these specifications are provided Table 2 Vegetation Management Requirements. The intent of this approach is to manage these areas as low bushfire threat, and this will require ongoing vegetation management.

In addition, CoGG will require the submission of a canopy coverage plan at subdivision to demonstrate how the canopy cover targets will be achieved. This plan will indicate the species and location of trees. The Bushfire Management Plan which is recommended as a requirement of the UGZ schedule for Creamery Rd (refer to item 24 Development Staging within this document) will consider and respond to the canopy coverage plan.

## Development measures to reduce bushfire risk

### Fuel breaks

Fuel breaks (fuel disruptions) are generally employed to limit the spread of ground fire and to provide areas from which to stage fire suppression activities. As the forest fire danger index (FFDI) and grassland fire danger index (GFDI)<sup>2</sup> increase, fuel breaks become less effective at limiting fire transmission. Flame lengths can result in fire crossing a break, and typically fuel breaks will not significantly reduce ember attack. Radiant heat will be reduced by the width of the fuel break, but depending on fuel type, slope and width of the break, this may be insufficient to avoid impact.

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<sup>2</sup> These indices combine a measure of vegetation dryness with air temperature, wind speed and humidity.

18. Fuel breaks within the precinct will predominantly take the form of roads or transport corridors located between classified vegetation and developable land. CoGG has advised that the conservation roads will be 20m wide, and the standard width for the clever and creative corridor will be 34m, except where it traverses an activity centre – where it will be 20 to 26m. Cross sections for each road type are provided in Appendix G.
19. A perimeter precinct fuel break is provided by a combination of the M1 to the east, Midland Hwy to the south and Geelong-Ballan Rd to the west. To the north the precinct is bordered by the railway line which currently has limited capacity as a fuel break due to high grassland fuel loads. Precinct perimeter fuel breaks will need to be managed in low fuel condition to be at all effective. Fuel treatment programs will be required to maintain grass on road and railway verges in a minimal fuel condition over the fire danger period

## Roads

The Future Urban Structure specifies roads to separate the bushfire hazard from development in most situations. Where this does not occur, or where the separating road is too narrow to capture the setback required within the extent of the road reserve, setbacks will be required on developable land.

Roads also provide access and egress for emergency vehicles, and for evacuation.

20. Perimeter roads or transport corridors are currently provided around the precinct, as is required to provide some separation between the developable area and any external bushfire hazard – predominantly grassland to the south and west. The M1 and Midland Highway where they boarder the precinct are identified in the Municipal Fire Management Plan as Strategic Fire Control Break Roads (Geelong Municipal Fire Management Planning Committee, 2021), however, they do not appear as such in the Barwon South West Joint Fuel Management Program (Forest Fire Management Victoria and CFA, 2021).

The fuel treatment required to maintain effective separation from bushfire hazards on perimeter roads and the railway line should be added to the Joint Fuel Management Program.

Note that the road verges of the M1 adjacent the precinct contain mature scrubland which has been assessed to be of reduced risk due to the relatively low flammability of the species planted (saltbush), the linear nature of the planting, and the existence of a radiant heat shield (tall steel fence) along the northern section of the interface and between the vegetation and Creamery Rd Precinct.

21. Road networks will be used to provide suitable bushfire access and egress for residents/site occupants and emergency management vehicles, including a minimum of two ways in and out, and to provide for the movement of vehicles away from the bushfire hazard. All roads will be designed and constructed to satisfy the specifications for access by Fire Rescue Victoria.

The feasibility of installing traffic light phasing to prioritise emergency vehicles is being investigated.

22. Roads and transport corridors of appropriate width and design will be used to separate bushfire hazards from developable areas and will contribute to required setback separation distances. Roads and transport corridors will be somewhat effective in minimising the travel of ground fire from classified vegetation to developed areas, understanding that flame lengths and ember attack may result in fire crossing linear disruptions, and the potential increases under elevated FFDI and GFDI conditions.

### Development staging and interim bushfire risk management

Broad areas of the precinct currently support classified vegetation, predominantly grassland, which presents a bushfire hazard. The precinct will be developed in stages. An interim bushfire hazard will exist for earlier phases of development, as large areas of classified vegetation will remain until the development is completed.

To satisfy the requirements of Clause 13.01-1S, development will be directed to areas of less than 12.5kW/m<sup>2</sup> radiant heat flux (BAL12.5 or lower), at all stages. In accordance with advice received from the Victorian Planning Authority, a proponent seeking to develop their land must address bushfire risk within the property being developed without imposing additional bushfire mitigation measures on adjoining land owned by others. Staging of development will need to respond to these requirements.

The capacity of bushfire radiant heat modelling to inform staging area decisions for Creamery Rd has been investigated (Bushfire Environs, 2022), and the work provided some options for its application at a property, or group of properties scale.

23. When seeking to develop land, proponents will need to demonstrate the area for development can achieve less than 12.5kW/m<sup>2</sup> without imposing additional bushfire mitigation measures on adjoining land owned by others. Bushfire mitigation actions, including fuel reduction, cannot be imposed on neighbouring land. Public land which is assured of remaining in a perpetual low threat state may be utilised in the BAL 12.5 assessment.
24. The following statement has been included in recent and comparable UGZ schedules and is recommended to be included in the UGZ schedule for Creamery Rd:
  - *A Bushfire Management Plan that addresses bushfire risk during, and where necessary, after construction which is approved by the responsible authority. The plan must specify, amongst other things:*
    - *The staging of development and the likely bushfire risks at each stage;*
    - *An area of land between the development edge and non-urban areas consistent with the separation distances specified in AS3959-2018, where bushfire risk is managed to enable the development, on completion, to achieve a BAL-12.5 construction standard in accordance with AS3959-2018;*
    - *The land management measures to be undertaken by the developer to reduce the risk from fire within any surrounding rural or undeveloped landscape to protect residents and property from the threat of grassfire and bushfire;*
    - *Provision of adequate access and egress for early subdivisions to minimise grass and bushfire risks to new residents prior to the full completion of the PSP.*

### Other measures

25. An emergency hub will be provided in the precinct to service this and future neighbouring precincts. A tentative location has been identified near the intersection of the Geelong-Ballan Rd and a main through road of the precinct – refer to the Future Urban Structure Plan version 06c. The site will be confirmed following discussions with a range emergency service authorities. Selection of the site will be informed by the need for CFA/FRV response times to be met.

26. **Water supply** – a conventional reticulated fire hydrant system is proposed as the water supply for fire-fighting purposes. Further advice from CFA and FRV is required to confirm whether the configuration of the mains water supply for the precinct will provide satisfactory water supply at for the hydrant system, and this is being investigated.

In accordance with Clause 56.09-3, standard C29 of the Greater Geelong Planning Scheme, fire hydrants should be provided at a maximum distance of the 120m from the rear of each lot, and no more than 200m apart. Hydrants and fire plugs must be compatible with the relevant fire service equipment, or provided to the satisfaction of the relevant fire authority (DELWP, 2022). Fire hydrants are to be identified and maintained as prescribed by CFA (Country Fire Authority, 2019).

27. **Bushfire shelter** - the provision of bushfire shelter has been considered, and in discussion with CFA, it has been determined that a Neighbourhood Safer Place – Bushfire Place of Last Resort is not required for this precinct. As development progresses, areas of less than 2kW/m<sup>2</sup> exposure will be created, and once development is completed there will be substantial areas below 2 kW/m<sup>2</sup> (refer to fig 1 BAL Model Map). As a result, the provision of a Neighbourhood Safer Place – Bushfire Place of Last Resort is not required for the precinct.

28. **Avoiding high risk movement of people out of the precinct in the event of grassfire.** Potential exists for grassfire to originate within the precinct, or to enter the precinct if fuel breaks are breached, or under elevated fire danger indices. If this occurs, people may seek to move out of the precinct – most likely towards the east and the urban areas of Geelong, and this has potential to be a greater risk than the fire itself. Vehicle travel under the threat of fire often occurs in thick smoke and without understanding of the fire area, and this presents an increased risk of accidents, road blockages and entrapment.

Provided that fire wise development occurs, large areas of the precinct will become BAL low, including large areas below 2kW/m<sup>2</sup> (figure 1). It may be useful to identify the BAL low areas (or facilities in BAL low areas) near grasslands for people to walk to in the event of a nearby grassfire. A wayfinding approach could be employed. Achieving this response will require community engagement and education.

29. **Avoiding the creation of residential lots adjoining bushfire hazards** - it is recommended that the creation of residential lots that directly abut land supporting hazardous vegetation be avoided. This can be achieved through the location of roads or permanent fuel breaks to provide separation.

### Excision of land from the Bushfire Prone Area designation

30. As development of the precinct progresses, much of the vegetation within will change from its current state of (predominantly) classified grassland to reliably low threat (AS3959:2018). As this occurs, the radiant heat exposure to some areas will be reduced. Once the radiant heat exposure falls below 4kW/m<sup>2</sup>, a key criterion for excision from the Bushfire Prone Area (BPA) will be met (Department of Environment, Land, Water & Planning, 2019). Areas which are exposed to less than 4kW/m<sup>2</sup> can be assessed for excision from the BPA.

The application process for excising land from the BPA is described in the Department of Land Water and Environment publication – Frequently Asked Questions for lot owners in the Bushfire Prone Area (DELWP, 2022). Developers or Councils may request a BPA review for subdivisions and

a review may take more than 6 months. Note that land near to permanent classified vegetation, such as Cowies Creek Conservation Area and the east-west drainage reserve is unlikely to satisfy the BPA excision criteria.

## Precinct Requirements and Guidelines

31. Creamery Road Precinct Structure Plan Requirements and Guidelines have been drafted.

## Key Challenges

While earlier sections of the report outlined the response to bushfire challenges, some key challenges and how they are being addressed warrant further discussion.

### Tree canopy targets and bushfire risk

Tree canopy targets are proposed for each land use and street typology within the precinct in response to the City of Greater Geelong's Urban Forest Strategy 2015-2025 (Appendix F). High canopy targets are mandated for some areas, with 50% cover required on local open space, 40% on the creative corridor and 35% on drainage corridors and community facilities. For development to occur as described in the FUS, and to ultimately achieve a low risk designation for the precinct, all areas with allocated canopy cover will need to meet low bushfire threat standards. This presents quite a challenge.

To achieve proposed tree canopy targets without triggering the classified vegetation definitions of AS3959: 2018 will require careful planting design along with intensive and ongoing management and maintenance of trees and understorey. If planted areas match any of the classified vegetation categories of AS3959: 2018, development setbacks will be required.

Areas planted for tree canopy coverage could easily correspond to classified vegetation categories. For example, an area with 10% to 30% tree canopy cover which predominantly included native or other highly flammable species and a grassy understorey, would be classified as Woodland under AS3959: 2018, and would require development setbacks ranging from 33m to 73m depending on the slope. A setback table is provided at Appendix C.

Vegetation management standards are proposed to enable areas designated for canopy cover to be designed and remain as low threat vegetation and avoid becoming a bushfire hazard.

Areas subject to tree canopy targets of greater than 10%, excluding bushfire hazards identified on plan A, must meet the following vegetation management standards in perpetuity:

One or more of the AS3959: 2018 clause 2.2.3.2 low threat categories (a) to (f) \*

**And**

All the following specifications:

- Fire wise species as determined by the CFA guidelines will be selected for planting #.
- Trees over 5m in height will be up-pruned to achieve at least a 2m clearance between the lowest branches and ground level.
- 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.
- The canopy of trees, or of small clusters of trees must be separated by at least 2m

\* AS3959 clause 2.2.3.2 low threat categories are provided at Appendix E

# The CFA publication: *Landscaping for Bushfire* provides effective guidance and includes a key for bushfire-wise plant selection (Country Fire Authority Victoria, nd).

In addition to the proposed vegetation management standards, CoGG will require the submission of a canopy coverage plan at subdivision to demonstrate how the canopy cover targets will be achieved. This plan will indicate the species and location of trees. The Bushfire Management Plan which is recommended as a requirement of the UGZ schedule for Creamery Rd will consider and respond to the canopy coverage plan. Item 24. Development Staging within this document outlines the requirement for a Bushfire Management Plan.

Ultimately, the bushfire hazard will be assessed at the subdivision stage, based on the vegetation that exists and is planned at that time, and this will dictate any development setbacks required.

### Revegetation and urban fuels

In urban environments, urban vegetation (fuels) can play a significant role in the development and spread of unplanned fires on the urban edge and into suburbs (Opie, March, Leonard, & Newnham, 2014).

Over time, there is potential for revegetation to occur within the precinct through plant recruitment or by active planting. This may result in the creation of additional or extended areas of classifiable vegetation. Revegetation could create fuel links between bushfire hazards and urban development, and allow fire to move into developed areas. This is a significant risk factor for this development

Revegetation within the precinct will need to be monitored and managed to prevent fuel connections between bushfire hazards and urban development, and to avoid ground fire spread through developed areas and exposure to radiant heat greater than 12.5kW/m<sup>2</sup>.

On council and public land, this can be managed by appropriate and ongoing treatment of vegetation to reduce the hazard, and/or the provision of commensurate setbacks. There are fewer opportunities to prevent the creation of bushfire hazards on private land, however it can be addressed in a limited way through the application of Council's bushfire prevention and planning program.

This interim report further recommends that vegetation located on setback areas which separate classifiable vegetation and the BAL 12.5 line be managed in accordance with Table 6 to c 53.02 Vegetation Management Requirements. The BAL 12.5 line is shown on figures 1 and 2. This is an enhanced bushfire protection measure which is intended to contribute to mitigating the risk associated with unplanned revegetation and establishment of mandated canopy targets.

## Preliminary conclusion

The Creamery Road Precinct, in its current state, presents a low to moderate level of bushfire risk, with risk varying across the site. The predominant bushfire risk arises from grasslands within the precinct - some on steep slopes, and grassland located externally to the west and south. Interface vegetation, and small patches of woodland within the precinct also contribute to the risk.

An interim bushfire hazard also exists for earlier phases of development, as broad areas of existing grassland will continue to present a bushfire hazard until it is replaced by development and associated low threat vegetation.

Careful planning and design at the precinct scale is required to mitigate bushfire risk to an acceptable level and to satisfy the requirements of Clause 13.02.1S. Considered location and design of development, as well as buffers, setbacks and fuel breaks are required. The location, layout, and selection of fire-wise plant species for vegetated areas and ongoing management of those areas will be essential to mitigate bushfire risk. The provision of perimeter roads and road networks suitable for emergency response, along with water supply for fire suppression and the location of an emergency hub will all contribute to bushfire risk reduction.

This report proposes a broad range of bushfire protection measures for adoption, and they work as a collective to reduce risk. Some of the key measures include:

- Development setbacks have been identified against bushfire hazards (figure 1, plan A), and setback distances nominated in Table 1. A modelled BAL 12.5 line identifies where development can achieve BAL 12.5.
- Management of setback areas - land occupying the distance between classified vegetation and the BAL 12.5 line – will be managed as Table 6 Vegetation Management Requirements to Clause 53.02 Bushfire Planning, as an enhanced bushfire protection measure.
- Vegetation management has been prescribed for all areas of the precinct (Table 2), with all areas outside of the identified bushfire hazards to be treated as low threat.
- Achieving low threat vegetation standards with nominated Tree canopy targets for the present is a particular challenge, and vegetation management measures have been prescribed to achieve this (Table 2).
- Fuel breaks are recommended to separate bushfire hazards from development

Collectively, the full range of planning directions and measures proposed in this report are intended to respond to the bushfire challenges of the development and seek to satisfy the bushfire planning requirements.

Over time, and provided that fire-wise urban development proceeds within and adjacent the precinct, the bushfire risk can be expected to reduce over most of the precinct. The future-state BAL Model Map indicates that if development occurs as currently planned – including specified vegetation assumptions - large areas of BAL Low would be established including significant areas modelled at below 2kW/m<sup>2</sup>.

At this stage in the bushfire assessment and planning process, it is considered that through careful precinct design and application of appropriate bushfire protection measures, the development is likely to be able to effectively prioritise the protection of human life above all other policy considerations and satisfy the objective of c13.02-1S. It is anticipated that such development is appropriate at this site.

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## Appendices

### Appendix A Bushfire actions of the NWGGA Framework Plan 2020 – Western Growth Area

The Framework Plan for the Northern & Western Geelong Growth Areas was finalised in August 2020, and it states that:

The Northern and Western Geelong Growth Areas will exemplify Geelong’s transformation as a clever and creative city by building diverse, localised, and sustainable neighbourhoods that prioritise self-sufficiency whilst maximising connections to the Geelong community, economy and identity.

The NWGGA Framework Structure Plan makes some reference to bushfire protection measures and makes reference to the Bushfire Planning Assessment Report of 2019 undertaken by Kevin Hazell Bushfire Planning. Table A1 lists all bushfire actions from the NWGGA Framework Plan which are relevant to the Creamery Rd Precinct, and a response is proposed by Bushfire Environs.

**Table A1** Bushfire Actions of the NWGGA Framework Plan, and proposed response

NWGGA Report Action	Bushfire Environs proposed response
<p><b>ACTION W1.7.3 (p 120)</b></p> <p>Potential fire risks associated with non-urban interfaces to new neighbourhoods will be identified and managed as part of urban development.</p> <p>Interfaces with non-urban land uses that present grassfire or bushfire risks as part of the interim and ultimate development of new communities will undertake:</p> <ul style="list-style-type: none"> <li>• Assessment of fuel loads (agricultural land and grasslands) and vegetation, slope and prevailing wind directions in urban design of subdivisions</li> <li>• Creation of fire breaks and fuel reduction and minimisation using appropriate planting and management guidelines.</li> </ul>	<p>A comprehensive bushfire hazard site analysis has been undertaken by Bushfire Environs as part of the Creamery Road Precinct Bushfire Planning Assessment to identify and assess bushfire risks at the precinct scale, including out to a distance of 150m. The landscape bushfire risk assessment will analyse bushfire risk arising from the broader landscape.</p> <p>The 2019 Bushfire Planning Assessment Report provides guidance on the treatment of bushfire interface areas.</p> <p>Bushfire Environs will undertake fuel load assessments within 150m of the precinct, and for all vegetated areas of the precinct. Fuel load parameters will be provided for proposed vegetation within the precinct. Vegetation, weather, and terrain are key elements of bushfire risk assessment and will be included.</p> <p>Bushfire protection measures will include establishment of fuel reduced areas and fuel disruptions. Bushfire protection measures will also include guidelines and/or requirements for appropriate planting and management of vegetation within the precinct with recommendations for each land type. The 2019 bushfire assessment provides guidance on this, and its recommendations will be adopted unless otherwise instructed by CoGG.</p>
<p><b>Delivery – CRPSP (P243 and attached)</b></p> <p>The estimated social infrastructure required to support new communities in the Western Geelong Growth Area includes:</p> <p><b>Community facilities:</b></p> <ul style="list-style-type: none"> <li>• One emergency hub incorporating ambulance, fire and state emergency services.</li> </ul>	<p>An emergency hub will be provided in the precinct to service this and future neighbouring precincts. A tentative location has been identified near the intersection of the Geelong-Ballan Rd and a main through road of the precinct – refer to the Future Urban Structure Plan version 06c. The site will be confirmed following discussions with a range emergency service authorities. Selection of the site will be informed by the need for CFA/FRV response times to be met.</p>

Attachment A1: Excerpt - Northern and Western Geelong Growth Areas Framework Plan

## DELIVERY

### CREAMERY ROAD PRECINCT STRUCTURE PLAN

#### WESTERN GEELONG GROWTH AREA

##### INFRASTRUCTURE REQUIREMENTS

###### Integrated transport infrastructure

The estimated integrated transport infrastructure required to support new communities includes:

###### State infrastructure

- Geelong-Ballarat railway corridor\*
- New railway station, subject to commuter rail services\*
- Upgrade and duplication of the Midland Highway with external upgrades towards North Geelong Railway Station\*
- Upgrade of the Midland Highway interchange on the Geelong Ring Road\*
- Rail overpass of Geelong-Ballarat railway line on the Clever and Creative corridor and the Cowies Creek corridor, subject to commuter rail services\*
- Public transport services.\*

###### Local infrastructure

- The Clever and Creative Corridor, including upgrade of Geelong-Ballarat Road and upgrade and realignment of Evans Road\*
- External upgrade of Evans Road towards the Northern Geelong Growth Area to connect the Clever and Creative Corridor\*
- A minimum of four Clever and Creative Corridor intersections on the arterial road and connector street network\*
- One arterial road intersection on the Midland Highway
- Linear active transport corridor along Cowies Creek
- A connector and local street network including upgrades to Creamery Road and Bluestone Bridge Road.
- Upgrade the Creamery Road flyover of the Geelong Ring Road.

###### Waterway infrastructure

The estimated waterway infrastructure required to support new communities includes:

###### State partnership

- Cowies Creek corridor masterplan\*

###### Local infrastructure

- Integrated water management that retains water within the urban environment and conveys stormwater flows to the Cowies Creek catchment.

###### Social infrastructure

The estimated social infrastructure required to support new communities includes:

- One multi-purpose community centre incorporating a neighbourhood house, flexible community meeting spaces and community gardens that is co-located with other uses such as seniors and youth centres and/or a men's shed\*
- One maternal and child health centre
- One kindergarten
- One long day child care centre
- Two primary schools\*
- One emergency hub incorporating ambulance, fire and state emergency services.\*
- A network of active open space (sports and recreation) and passive open space (local parks) for residential land equivalent to 10% of the net developable area
- Internal demand for a sub-regional sport reserves and facilities to be provided outside the precinct.

##### ESTIMATED GROWTH



**TOTAL GROWTH AREA 350 hectares**



**TOTAL RESIDENTIAL AREA 236 hectares**



**ANTICIPATED DWELLINGS 3,012**



**ANTICIPATED POPULATION 8,433**



**NON DEVELOPMENT AREA 114 hectares**

*\*Infrastructure requirements based on estimated growth.*

##### PRECINCT FEATURES

- The Clever and Creative Corridor
- A neighbourhood activity centre located on the Clever and Creative Corridor (subject to location assessment)
- Cowies Creek corridor open space network
- Myers Reserve
- The constructed waterway network.

*\*Infrastructure required to support multiple precincts. Infrastructure requirements will be refined as part of the Precinct Structure Plan process.*

## Appendix B Response to the Bushfire Planning Assessment Report 2019 for NWGGA Greater Geelong Amendment C395

A bushfire planning assessment was undertaken by Kevin Hazell Bushfire Planning in 2019 for CoGG as part of Amendment C395 to implement the Northern and Western Geelong Growth Areas Framework Plan. The Bushfire Planning Assessment Report of May 2019 detailed actions and recommendations to be followed for planning at the precinct scale.

Below is a summary of the recommendations and actions from the 2019 assessment which are relevant to the Creamery Road precinct, and the response recommended for the 2022 precinct planning phase.

### Key findings from the NWGGA Bushfire Planning Assessment Report 2019

#### Landscape and site hazard assessment excerpts

The following statements are key excerpts from the 2019 report:

*The landscape and strategic bushfire risk to the study area is low to moderate. There is no landscape bushfire feature that impacts on the principle of the Northern and Western Growth Areas as a location for growth. Areas of elevated landscape risk around Dog Rocks Flora and Fauna Sanctuary should be subject to risk avoidance strategies and interface treatments.*

*The site assessment considered the following areas separately:*

- *Grassland interfaces on study area edges.*
- *Dog Rocks Flora And Fauna Sanctuary.*
- *Barwon River interface.*
- *Hazards proposed within the study area.*
- *Interim hazards during the development phase*

*The bushfire hazard and site assessment confirm that the bushfire risk at the site scale is low to moderate based on the exposure benchmarks in planning schemes and the separation distances required. There is no site-scale bushfire feature that would make development as indicatively set out in the Framework Plan unacceptable*

*The site assessment concludes that exposure of future development to no more than 12.5kw of radiant heat can be achieved, as required by c13.02-1S Bushfire. Precinct structure plans should give effect to this in the more detailed design of various precincts in the study area.*

*At this stage and recognising that more detailed work will occur at the precinct structure plan stage, is it reasonable to conclude that development can implement bushfire protection measures.*

#### Compliance with c13.02-1S - excerpt

The following statement is an excerpt from the 2019 report:

*The proposal is consistent with the bushfire policies and directions contained in the planning scheme. There is no planning scheme bushfire factor that would warrant the proposal not proceeding subject to the recommendations in this report being implemented through precinct structure plans.*

## Response to recommendations of 2019 bushfire planning assessment

Tables below provide the recommendations, actions and issues identified in the 2019 Bushfire Planning Assessment for NWGGA, along with a response recommended for the Creamery Road Precinct.

**Table B1** Recommendations from the Kevin Hazell Planning 2019 NWGGA Bushfire Planning report, and response

2019 Report recommendation	Recommended response for CRPSP	Rationale
<p><b>Recommendation 1: All interfaces with a bushfire hazard.</b></p> <p>Development will be required to be set back from assessed vegetation for a distance no less than that required to ensure exposure is no more than 12.5kw of radiant heat. This equates to Column A in Table 2 to c53.02 Bushfire in the planning scheme.</p>	<p>Adopt the 2019 recommendation, with clarification and an enhanced bushfire protection measure.</p> <p>Development is required to be setback from classified vegetation for a distance no less than that required to ensure radiant heat exposure to all building facades is no more than 12.5 kW/m2.</p> <p>Setback distances are specified in AS3959: 2018.</p> <p>Development setback areas which are setback from retained and planned classified vegetation will be managed to satisfy the vegetation management requirements of Table 6 to c53.02.</p>	<p>Column A of Table 2 to c53.02 has the same setback distances as required for BAL 12.5 under AS3959: 2018 for non-alpine areas of Victoria. AS3959:2018 generally applies to buildings and works in the BPA. BAL 12.5 is the maximum allowable radiant heat exposure for this development as specified in c13.02-1S.</p> <p>Requiring setback areas which are against permanent classified vegetation to be managed in accordance with Table 6 to c53.02 Table 6 is to avoid a commonly occurring situation where over time, vegetation is planted in a way that causes an increased bushfire hazard.</p>
<p><b>Recommendation 2: Grassland interfaces on the edges of the study area.</b></p> <p>At the time a precinct structure plan is prepared, a revised bushfire hazard site assessment should be prepared. The revised assessment should ensure that there is no continuity of fuel paths from grassland areas into urban developed areas.</p>	<p>Adopt 2019 report recommendation in full and clarify the process:</p> <ul style="list-style-type: none"> <li>• A bushfire hazard assessment at the landscape, local, community and site scale will be prepared to comply with c13.02-1S.</li> <li>• The issue of fuel path continuity and requirements for fuel path disruption will be addressed in the response and the hazard assessment will also address radiant heat and ember attack potential.</li> </ul>	<p>Bushfire spreads by a number of mechanisms including flame contact, radiant heat and ember attack, and combinations thereof. Disruption to fuel continuity can address flame contact (e.g., ground fire spread), and additional measures are required to appropriately address ember attack and radiant heat. Bushfire hazard assessments will need to consider all forms of bushfire attack.</p>

2019 Report recommendation	Recommended response for CRPSP	Rationale
<p><b>Recommendation 5: Hazards proposed within the study area.</b></p> <p>At the time a precinct structure plan is prepared, a revised bushfire hazard site assessment should be prepared. The revised assessment should:</p> <ul style="list-style-type: none"> <li>Assess proposed areas of vegetation at maturity to determine if they will be a bushfire hazard.</li> <li>If bushfire hazards are proposed within the study area, development should be set back from these hazards for at least the distance specific in Column A in Table 2 to c53.02 Bushfire in the planning scheme.</li> </ul> <p>Ensure there is no continuity of fuel paths from grassland areas, the Dog Rocks Flora and Fauna Sanctuary and proposed bushfire hazards into urban developed areas.</p> <p>A key objective of future precinct structure planning process is to design an internal open space and vegetation outcome that does not enable a moving bushfire to enter developed areas.</p>	<p>Recommendation be fully adopted with some additional measures.</p> <ul style="list-style-type: none"> <li>A bushfire site hazard assessment will be prepared in accordance with requirements of 13.02-1S. It will assess proposed areas of vegetation for their designed structure and composition at maturity to determine risk attributes – where these areas known. For example, conservation areas and some drainage corridors. It will be based on an initial assumption that low threat vegetation will occur on all other land use types. It will recommend that a revised site assessment be undertaken at the next phase of development.</li> <li>A hazard assessment at the landscape, local and neighbourhood scale will also be prepared, and potential ember impacts and radiant heat will be considered in addition to groundfire.</li> <li>Recommendations to adequately respond to all forms of (mitigatable) bushfire risk will be included in the response</li> <li>Where they can be determined, setback distances will conform with BAL 12.5 in AS3959:2018 which equate to Column A in Table 2 to c53.02</li> <li>Vegetation on all land within setback areas (all land occupying the distance between any classified vegetation and building facades) – will be managed to meet requirements of Table 6 to c53.02</li> </ul> <p>Design of internal open space and vegetation to inhibit the movement of bushfire into and through the precinct requires disruption to fuel (vegetation) continuity, and achieving this is likely to require compromises on other precinct objectives (see comments). This recommended response elevates bushfire protection above other objectives, thereby facilitating compliance with 13.02-1S</p>	<p>At this stage in the precinct planning process – except for Cowies Creek Conservation and the main east-west drainage corridor where located between the M1 and the future clever and creative corridor - the location, size, and future state of much of vegetation in the precinct has not been finalised.</p> <p>Assumptions have been made that vegetation on land use types that are not conservation reserve or the identified large east-west drainage corridor, will be managed as low threat in accordance with AS3959: 2018 in order to generalise the bushfire hazard mapping across the precinct to inform development. However, it is the final location, size, extent, and nature of vegetation that will determine development setbacks.</p> <p>Design of internal open space and vegetation to prevent a moving bushfire entering developed areas requires disruption to fuel (vegetation) continuity. This will be challenging in light of competing objectives, for example:</p> <ul style="list-style-type: none"> <li>tree canopy cover and vegetation connectivity for environment, biodiversity, and amenity outcomes.</li> <li>maximising build area.</li> </ul> <p>Fuel path disruptions will be included in the suite of bushfire protection measures.</p> <p>Ground fire is one bushfire attack mechanism to be considered, but also ember attack, and radiant heat must be considered.</p>
<p><b>Recommendation 6: Interim hazards during development phasing</b></p> <p>A 50m corridor of low-threat vegetation should be provided around all developed areas within the study area.</p> <p>A developed area can be defined as land subdivided for urban uses where a statement of compliance has been issued.</p>	<p><b>Recommendation for bushfire hazard treatment during development phase</b></p> <p>Development will be staged so that only areas which can achieve less than 12.5kW/m2 within the property boundaries will be developed.</p> <p>Include as an application requirement in the UGZ Schedule:</p> <p>A Bushfire Management Plan that addresses bushfire risk during, and where necessary, after construction, which is</p>	<p>Unable to adopt the 50m buffer. In accordance with advice received from the Victorian Planning Authority, a proponent seeking to develop their land must address bushfire risk within the property being developed without imposing additional bushfire mitigation measures on adjoining land owned by others. Staging of development will need to respond to these requirements.</p>

2019 Report recommendation	Recommended response for CRPSP	Rationale
<p>The planning scheme requirements for vegetation management for bushfire purposes in c53.02 Bushfire Table 6 Vegetation management requirements (see Figure 19 in this report) is the appropriate treatment of these areas.</p> <p>At the time a precinct structure plan is prepared, a suitable planning mechanism should be identified and included to secure interim vegetation management (for example, a s173 agreement) during the development phase.</p> <p>The 2019 report states: <i>Bushfire hazards within the study area present a risk to development through the various stages of the development until they are either removed (as stages of development occur) or are managed as part of the completed development.</i></p>	<p>approved by the Responsible Authority. The plan must specify, amongst other things:</p> <ul style="list-style-type: none"> <li>• The staging of development and the likely bushfire risks at each stage;</li> <li>• An area of land between the development edge and non-urban areas consistent with the separation distances specified in AS 3959-2018, where bushfire risk is managed to enable the development, on completion, to achieve a BAL-12.5 construction standard in accordance with AS3959-2018.</li> <li>• 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</li> <li>• Provision of adequate access and egress for early subdivisions to minimise grassfire and bushfire risks to new residents prior to the full completion of the PSP</li> </ul>	
<p><b>Recommendation 7: Biodiversity</b></p> <p>If any part of the study area cannot accommodate bushfire requirements due to biodiversity factors, then development should not proceed in that area.</p>	<p>Adopt recommendation in full.</p> <p>In addition, prohibit creation of low threat areas on conservation reserves</p>	<p>It is expected that biodiversity values will be protected by assigning an appropriate land use category. Setbacks will not be permitted to be established on conservation areas</p>

Recommendations 3 and 4 of the 2019 report are not relevant to the Creamery Road Precinct

**Table B2** Actions

2019 Report Action	Recommended response for CRPSP	Rationale
<p>Consider whether there is merit in designating a Neighbourhood Safer Place within the study area. This could be investigated in partnership with the CFA at the time precinct structure plans are prepared.</p>	<p>A NSP- BPLR is not required in the Creamery Rd Precinct due to the general low to moderate bushfire risk of the precinct and due to the identification of large areas of less than 2kW/m2</p> <p>Note: seeking shelter at an NSP-BPLR is a last resort option, and an NSP-BPLR may not be required in a low threat landscape and site.</p>	<p>NSP-BPLR feasibility and requirement has been considered and discussed with CFA as a potential bushfire protection measure. It has been determined that the low risk grassland threat of the developed precinct does not require an NSP-BPLR</p>

**Table B3** Assumptions and Issues

2019 Report assumption/issue	Recommended response for CRPSP	Rationale
<p>The potential that occupants of the study area will move east of the Geelong Ring Road rather than sheltering in urban areas within the study area during a bushfire may need to be managed</p>	<p>Provided that fire wise development occurs, large areas of the precinct will become BAL low, including large areas below 2kW/m<sup>2</sup> (figure 1).</p> <p>It will be useful to identify the BAL low areas (or facilities in BAL low areas) near grasslands for people to walk to in the event of a nearby grassfire. A wayfinding approach could be employed. Achieving this response will require community engagement and education.</p>	<p>The site hazard assessment indicates that provided the precinct is developed in accordance with the proposed bushfire protection measures, significant areas of less than 2kW/m<sup>2</sup> exist within the precinct.</p> <p>An NSP-BPLR is not required for the Creamery Rd Precinct</p>
<p>The landscape provides good access to areas of BAL: Low in the surrounding developed areas of Geelong and Lara and immediate access to BAL: Low areas in the completed development</p>	<p>BAL Low areas of the completed development have been identified as part of the site hazard assessment</p>	<p>BAL mapping indicates there will be large areas of BAL low once the development is completed. A BAL map has been produced based on the ultimate development (figure 1). 13.02-1S requires access to BAL Low areas</p>
<p>Whole of planning area is within the BPA</p>	<p>The final report will include the DELWP criteria for excising areas from the BPA.</p> <p>The Interim Report discusses this matter.</p>	<p>Criteria, mechanism, and timing for removal of BPA have been identified.</p>
<p>The Moorabool River is a potential bushfire hazard through the Western Growth Area and may have steeper slopes, which would increase the setback required</p>	<p>The landscape hazard assessment will evaluate the potential for ember attack</p>	<p>Moorabool river corridor is some 390m from the CR PSP area to the south and 1300m to the west. Hazard potential will be reviewed (the threat may be ember attack).</p>

## Appendix C Creamery Rd Precinct Structure Plan development setback table

### Minimum setbacks to achieve BAL 12.5 exposure

The table below provides a list of minimum separation distance between the bushfire hazard and the development (building façade) to achieve BAL 12.5 exposure (i.e., <12.5kW/m<sup>2</sup> radiant heat flux), for the range of slopes and vegetation occurring in the Creamery Rd Precinct, and applying a BAL method 1 assessment.

Note that the table only shows the likely vegetation types for this site, and AS3959: 2018 includes other types.

**Table C1** Minimum development setbacks in accordance with AS3959: 2018

Effective slope* (degrees) AS 3959 categories	Minimum separation (m) for BAL 12.5 at FDI 100 (1090K)				
	Low threat	Grassland	Scrub	Woodland	Forest
Flat land or upslope	0	19	27	33	48
> 0 to 5 degrees downslope	0	22	31	41	57
> 5 to 10 degrees downslope	0	25	35	50	69
> 10 to 15 degrees downslope	0	28	39	60	82
> 15 to 20 degrees downslope	0	32	43	73	98

\* the slope under the hazard vegetation in relation to the development

## Appendix D Vegetation management standards of table 6 to Clause 53.02

The table below is Table 6 to Clause 53.02 Bushfire Planning, within the local planning scheme.

Vegetation Management Requirement
<p>Defendable space is provided and is managed in accordance with the following requirements:</p> <ul style="list-style-type: none"><li>• Grass must be short cropped and maintained during the declared fire danger period.</li><li>• All leaves and vegetation debris must be removed at regular intervals during the declared fire danger period.</li><li>• Within 10 metres of a building, flammable objects must not be located close to the vulnerable parts of the building.</li><li>• Plants greater than 10 centimetres in height must not be placed within 3 metres of a window or glass feature of the building.</li><li>• Shrubs must not be located under the canopy of trees.</li><li>• Individual and clumps of shrubs must not exceed 5 square metres in area and must be separated by at least 5 metres.</li><li>• Trees must not overhang or touch any elements of the building.</li><li>• The canopy of trees must be separated by at least 5 metres<sup>3</sup>.</li><li>• There must be a clearance of at least 2 metres between the lowest tree branches and ground level.</li></ul>

<sup>3</sup> Several LGAs have negotiated with CFA for a reduced tree canopy separation distance to be adopted in Table 6 of c53.02, some at 2m. Given that CR PSP is generally of lower bushfire risk, a similar outcome could be explored.

## Appendix E Excerpts – relevant vegetation classifications of AS3959: 2018

AS 3959: 2018 categorises vegetation on the basis of its ability to contribute to bushfire spread or intensity. Descriptions of vegetation classifications relevant to the Creamery Rd Precinct are described below. Vegetation is classified on the basis of its structure and composition at maturity.

Classification	Description (elements relevant to CR PSP)
<p><b>Low threat vegetation (excluded from BAL assessment) AS3959: 2018 2.2.3.2</b></p>	<p>To classify vegetation as exempt, there must be an assurance that the vegetation will continue to be managed in its low-threat state in perpetuity.</p> <p>Low threat vegetation as defined in AS3959:2018 will be met if any one of the vegetation categories (a) to (f) below are achieved:</p> <ul style="list-style-type: none"> <li>(a) Vegetation of any type that is more than 100m from the site [note that a 150m assessment zone is required by 53.02 in the BMO, and will be applied to CR PSP].</li> <li>(b) Single areas of vegetation less than 1 ha in area and not within 100m of other areas of vegetation being classified vegetation.</li> <li>(c) Multiple areas of vegetation less than 0.25ha in area and not within 20m of the site, or each other or of other areas of vegetation being classified vegetation.</li> <li>(d) Strips of vegetation less than 20m in width (measured perpendicular to the evaluation exposed to the strip of vegetation) regardless of length and not within 20m of the site or each other, or other areas of vegetation being classified vegetation.</li> <li>(e) Non-vegetated areas, that is, areas permanently cleared of vegetation including waterways, exposed beaches, roads, footpaths, buildings and rocky outcrops.</li> <li>(f) Vegetation regarded as low threat due to factors such 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, banana plantations, orchards, market gardens (and other non-curing crops), cultivated gardens, commercial nurseries, nature strips and windbreaks.</li> </ul> <p>Notes:</p> <ul style="list-style-type: none"> <li>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 100mm)</li> <li>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</li> </ul>
<p><b>Grassland</b></p>	<p>All forms (except tussock moorlands), including situations with shrubs and trees, if the overstorey foliage cover is less than 10%. Includes pasture and cropland. Note that grassland managed in minimal fuel conditions and non-curing crops are regarded as low threat vegetation for the purpose of Clause 2.2.3.2 (AS3959)</p> <p><b>Forms:</b> Open Woodland/Low Open Woodland/Open Shrubland/Low Open Shrubland/ Hummock Grassland/Closed Tussock Grassland/Tussock Grassland/Open Tussock/Sparse Open Tussock/Dense Sown Pasture/Sown Pasture/Open Herbfield/Sparse Open Herbfield.</p>
<p><b>Scrub</b></p>	<p>Found in wet areas and/or areas affected by poor soil fertility or shallow soils: &gt; 30% foliage cover. Dry heaths occur in rocky or sandy areas. Shrubs &gt; 2m high. Typical of coastal areas and tall heaths up to 6 metres in height. May be dominated by Banksia, Melaleuca or Leptospermum with heights of up to 6 meters</p>
<p><b>Woodland</b></p>	<p>Trees 10m to 30m high; 10% to 30% foliage cover dominated by eucalypts and/or Callitris with a prominent grassy understorey. May contain isolated shrubs.</p>
<p><b>Forest</b></p>	<p>Trees [to] 30m high; 30% to 70% foliage cover (may include understorey of sclerophyllous low trees or shrubs). Typically dominated by eucalypts, melaleuca or callistemon (may include riverine or wetland environments) and Callitris. Includes eucalypt plantations.</p> <p>Trees over 30m high; 30% to 70% foliage cover (may include understorey ranging from rainforest species and tree ferns to low trees and tall shrubs). Found in areas of high reliable rainfall. Typically dominated by eucalypts with a sub-dominant tree layer.</p>

## Appendix F Precinct tree canopy targets by land use type

The City of Greater Geelong’s Urban Forest Strategy 2015-2025 requires a 25% tree canopy cover for urban areas of the municipality. In response, canopy targets for Creamery Road PSP have been proposed for each land use and street typology (Table F1 and Table F2) (City of Greater Geelong, 2022). The complete report provides further detail.

A development and/or subdivision application must demonstrate that they meet the mandated minimum canopy coverage stipulated by *Table 1: Canopy Coverage Requirement by Land Use* and *Table 2: Canopy Coverage Requirement by Road Cross Section Type*.

**Table F1: Canopy Coverage Requirement by Land Use**

Land use as per FUS	Mandated minimum canopy coverage *	Site area the canopy is to be calculated across
Drainage Corridors	35%	Centreline of abutting roads and/or parcel boundaries where appropriate
Drainage Reserves	10%	Site Boundary
Cowies Creek Conservation Area	10.0%	Centreline of abutting roads
Clever and Creative Corridor	40.0%	Site Boundary
Schools (new)	30.0%	Centreline of abutting roads
Community Facility	35.0%	Centreline of abutting roads
Bulky Goods	30.0%	Centreline of abutting roads
Active Open Space	30.0%	Centreline of abutting roads
Local Open Space	50.0%	Centreline of abutting roads
Neighbourhood Activity Centre	25.0%	Centreline of abutting roads
Residential IDA	23.0%	Centreline of abutting roads
Residential Standard	27.0%	Centreline of abutting roads

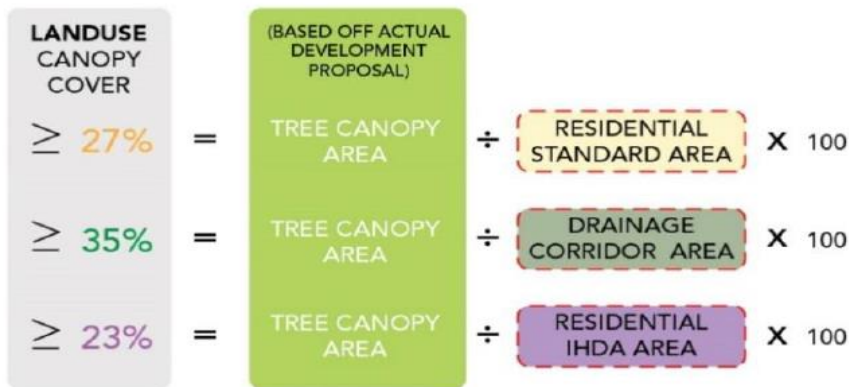
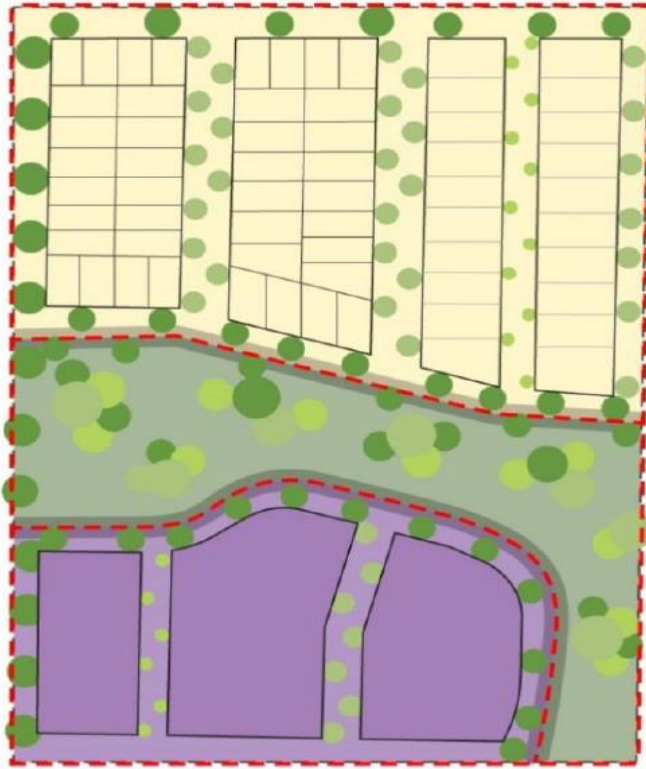
**Table F2: Canopy Coverage Requirement by Road Cross Section Type**

Road Reserve Width	Cross Section Name	Mandated Minimum Canopy Coverage	Canopy diameter to be consistent with Example Tree Species List*
6m	Lane	20%	A
10m	Micro Street	25%	A
12–16m	Pedestrian Street	50%	B
16m	Local Access Street	40%	B
16m	Parking Street	40%	B
20m	Conservation Interface Street	30%	C
20m	Key Local Access Street	40%	C
xxxx	Bluestone Bridge Road (Modified Local Access Street)	25%	C
20m	Evans Road through Conservation (Modified Local Access Street)	30%	C
25m	Standard Connector Road	40%	C
25m	Urban Connector Street	30%	D
20m	Clever & Creative Corridor (Activity Centre)	40%	D
34m	Clever & Creative Corridor (Standard)	40%	C
40m	Arterial Road (Midland Hwy)	10%	D

\*Tree species is required to comply with relevant requirements nominated in the PSP and respond to relevant guidelines as practicable.

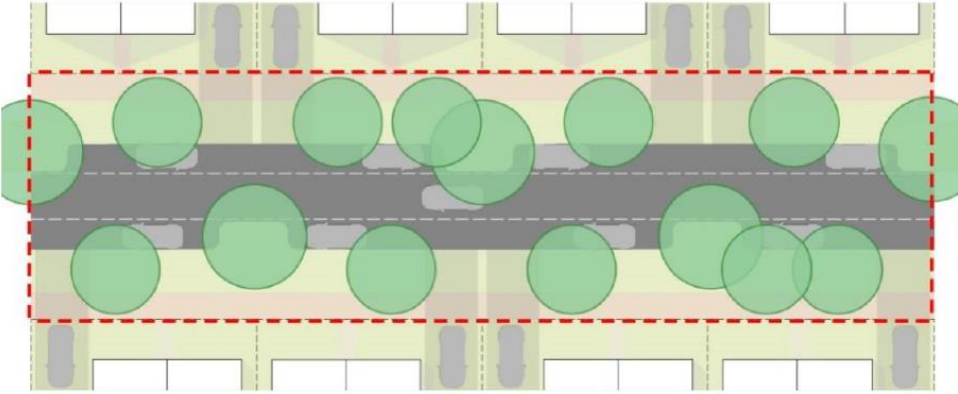
To account for existing canopy cover on roads abutting a site, *Table 1: Canopy Coverage Requirement by Land Use* directs the site area of certain uses to be calculated across the centreline of abutting roads (shown by the red dotted line in Figure 1 below). This allows the canopy cover of established trees on adjacent streets to be counted towards the land use based canopy coverage.

Trees retained in accordance with the CRPSP Arboriculture Assessment will also contribute towards the canopy coverage calculation.



**Figure F1** Tree canopy cover calculation example

Source: *Creamery Road PSP - Assumptions for Bushfire Hazard Assessment Modelling* (City of Greater Geelong, 2022)



$$\text{STREET CANOPY COVER} = \frac{\text{TREE CANOPY (accumulated canopy area from actual proposal)}}{\text{STREET AREA (street length x specified street section)}} \times 100$$

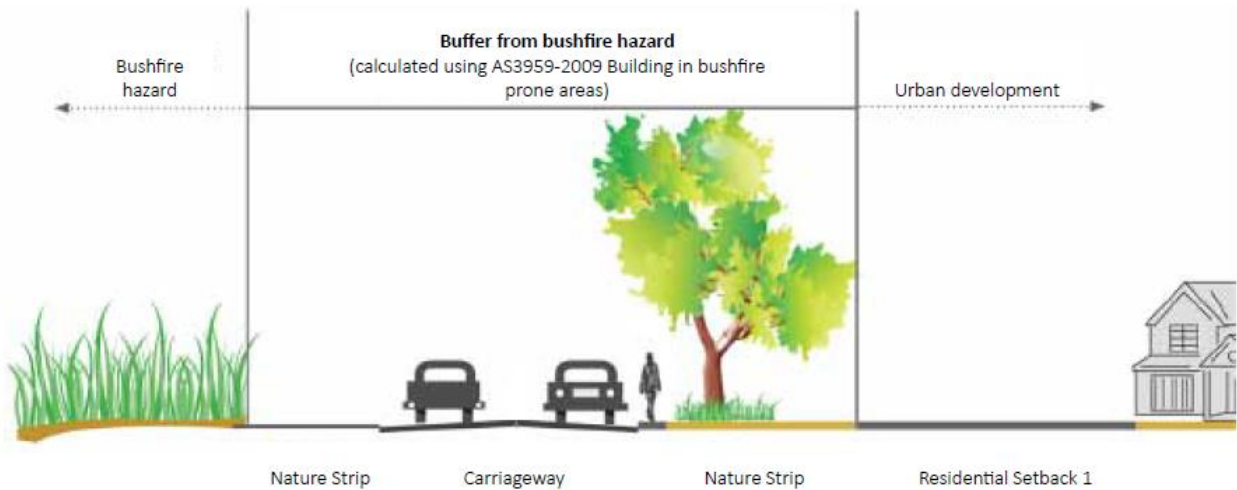
Figure F2 Example of street canopy cover calculation

Source: Creamery Road PSP - Assumptions for Bushfire Hazard Assessment Modelling (City of Greater Geelong, 2022)

## Appendix G Using perimeter roads as buffers against bushfire hazards

Planning Practice Note 64 (Department of Environment Land Water and Planning Vic, 2015) provides guidance on the provision of buffers between the bushfire hazard and urban development which include perimeter roads, water bodies and open spaces managed in minimal fuel condition.

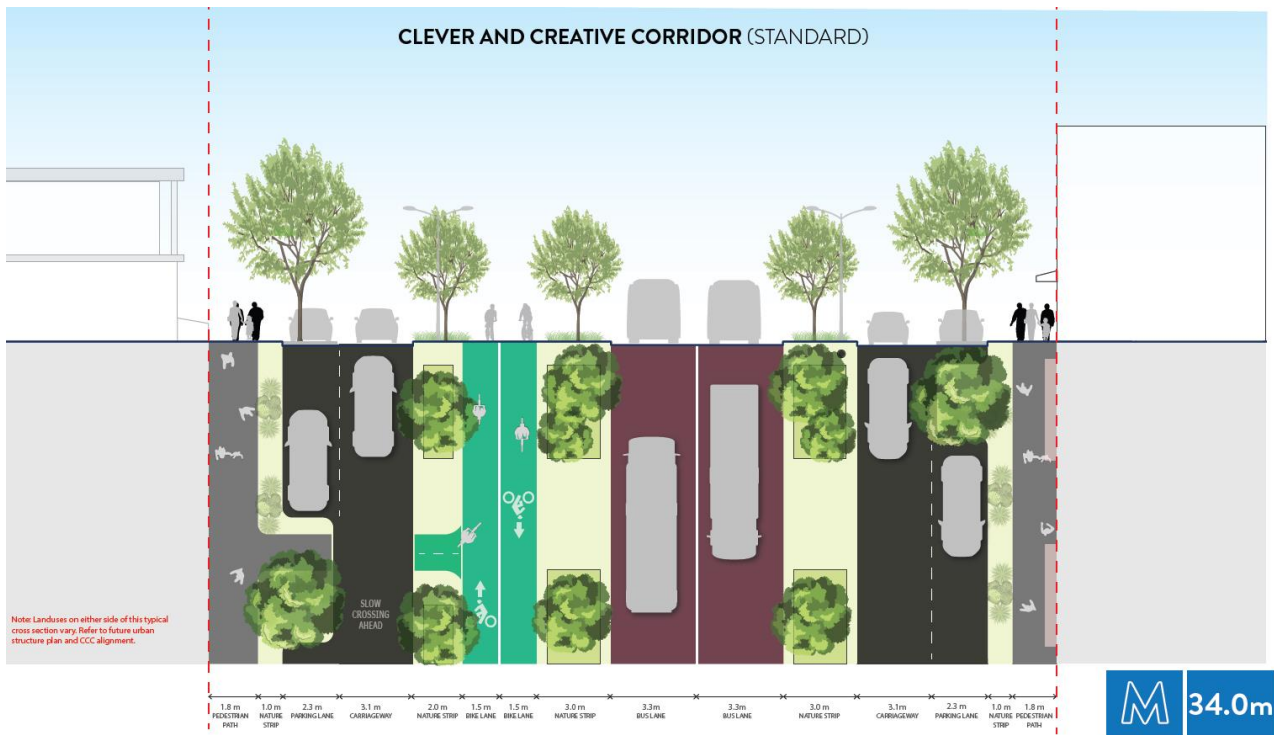
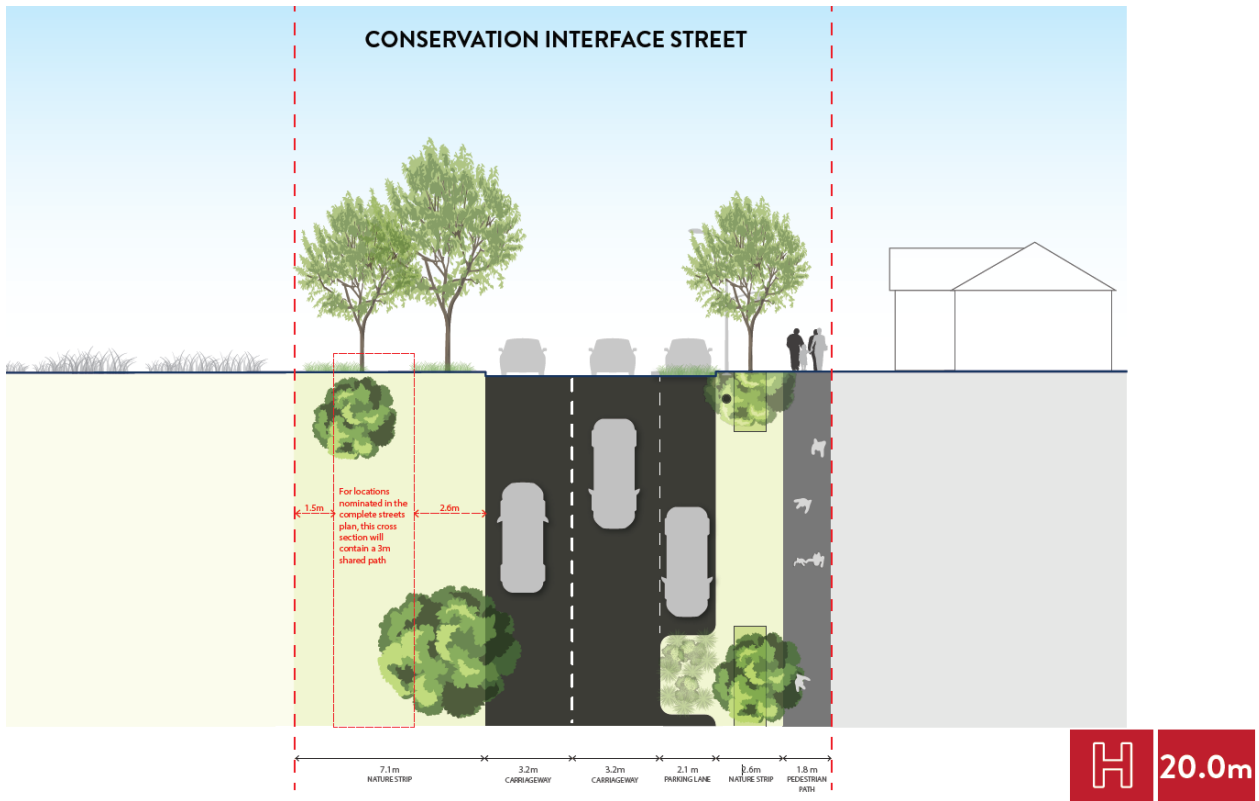
### Using perimeter roads to deliver bushfire protection in new subdivisions

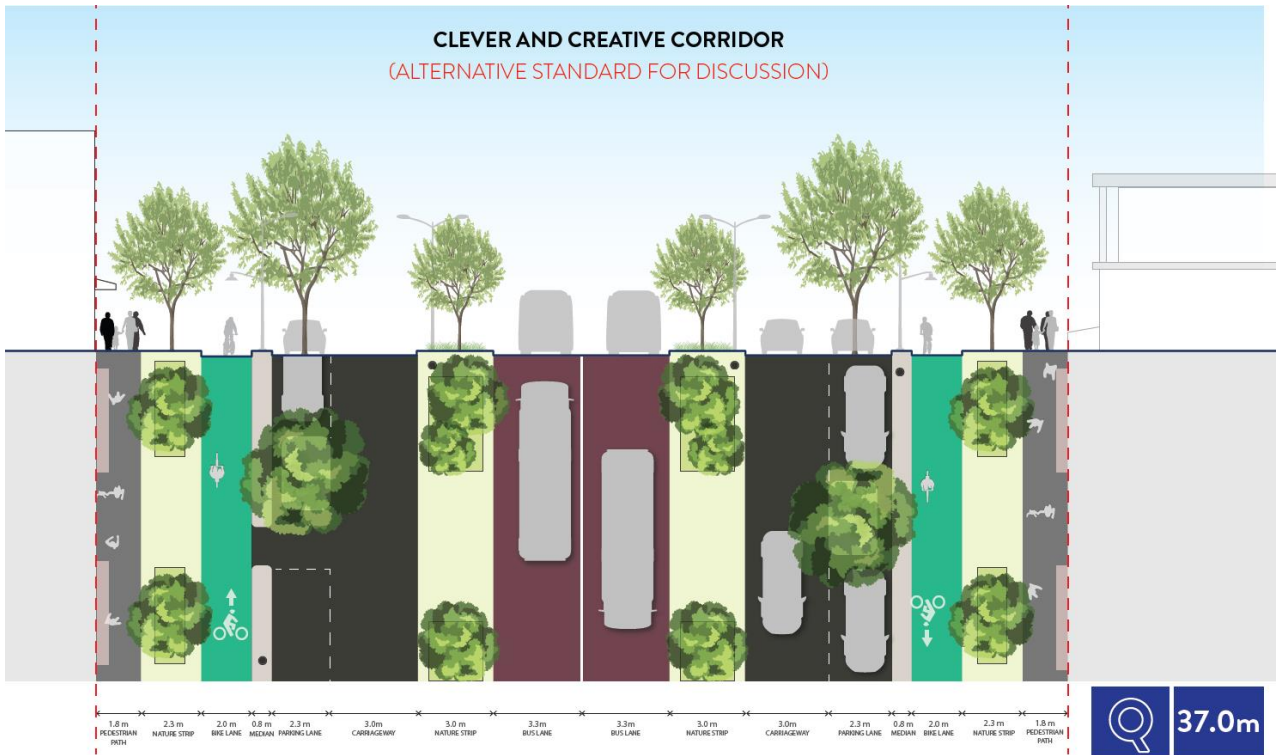


Note 1: Where the required buffer is greater than the road reserve, the buffer may comprise the front setback in conjunction with vegetation management.

**Figures G1 & G2** (above) Use of perimeter roads as a bushfire protection measure in new subdivisions - Excerpt from Planning Practice Note 64 (Department of Environment Land Water and Planning Vic, 2015).

The City of Greater Geelong has provided cross sections for road categories for the precinct. Those which are likely to contribute to setbacks and fuel breaks are shown below.





Figures G3, G4 & G5 (above) Sample road cross-sections for Creamery Rd Precinct. Source: City of Greater Geelong