

**From:** [Yousheng Li](#)  
**To:** [Megan Fu](#)  
**Cc:** [Karen Armstrong](#); [David Gibson](#); [Karen Harragon](#)  
**Subject:** RE: Greenwich Hospital Redevelopment - Detailed Design  
**Date:** Friday, 8 March 2024 4:40:19 PM  
**Attachments:** [image002.png](#)  
[image003.png](#)  
[image010.png](#)  
[image011.png](#)  
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[image013.png](#)  
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[image015.png](#)  
[image016.png](#)  
[image017.png](#)  
[image018.png](#)  
[Bushfire Response.pdf](#)

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Hi Megan,

Please find attached response from Travers Bushfire with regards to your queries around the Bushfire Protection Assessment.

I will be sending a separate email responding to the waste matter shortly.

Kind regards,

---

**Yousheng Li**

Senior Urbanist  
Planning



M. [REDACTED]  
W. [ethosurban.com](http://ethosurban.com)



Level 4, 180 George St  
Sydney NSW 2000  
(Gadigal Land)

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Ethos Urban acknowledges Traditional Owners of Country throughout Australia and recognises the continuing connection to lands, waters, and communities. We pay our respect to Aboriginal and Torres Strait Islander cultures; and to Elders past and present.

We pledge our support to the Uluru Statement from the Heart and embrace the call to walk with the Aboriginal and Torres Strait Islander people in a movement of the Australian people for a better future.

This email is confidential and may contain information that is confidential and privileged. If you are not the intended recipient, please notify us by return email or phone, and delete the original message.

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**From:** Megan Fu <Megan.Fu@planning.nsw.gov.au>

**Sent:** Wednesday, February 21, 2024 12:26 PM

**To:** Yousheng Li <[REDACTED]>

**Cc:** Karen Armstrong <[REDACTED]>; david.gibson@planning.nsw.gov.au; Karen Harragon <Karen.Harragon@planning.nsw.gov.au>

**Subject:** Greenwich Hospital Redevelopment - Detailed Design

Hi Yousheng

The Commission has requested a response to proposed changes to the Department's recommended conditions and queries regarding the recommended conditions. We require further information in relation to bushfire assessment, landscaping and waste management to be able to complete our response to the Commission.

We note that the Bushfire Protection Assessment (BPA) identified in Section 3.3 that "It is recommended that the entire site, with the exception of the currently vegetated area to the south west of the site (OPA) be managed as an Inner Protection Area (IPA). However, the recommendations of the BPA does not include this but recommends that "APZs are to be provided to the proposed development as outlined in Table 2-2 and as generally depicted within SCHEDULE 1." We note that the APZ outlined in Table 2-2 and depicted within Schedule 1 is a 23 metre portion of the site that adjoins the bushland to the south-west. Please clarify whether the intention is to manage the APZ only or the remainder of the site as an IPA and the bushland as an OPA? We note that IPAs are limited to 15 per cent canopy cover and the proposed development would exceed that as would the bushland in relation to OPA. Please identify if any landscape changes are required to manage bush fire risk or further clarification from a bushfire consultant confirming that the landscaping meets asset protection zone requirements?

Also, the current landscape plans seeking approval have been modified since the bushfire assessment was undertaken. Please provide confirmation from the bushfire consultant that the latest plans meet the requirements for IPAs, including canopy cover? Also, please provide heights of trees for bushland regeneration planting?

The waste management plan does not identify waste collection hours and/or address noise impacts associated with increased operational waste collection. Please provide details of loading dock operations in relation to waste collection and if any potential mitigation measures are required to address impacts from waste collection activities?

Please provide a response by Monday, 26 February 2024 or please notify us when a response will be provided if that timeline is an issue.

Feel free to contact me on 9274 6531 if you wish to discuss.

Thanks  
Megan

**Megan Fu**

Principal Planner, Social and Infrastructure Assessments  
Infrastructure Assessments  
**Department of Planning, Housing and Infrastructure**

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12 Darcy Street  
Parramatta NSW 2150



I acknowledge the traditional custodians of the land and pay respects to Elders past and present. I also acknowledge all Aboriginal and Torres Strait Islander staff working with the NSW Government.

Please consider the environment before printing this email.

Our ref: 18TSA

7<sup>th</sup> March 2024

Alex Lisney  
Senior Project Manager  
TSA  
[REDACTED]



Dear Alex

**Re: Hammondcare SSD Application - Greenwich Hospital**

I refer to your request for clarification from the Department of Planning, Housing and Infrastructure (DPHI). as part of the SSD for Greenwich Hospital. The clarification sought by DPHI was as follows;

*We note that the Bushfire Protection Assessment (BPA) identified in Section 3.3 that “It is recommended that the entire site, with the exception of the currently vegetated area to the south west of the site (OPA) be managed as an Inner Protection Area (IPA). However, the recommendations of the BPA does not include this but recommends that “APZs are to be provided to the proposed development as outlined in Table 2-2 and as generally depicted within SCHEDULE 1.”*

*We note that the APZ outlined in Table 2-2 and depicted within Schedule 1 is a 23 metre portion of the site that adjoins the bushland to the south-west. Please clarify whether the intention is to manage the APZ only or the remainder of the site as an IPA and the bushland as an OPA? We note that IPAs are limited to 15 per cent canopy cover and the proposed development would exceed that as would the bushland in relation to OPA. Please identify if any landscape changes are required to manage bush fire risk or further clarification from a bushfire consultant confirming that the landscaping meets asset protection zone requirements?*

*Also, the current landscape plans seeking approval have been modified since the bushfire assessment was undertaken. Please provide confirmation from the bushfire consultant that the latest plans meet the requirements for IPAs, including canopy cover? Also, please provide heights of trees for bushland regeneration planting?*

There are several queries to be considered.

In regard to the first part of the query DPHI is reviewing the wrong report in that they have reviewed the 6 April 2022 report prepared by Travers Bushfire & Ecology. This was prepared for the draft EIS and to which the RFS subsequently wrote to DPHI on 28<sup>th</sup> February 2023 whereby they provided DPHI with their requirements for the project to consider.

Travers Bushfire & Ecology responded to those requirements with a revised submission authored by the undersigned and dated 17<sup>th</sup> July 2023. That is the report that the department should be relying on.

In hindsight we now recognize the April 2022 version made reference to both an OPA and the need for an IPA over the entire site. The latter is a typical approach often made by the RFS when approving seniors living developments where a complete new canvas is occurring in a typical bushfire prone area. This ensures that contiguous vegetation should not occur which could potentially extend the hazards to within the new seniors living area.

## Amendment to the APZ

In the case of this development the design intention is to locate a new development within a predominant urban environment along with its existing internal landscape values. Given the site is also a mix of mapped bushfire prone lands and non-mapped bushfire prone lands than the project makes it somewhat difficult to interpret RFS guidelines.

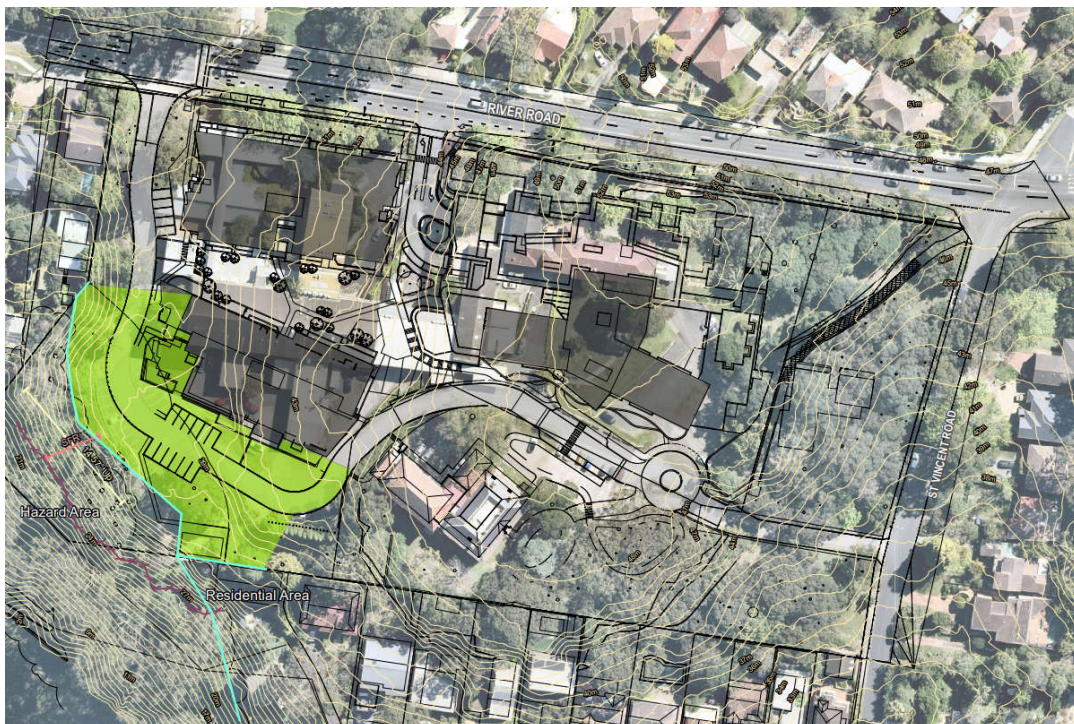
In the July 2023 report we provided an RFS compliant design which was based on a 23m setback from the hazards. In hindsight this approach makes it difficult for the department to identify the 'APZ management area' and to ensure consistency between the needs for bushfire protection and the needs for landscape planning.

A recent site inspection by the undersigned on 4<sup>th</sup> March 2024 reviewed the landscape plan prepared by *Taylor Brammer* 29<sup>th</sup> August 2023 with the unmanaged bushfire hazard areas in the area of the current southern car park – see Figure 1.

As a result of that inspection we have amended the hazard interface line to better reflect the intent of the landscaping plans and the proximity of a previously unknown dwelling located in the adjoining residential zone – see the aqua colored line shown below in Figure 1; or the larger A3 version provided in Appendix 1 attached. The aqua line extends south into neighboring residential lands to show the extent of the bushfire hazard.

On the inspection we found a dwelling to the immediate south which we had not recognized before (due to dense vegetation screening) and subsequently we have had to amend the edge of the hazard to ensure that the hazard planning was no closer to that dwelling than it was previously.

We also simplified the APZ area on the plan as extending from the hazard outwards from the bushland hazard (represented by the aqua colored line) to the nearest building being Seniors Living South – see Figure 1.



**Figure 1** — location of proposed APZ for Greenwich Hospital



**Figure 2** – landscape design (*Taylor Brammer* August 2023 – Revision C)

**Clarification of the varying vegetation conditions relevant to the overall site**

As noted above there is an inconsistency with the site conditions in that vegetation in the east, surrounding the Respite Building, is not mapped as bushfire prone and as a result is not captured by the need to formally protect nearby buildings from that vegetation assemblage by Section 100B of the Rural Fires Act.

The introduction of the Respite Building into that assemblage will reduce that vegetation mass and break up the north south contiguity and we agree that this vegetation assemblage, being adjacent to St Vincents Road, is not bushfire prone nor is it linked to bushfire prone vegetation.

Whilst on site the undersigned undertook a particularly close inspection of the Pallister building and the mature trees located on its southern and southwestern aspect. We noted the sandstone garden that frames this landscape – see Photo 1. This assemblage is dominated by one large tree being Tree 108 (*Eucalyptus pilularis* Black Butt) as depicted in the *Tree Impact Assessment Report and Tree Management Plan* prepared by Mark Bury Consulting dated 27<sup>th</sup> September 2021. Several other trees (Trees 107, 111 & 112) are located in the assemblage under the canopy of Tree 108. This clump amounts to 170m<sup>2</sup> in area.

The vegetation in and around the Pallister Building will not be subject to IPA or OPA regimes as that vegetation assemblage is external to the bushfire prone mapping and is external to the mapped 23m distance – as shown on Figure 1.

Therefore, in the management of the APZ we are required to comply with Appendix 4 of *Planning for Bushfire Protection 2019 (PBP)* – see Appendix 2 herein. This guideline identifies the requirements when designing / constructing the asset protection zone and in this case that zone is shown as the green areas on Figure 1.

In terms of managing the remaining vegetation on the site the first observation is that the new development seeks to intensify the site and with that the provision of buildings, roads, parking areas and landscape features, which together, significantly reduces the possibility of the site having excess vegetation and or extending bushfire hazards.



**Photo 1** - Looking northeast towards Pallister building

Therefore, whilst the remainder of the site is not mapped as APZ and need not be managed as an APZ for the purposes of bushfire protection the area can gain from an allied vegetation management protocol that ensures ongoing mowing and pruning etc'.

A valuable approach is as per our advice in the vegetation management plan prepared by Travers Bushfire & Ecology dated March 2022 to use the RFS document entitled *Standards for Asset Protection Zones*. This provides advice on vegetation management inclusive of thinning, pruning and the removal of excessive fuels – see Appendix 3 attached.

#### **Application of the 15% canopy cover in the APZ**

The mapped APZ covers an area of 3,308m<sup>2</sup> and 15% of that area would be 496 m<sup>2</sup>. A review of the landscape plans makes it difficult to calculate the final extent of planting area within the overall APZ area however a visual depiction of those plans reveals that the planting extent would be less than 15%.

#### **References to OPA**

We note the reference to the OPA in the April 2022 bushfire protection assessment report in Table 3.1 whereby it referred to an existing weed infested area that should be rehabilitated and managed as an Outer Protection Zone (OPA).

This notation was also referred to in the VMP – see page 3 under vegetation management specifications dot point 6. This refers to managing an area of PCT 1841 (200m<sup>2</sup>) as an OPA. This area is located as per Figure 3 below in red polygon.

From a bushfire danger perspective this vegetation is narrow and currently managed as a garden with mature trees and very little in the garden zone below the canopy – see Photos 2 and 3. This vegetation acts as a privacy screen to the private residence to the immediate west. We do not regard this vegetation as a bushfire hazard and we have removed it from being an APZ on that basis.



Figure 3 – extract from vegetation management plan March 2022



Photo 2 – Looking northwest towards adjacent residence



Photo 3 – looking northwest into garden area

## Heights of trees for bushland regeneration planting

A query by DPHI is in relation to the heights of trees for bushland regeneration planting. The extent of tree height is not limited but the canopy cover extent is limited to 15% of the IPA.

Canopy cover is estimated in accordance with the following protocol: *Foliage projective covers of overstorey and understorey mature vegetation in Australia* (R.L. Specht, 1970)

The technique measures the canopy openness (or open space) in the canopy by looking up into the canopy to estimate the percentage of canopy present vs the overall volume of the canopy being measured. This allows the practitioner undertaking the assessment to consider the difference between a tree with a sparse canopy foliage cover as opposed to a tree with a very dense tree canopy foliage cover.

A visual graphic is used to assist the determination of the open space in the canopy.

This approach was valuable for Australian vegetation measurements because of the unique structure and form of the eucalyptus / angophora tree canopies as opposed to more dense European conifer trees.

The result enables a clear depiction of foliage cover, against a base standard, and enables an accurate calculation of the percentage of the tree canopy cover rather than calculating a solid mass of tree canopy foliage cover within the surveyed edge of the tree canopy.

This technique can assist in reducing the need to be excessively harsh in the removal of native vegetation and biodiversity within an APZ by utilizing the benefits of a large sparse canopy on one tree to offset the need to remove say another smaller dense canopy tree

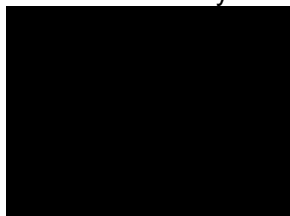
## Recommendations

The development consent should refer to the following;

- The development is required to provide an APZ as shown on the Travers Bushfire & Ecology dated 7 March 2024.
- The APZ area should be designed / constructed in accordance with Appendix 4 of PBP 2019.
- The non-APZ areas (being the remainder of the development footprint) should be managed as per the vegetation management guidelines of the RFS Standards for Asset Protection Zones (in particular Step 4; Items 1 to 3).

Should you require any assistance in this matter please contact John Travers at [REDACTED] or at [REDACTED].

Yours faithfully



John Travers BA Sc / Ass Dip / Grad Dip  
Consultant





## **Appendix 1**

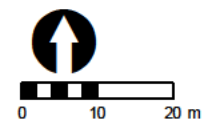
**Revised APZ plan dated 7 March 2024**



DISCLAIMER: CAD not georeferenced & has been aligned to LPI boundaries. Verification by a registered surveyor required prior to finalisation

- Legend**
- Contour 1m (source: LiDAR)
  - Escarpment edge
  - Edge of hazard
  - Access road
  - Building (proposed)
  - Asset Protection Zone (APZ) (3308.23 m2)

Aerial source: Nearmap



Disclaimer: The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy, the location of all mapped features are to be confirmed by a registered surveyor.

**PROJECT & MXD REFERENCE**  
 97 - 115 River Road,  
 Greenwich  
 18TSA08\_BF002

**DATE & ISSUE NUMBER**  
 7/03/2024  
 Issue 1  
 AG

**SCALE & COORDINATE SYSTEM**  
 1:1,000 @A3  
 GDA 1994 MGA Zone 56

**TITLE**  
 Schedule 1 - Bushfire Protection Measures

Document Path: N:\GIS STORAGE\N Drive\18TSA08\_RiverRoad\_Greenwich\MXD\18TSA08\_BF002.mxd



## **Appendix 2**

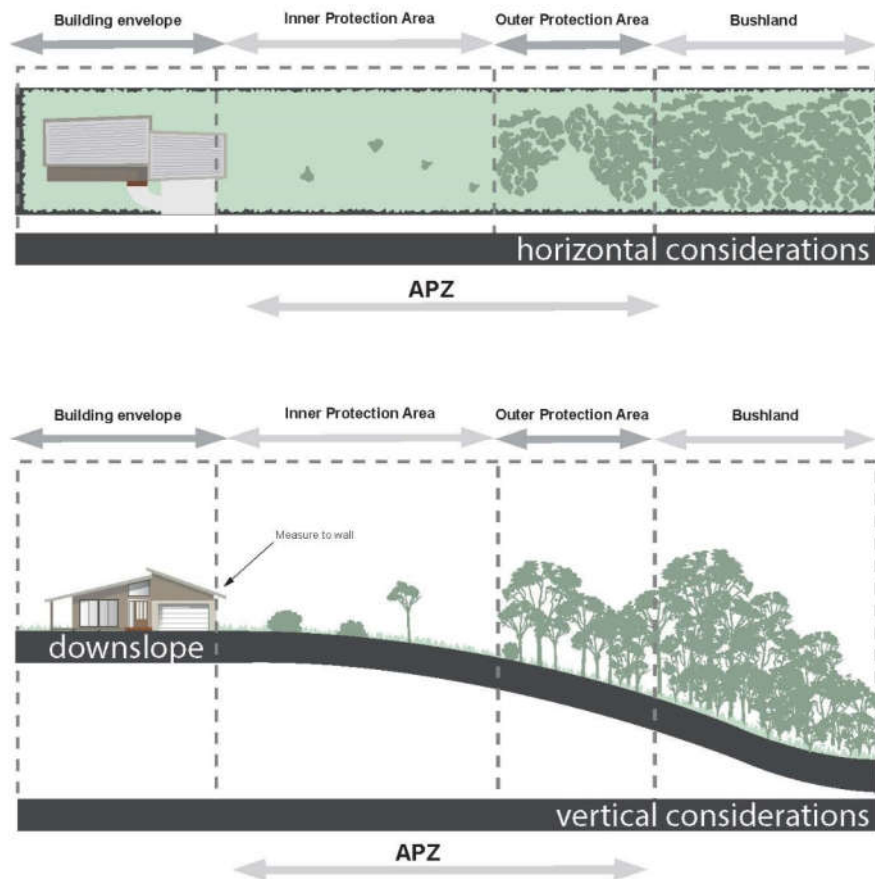
### **Asset Protection Zone Requirements (RFS, 2019)**

# MANAGEMENT OF ASSET PROTECTION ZONES

The RFS provides basic advice in respect of managing APZs through documents such as *Standards for Asset Protection Zones* (FS, 005), with an obligation to comply with Appendix 4 of *BPP*.

In fire threat areas an APZ may consist of two subordinate areas, an inner protection area (IPA) and an outer protection area (OPA). The IPA is the area immediately surrounding the building and the OPA (up to 30% of the total APZ width) is between the IPA and the bushland.

A typical APZ is graphically represented below.



## APZs and progressive reduction in fuel loads

Source: BPP, 2019

**Note:** Vegetation management as shown is for illustrative purposes only. Specific advice is to be sought regarding vegetation removal and retention from a qualified and experienced expert to ensure APZs comply with the RFS performance criteria.

The following table adapted from *BPP 2019* provides maintenance advice for vegetation within the IPA and OPA. The APZs should be maintained in perpetuity and maintenance should be undertaken regularly, particularly in advance of the bushfire season.

	Inner Protection Area	Outer Protection Area
Trees	<ul style="list-style-type: none"> <li>➤ Tree canopy cover should be less than 15% at maturity;</li> <li>➤ Trees at maturity should not touch or overhang the building;</li> <li>➤ Lower limbs should be removed up to a height of 2m above the ground;</li> <li>➤ Tree canopies should be separated by 2 to 5m; and</li> <li>➤ Preference should be given to retaining smooth barked and evergreen trees.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Tree canopy cover should be less than 30%; and</li> <li>➤ Canopies should be separated by 2 to 5m.</li> </ul>
Shrubs	<ul style="list-style-type: none"> <li>➤ Large discontinuities or gaps in the vegetation should be provided to slow down or break the progress of fire towards buildings;</li> <li>➤ Shrubs should not be located under trees;</li> <li>➤ Shrubs should form less than 10% ground cover; and</li> <li>➤ Clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of the vegetation.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Shrubs should not form a continuous canopy; and</li> <li>➤ Shrubs should form less than 20% of ground cover.</li> </ul>
Grass and Leaf Litter	<ul style="list-style-type: none"> <li>➤ Grass should be kept mown to a height of less than 100mm; and</li> <li>➤ Leaves and other debris should be removed</li> </ul>	<ul style="list-style-type: none"> <li>➤ Grass should be kept mown to a height of less than 100mm; and</li> <li>➤ Leaf and other debris should be removed.</li> </ul>

	All Management Zones
Weeds	<ul style="list-style-type: none"> <li>➤ All weeds should be removed in accordance with best practice guidelines, and measures taken to prevent their further spread</li> </ul>
Landscaping	<ul style="list-style-type: none"> <li>➤ Suitable impervious areas being provided immediately surrounding the building such as courtyards, paths and driveways;</li> <li>➤ Restrict planting in the immediate vicinity of the building which may over time and if not properly maintained come into contact with the building;</li> <li>➤ When considering landscape species consideration needs to be given to estimated size of the plant at maturity;</li> <li>➤ Avoid species with rough fibrous bark, or which retain/shed bark in long strips or retain dead material in their canopies;</li> <li>➤ Use smooth bark species of trees species which generally do not carry a fire up the bark into the crown;</li> <li>➤ Avoid planting of deciduous species that may increase fuel at surface / ground level (i.e. leaf litter);</li> <li>➤ Avoid climbing species to walls and pergolas;</li> <li>➤ Locate combustible materials such as woodchips / mulch, flammable fuel stores away from the building;</li> <li>➤ Locate combustible structures such as garden sheds, pergolas and materials such timber garden furniture way from the building; and</li> <li>➤ Use of low flammability vegetation species.</li> </ul>

## **Appendix 3**

### **Standards for Asset protection Zones (RFS, 2006)**



## STANDARDS FOR ASSET PROTECTION ZONES

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## INTRODUCTION

For thousands of years bush fires have been a natural part of the Australian landscape. They are inevitable and essential, as many Australian plants and animals have adapted to fire as part of their life cycle.

In recent years developments in bushland areas have increased the risk of bush fires harming people and their homes and property. But landowners can significantly reduce the impact of bush fires on their property by identifying and minimising bush fire hazards. There are a number of ways to reduce the level of hazard to your property, but one of the most important is the creation and maintenance of an Asset Protection Zone (APZ).

A well located and maintained APZ should be used in conjunction with other preparations such as good property maintenance, appropriate building materials and developing a family action plan.

## WHAT IS AN ASSET PROTECTION ZONE?

An Asset Protection Zone (APZ) is a fuel reduced area surrounding a built asset or structure. This can include any residential building or major building such as farm and machinery sheds, or industrial, commercial or heritage buildings.

An APZ provides:

- a buffer zone between a bush fire hazard and an asset;
- an area of reduced bush fire fuel that allows suppression of fire;
- an area from which backburning may be conducted; and
- an area which allows emergency services access and provides a relatively safe area for firefighters and home owners to defend their property.

Potential bush fire fuels should be minimised within an APZ. This is so that the vegetation within the planned zone does not provide a path for the transfer of fire to the asset either from the ground level or through the tree canopy.

## WHAT WILL THE APZ DO?

An APZ, if designed correctly and maintained regularly, will reduce the risk of:

- direct flame contact on the asset;
- damage to the built asset from intense radiant heat; and
- ember attack on the asset.

## WHERE SHOULD I PUT AN APZ?

An APZ is located between an asset and a bush fire hazard.

The APZ should be located wholly within your land. You cannot undertake any clearing of vegetation on a neighbour's property, including National Park estate, Crown land or land under the management of your local council, unless you have written approval.

If you believe that the land adjacent to your property is a bush fire hazard and should be part of an APZ, you can have the matter investigated by contacting the NSW Rural Fire Service (RFS).

There are six steps to creating and maintaining an APZ. These are:

1. Determine if an APZ is required;
2. Determine what approvals are required for constructing your APZ;
3. Determine the APZ width required;
4. Determine what hazard reduction method is required to reduce bush fire fuel in your APZ;
5. Take measures to prevent soil erosion in your APZ; and
6. Landscape and regularly monitor in your APZ for fuel regrowth.

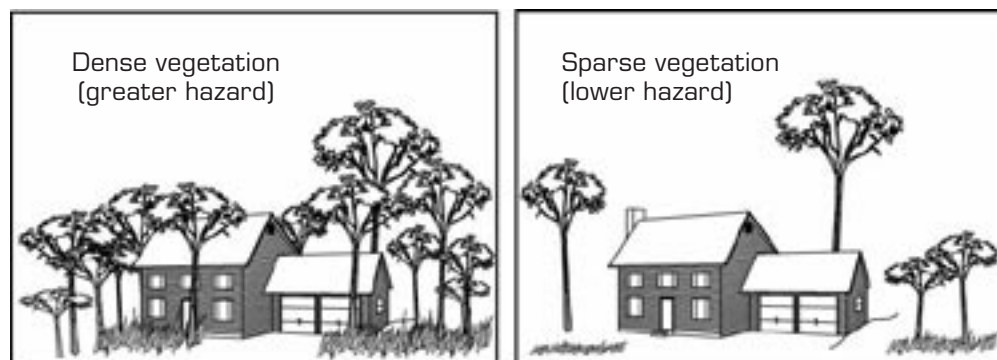
## STEP 1. DETERMINE IF AN APZ IS REQUIRED

Recognising that a bush fire hazard exists is the first step in developing an APZ for your property.

If you have vegetation close to your asset and you live in a bush fire prone or high risk area, you should consider creating and maintaining an APZ.

Generally, the more flammable and dense the vegetation, the greater the hazard will be. However, the hazard potential is also influenced by factors such as slope.

- A large area of continuous vegetation on sloping land may increase the potential bush fire hazard.
- The amount of vegetation around a house will influence the intensity and severity of a bush fire.
- The higher the available fuel the more intense a fire will be.



Isolated areas of vegetation are generally not a bush fire hazard, as they are not large enough to produce fire of an intensity that will threaten dwellings.

This includes:

- bushland areas of less than one hectare that are isolated from large bushland areas; and
- narrow strips of vegetation along road and river corridors.

If you are not sure if there is a bush fire hazard in or around your property, contact your local NSW Rural Fire Service Fire Control Centre or your local council for advice.

## STEP 2. DETERMINE WHAT APPROVALS ARE REQUIRED FOR CONSTRUCTING YOUR APZ

If you intend to undertake bush fire hazard reduction works to create or maintain an APZ you must gain the written consent of the landowner.

### **Subdivided land or construction of a new dwelling**

If you are constructing an APZ for a new dwelling you will need to comply with the requirements in *Planning for Bushfire Protection*. Any approvals required will have to be obtained as part of the Development Application process.

### **Existing asset**

If you wish to create or maintain an APZ for an existing structure you may need to obtain an environmental approval. The RFS offers a free environmental assessment and certificate issuing service for essential hazard reduction works. For more information see the RFS document *Application Instructions for a Bush Fire Hazard Reduction Certificate* or contact your local RFS Fire Control Centre to determine if you can use this approval process.

Bear in mind that all work undertaken must be consistent with any existing land management agreements (e.g. a conservation agreement, or property vegetation plan) entered into by the property owner.

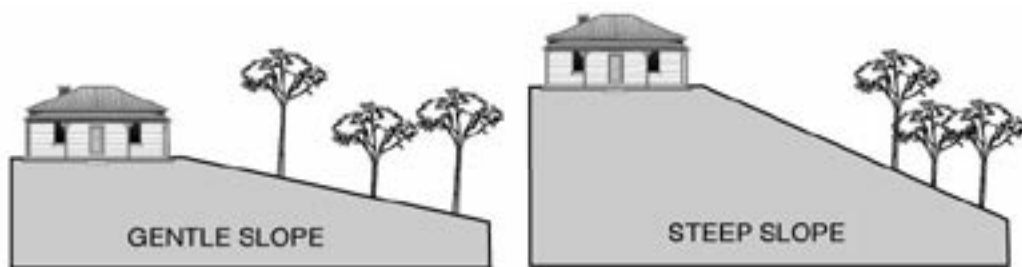
If your current development consent provides for an APZ, you do not need further approvals for works that are consistent with this consent.

If you intend to burn off to reduce fuel levels on your property you may also need to obtain a Fire Permit through the RFS or NSW Fire Brigades. See the RFS document *Before You Light That Fire* for an explanation of when a permit is required.

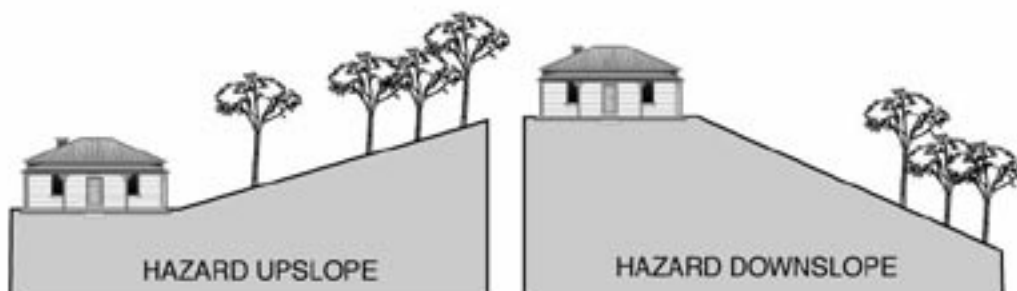
## STEP 3. DETERMINE THE APZ WIDTH

The size of the APZ required around your asset depends on the nature of the asset, the slope of the area, the type and structure of nearby vegetation and whether the vegetation is managed.

Fires burn faster uphill than downhill, so the APZ will need to be larger if the hazard is downslope of the asset.



Gentle slopes require a smaller APZ distance than steep slopes



A hazard downslope will require a greater APZ distance than a hazard upslope of the asset

Different types of vegetation (for example, forests, rainforests, woodlands, grasslands) behave differently during a bush fire. For example, a forest with shrubby understorey is likely to result in a higher intensity fire than a woodland with a grassy understorey and would therefore require a greater APZ width.

A key benefit of an APZ is that it reduces radiant heat and the potential for direct flame contact on homes and other buildings. Residential dwellings require a wider APZ than sheds or stockyards because the dwelling is more likely to be used as a refuge during bush fire.

#### **Subdivided land or construction of a new dwelling**

If you are constructing a new asset, the principles of *Planning for Bushfire Protection* should be applied. Your Development Application approval will detail the exact APZ distance required.

#### **Existing asset**

If you wish to create an APZ around an existing asset and you require environmental approval, the Bush Fire Environmental Assessment Code provides a streamlined assessment process. Your Bush Fire Hazard Reduction Certificate (or alternate environmental approval) will specify the maximum APZ width allowed.

For further information on APZ widths see *Planning for Bushfire Protection* or the *Bush Fire Environmental Assessment Code* (available on the RFS website), or contact your local RFS Fire Control Centre.

## **STEP 4. DETERMINE WHAT HAZARD REDUCTION METHOD IS REQUIRED TO REDUCE BUSH FIRE FUEL IN YOUR APZ**

The intensity of bush fires can be greatly reduced where there is little to no available fuel for burning. In order to control bush fire fuels you can reduce, remove or change the state of the fuel through several means.

Reduction of fuel does not require removal of all vegetation, which would cause environmental damage. Also, trees and plants can provide you with some bush fire protection from strong winds, intense heat and flying embers (by filtering embers) and changing wind patterns. Some ground cover is also needed to prevent soil erosion.

#### **Fuels can be controlled by:**

##### **1. raking or manual removal of fine fuels**

Ground fuels such as fallen leaves, twigs (less than 6 mm in diameter) and bark should be removed on a regular basis. This is fuel that burns quickly and increases the intensity of a fire.

Fine fuels can be removed by hand or with tools such as rakes, hoes and shovels.

##### **2. mowing or grazing of grass**

Grass needs to be kept short and, where possible, green.

##### **3. removal or pruning of trees, shrubs and understorey**

The control of existing vegetation involves both selective fuel reduction (removal, thinning and pruning) and the retention of vegetation.

Prune or remove trees so that you do not have a continuous tree canopy leading from the hazard to the asset. Separate tree crowns by two to five metres. A canopy should not overhang within two to five metres of a dwelling.

Native trees and shrubs should be retained as clumps or islands and should maintain a covering of no more than 20% of the area.

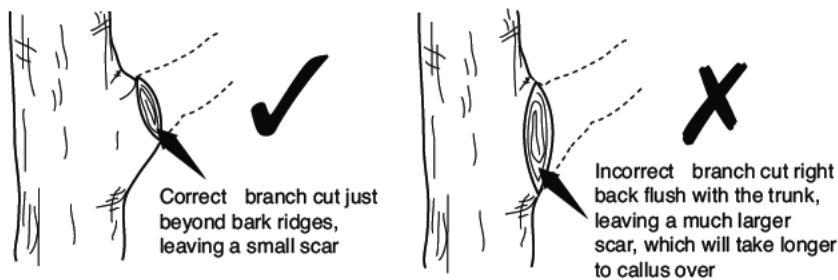
When choosing plants for removal, the following basic rules should be followed:

1. Remove noxious and environmental weeds first. Your local council can provide you with a list of environmental weeds or 'undesirable species'. Alternatively, a list of noxious weeds can be obtained at [www.agric.nsw.gov.au/noxweed/](http://www.agric.nsw.gov.au/noxweed/);
2. Remove more flammable species such as those with rough, flaky or stringy bark; and
3. Remove or thin understory plants, trees and shrubs less than three metres in height

The removal of significant native species should be avoided.

Prune in accordance with the following standards:

- Use sharp tools. These will enable clean cuts and will minimise damage to the tree.
- Decide which branches are to be removed before commencing work. Ensure that you maintain a balanced, natural distribution of foliage and branches.
- Remove only what is necessary.
- Cut branches just beyond bark ridges, leaving a small scar.
- Remove smaller branches and deadwood first.



There are three primary methods of pruning trees in APZs:

#### 1. Crown lifting (skirting)

Remove the lowest branches (up to two metres from the ground). Crown lifting may inhibit the transfer of fire between the ground fuel and the tree canopy.

#### 2. Thinning

Remove smaller secondary branches whilst retaining the main structural branches of the tree. Thinning may minimise the intensity of a fire.

#### 3. Selective pruning

Remove branches that are specifically identified as creating a bush fire hazard (such as those overhanging assets or those which create a continuous tree canopy). Selective pruning can be used to prevent direct flame contact between trees and assets.

Your Bush Fire Hazard Reduction Certificate or local council may restrict the amount or method of pruning allowed in your APZ.

See the *Australian Standard 4373 (Pruning of Amenity Trees)* for more information on tree pruning.

#### 4. Slashing and trittering

Slashing and trittering are economical methods of fuel reduction for large APZs that have good access. However, these methods may leave large amounts of slashed fuels (grass clippings etc) which, when dry, may become a fire hazard. For slashing or trittering to be effective, the cut material must be removed or allowed to decompose well before summer starts.

If clippings are removed, dispose of them in a green waste bin if available or compost on site (dumping clippings in the bush is illegal and it increases the bush fire hazard on your or your neighbour's property).

Although slashing and trittering are effective in inhibiting the growth of weeds, it is preferable that weeds are completely removed.

Care must be taken not to leave sharp stakes and stumps that may be a safety hazard.

### **5. Ploughing and grading**

Ploughing and grading can produce effective firebreaks. However, in areas where this method is applied, frequent maintenance may be required to minimise the potential for erosion. Loose soil from ploughed or graded ground may erode in steep areas, particularly where there is high rainfall and strong winds.

### **6. Burning (hazard reduction burning)**

Hazard reduction burning is a method of removing ground litter and fine fuels by fire. Hazard reduction burning of vegetation is often used by land management agencies for broad area bush fire control, or to provide a fuel reduced buffer around urban areas.

Any hazard reduction burning, including pile burns, must be planned carefully and carried out with extreme caution under correct weather conditions. Otherwise there is a real danger that the fire will become out of control. More bush fires result from escaped burning off work than from any other single cause.

**It is YOUR responsibility to contain any fire lit on your property. If the fire escapes your property boundaries you may be liable for the damage it causes.**

Hazard reduction burns must therefore be carefully planned to ensure that they are safe, controlled, effective and environmentally sound. There are many factors that need to be considered in a burn plan. These include smoke control, scorch height, frequency of burning and cut off points (or control lines) for the fire. For further information see the RFS document *Standards for Low Intensity Bush Fire Hazard Reduction Burning*, or contact your local RFS for advice.

### **7. Burning (pile burning)**

In some cases, where fuel removal is impractical due to the terrain, or where material cannot be disposed of by the normal garbage collection or composted on site, you may use pile burning to dispose of material that has been removed in creating or maintaining an APZ.

For further information on pile burning, see the RFS document *Standards for Pile Burning*.

In areas where smoke regulations control burning in the open, you will need to obtain a Bush Fire Hazard Reduction Certificate or written approval from Council for burning. During the bush fire danger period a Fire Permit will also be required. See the RFS document *Before You Light that Fire* for further details.

## STEP 5. TAKE MEASURES TO PREVENT SOIL EROSION

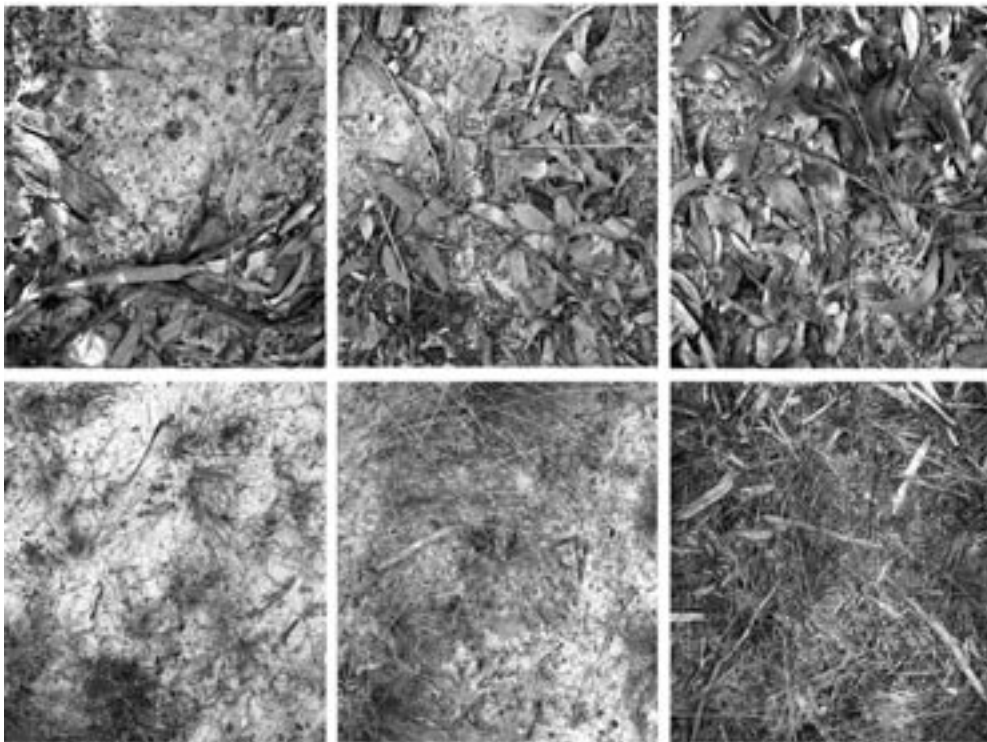
While the removal of fuel is necessary to reduce a bush fire hazard, you also need to consider soil stability, particularly on sloping areas.

Soil erosion can greatly reduce the quality of your land through:

- loss of top soil, nutrients, vegetation and seeds
- reduced soil structure, stability and quality
- blocking and polluting water courses and drainage lines

A small amount of ground cover can greatly improve soil stability and does not constitute a significant bush fire hazard. Ground cover includes any material which directly covers the soil surface such as vegetation, twigs, leaf litter, clippings or rocks. A permanent ground cover should be established (for example, short grass). This will provide an area that is easy to maintain and prevent soil erosion.

When using mechanical hazard reduction methods, you should retain a ground cover of at least 75% to prevent soil erosion. However, if your area is particularly susceptible to soil erosion, your Hazard Reduction Certificate may require that 90% ground cover be retained.



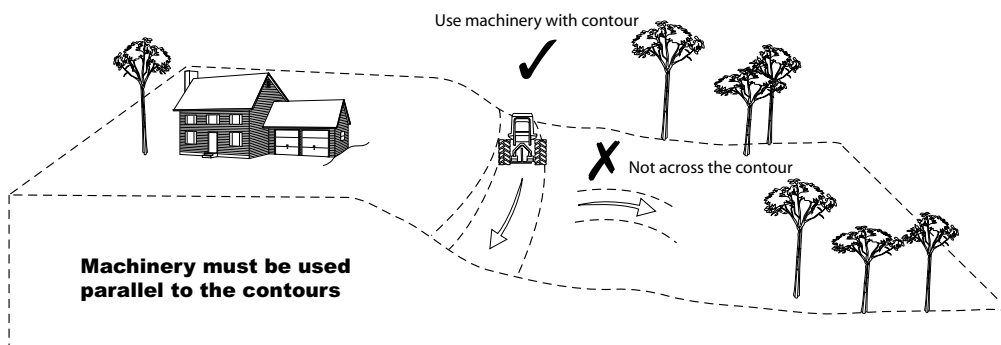
50%

75%

100%

Ground Cover

To reduce the incidence of soil erosion caused by the use of heavy machinery such as ploughs, dozers and graders, machinery must be used parallel to the contours. Vegetation should be allowed to regenerate, but be managed to maintain a low fuel load.



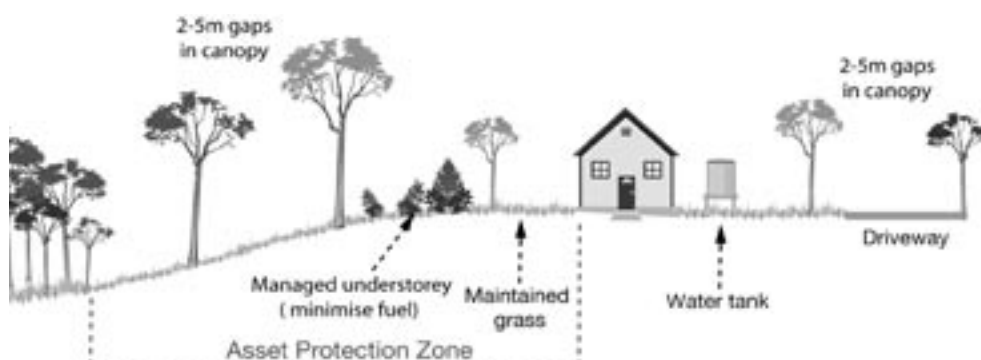
## STEP 6. ONGOING MANAGEMENT AND LANDSCAPING

Your home and garden can blend with the natural environment and be landscaped to minimise the impact of fire at the same time. To provide an effective APZ, you need to plan the layout of your garden to include features such as fire resistant plants, radiant heat barriers and windbreaks.

### Layout of gardens in an APZ

When creating and maintaining a garden that is part of an APZ you should:

- ensure that vegetation does not provide a continuous path to the house;
- remove all noxious and environmental weeds;
- plant or clear vegetation into clumps rather than continuous rows;
- prune low branches two metres from the ground to prevent a ground fire from spreading into trees;
- locate vegetation far enough away from the asset so that plants will not ignite the asset by direct flame contact or radiant heat emission;
- plant and maintain short green grass around the house as this will slow the fire and reduce fire intensity. Alternatively, provide non-flammable pathways directly around the dwelling;
- ensure that shrubs and other plants do not directly abut the dwelling. Where this does occur, gardens should contain low-flammability plants and non flammable ground cover such as pebbles and crush tile; and
- avoid erecting brush type fencing and planting “pencil pine” type trees next to buildings, as these are highly flammable.



### Removal of other materials

Woodpiles, wooden sheds, combustible material, storage areas, large quantities of garden mulch, stacked flammable building materials etc. should be located away from the house. These items should preferably be located in a designated cleared location with no direct contact with bush fire hazard vegetation.

### Other protective features

You can also take advantage of existing or proposed protective features such as fire trails, gravel paths, rows of trees, dams, creeks, swimming pools, tennis courts and vegetable gardens as part of the property's APZ.

## PLANTS FOR BUSH FIRE PRONE GARDENS

When designing your garden it is important to consider the type of plant species and their flammability as well as their placement and arrangement.

Given the right conditions, all plants will burn. However, some plants are less flammable than others.



Trees with loose, fibrous or stringy bark should be avoided. These trees can easily ignite and encourage the ground fire to spread up to, and then through, the crown of the trees.

- Plants that are less flammable, have the following features:
- high moisture content
  - high levels of salt
  - low volatile oil content of leaves
  - smooth barks without “ribbons” hanging from branches or trunks; and
  - dense crown and elevated branches.

When choosing less flammable plants, be sure not to introduce noxious or environmental weed species into your garden that can cause greater long-term environmental damage.

For further information on appropriate plant species for your locality, contact your local council, plant nurseries or plant society.

If you require information on how to care for fire damaged trees, refer to the Firewise brochure *Trees and Fire Resistance; Regeneration and care of fire damaged trees*.

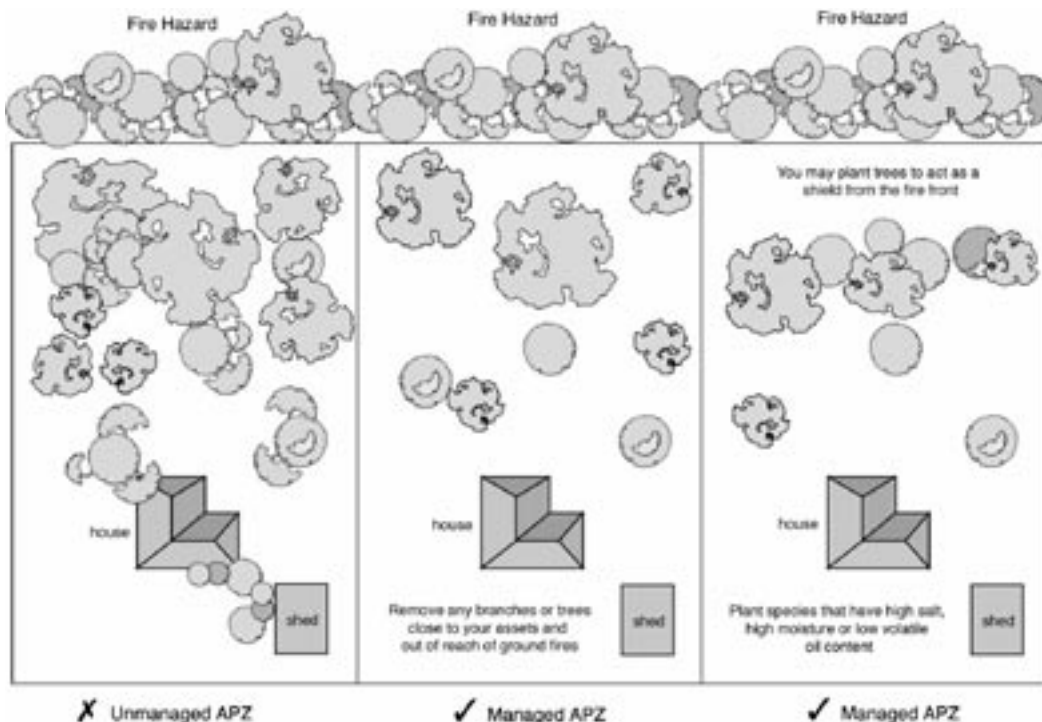
## WIND BREAKS

Rows of trees can provide a wind break to trap embers and flying debris that could otherwise reach the house or asset.

You need to be aware of local wind conditions associated with bush fires and position the wind break accordingly. Your local RFS Fire Control Centre can provide you with further advice.

When choosing trees and shrubs, make sure you seek advice as to their maximum height. Their height may vary depending on location of planting and local conditions. As a general rule, plant trees at the same distance away from the asset as their maximum height.

When creating a wind break, remember that the object is to slow the wind and to catch embers rather than trying to block the wind. In trying to block the wind, turbulence is created on both sides of the wind break making fire behaviour erratic.



## HOW CAN I FIND OUT MORE?

The following documents are available from your local Fire Control Centre and from the NSW RFS website at [www.rfs.nsw.gov.au](http://www.rfs.nsw.gov.au).

- Before You Light That Fire
- Standards for Low Intensity Bush Fire Hazard Reduction Burning
- Standards for Pile Burning
- Application Instructions for a Bush Fire Hazard Reduction Certificate

If you require any further information please contact:

- your local NSW Rural Fire Service Fire Control Centre.  
Location details are available on the RFS website or
- call the NSW RFS Enquiry Line 1800 679 737  
(Monday to Friday, 9am to 5pm), or
- the NSW RFS website at [www.rfs.nsw.gov.au](http://www.rfs.nsw.gov.au).

**Produced by the NSW Rural Fire Service, Locked Mail Bag 17,  
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[www.rfs.nsw.gov.au](http://www.rfs.nsw.gov.au)