

Appendix E – Bushfire Management Plan



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Bushfire Management Plan

Lot 201 Pollino Gardens, Landsdale

Prepared for
Urbis
by Strategen

October 2016

Bushfire Management Plan

Lot 201 Pollino Gardens, Landsdale

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1. Introduction

On behalf of the landowner, Urbis is proposing to lodge a subdivision application for Lot 201 Pollino Street, Landsdale (the project area). The subdivision plan aims to create three lots ranging in size from 2602 m²–6380 m² (Figure 1).

The project area is located within a designated bushfire prone area as per the Western Australia State Map of Bush Fire Prone Areas (DFES 2016) and consequently, a Bushfire Management Plan (BMP) is required to support the subdivision application in accordance with *State Planning Policy 3.7 Planning in Bushfire-Prone Areas* (SPP 3.7; WAPC 2015a) and *Guidelines for Planning in Bushfire-Prone Areas* (the Guidelines; WAPC 2015b).

1.1 Purpose and application of the plan

The purpose of the BMP is to provide guidance on how to plan for and manage the potential bushfire risk to future assets of the project through implementation of a range of bushfire risk mitigation measures. The BMP outlines how future on-site assets can be protected during the summer months when the threat from bushfire is at its peak. This is particularly relevant when existing fire appliances in the area may be unable to offer an immediate emergency suppression response; therefore, development planning and design should aim to provide mitigation strategies that protect future life and property from bushfire as a priority.



Legend

- Site Boundary
- 100m Assessment Area
- Proposed Layout
- Proposed Access Road
- Emergency Access Route

Scale: 1:1,500 @ A3

0 5 10 20 30 40 50 Meters

Coordinate System: GDA 1994 MGA Zone 50
 Note: Position errors may occur in some areas
 Date: 7/10/2016
 Author: ENVIRONMAPS
 Source: Cadastre - Landgate, 2016
 Orthophoto - Nearmap, 24.07.16
 Proposed Layout - URBIS, 04.10.16



Bushfire Management Plan Landsdale
 Site Overview

Figure
 1

2. Spatial consideration of bushfire threat

2.1 Existing site characteristics

2.1.1 Location

The project area comprises Lot 201 Pollino Gardens, Landsdale, in the City of Wanneroo (CoW), located approximately 18 km north of the Perth Central Business District (Figure 1).

The project area encompasses 1.29 ha and is bound by the following, as depicted in Figure 1:

- Gnangara Road and woodland bushland to the north
- residential development to the south
- a stormwater drainage area and residential development to the east
- residential development and cleared land in preparation for development to the west.

2.1.2 Zoning and land use

The project area is zoned as 'Urban Development' under the City of Wanneroo District Planning Scheme No. 2 (DPS 2) and 'Urban' under the Metropolitan Region Scheme (MRS). Land surrounding the Project area is zoned as:

- 'General Rural' on the other side of Gnangara Road under DSP 2 and 'Other Regional Roads' and then 'Rural' under the MRS to the north
- 'Urban Development' and 'Residential' under DPS 2 and 'Urban' under the MRS to the south and east
- 'Urban development' under DPS 2 and 'Urban' under the MRS to the west.

2.1.3 Assets

There is no infrastructure currently present on the project area. The development of the project area will significantly increase the critical life and property assets of the site by intensifying the number of inhabitants, visitors and built assets across the Project area.

There are no significant environmental values contained on-site as a result of previous land use.

2.1.4 Access

The project area can currently be accessed via Bakana Loop to the west of the project area (Figure 1).

2.1.5 Water and power supply

Water and power supply services will be extended throughout the project area from surrounding areas of residential and industrial development if any infrastructure is proposed to be built in the future. This will result in provision of a reticulated water supply including emergency use fire hydrants, hose reels and underground power supply for proposed inhabitants.

2.2 Existing fire environment

2.2.1 Vegetation

Classified vegetation

Strategen undertook an assessment of the pre-development vegetation within the project area and the 100 m of the surrounding land on 12 August 2016. The project area and adjacent land has been subject to various levels of vegetation disturbance as a result of clearing for development purposes.

The project area itself currently contains fragmented woodland vegetation that is intersected by dirt tracks and surrounded firebreaks. Land within 100 m of the project area contains:

- Gnangara road and woodland vegetation to the north
- Pollino gardens (road) and residential properties to the south
- Priest road and residential properties and scrub and grassland vegetation to the east
- woodland vegetation and cleared land and residential properties to the west.

Pre-development vegetation within the project area and the surrounding 100 m was assessed by Strategen comprises the following vegetation classes assessed in accordance with the *Visual guide for bushfire risk assessment in Western Australia* (DoP 2016) and AS 3959-2009:

- Class B Woodland (Plate 1, Plate 2,)
- Class D Scrub (Plate 3)
- Class G Grassland (Plate 4)
- excluded area as per Clauses 2.2.3.2 (e) and (f) of AS3959-2009 (Plate 5–Plate 7).

The extent and location of the vegetation within the project area and the surrounding 100 m of land prior to subdivision is depicted in Figure 2.

The project area is proposed to be cleared prior to subdivision. This will remove all classified vegetation from within the project area and consequently any bushfire risk associated with it. The proposed clearing is reflected in the BAL assessment in Section 2.4 and Figure 4.

2.2.2 Site topography and slope under vegetation

The project area is relatively flat rising gently from approximately 48 metres Australian Height Datum (mAHD) in the northeast corner to approximately 52 mAHD in the south.

The following information summarises the slope characteristics under the classified vegetation to inform the BAL assessment outlined in Section 2.4 and depicted in Figure 2:

- slope under classified vegetation to the north and southwest is down-slope at an angle of 0–5 degrees in relations to the project area
- slope under classified vegetation to the east and northwest is upslope or on flat land in relation to the project area.



Plate 1: Class B woodland vegetation to the north of the project area



Plate 2: Class B woodland vegetation within the project area



Plate 3: Class D scrub within the eastern portion of the project area



Plate 4: Class G grassland to the east of the project area associated with a drainage area with Class D Scrub surrounding the drain



Plate 5: Excluded areas west of the project area consistent with Clause 2.2.3.2 (e) of AS 3959 2009

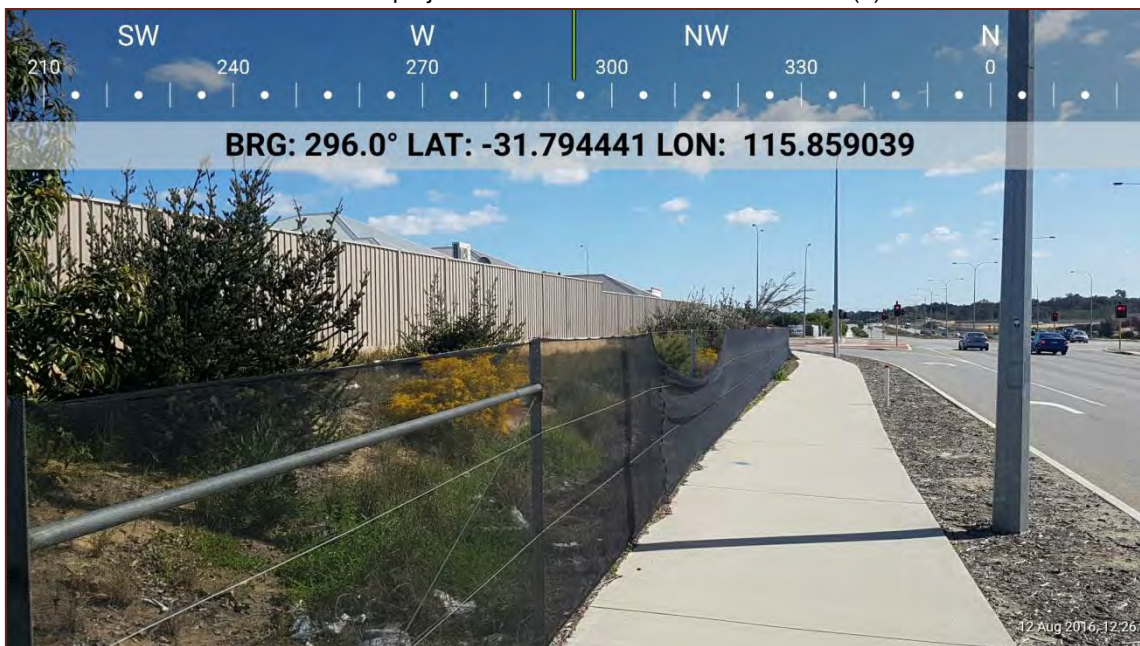


Plate 6: Excluded areas northwest of the project area consistent with Clauses 2.2.3.2 (e) & (f) of AS 3959 2009



Plate 7: Excluded areas west of the project area consistent with Clause 2.2.3.2 (e) of AS 3959 2009



2.2.3 Bushfire weather conditions

Worst case bushfire weather condition

Southwest Western Australia generally experiences a cool to mild growing season in the months of August through to November of each year, followed by four months of summer drought conditions, which is when the potential for bushfire occurrence is at its peak.

Worst case (adverse) bushfire weather conditions can occur during this dry period when a low pressure trough forms off the west coast and strong winds develop from the north or northeast. These conditions are sometimes associated with 'Extreme' or 'Catastrophic' fire dangers, which are consistent with very high temperatures, low relative humidity and very strong winds. Based on the predominant summer climatic conditions of the local area, 'Extreme' and 'Catastrophic' fire dangers normally occur less than 5% of the time during the designated bushfire season, which equates to around six days between December and March (McCaw & Hanstrum 2003).

Predominant bushfire weather conditions

Predominant fire weather conditions are considered to occur 95% of the time during the designated bushfire season and these conditions generally align with average summer climatic conditions of the locality.

Average 9:00 am and 3:00 pm January wind profiles for Perth Metro weather station (approximately 16.5 km to the south) are contained in Appendix 1. These illustrate that the predominant winds during the designated bushfire season are from the east in the morning averaging 13.9 km/h; and from the southwest in the afternoon averaging around 19.0 km/h (BoM 2016).

The mean 9:00 am and 3:00 pm relative humidity for Perth Metro weather station during the designated bushfire season is around 51% and 39% respectively, with average monthly maximum temperatures peaking at around 31.7°C in February.

The predominant bushfire weather conditions discussed above correlate with an average fire danger index of 'High', as determined using the Commonwealth Science and Industrial Research Organisation (CSIRO) Fire Danger and Fire Spread Calculator (CSIRO 1999).

2.2.4 Bushfire history, fuel age, risk of ignition and potential ignition sources

Vegetation within and directly adjacent to the project area does not contain any evidence of recent bushfire occurrence outlined in the recent Landgate firewatch data; however, there is evidence of a moderately sized fire in 2006 located approximately 1.2 km to the east and northeast of the project area associated with vegetation surrounding Gngangara Lake (Landgate 2016).

Woodland vegetation to the north although fragmented by semi-rural properties, contains a moderate amount of near-surface fuels and has a long fire run (approximately 2.7 km) as it connects with wetland vegetation associated with Gngangara Lake; consequently, fuel loads are classified as 'Extreme'. Vegetation to the east is associated with a drain and has a very short bushfire run (approximately 100 m long); consequently, the fuel loads are classified as 'Moderate'. Vegetation to the west of the project area is isolated and very small in size; consequently, the fuel loads are classified as 'Moderate'.

The risk of ignition pre-development was assessed as low throughout the project area due to the low levels of public access and visitation. The risk of ignition will potentially increase due to the long unburnt nature of the vegetation surrounding the project area, fuel loads and increasing levels of public access and inhabitant occupancy at the bushland interface. The mitigation measures within this BMP are proposed to effectively manage the fire hazard associated with the project area.

The potential sources of ignition in the area are expected to be from:

- deliberately lit fire (i.e. arson)
- lightning strike
- accidental causes, such as vehicle accidents and sparks from vehicle exhausts
- escapes from unauthorised camp fires, particularly throughout the broader fire environment and bushland reserves
- escapes from prescribed burns
- pole-top fires
- incorrect disposal of cigarettes.

2.2.5 Potential bushfire scenarios

Bushfire runs in land adjacent to the project area are both short (approximately 100 m to the east) and long in size (approximately 2.7 km to the north of vegetation with a canopy width of 20 m or greater). The bushfire run to the north is associated with wetland vegetation surrounding Gngangara Lake.

Based on the above and fire history, a bushfire certainly has the potential to ignite and occur in and around the project area, particularly in the north. The long sized bushfire runs to the north may facilitate significantly elevated levels of radiant heat and ember attack as a result of the bushfire potentially reaching its full rate of spread potential.

Bushfire impacts are most likely to be received from the east and north in the morning and west in the afternoon in association with the predominant prevailing winds during the bushfire season.

2.2.6 Bushfire suppression response capability

Local volunteer Bush Fire Brigades stationed at Wanneroo and West Swan are expected to provide a best case emergency suppression response time of 40 minutes should a bushfire threaten lives or homes on or adjacent to the project area.

2.3 Bushfire hazard assessment

Strategen has mapped the current bushfire hazard levels within 100 m of the project area (refer to Figure 3) on the basis of the vegetation classes identified in Section 2.2.1 and the slope under classified vegetation assessed in Section 2.2.2. The following bushfire hazard levels were assigned:

- Class B Woodland and to the north of the project area: 'Extreme'
- Class D Scrub and Class G Grassland to the east of the project area: 'Moderate'
- Class B Woodland to the west of the project area: 'Moderate'
- land within 100 m of classified vegetation: 'Moderate'
- all other land within the Project area and within 100 m of the project area: 'Low'.

2.4 BAL assessment

Vegetation with a 'Moderate' or 'Extreme' bushfire hazard level is considered bushfire prone and any proposed development within 100 m of the bushfire prone vegetation extent will require application of Australian Standard *AS 3959–2009 Construction of Buildings in Bushfire-prone Areas* (SA 2009) via implementation of increased building construction standards in response to the assessed Bushfire Attack Level (BAL).

All three of the proposed lots within the project area will be located within 100 m of classified vegetation, which will require a BAL response in accordance with AS 3959–2009 (Figure 4). This is largely consistent with findings of the *WA State Map of Bush Fire Prone Areas*.

The Method 1 procedure for calculating the BAL (as outlined in AS 3959–2009) incorporates the following factors:

- state-adopted FDI rating
- vegetation class
- slope under classified vegetation
- distance maintained between proposed development areas and the classified vegetation.

Based on the specified BAL, construction/separation requirements for proposed buildings can then be assigned.

2.4.1 Fire Danger Index

A blanket rating of FDI 80 is adopted for Western Australian environments, as outlined in AS 3959–2009 and endorsed by Australasian Fire and Emergency Service Authorities Council.

2.4.2 Vegetation class

Vegetation class is described in Section 2.2.1 and depicted in Figure 2 and consists of areas of woodland vegetation (Class B), scrub vegetation (Class D) and grassland vegetation (Class G). The project area will be cleared prior to subdivision and therefore classified as BAL low as discussed in Section 2.2.1.

Where BAL contours differ based on the different BAL application distances associated with the two vegetation classifications, the highest BAL has been applied (e.g. BAL 12.5 in Class B woodland vs. BAL 19 in Class D scrub – BAL 19 would be the end result).

2.4.3 Slope under classified vegetation

Slope under classified vegetation is assessed in Section 2.2.2, with a summary provided as follows on the basis of the surface elevations depicted in Figure 2:

- slope under classified vegetation to the north and southwest is down-slope at an angle of 0–5 degrees in relations to the project area
- slope under classified vegetation to the east and northwest is upslope or on flat land in relation to the project area.

2.4.4 Distance between proposed development areas and the classified vegetation

Strategen has assessed and identified the separation distances between future buildings and the classified vegetation extent, as summarised in Table 1.

2.4.5 Method 1 BAL calculation

A Method 1 BAL calculation has been completed for each proposed lot in accordance with AS 3959–2009 (Table 1). The BAL rating gives an indication of the level of bushfire attack (i.e. the radiant heat flux) that may be received by the proposed lot. In this case, with no residential dwellings currently proposed, it informs the land owner the bushfire risk to areas of land within each lot and the standard of building construction required for any future dwellings to withstand such impacts in those areas.

The entirety of the three proposed lots will be located within 100 m of vegetation assessed as having an 'Extreme' and 'Moderate' bushfire hazard level (i.e. bushfire prone land), which will require implementation of AS 3959–2009 (refer to Figure 4). The 'Extreme' bushfire hazard applies to Class B woodland vegetation to the north of the project area, while the 'Moderate' bushfire hazard applies to Class D scrub vegetation and Class G grassland vegetation to the east and Class B woodland to the west of the project area. Vegetation under slope is summarised in Section 2.4.3.

BALs for proposed built assets within 100 m of this vegetation are outlined in Table 1. The resulting hazard separation distances around dwellings will be provided in the form of Asset Protection Zones (APZs).

Table 1: Method 1 BAL calculation (BAL contours)

BAL	Vegetation class	Slope under classified vegetation	Distance from classified vegetation	Minimum setback of development from classified vegetation
BAL FZ	Class B Woodland	Upslope or flat land	0-<10 m	14 m
BAL 40			10-<14 m	
BAL 29			14-<20 m	
BAL 19			20-<29 m	
BAL 12.5			29-<100 m	
BAL FZ	Class B Woodland	Down-slope 0-<5 degrees	0-<13 m	17 m
BAL 40			13-<17 m	
BAL 29			17-<25 m	
BAL 19			25-<35 m	
BAL 12.5			35-<100 m	
BAL FZ	Class D Scrub	Upslope or flat land	0-<10 m	13 m
BAL 40			10-<13 m	
BAL 29			13-<19 m	
BAL 19			19-<27 m	
BAL 12.5			27-<100 m	
BAL FZ	Class G Grassland	Upslope or flat land	0-<6 m	8 m
BAL 40			6-<8 m	
BAL 29			8-<12 m	
BAL 19			12-<17 m	
BAL 12.5			17-<50 m	

*Development in BAL FZ and BAL 40 areas is not permitted in Western Australia without special planning approval for unavoidable development.



3. Bushfire management measures

Strategen has identified a range of bushfire management measures that on implementation will enable all proposed lots to be developed whilst maintaining a manageable level of bushfire risk and compliance with the Guidelines. The bushfire management measures are depicted in Figure 4 (where applicable) and discussed in the following subsections.

3.1 Asset Protection Zones (APZs)

Strategen has designated areas of hazard separation between classified vegetation and any future dwellings in the form of APZs. The width of each proposed lot's APZ has been determined on the basis of compliance with a BAL 12.5, BAL 19 and BAL 29 rating under AS 3959–2009. A minimum width APZ will be maintained between all dwellings proposed in the future and classified vegetation. The minimum APZ widths are as follows and shown as minimum setback distances in Table 1:

- 14 m for Class B woodland (upslope or flat land)
- 17 m for Class B woodland (down-slope 0–5 degrees)
- 13 m for Class D scrub (upslope or flat land)
- 8 m for Class G grassland (upslope or flat land).

The APZs are low fuel areas around each building or lot and are required to be maintained on a regular and ongoing basis at a fuel load less than 2 t/ha to achieve a low threat minimal fuel condition status all year round. Overstorey trees can be retained to some extent within the APZ provided all flammable material including understorey grasses, weeds, shrubs and scrub are removed from the fuel profile, essentially creating a managed parkland cleared landscape, which would result in a diminishing level of radiant heat, ember attack and fire rate of spread at the dwelling interface.

This is also consistent with requirements under City of Wanneroo Fire and Burning Information 2015-2016 (CoW 2015, Appendix 2) for every building and asset of critical infrastructure to be clear of all flammable material, with all grasses to be kept short and scrub pruned so that it is not dense. In addition, all trees, bushes and shrubs are to be trimmed back over driveways and accessways to all buildings to 2 m wide with tree crowns a minimum of 10 m apart (CoW 2015). Lawns, managed gardens, paving, driveways and swimming pools are also suitable within the APZ. Buildings are not permitted within the APZ.

3.2 Increased building construction standards

Strategen has designated BAL contours for each proposed lot in accordance with AS 3959–2009. Development in BAL FZ and BAL 40 areas is not permitted in Western Australia without special planning approval for unavoidable development. Any buildings proposed in the future on these lots will be required to be situated within areas of land subject to BAL 29 or lower.

3.3 Vehicular access

The proposed vehicular access network will provide a total of five access links from the project area to the surrounding public road network. The three lots all have proposed access routes via Pollino Gardens, with emergency access routes connecting lots 2 and 3 to the Bakana Loop cul-de-sac to the north of the project area (Figure 4).

The Emergency access routes will need to comply with Appendix 4 of the Guidelines, specifically that they will be less than 600 m from a public road, signposted and locked and to be opened only in an emergency to ensure accessibility to the public and fire services. The emergency access routes will also need to comply with technical requirements of the Guidelines, as outlined in Table 2.

The access roads to each lot from Pollino gardens will need to comply with Appendix 4 of the Guidelines, specifically that they are less than 200 m in length and meet the minimum turn-around area including a 17.5 m diameter head. The dead end roads will also need to comply with technical requirements of the Guidelines, as outlined in Table 2. As the project area will be completely cleared, and the dead end road in Lot 3 is within 600 m of the Bakana Loop cul-de-sac, the proposed access to Lot 3 achieves two-way access and satisfies Acceptable Solution A3.1 of the guidelines.

Public roads and private driveways longer than 50 m (none are proposed) proposed as part of the subdivision will need to comply with technical requirements of the Guidelines, as outlined in Table 2.

Table 2: Vehicular access technical requirements

Technical requirement	Public road	Private driveway	Cul-de-sac	Emergency access way	Fire service access routes
Minimum trafficable surface (m)	6*	4	6	6*	6*
Horizontal distance (m)	6	6	6	6	6
Vertical clearance (m)	4.5	4.5	N/A	4.5	4.5
Maximum grade <50 m	1 in 10	1 in 10	1 in 10	1 in 10	1 in 10
Minimum weight capacity (t)	15	15	15	15	15
Maximum crossfall	1 in 33	1 in 33	1 in 33	1 in 33	1 in 33
Curves minimum inner radius	8.5	8.5	8.5	8.5	8.5

* Refer to E3.2 Public roads: Trafficable surface

Source: WAPC 2015b

3.4 Reticulated water supply

Water supply services will be extended throughout the project area for any residences proposed in the future from surrounding areas of residential development, which will result in provision of a reticulated mains water supply.

A network of hydrants will also be provided along the internal road network at locations which meet relevant water supply authority and DFES requirements.

3.5 Additional measures

The following measures are also required to inform ongoing planning stages of the development:

1. **Notification on Title:** Notification on title be placed on all proposed lots with a BAL of 12.5 or greater as a condition of subdivision to ensure all landowners/proponents and prospective purchasers are aware that their lot is in a designated bushfire prone area and is subject to a Bushfire Management Plan.

2. Compliance with the City of Wanneroo annual fire season guide: the developer/land manager and prospective land purchasers are to comply with the current CoW annual fire season guides and bushfire information (Appendix 2).



4. Proposal compliance and justification

The following information has been referenced from SPP 3.7 to demonstrate that the proposed development is compliant with the requirements of SPP 3.7 and associated guidelines.

The proposed subdivision of Lot 201 Pollino Gardens, Landsdale is required to comply with SPP 3.7 and the Guidelines, as required under the following policy measures:

6.2 Strategic planning proposals, subdivision and development applications

a) Strategic planning proposals, subdivision and development applications within designated bushfire prone areas relating to land that has or will have a Bushfire Hazard Level (BHL) above low and/or where a Bushfire Attack Level (BAL) rating above BAL-LOW apply, are to comply with these policy measures.

b) Any strategic planning proposal, subdivision or development application in an area to which policy measure 6.2 a) applies, that has or will, on completion, have a moderate BHL and/or where BAL-12.5 to BAL-29 applies, may be considered for approval where it can be undertaken in accordance with policy measures 6.3, 6.4 or 6.5.

c) This policy also applies where an area is not yet designated as a bushfire prone area but is proposed to be developed in a way that introduces a bushfire hazard, as outlined in the Guidelines.

6.4 Information to accompany subdivision applications

Any subdivision application to which policy measure 6.2 applies is to be accompanied by the following information in accordance with the Guidelines:

a) a BAL Contour Map to determine the indicative acceptable BAL ratings across the subject site, in accordance with the Guidelines. BAL Contour Maps should be prepared by an accredited Bushfire Planning Practitioner;

b) the identification of any bushfire hazard issues arising from the BAL Contour Map; and

c) an assessment against the bushfire protection criteria requirements contained within the Guidelines demonstrating compliance within the boundary of the subdivision site.

Implementation of this BMP is expected to meet the following objectives of SPP 3.7:

- 5.1: Avoid increasing the threat of bushfire to people, property and infrastructure. The preservation of life and the management of bushfire impact is paramount
- 5.2: Reduce vulnerability to bushfire through the identification and assessment of bushfire hazards in decision-making at all stages of the planning and development process
- 5.3: Ensure that planning proposals and development applications take into account bushfire protection requirements and include specified bushfire protection measures where land has or will have a moderate or extreme bushfire hazard level, and/ or where a rating higher than BAL-Low applies
- 5.4: Achieve a responsible approach between bushfire management measures and landscape amenity and biodiversity conservation values, with consideration of the potential impacts of climate change.

In response to the above requirements of SPP 3.7 and the Guidelines, bushfire management measures, as outlined in Section 3 have been devised for the proposed development accordance with Guideline acceptable solutions where possible to meet compliance with bushfire protection criteria. An 'acceptable solutions' assessment' is provided in Table 3 to assess the proposed bushfire management measures against each bushfire protection criteria in accordance with the Guidelines and demonstrate that the measures proposed meet the intent of each element of the bushfire protection criteria.

Table 3: Acceptable solutions assessment against bushfire protection criteria

Bushfire protection criteria	Intent	Solution	Proposed bushfire management measures	Compliance statement
Element 1: Location	To ensure that strategic planning proposals, subdivision and development applications are located in areas with the least possible risk of bushfire to facilitate the protection of people, property and infrastructure	<u>Acceptable solution</u> A1.1 Development location The strategic planning proposal, subdivision and development application is located in an area that is or will, on completion, be subject to either a moderate or low bushfire hazard level, or BAL-29 or below.	Refer to Section 3.2, which demonstrates that any future development will be required to only occur in areas of BAL 29 or lower. No development is to occur in BAL 40 or BAL FZ areas.	The measures proposed are considered to comply and meet the intent of Element 1 Location.
Element 2: Siting and design of development	To ensure that the siting and design of development minimises the level of bushfire impact	<u>Acceptable solution</u> A2.1 Asset Protection Zone Every building is surrounded by an APZ, depicted on submitted plans, which meets detailed requirements (refer to the Guidelines for detailed APZ requirements).	Refer to Section 3.1, which demonstrates that minimum APZs will be wholly contained within building setbacks.	The measures proposed are considered to comply and meet the intent of Element 2 Siting and design of development.
		<u>Acceptable solution</u> A2.2 Hazard Separation Zone Every building and its contiguous APZ is surrounded by an HSZ, depicted on submitted plans, that meets detailed requirements (refer to the Guidelines for detailed HSZ requirements). An HSZ may not be required if the proposed construction meets the standard appropriate to the BAL for that location, and does not exceed BAL-29.	N/A HSZs are not required since compliant separation will be provided wholly through the APZ in accordance with the BAL for that location.	
Element 3: Vehicular access	To ensure that the vehicular access serving a subdivision/development is available and safe during a bushfire event	<u>Acceptable solution</u> A3.1 Two access routes Two different vehicular access routes are provided, both of which connect to the public road network, provide safe access and egress to two different destinations and are available to all residents/the public at all times and under all weather conditions.	Refer to Section 3.3 and Figure 4, which demonstrate that a minimum of two different vehicular access routes will be provided for all proposed lots via Pollino Gardens and emergency access routes.	The measures proposed are considered to comply and meet the intent of Element 3 Vehicular access.
		<u>Acceptable solution</u> A3.2 Public road A public road is to meet the requirements in Table 2, Column 1.	Refer to Section 3.3, which demonstrates that all proposed public roads will meet minimum requirements outlined in the Guidelines and outlines in Table 2.	
		A3.3 Cul-de-sac (including a dead-end-road A cul-de-sac and/or a dead end road should be avoided in bushfire prone areas. Where no alternative exists (i.e. the lot layout already exists and/or will need to be demonstrated by the proponent), detailed requirements will need to be achieved (refer to the Guidelines for detailed cul-de-sac requirements).	Refer to Section 3.3, which demonstrates the cul-de-sacs and dead end roads proposed for the proposed lots meet minimum requirements outlined in the Guidelines and outlines in Table 2.	

Bushfire protection criteria	Intent	Solution	Proposed bushfire management measures	Compliance statement
		<p>A3.4 Battle-axe Battle-axe access leg should be avoided in bushfire prone areas. Where no alternative exists, (this will need to be demonstrated by the proponent) detailed requirements will need to be achieved (refer to the Guidelines for detailed battle-axe requirements).</p> <p>A3.5 Private driveway longer than 50 m A private driveway is to meet detailed requirements (refer to the Guidelines for detailed private driveway requirements).</p> <p>A3.6 Emergency access way An access way that does not provide through access to a public road is to be avoided in bushfire prone areas. Where no alternative exists (this will need to be demonstrated by the proponent), an emergency access way is to be provided as an alternative link to a public road during emergencies. An emergency access way is to meet detailed requirements (refer to the Guidelines for detailed EAW requirements).</p> <p>A3.7 Fire service access routes (perimeter roads) Fire service access routes are to be established to provide access within and around the edge of the subdivision and related development to provide direct access to bushfire prone areas for fire fighters and link between public road networks for fire fighting purposes. Fire service access routes are to meet detailed requirements (refer to the Guidelines for detailed fire service access route requirements).</p> <p>A3.8 Firebreak width Lots greater than 0.5 hectares must have an internal perimeter firebreak of a minimum width of three metres or to the level as prescribed in the local firebreak notice issued by the local government.</p>	<p>N/A No battle-axes are proposed as part of the development.</p> <p>N/A No private driveways are proposed as part of the development.</p> <p>Refer to Section 3.3, which demonstrates that the emergency egress will meet minimum requirements of the Guidelines outlined in Table 2.</p> <p>Refer to Section 3.3, which demonstrates that the emergency egress will meet minimum requirements of the Guidelines outlined in Table 2.</p> <p>N/A. No firebreaks are proposed as part of the development as the entire project area will be cleared prior to subdivision.</p>	
Element 4: Water	To ensure that water is available to the subdivision, development or land use to enable people, property and infrastructure to be defended from bushfire.	<p>A4.1 Reticulated areas The subdivision, development or land use is provided with a reticulated water supply in accordance with the specifications of the relevant water supply authority and Department of Fire and Emergency Services.</p>	Refer to Section 3.4, which demonstrates that any dwellings proposed in the future will be provided a reticulated water supply and network of hydrants in accordance with local water authority, CoW and DFES requirements.	The measures proposed are considered to comply and meet the intent of Element 4 Water.

Bushfire protection criteria	Intent	Solution	Proposed bushfire management measures	Compliance statement
		<p>A4.2 Non-reticulated areas Water tanks for fire fighting purposes with a hydrant or standpipe are provided and meet detailed requirements (refer to the Guidelines for detailed requirements for non-reticulated areas).</p> <p>A4.3 Individual lots within non-reticulated areas (Only for use if creating 1 additional lot and cannot be applied cumulatively) Single lots above 500 square metres need a dedicated static water supply on the lot that has the effective capacity of 10 000 litres.</p>	<p>N/A. The proposed development will not occur within a non-reticulated area.</p> <p>N/A. The proposed development will not occur within a non-reticulated area.</p>	

5. Implementation and enforcement

Implementation of the BMP applies to the developer, local government and prospective landowners to ensure bushfire management measures are adopted and implemented on an ongoing basis. A summary of the bushfire management measures described in Section 3, as well as a works program, is provided in Table 4. These measures will be implemented to ensure the ongoing protection of proposed life and property assets is achieved. Timing and responsibilities are also defined to assist with implementation of each measure.

Table 4: Proposed works program

Bushfire management measure	Timing for application	Responsibility
Ongoing maintenance of APZ (continuation of the current road verge maintenance regime)	As required to keep road verges slashed on a regular and ongoing basis (i.e. grasses and weeds to be maintained under 100 mm in height)	As per the current road verge management arrangement
Implementation of increased building construction standards	During construction of proposed dwellings	Builder, prospective landowners
Construction of public roads as per approved subdivision	Prior to development of lots for each respective stage	Developer
Provision of reticulated water supply and fire hydrant network	Prior to development of lots for each respective stage	Developer
Notification on Title	Following subdivision approval	Developer
Reassessment of the BAL and separation distances	Following any modification to the surrounding vegetation extent or proposed lot layout.	Developer, prospective landowners
Compliance with current fire control order	All year round as specified in the current fire control order	Developer/land manager/prospective landowners

5.1 Document review

This BMP will be updated as necessary following the date of approval to ensure:

1. Implementation is assessed and corrective actions are applied in cases of non-compliance.
2. The effectiveness and impact of fire prevention work is evaluated and any significant changes in development design or the surrounding environment are reassessed in a revised BMP.

The developer will be responsible for updating and revising the BMP until such time that the development is complete, after which time CoW will be the authority responsible for updating and revising the BMP.

6. References

- Bureau of Meteorology (BoM) 2016, Climate statistics for Australian locations: Monthly climate statistics for Perth Metro, [Online], Commonwealth of Australia, available from: http://www.bom.gov.au/climate/averages/tables/cw_009225.shtml, [Accessed: 03 August 2016].
- City of Wanneroo (CoW) 2015, *City of Wanneroo Fire and Burning Information 2015–2016*, (Online), City of Wanneroo, Available from: file:///C:/Users/pmolinari/Downloads/15_486426_Promotional_Material_City_Fire_and_Burning_Information_Flip_Brochure_September_2015_FINAL_PROOF.pdf [Accessed: 15 July 2016]
- Commonwealth Science and Industrial Research Organisation (CSIRO) 1999, Fire Danger and Fire Spread Calculator, Commonwealth Science and Industrial Research Organisation, Perth.
- Department of Fire and Emergency Services (DFES) 2016, Map of Bush Fire Prone Areas, [Online], Government of Western Australia, available from: <http://www.dfes.wa.gov.au/regulationandcompliance/bushfireproneareas/Pages/default.aspx>, [15 July 2016].
- Department of Planning (DoP) 2016, *Visual guide for bushfire risk assessment in Western Australia*, Department of Planning, Perth, WA.
- Landgate 2016, *Firewatch*, [Online], Landgate, available from: <http://firewatch-pro.landgate.wa.gov.au/> [Accessed: 05 October 2016]
- McCaw L and Hanstrum B 2003, 'Fire environment of Mediterranean south-west Western Australia', in *Fire in Ecosystems of South-West Western Australia: Impacts and Management*, eds I Abbott & ND Burrows, Backhuys Publishers, Leiden, Netherlands, pp. 171–188.
- Standards Australia (SA) 2009, Australian Standard AS 3959–2009 Construction of Buildings in Bushfire-prone Areas, Standards Australia, Sydney.
- Western Australian Planning Commission (WAPC) 2015a, State Planning Policy 3.7 Planning in Bushfire-Prone Areas, Western Australian Planning Commission, Perth.
- Western Australian Planning Commission (WAPC) 2015b, Guidelines for Planning in Bushfire-Prone Areas, Western Australian Planning Commission, Perth.

Appendix 1
January wind profiles for Perth Metro
Weather Station

Rose of Wind direction versus Wind speed in km/h (12 Jan 1994 to 08 Mar 2011)

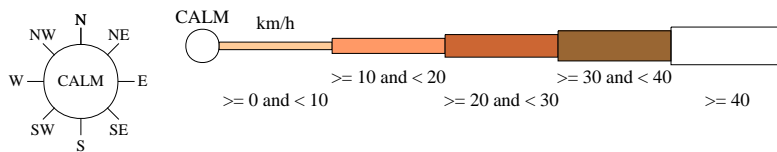
Custom times selected, refer to attached note for details

PERTH METRO

Site No: 009225 • Opened Feb 1993 • Still Open • Latitude: -31.9192° • Longitude: 115.8728° • Elevation 24.m

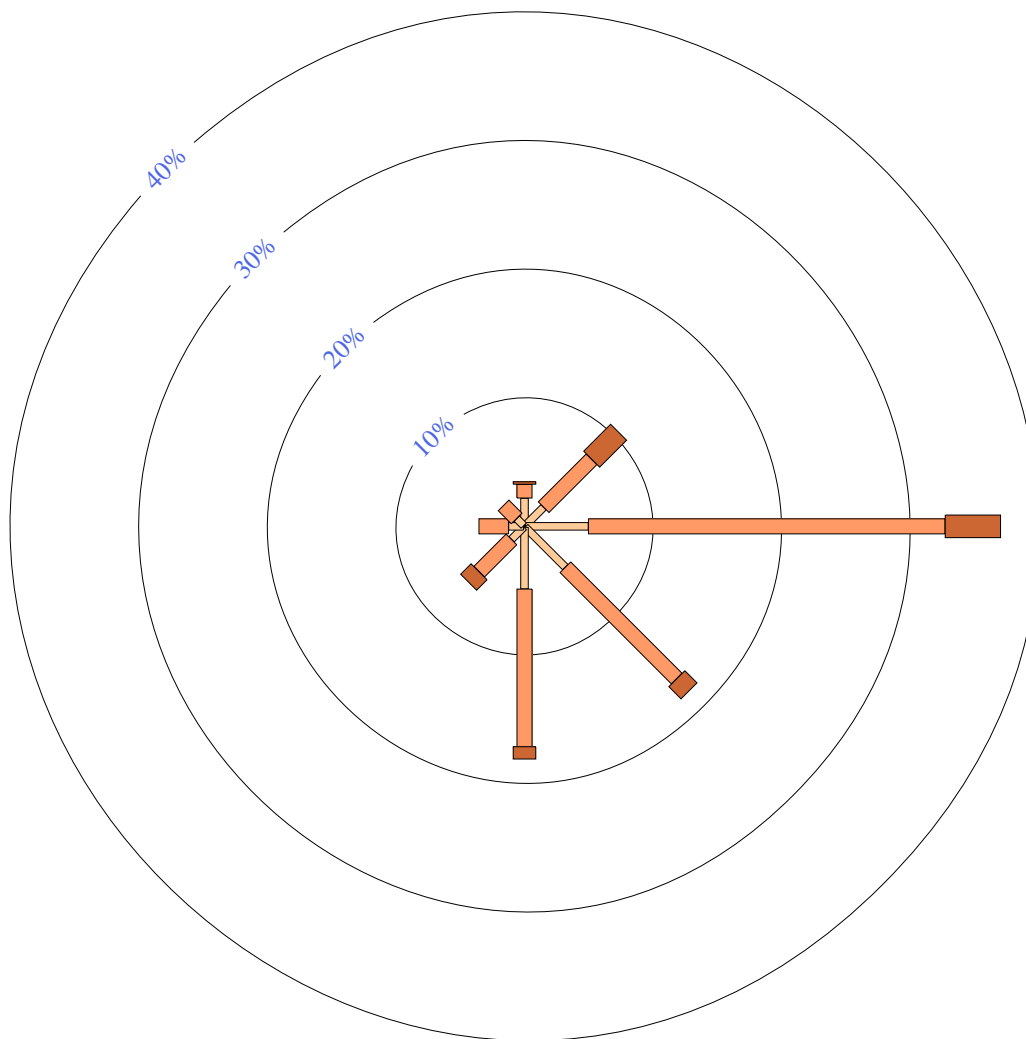
An asterisk (*) indicates that calm is less than 0.5%.

Other important info about this analysis is available in the accompanying notes.



9 am Jan
514 Total Observations

Calm *



Rose of Wind direction versus Wind speed in km/h (12 Jan 1994 to 08 Mar 2011)

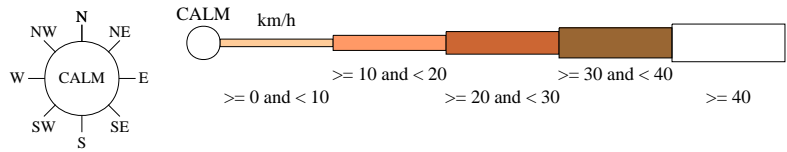
Custom times selected, refer to attached note for details

PERTH METRO

Site No: 009225 • Opened Feb 1993 • Still Open • Latitude: -31.9192° • Longitude: 115.8728° • Elevation 24.m

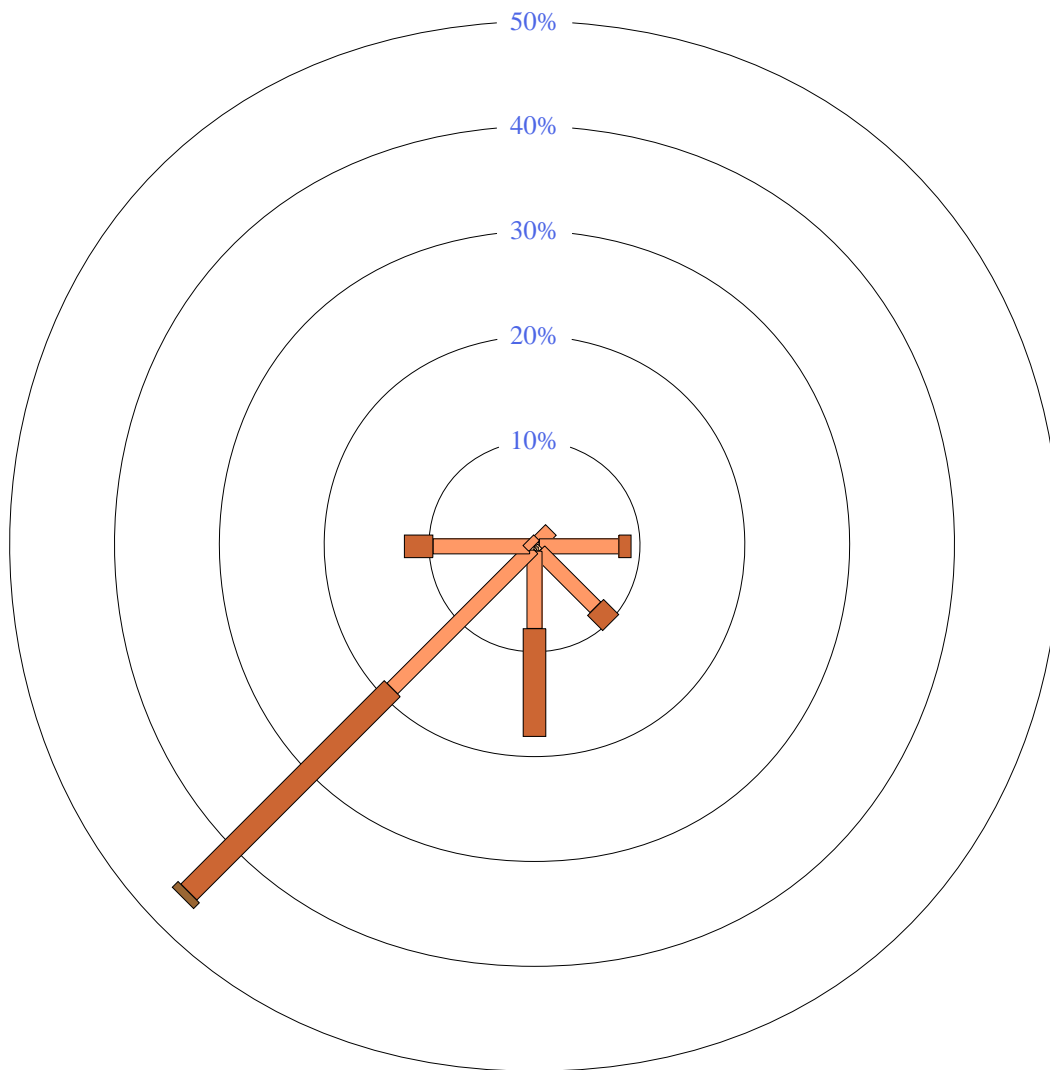
An asterisk (*) indicates that calm is less than 0.5%.

Other important info about this analysis is available in the accompanying notes.



3 pm Jan
516 Total Observations

Calm *



Appendix 2
City of Wanneroo Fire Season Guide
2015-2016 and Bushfire Information



CITY OF WANNEROO
FIRE AND BURNING INFORMATION
2015-2016

BURNING PERIODS & FDRS

BUILDING PROTECTION ZONES

BURNING GARDEN REFUSE

ALTERNATIVES TO BURNING

FIRE BANS / BRIGADE CONTACTS

BUSHFIRE SURVIVAL PLAN

FIREBREAKS & EXAMPLES

TO REPORT ALL FIRES RING 000

BURNING PERIOD DATES & FIRE DANGER RATINGS (FDRs)

1 DECEMBER TO 31 MARCH (INCLUSIVE)

ALL burning, including garden refuse is prohibited during this period.

Dates may be varied due to climate or weather conditions. Period variations will be advertised in local papers, the City website and Facebook page.

BURNING PERMITS ARE REQUIRED

1 APRIL - 30 NOVEMBER

Permits to burn may be obtained from the City of Wanneroo at the following locations:

Wanneroo Animal Care Centre

1204 Wanneroo Road, Ashby // 4pm-6pm everyday

City of Wanneroo Civic Centre

23 Dundobar Road, Wanneroo // 9am-4pm weekdays

Two Rocks Volunteer Fire Brigade

Carraway Loop, Two Rocks. Call **0427 026 000** before attending. For Two Rocks residents only (Seatrees Estate and Breakwater estate)

ALL BURNING IS PROHIBITED ON DAYS OF VERY HIGH OR ABOVE FIRE DANGER RATINGS AND IF A TOTAL FIRE BAN OR A HARVEST AND VEHICLE MOVEMENT BAN IS DECLARED.



FIRE DANGER RATINGS (FDR)

If you are in a bushfire risk location you need to know what the Fire Danger Rating (FDR) is for your area, monitor local conditions and keep informed.

The FDR is based on the forecast weather conditions and gives you advice about the level of bushfire threat on a particular day. When the rating is high, the threat of a bushfire increases.

FIRE DANGER RATING INFORMATION BOARDS

These boards clearly display the daily fire danger rating and are featured at eight locations across the City of Wanneroo.

- Corner of Joondalup Drive and Wanneroo Road
- Wanneroo Road, south of the Yanchep Beach Road turn off
- Wanneroo Road, Carabooda
- Marmion Avenue, Jindalee
- Neaves Road, Mariginiup
- Old Yanchep Road, Pinjar
- Gngangara Road, Landsdale
- Countryside Drive, Two Rocks

STAY INFORMED

An RSS feed is available to receive email alerts when the City's Harvest and Vehicle Movement Bans are declared. To sign up, visit the City website.

Harvest and Vehicle Movement Bans are also published on the website and broadcast on the ABC local radio station.



The City of Wanneroo's fire weather district is -
Lower West Coast.

You can find out the daily FDR online at:

- www.dfes.wa.gov.au
 - www.bom.gov.au
- or by phoning the **Telstra Weather Service on 1196.**

BURNING PERIODS & FDRS

BUILDING PROTECTION ZONES

A building protection zone (BPZ) is an area extending for at least 20 metres around a building on all sides where there is little or nothing to burn.

Reducing vegetation, rubbish and anything that can burn from around your home will increase its chances of surviving a bushfire.

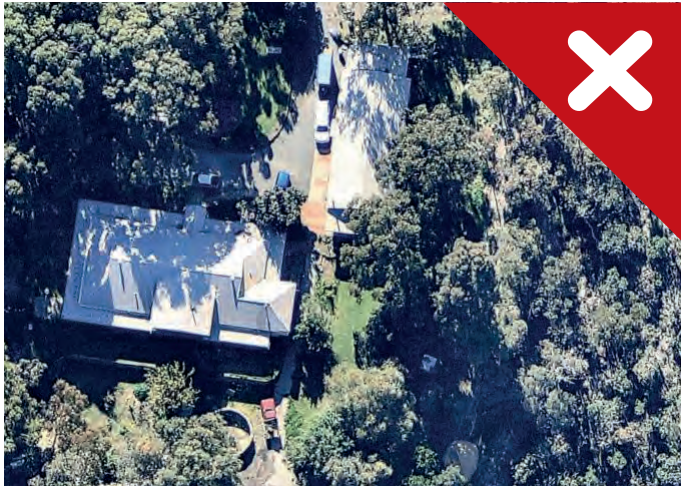


If there is little or nothing to burn then the fire's impact will be reduced. This can be achieved by:

- Maintaining a minimum 2m gap between trees and the building. Make sure that no trees overhang the house.
- Ensuring tree crowns are a minimum of 10m apart.
- Ensuring there is a gap between shrubs and buildings of three times their mature height.
- Ensuring shrubs aren't planted in clumps.



- Keeping the grass short and prune the scrub so that it is not dense, nor does it have fine, dead aerated material in the crown of the scrub.
- Raking up leaves, twigs and removing tree trailing bark.
- Pruning lower branches (up to 2m off the ground) to stop a surface fire spreading to the canopy of the trees.
- Creating a mineral earth firebreak.
- Having your paths adjacent to the building and have your driveway placed so that it maximises the protection to the house.
- Keeping your gutters free of leaves and other flammable material



✓ EXAMPLE ABOVE:
extensive fire protection
zone created around
building.

✗ EXAMPLE LEFT:
no fire protection zone
created around building.

BUILDING PROTECTION ZONES

BURNING GARDEN REFUSE

There are many methods of hazard reduction available to residents. Reduction of fuel does not have to be as drastic as removing all vegetation. Burning garden refuse is one option available at certain times of the year.

GARDEN REFUSE MAY BE BURNT WITHOUT A PERMIT AFTER 6PM, SUBJECT TO:

- the pile of refuse being burnt not exceeding 1sqm
- a 2 metre wide area clear of flammable material surrounding the pile
- the fire only being lit between 6pm and 11pm
- only one heap being burnt at any one time
- the fire being completely extinguished by midnight
- a person in control of the fire staying with the fire until it is completely extinguished
- there being a means of extinguishing the fire available at all times (eg garden hose, knapsack spray or fire unit)
- neighbours are informed of your intention to burn
- the smoke does not cause a nuisance to neighbours
- the smoke does not create a traffic hazard
- household or commercial waste, or any noxious materials are not burned.



**BURNING PERMITS REQUIRED 01 APRIL - 30 NOVEMBER.
OUTSIDE OF THESE DATES (01 DEC - 3 MARCH)
BURNING IS PROHIBITED.**

MITIGATION BURNS

For assistance regarding mitigation burns, contact the City of Wanneroo Fire Protection Officers where properties can be assessed. Volunteer Fire Brigades in conjunction with the City's Fire Protection Officers may be able to assist with undertaking the burns. For more information please call 9405 5000.



Mild intensity prescribed burn for fuel reduction.

Eight months post burn at Ashbrook Park.



GARDEN REFUSE CANNOT BE BURNT:

- At any time during the Prohibited Burning Period
- If a Total Fire Ban or Harvest and Vehicle Movement Ban has been declared
- If the Fire Danger Rating is Very High or above.

NOTE: DO NOT BURN DAMP, WET OR GREEN MATERIAL AT ANY TIME AS THIS WILL CAUSE EXCESSIVE SMOKE.

BURNING GARDEN REFUSE

ALTERNATIVES TO BURNING

There are a range of alternatives to burning waste which can also be used as a method of hazard reduction.

In many circumstances, hand and mechanical clearing methods should be considered the best way to protect assets. These methods can be safer than burning, and easier to organise and maintain.

Raking or manual removal of fine fuels

Remove fuels such as fallen leaves, twigs and bark.

Mowing grass

Keep grass short, green and well watered. Mowed / slashed firebreaks need to be kept below 20mm.

Spraying

Grass can be sprayed with herbicide to reduce fuel loads. This may be a practical alternative particularly if erosion is a concern or if areas are difficult to access.

Slashing and mulching

This is an economical method of fuel reduction. To be effective, the cut material must be removed or allowed to rot before summer starts. Slashing and mowing may leave grass in rows, increasing fuel in some places. Mulching, or turbo mowing, also mulches the vegetation leaving the fuel where it is cut.



Ploughing and grading

These methods can produce effective firebreaks, however, the areas need constant maintenance. Loose soil may erode in steep areas, particularly where there is high rainfall and strong winds.

For further information on preventing erosion please contact the Fire Protection Officer.

DISPOSAL OF GREEN WASTE

City residents and ratepayers are able to dispose of green waste and garden refuse at the Greens recycling Facility (70 Motivation Drive, Wangara. 8am – 4.45pm weekends and public holidays).

Access to the site is free with a 'Greens voucher'. Four Greens vouchers are included with the annual Rates notice. Each voucher allows the disposal of a standard 6x4 trailer-load of clean greens at no charge. Entry fees apply without a valid voucher

Garden refuse can also be used as a mulch or compost to improve soils and the growth of plants. If you have large quantities of green waste (branches, tree trunks) you can arrange for mobile mulching services to mulch the material onsite.

Mulch piles should be no larger than 5 cubic metres to reduce the risk of spontaneous combustion and should be surrounded by a firebreak.



VERGES - A SHARED RESPONSIBILITY

The City of Wanneroo urges all residents to include their property's verge in their fire preparation activities.

The City cannot do it alone, given its size and number of bush verges requiring maintenance.

ALTERNATIVES TO BURNING

FIRE BANS / BRIGADE CONTACTS

TOTAL FIRE BAN

A Total Fire Ban is declared by Department of Fire and Emergency Services (DFES) on days when fires are most likely to threaten lives and property.

WHEN A BAN IS DECLARED IT WILL BE FEATURED ON:

- the DFES website www.dfes.wa.gov.au
- DFES Twitter account [@dfes_wa](https://twitter.com/dfes_wa)
- published to subscribers through DFES's automated RSS feeds
- broadcast on **ABC local radio**
- via DFES information line **1800 709 355**

VOLUNTEER BUSH FIRE BRIGADES

Volunteer Bush Fire Brigades are called to fires via a paging and radio communications system. The 000 emergency number will put you in contact with DFES who will dispatch the nearest Brigade.

Brigades should not be contacted directly to report a fire; call 000 to report a fire.



HARVEST AND VEHICLE MOVEMENT BAN

Harvest and Vehicle Movement Bans must be imposed by a local government when the bush fire danger index exceeds 35 during a Total Fire Ban.

They are also imposed when the Chief Bush Fire Control Officer is of the opinion that the use of engines, vehicles, plant or machinery during the prohibited burning times or the restricted burning times or both is likely to cause a fire or contribute to the spread of a bush fire.

If a Harvest and Vehicle Movement and Hot works Ban is declared it is published on the City's website and broadcast on radio 720 AM.

During a Total Fire Ban or Harvest and Vehicle Movement Ban you are not allowed to light, maintain or use a fire in the open air, or to carry out any activity in the open air that causes, or is likely to cause, a fire.

This includes a prohibition on the use of engines, vehicles, plant or machinery likely to cause or be conducive to the spread of a bush fire.

YOU COULD BE FINED UP TO \$25,000 AND/OR JAILED FOR 12 MONTHS IF YOU BREACH A BAN.



BRIGADE CONTACT INFORMATION

Quinns Rocks Brigade

T: 0428 498 779

www.quinnsrocksbfb.org.au

Wanneroo Fire Support Brigade

T: 0427 026 006

www.wanneroosupportbfb.org.au

Quinns Rocks Fire Station
14 Hidden Valley Retreat,
Clarkson

Two Rocks Brigade

Caraway Loop, Two Rocks

T: 0427 026 000

www.tworocksbfb.org.au

Wanneroo Brigade

Bldg 1, Ashby Operations Centre
1204 Wanneroo Road, Ashby

T: 0427 026 521

www.wanneroobfb.org.au

FIRE BANS / BRIGADE CONTACTS

ARE YOU BUSHFIRE READY?

areyouready.wa.gov.au

IT COULD SAVE YOUR LIFE!

If you live in or near bush, developing and using a **bushfire survival plan** is critical. Your plan will help you avoid making last minute decisions that could prove deadly during a bushfire.

Your plan **MUST** include

1

Your triggers to leave or start defending.

2

An informed decision about whether you will leave for a safer place or stay and actively defend.

Bushfire Survival Plan TIPS

- Your plan must work for you and your family. Everyone's bush fire survival plan will be different and depend on individual circumstances.
- If you live alone develop a plan with your neighbours.
- Write your plan down and don't doubt it when the time comes to put it into action.
- Prepare and practice your plan with all the members of your family before the start of the bushfire season.
- Review your plan when your family circumstances change.

3

A back-up plan. Conditions can change very quickly in a bushfire, often without warning. Your plan must be flexible and cover a range of situations you may face before, during or after the fire.

4

Where you will go and how you will get there if you plan to leave for a safer place?

Research has shown that leaving late can be deadly. Over the last 100 years 60% of people who died in bushfires were found within 100 metres of their own residence.

Act immediately. Never 'wait and see' what might happen. Relocating at the last minute can be deadly. **Never second guess your plan.**

- Don't forget to include your pets and livestock in your bushfire survival plan.

Download a bushfire survival plan template today at www.dfes.wa.gov.au



For more information visit www.dfes.wa.gov.au or contact **DFES Community Engagement** 9395 9861



Government of **Western Australia**
Department of **Fire & Emergency Services**



BUSHFIRE SURVIVAL PLAN

FIREBREAKS / FUEL HAZARD REDUCTION / FIREBREAK EXAMPLES

Under the Bush Fires Act (1954), all owners and occupiers of land in Western Australia must establish and maintain firebreaks.

Fire breaks and protection measures are vital in assisting the prevention of fires spreading and to allow safer access for bush fire fighters and vehicles.

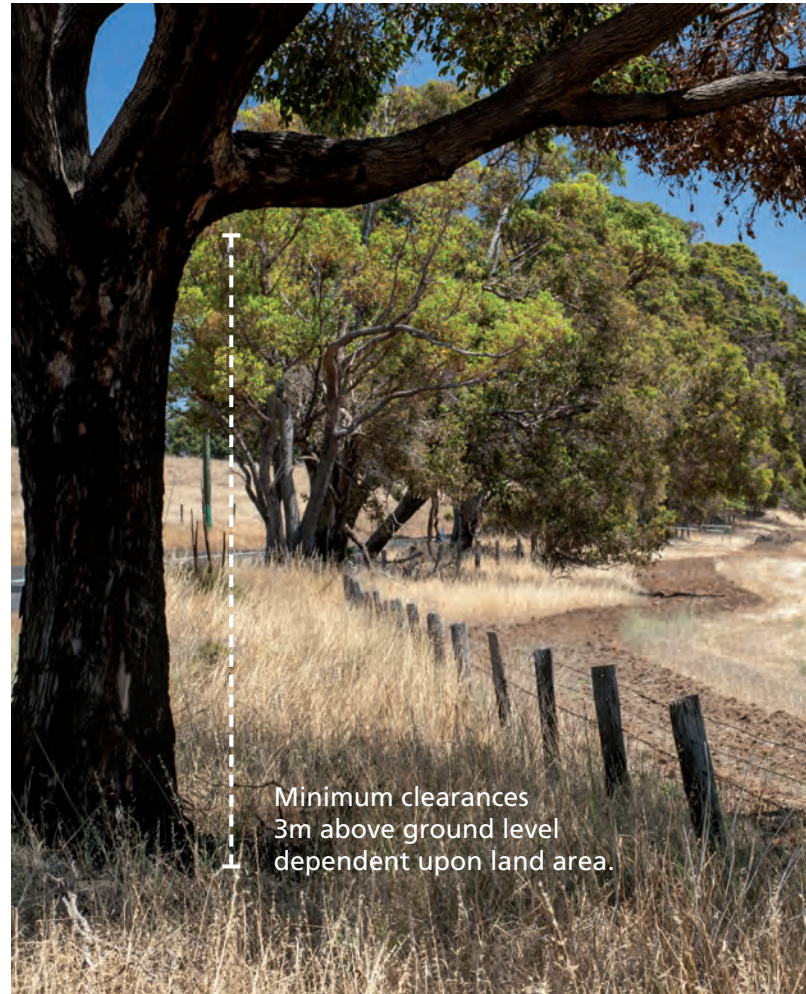
ALL LAND OWNERS WITHIN THE CITY OF WANNEROO BE ADVISED

Fire break installation must be completed by 15 November each year. Property inspections will commence the following day.

Failure to comply with these requirements may incur fines and further action by the City of Wanneroo.

Land with an area of less than 2,000m²

- A firebreak, not less than two (2) metres wide must be cleared immediately inside (or as close as possible) and around all external boundaries of the land.
- All tree branches that over-hang a firebreak must be trimmed back to a minimum height of three (3) metres above ground level.



Minimum clearances
3m above ground level
dependent upon land area.

Land with an area of 2,000m² or more

- A firebreak, not less than three (3) metres wide, must be cleared immediately inside (or as close as possible) around all external boundaries of the land.
- All tree branches that over-hang a firebreak must be trimmed back to a minimum height of three (3) metres above ground level.

Buildings

- A firebreak not less than three (3) metres wide immediately around all external walls of every building must be cleared.

APPLICATION TO VARY THE ABOVE REQUIREMENTS

If it is considered impracticable for any reason to implement any of these requirements, an application may be made not later than the 1st day of November annually to the Council or its authorised officer for permission to provide alternative fire protection measures. If permission is not granted the stated requirements must be complied with.

ADDITIONAL WORKS

In addition to these requirements, you may be required to carry out further works which are considered necessary by an Authorised Officer and specified by way of a separate written notice forwarded to the address of the owner/s as shown on the City of Wanneroo rates record for the relevant land.



Non-compliant: no firebreak installed inside boundary fence



Compliant: grass slashed to ground level



Non-compliant: mineral earth fire break showing grass/weed regrowth



Compliant: mineral earth fire break



Non-compliant: thick scrub creates a fire hazard around power poles



Compliant: cleared buffer zone around power poles



23 Dundebur Road, Wanneroo, WA 6065

Locked Bag 1, Wanneroo, WA 6946

T : (08) 9405 5000 F : (08) 9405 5499

wanneroo.wa.gov.au

