



Case Study

Vegetation Management

Conditions in the BMO
and offset planting

How to use this guide

This guide has been developed to assist Cardinia City Council in implementing the vegetation management conditions as prescribed by CFA in the Bushfire Management Overlay (BMO) where native vegetation offsets are also required. It has been developed for use specifically as guidance to support the application of CFA's defensible space conditions and applies the principles in 'Landscaping for Bushfire.' This guide should not be used as a replacement for these policy documents.

Introduction

The layout of a garden can significantly reduce the risk of a house burning down in a bushfire. Plants are the main source of fuel for bushfires and can provide a path for the fire to move across a garden. Effective defensible space, house construction, water and access must not be compromised by inappropriate planting. Mulch, garden edging, outdoor furniture, sheds, decks and pergolas can also burn in a bushfire and need consideration.

The overarching principle behind 'Landscaping for Bushfire' is creating and maintaining defensible space around a house. This involves thinking carefully about what you put in the area directly around your house and how it will behave in a bushfire (how flammable it is).

The most important thing to consider with native vegetation offsets is whether a property can achieve on-site offsets while also satisfying the bushfire protection measures as prescribed by the BMO, specifically the vegetation management conditions for defensible space. Native vegetation offsets must not increase the risk to the proposed development or neighbouring properties.

Where vegetation is being removed and native vegetation offsets are proposed on-site, defensible space for the development **and** the neighbouring land cannot be compromised.

Any native vegetation offsets or landscaping within defensible space must meet the requirements as relevant for defensible space. Where native vegetation offsets will affect fuel load, structure or continuity in a way that will increase fire intensity and behaviour they must be located **outside the 150 metre area** being assessed as part of the Bushfire Site Assessment under the BMO.

Any revegetation or native vegetation offsets within the 150 metre BMO assessment area should not:

- Alter the predominant vegetation class that has been used to calculate defensible space and level of bushfire attack
- Prevent defensible space from being established and maintained
- Have an impact on the defensible space (or bushfire risk) of existing adjacent development (in the same or separate ownership).

This means avoiding planting offsets in the area of defensible space in the first instance, and where this is not an option, offsets need to be planted in accordance with this guide and 'Landscaping for Bushfire.' Planting within the defensible space would therefore use plant species that are selected using CFA's Plant Selection Key, that have low or moderate flammability then arranging the plants and other landscape elements in accordance with the design principles and planning permit conditions. See cfa.vic.gov.au/plants for further information.



Indigofera australis 'Austral Indigo' photo by David Francis licensed under CC BY 4.0

Vegetation management within defensible space

CFA vegetation management conditions are specified for defensible space. The conditions are designed to ensure that the layout of the garden does not allow a continual path of vegetation up to and around the house.

When plants burn, flame height is approximately one-and-a-half to double the height of the plant e.g. a 2 metre shrub can produce flames of up to 4 metres (please note this is a general indication). Defensible space creates gaps between trees and shrubs so that if they catch fire there is enough space to minimise the chance of the fire spreading between plants and throughout the garden. It takes into account how plants burn and the ways they can ignite; through direct flame contact (from plants/other elements burning close by), radiant heat and ember attack.

The objective of defensible space is to:

- eliminate direct flame contact,
- reduce radiant heat and
- reduce ember attack.

In practical terms this means:

Defensible space

- 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 sq. 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.

Paving or gravel should be used directly around the house to ensure separation between plants and the building. This also reduces maintenance. If there are existing trees they must not overhang the roofline, touch walls or other parts of the building and must not form a continuous canopy with other trees. Canopies should be at least 5 metres apart. This is so that if they are blown over in wind or drop limbs they can't cause structural damage to the house allowing embers and fire directly into the structure (as well as creating adequate separation to avoid direct flame contact with the house). For alternative measures if an outer zone is being considered as part of defensible space, it should meet the following requirements:

- Trees must not be located to form a continuous canopy with unmanaged vegetation.
- There must be a clearance of at least 2 metres between the lowest tree branches and ground level.
- Individual and clumps of shrubs must not exceed 10 sq. metres in area and must be separated by at least 5 metres.

Note: in the area beyond the defensible space the flammable elements in the property and the broader landscape may contribute to bushfire risk but this is not subject to BMO permit conditions.

Approach

When planning offsets there are several key things to remember.

Offsets must not:

1. compromise defensible space on-site or on the neighbouring properties
2. change the predominant fuel type
3. increase bushfire risk to the property or neighbouring properties.

- Break up planting within the garden and create areas with minimal fuel around the house. Avoid creating a continual path of plants leading to the house, this can allow fire to spread easily across the garden.
- Weed removal as part of offset and ongoing maintenance is an easy way to reduce fuel load and bushfire hazard.
- On small blocks, create space and separation along boundary fences to break up fuel continuity and potential fire spread.
- Creepers and climbers should be avoided because they add fuel directly to a structure and create a fuel path from the ground into the canopy.
- Pergolas, decks and outdoor furniture and flammable mulch are all sources of fuel - planting on or near these should be avoided.
- Choose plants with low flammability as determined by CFA's Plant Selection Key
cfa.vic.gov.au/plants

Why design tops the list

Research shows the layout of a garden has a bigger impact on bushfire behaviour than the flammability of an individual plant. This is because of how fire moves across the landscape and the fact that even plants with low flammability can catch fire and burn in a bushfire.

Lists of plants are potentially misleading because they overlook the layout of a garden and the importance of design in moderating fire behaviour around the house.

Lists go out of date (consider environmental weeds) and provide a limited number of plants to choose from. It is impossible to tailor a list of plants suitable for growing or that are 'desirable' across all of Victoria. CFA's Plant Selection Key allows users to determine the flammability of any plant.

Some other considerations include:

- plants grow differently across Victoria. The variability in growing conditions can affect the flammability of a plant. For example a plant with low flammability in Beechworth might have high flammability in Mildura.
- plant flammability is highly variable and depends on a number of interacting factors (age, plant health, structure, moisture, chemical content etc) and in bushfire conditions all plants can eventually dry out and burn.

For these reasons CFA does not produce or endorse plant lists.

Choosing appropriate plants

The most effective way to reduce the spread of fire within a garden is by creating space between garden beds, avoiding ladder fuels and ensuring space between tree canopies.

Plant flammability is influenced by a number of different characteristics and site factors as detailed on pages 34-35 of CFA's 'Landscaping for Bushfire' publication. The Plant Selection Key (cfa.vic.gov.au/plants) allows users to determine the flammability of any plant based on an assessment of:

- **branching pattern** - open and loose branching and thinly spread leaves are generally more desirable than closely packed leaves and branches.
- **separation** between the ground and foliage on the rest of the plant prevents lower branches acting as ladder fuels.
- **texture** – plants with a coarse texture (overall appearance of the plant) have a lower surface-area-to-volume ratio making them less flammable than plants with a fine texture.
- **density** – (amount and arrangement of fuel within the plant) sparsely dense plants have less fuel readily available to burn than a dense plant.
- **leaves** – broad, flat and thicker leaves and those with high moisture content are less flammable than small, thin and narrow leaves that have a higher surface-area-to-volume ratio which makes them more susceptible to drying out. The shape of leaves also influences how easily they are caught in vegetation when they fall off the plant (e.g. pine needles).
- **bark type** – tightly held and smooth bark is usually less flammable than loose, stringy or fibrous bark that can ignite easily and break off and burn as embers. NB some smooth barked trees shed their bark annually and trap large ribbons of bark in their branches on the ground. These are highly flammable and can act as ladder fuel e.g. Manna Gums.
- **oils, waxes and moisture content** – some chemicals that are found naturally in plants will increase their flammability. The leaves of plants containing significant amounts of oils, waxes and resins can increase flammability. However, leaf flammability is one element of overall plant flammability.

■ **retention of dead material** – dead leaves, twigs, bark and branches that are retained on the plant or accumulate on the ground or in shrubs can increase the flammability of a plant.

■ **maintenance** is important year-round and can help keep a plant in a state of lower flammability. A diseased, stressed or dead plant is more flammable and dead twigs, leaves and bark should be regularly cleared throughout the garden.

Indigenous Species

Native vegetation offset plantings use species indigenous to the area. This has benefits for wildlife, biodiversity and can also complement the bushfire objectives if the right plants are chosen. Plants that are indigenous to the area are also likely to be healthy because they cope better with local conditions. Pay particular attention to the recommended growing conditions (sun, water, wind, shelter) to ensure plants will not become distressed (making them more flammable).

This Case Study is based on selected examples listed in Council's indigenous plants publication. It should be noted that these examples are a small sample of plants with low flammability and are not an exhaustive list of example species indigenous to the council areas. They must not be used without considering the layout and placement of plants within the garden. In addition to appropriate placement, plants will also require regular maintenance to ensure they are kept in a state of low flammability. Maintenance of the garden should be incorporated into bushfire preparation.



Helichrysum scorpioides 'Button Everlasting' photo by Chris Clarke licensed under CC BY 4.0

Trees

- Fire is rarely sustained in a canopy unless there is a fire burning in plants or leaf litter under a tree.
- Low grasses and groundcovers can be planted under trees because there is adequate separation between fuel and the ground level and canopies.
- Trees with smooth, tightly held bark and open branching are preferable to trees with loose, fibrous or stringy bark.
- There must be clearance of at least 2 metres between the lowest tree branches and ground level.
- All trees require ongoing maintenance for leaf litter etc.
- Retain existing trees only where they are not overhanging the building or in continuous canopy with unmanaged vegetation. There must be at least 5 metres separation between tree canopies and no shrubs under trees.

Some examples of suitable trees for the Cardinia region include:

Eucalyptus dives 'Broad-leaved Peppermint'

Eucalyptus radiata subsp. *radiata* 'Narrow-leaved Peppermint'

Eucalyptus camaldulensis 'River Red Gum'

Acacia melanoxylon 'Blackwood'

Allocasuarina littoralis 'Black Sheoak' (under pruning and maintenance required)

Banksia intergrifolia subsp. *intergrifolia* 'Coast Banksia' (maintenance required – larger shrubs may need underpruning)

Shrubs

- Need the most consideration as they can act as ladder fuels and often require lots of maintenance.
- Plant well away from trees, never under trees as they create ladder fuels.
- Must be separated in clumps / planted in groups surrounded by lawn or low fuel area.
- Shrubs are generally less than 2metres in height.
- The more thick and dense a shrub is, the higher the amount of fuel and more readily available it is compared with a sparse and coarse generally the less flammable.
- Shrubs can retain dead material, this increases flammability and these types of shrubs should be avoided in the defendable space.

Some examples of suitable trees for the Cardinia region include:

Viminaria juncea 'Golden Spray'

Tetratheca ciliata 'Pink Bells'

Prostanthera lasianthos var. *lasianthos* 'Victorian Christmas Bush'

Pomaderris aspera 'Hazel Pomaderris'

Indigofera australis 'Austral Indigo'

Hibbertia riparia 'Erect Guinea-flower'

Hibbertia acicularis 'Prickly Guinea-flower'

Grevillea alpina 'Mountain Grevillea'

Dodonaea viscosa subsp. *spatulata* 'Sticky Hop-bush'

Dillwynia glaberrima 'Smooth Parrot-pea'

Correa reflexa var. *reflexa* 'Common correa'

Banksia marginata 'Silver Banksia' (maintenance required – larger shrubs may need underpruning)

Acacia pycnantha 'Golden Wattle'

Acacia myrtifolia 'Myrtle Wattle'

Wildflowers

- A good low flammability choice because they don't carry a lot of fuel and will rarely sustain fire.
- Provide colour and interest.

Some examples of suitable wildflowers for the Cardinia region include:

Arthropodium strictum 'Chocolate Lily'

Bulbine bulbosa 'Bulbine Lily'

Dianella revoluta 'Black-anther Flax-lily'

Diplarrena moraea 'Butterfly flag'

Patersonia occidentalis 'Long Purple-flag'

Thelymitra media 'Tall Sun-orchid'

Thysanotus ruberosus subsp. *tuberosus* 'Common Fringe-lily'

Wahlenbergia stricta 'Tall Bluebell'

Grasses

- Maintained/slashed grass is a good area of low fuel to separate garden beds
- Can be planted under trees.
- Some taller grasses (greater than 30cm) may be ok if they are isolated and surrounded by maintained lawn or gravel.

Some examples of suitable grasses for the Cardinia region include:

Austrodanthonia setacea 'Bristly Wallaby-grass'

Eleocharis acuta 'Common Spike-rush'

Lomandra filiformis subsp. *coriacea* 'Wattle Mat-rush'

Microlaena stipoides var. *stipoides* 'Weeping grass'

Poa morrissi 'Velvet Tussock grass'

Xanthorrhoea minor subsp. *lutea* 'Small Grass-tree'

Groundcovers

- Can be planted under trees.
- Must be properly maintained (avoid any leaf litter build up).
- Scrambling groundcovers and climbers put fuel directly onto structures and can act as ladder fuels and should be avoided in the defensible space.

Some examples of groundcovers with low or moderate flammability include:

Acrotriche serrulata 'Honey pots'

Adiantum aethiopicum 'Common maidenhair'

Ajuga australis 'Austral Bugle'

Brachyschome multifida 'Cut-leaf daisy'

Dichondra repens 'Kidney weed'

Disphyma crassifolium subsp. *clavellatum* 'Rounded moon-flower'

Helichrysum scorpioides 'Button Everlasting'

Kennedia prostrata 'Running Postman'

Viola hederacea 'Ivy-leaf Violet'

Limitations

Garden design and maintenance are only one of many ways to prepare your house and property for bushfire. While garden design and maintenance can improve the chances of a house surviving a bushfire, do not rely on your garden to protect your house.

A garden will not provide protection in a bushfire. A holistic approach to bushfire preparation is critical. Appropriate water supply, access, house construction and general property maintenance are all important. A bushfire survival plan is an essential component of bushfire preparation.

On Severe, Extreme and Code Red days, leaving early will always be the safest option. Go to cfa.vic.gov.au for more information.

Example Planting Schedule

Common Name	Botanical Name	Height x Width at maturity	Quantity
Ground Covers			
Yellow Rice-flower	<i>Pimelia humilis</i>	0.2 x 0.2m	30
Cut-leaf daisy	<i>Brachyschome multifida</i>	0.4 x 1m	10
Button Everlasting	<i>Helichrysum scorpioides</i>	0.3 x 0.3m	10
Running Postman	<i>Kennedia prostrata</i>	Prostrate x 2.5m	5
Ivy-leaf Violet	<i>Viola hederacea</i>	Prostrate x 2m	10
Shrub			
Yellow Hakea	<i>Hakea nodosa</i>	2 x 2m	10
Common correa	<i>Correa reflexa</i> var. <i>reflexa</i>	2 x 2m	3
Pink Bells	<i>Tetratheca ciliata</i>	0.6 x 0.6m	3
Small Tree			
Blackwood	<i>Acacia melanoxylon</i>	12 x 5m	2
Black Sheoak	<i>Allocasuarina littoralis</i>	8 x 5m	1
Tree			
Narrow-leaved Peppermint	<i>Eucalyptus radiata</i>	20 x 6m	1

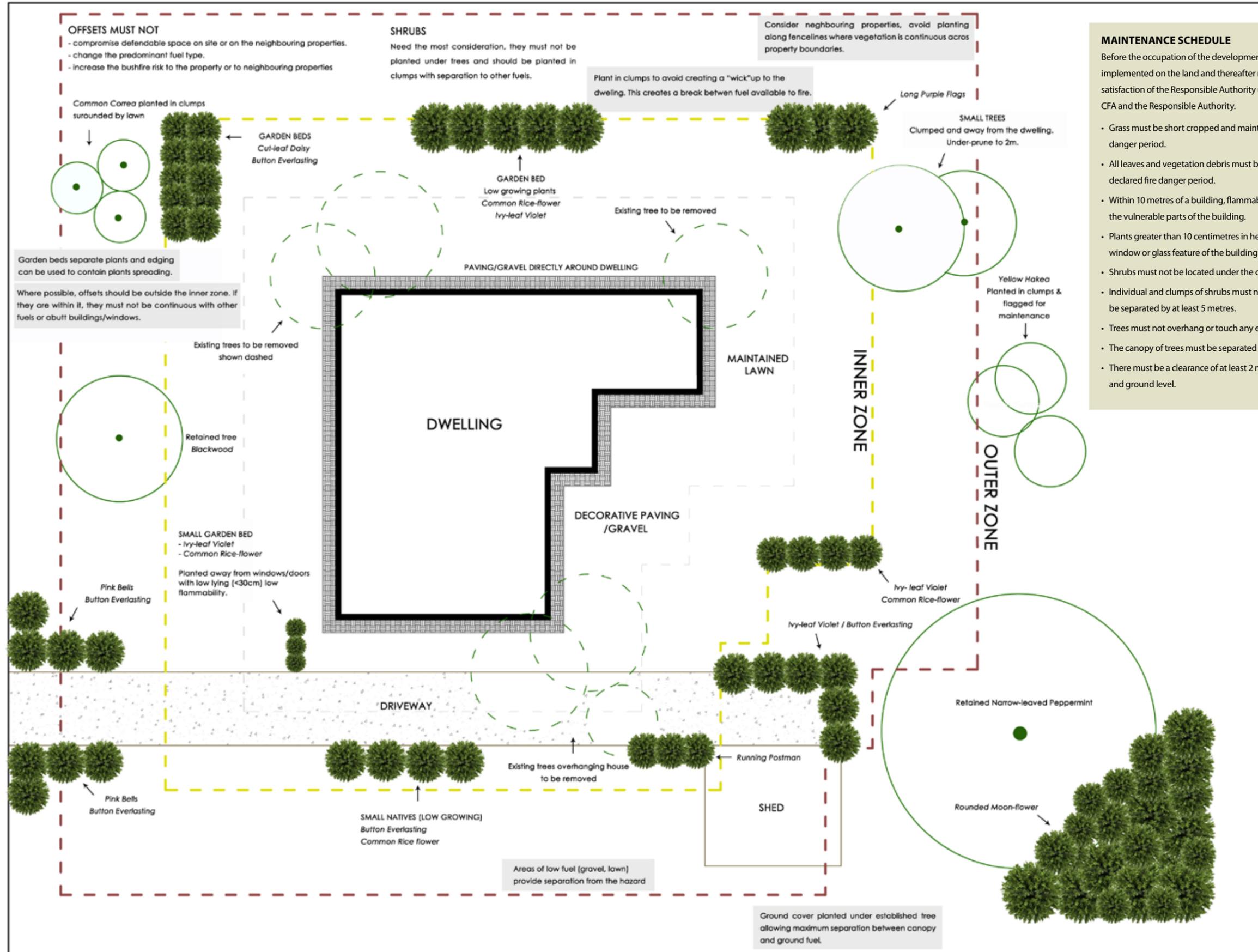


Kennedia prostrata 'Running Postman' photo by Russell Best licensed under CC BY 4.0



Dillwynia glaberrima 'Smooth Parrot-pea' photo by Bill Strong licensed under CC BY 4.0

Example Landscape Plan



MAINTENANCE SCHEDULE

Before the occupation of the development, defensible space must be implemented on the land and thereafter maintained as specified below, to the satisfaction of the Responsible Authority unless otherwise agreed in writing by the CFA and the Responsible Authority.

- 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.
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- 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.

* PLANTS SHOULD BE SHOWN WITH CANOPY AT MATURITY

