

2016

*Bush Fire Management Plan*

*Lots 9000 and 2 Flynn Drive*

*Carramar*

*City of Wanneroo*

FirePlan WA

November 2016

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Document prepared for:

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#### Document Status

Version	Comment	Reviewer	Review Date
Version 1		BWH	29.08.2016
Version 1		RADS	01.09.2016
Version 2	Project Team Comments & Maps		15.9.16
Version 3	Amendment to BHL	BWH	29.11.16

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FirePlan WA been in operation since 1998 and is a registered business with the Department of Trade and Commerce (Commonwealth Gov't). Mr Harris is the sole owner/operator of the business during that time FirePlan WA has been providing Bushfire Hazard Assessments (to Developers, Local Governments, State Government agencies and the Department for Defence), preparation of Fire Management Plans/ Bushfire Management Plans (Developers and landowners), and Bushfire Attack Level assessments (as part of FMP/BMP) for Landowners as part of the Building Permit Process.

Mr Harris has been involved in the Bushfire Planning, Fire Prevention and Hazard reduction burning programs, Response to bush fires/wildfires, State Fire Coordinator when at the Bush Fires Board/FESA (1975-1998), Fire Ecology and fire behaviour research in conjunction with CSIRO having worked in the Northern Territory (1971-1975) and Western Australia between 1965-1971 then 1975-1998.

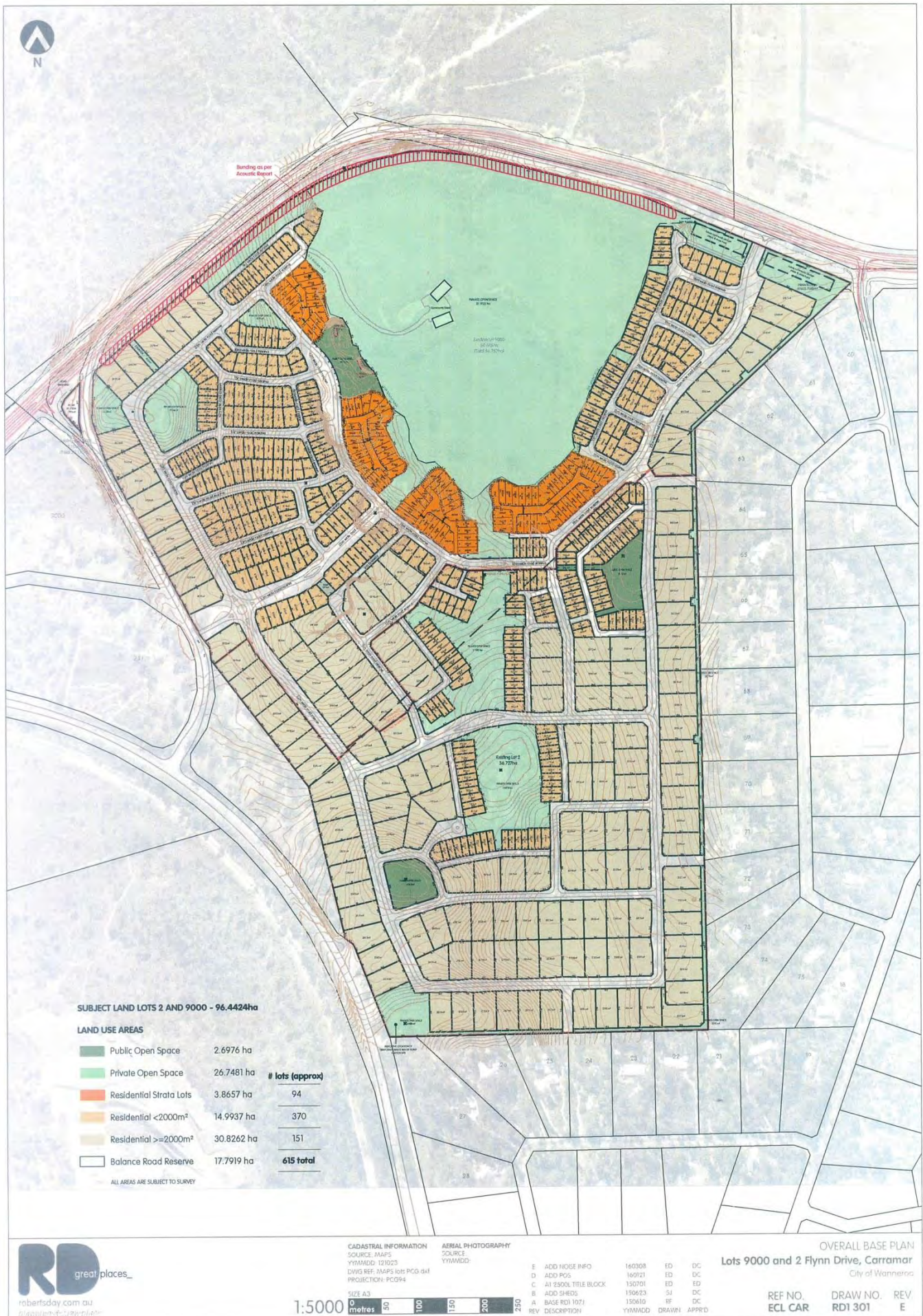
Mr Harris has attended the BAL Assessor/BPAD Level 1 Course and Bushfire Planning Practitioner (Prescriptive) BPAD Level 2 Workshop and is pursuing accreditation.

Disclaimer: The measures contained in this fire management plan are considered to be minimum standards and they do not guarantee that a building will not be damaged in a bush fire. All surveys, forecasts, projections and recommendations made in this report associated with the project are made in good faith on the basis of information available to FirePlan WA at the time; and achievement of the level of implementation of fire precautions will depend among other things on the actions of the landowners or occupiers over which FirePlan WA has no control. Notwithstanding anything contained therein, FirePlan WA will not, except as the law may require, be liable for any loss or other consequences (whether or not due to the negligence of the consultants, their servants or agents) arising out of the services rendered by the consultants.

Figure 1 Location Plan



Figure 2 Development Layout



DISCLAIMER: ISSUED FOR DESIGN INTENT ONLY. ALL AREAS AND DIMENSIONS ARE SUBJECT TO DETAIL DESIGN AND SURVEY

## 1.0 INTRODUCTION

### 1.1 Background

A Fire Management Plan for the Site was prepared by Roger Underwood of York Gum Services in 2010, and revised in June 2013. The 2013 Fire Management Plan was approved concurrently with WAPC Subdivision Application 147201. The State Administrative Tribunal (DR 26 of 2014) Amended Condition 20 of the WAPC Subdivision Approval 147201 following mediation held on the 24 February 2014.

This BMP has been prepared to support Amendment No. 2 Agreed Structure Plan No. 61 and a subsequent Subdivision Application and to bring the approved BMP in line with State Planning Policy 3.7 *Planning in Bushfire Prone Areas* (December 2015) and the *Guidelines for Planning in a Bushfire Prone Area* (December 2015) herein after referred to as the *Guidelines*.

#### Subdivision Approval

The Subdivision Application Approval WAPC 147201 has the following conditions applicable to Bushfire Management Planning for the development of the Site:-

19. A fire management plan being prepared , approved and relevant provisions being implemented during subdivisional works in accordance WAPC's Guideline *Planning for Bushfire Protection Edition 2*, May 2010 ( in particular Appendix 3) to the Specifications of the Local Government ( Local Government).
20. The Proposed strategic firebreaks shown on the approved plan of subdivision being shown on the diagram or plan of survey (deposited plan) as reserve(s) for the right of way being vested in the Crown under Section 152 of the Planning and Development Act 2005, such land is to be ceded free of cost and without any payment of compensation by the Crown (Local Government.
21. The proposed strategic firebreaks being constructed and drained at the landowner/applicants cost to the specifications of the Local government. (Local Government).

On the 17 December 2012 WAPC Application 147201 replaced the above Condition 20 with the following condition:

20. "Satisfactory arrangements being made with the Local Government for the maintenance and upkeep of the Strategic Firebreaks". (Local Government)

In the *Guidelines* the phase "Strategic Firebreak" has been replaced by "Fire Service Access Route (FSAR)".

### **State Planning Policy 3.7 Planning in in Bush Fire Prone Areas**

SPP 3.7 applies to all higher order strategic planning documents, strategic planning proposals, subdivision and development applications located in designated Bushfire Prone areas.

Lots 9000 and 2 Flynn Drive are located in a declared Bushfire Prone Area (DFES 2016).

### 1.2 Purpose and Application of the Plan

The purpose of this Bushfire Management Plan (BMP) is to detail the fire management methods and requirements that will be implemented for the Subdivision of the Site. (Refer Figure 2: Development Layout).

This Bushfire Management Plan (BMP) satisfies the requirements of the City of Wanneroo and the Western Australian Planning Commission (WAPC) outlined within the *Guidelines for Planning in Bush fire Prone Areas December 2015* referred to hereafter as the *Guidelines*.

This BMP will outline the responsibility and timing for implementing and maintaining the fire protection measures and strategies contained within this BMP, allocating these responsibilities between individual land owners, the developers and the City of Wanneroo.

As fire management strategies may require altering to meet changing weather, environment and land use needs, it must be advised that the provisions of the *Bush Fires Act 1954* may still be enforced, in addition to this Bushfire Management Plan.

The Structure Plan requires the preparation of a “Bushfire Management Plan” to support the proposed development. This document has been prepared to satisfy that requirement and becomes operational as a condition of subdivision.

This Bushfire Management Plan complies with the acceptable solutions detailed in Appendix 4 of the *Guidelines* and as summarised in ‘Compliance Checklist for Performance Criteria and Acceptable Solutions’ in Section 4.7 of this BMP.

### **1.3 Stakeholder Consultation**

Onsite assessment FirePlan WA

Developer- Man O War- Chairman: Trevor Delroy

Developer Project Team – Roberts Day

Local Government – Community Emergency Services Manager/Chief Bush Fire Control Officer City of Wanneroo.

### **1.4 Statement of Compliance with SPP 3.7 and Guidelines**

This Bushfire Management Plan has been prepared in accordance with the Requirement of SPP 3.7 Planning in Bushfire Prone Areas (December 2015) and the *Guidelines for Planning in Bushfire Prone Areas* (December 2015).

### **1.5 Home Owners Association. (HOA)**

A Home Owners’ Association will be established as an incorporated body pursuant to the Deed of 18<sup>th</sup> May 20018 between Eclipse Resources, the City of Wanneroo, and the National Australia Bank, and the Deed of assignment between Eclipse Resources, Man O War, and the City of Wanneroo of 20<sup>th</sup> February 2012. The owners of every lot in the estate will become members of the Home Owners Association.

## **2.0 SPATIAL CONSIDERATION OF BUSHFIRE THREAT**

### **2.1 Siting of Development**

#### **2.1.1 Location**

The property has an area of approximately 98 hectares. It is located 5 kilometres northeast of the Joondalup Town Centre and 8 Kilometres north of the Wanneroo Town Centre, east of the intersection of Flynn Drive and Wanneroo Road. The Site currently comprises bushland and a former quarry now rehabilitated and landscaped which comprises of approximately 80% irrigated lawn and 20% trees and shrubs.



The southern and eastern boundaries of the site are bounded by the Carramar Special Rural Estate (incorporating Lots in the order of 1 to 2 hectares in area). This in turn is adjoined by Banksia Grove Estate residential area.

The western boundary of the site is adjoined by Wanneroo Road and privately owned bushland and Neerebup National Park. The Flynn Drive is located on the northern boundary of the site, to the north of which is Meridien Estate Industrial Park, and Bush Forever Site 384.

Reticulated water is provided to each Lot and fire hydrants will be installed by the Developer.

Western Power will be available to each Lot.

### **2.1.2 Topography**

The topography of the site is undulating and slope upslope, 0°-5° and 5°-10°. See Slope Map Figure 3.

### **2.1.3 Land Use**

The site is designated for urban residential with areas of Private and Public Open Space. The site will be cleared of vegetation other than narrow strips of vegetation at the rear of lots with an area of approximately 2000m<sup>2</sup>. See detail in Section 2.5.

### **2.1.4 Assets**

The assets in and adjoining the site are dwellings, sheds, remnant native vegetation, roads, power poles/lines reticulated grass and gardens converted from the old quarry and a historic site associated with lime burning in past times.

### **2.1.5 Access**

The site is currently accessed from Flynn Drive by the former quarry entry. In addition there are numerous internal tracks and firebreak along the eastern boundary. Proposed Access as part of the development is discussed in Section 4.4.

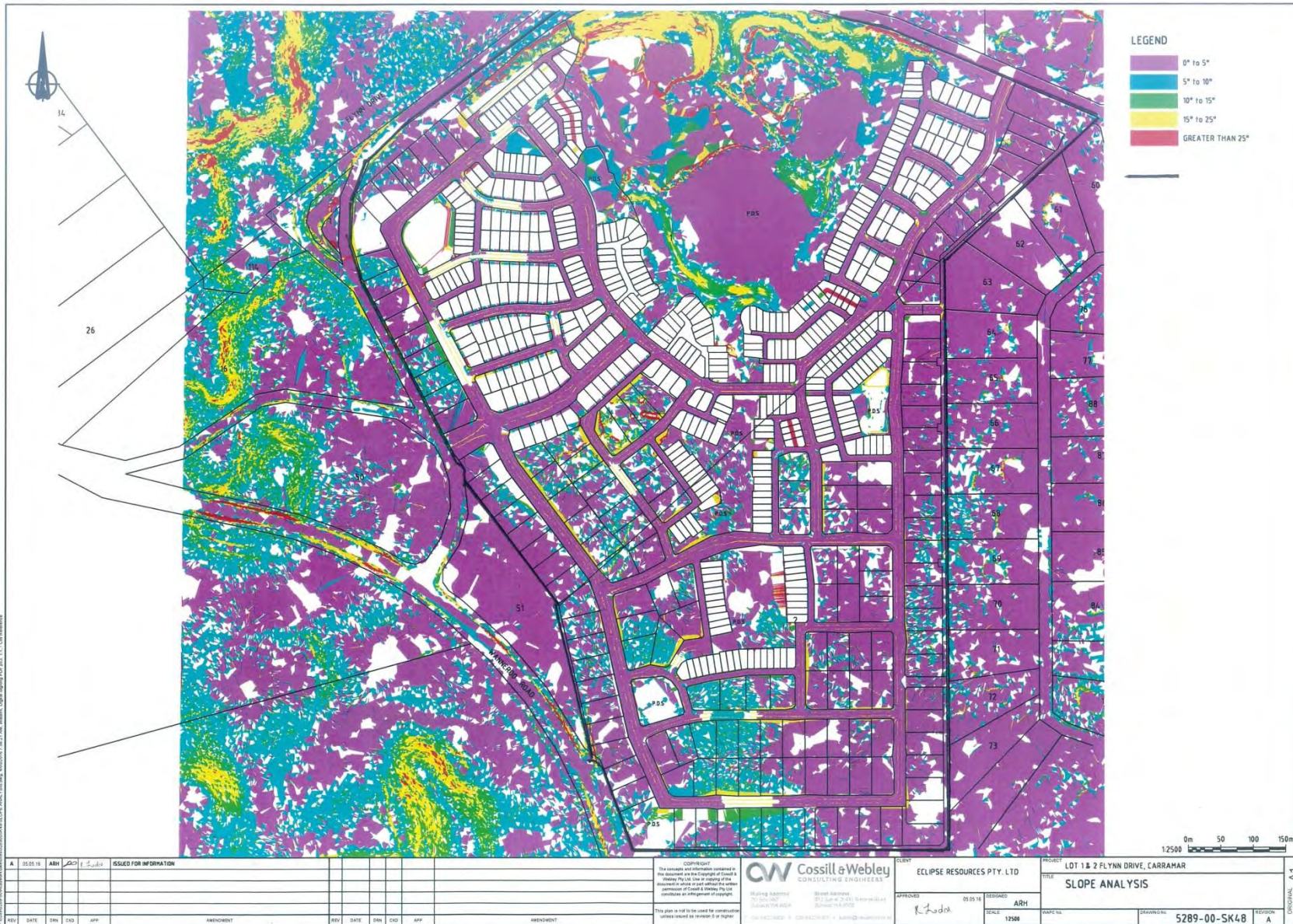
### **2.1.6 Water Supplies**

Existing water supplies for the existing and proposed lawns and gardens associated with proposed Public Open Space comes from two onsite bores.

#### Future Water for Fire Fighting

Mains water will be supplied fire hydrants will be installed by the developer which is discussed in detail in Section 4.5.

Figure 3 Slope Plan.



## 2.2 Bushfire History, Fuel Age and Risk of Ignition

### 2.2.1 Bushfire History

There was a fire in February 2001 that came from the area to the north of Flynn Drive and entered the site (under a NW wind) and burnt out the majority of the Site and some of the properties in the Carramar estate to the east.

### 2.2.2 Fuel Age/Loads

In accordance with Table B2 of AS 3959-2009 the Fuel loads for Forest Class A is 25-35 tonnes/ha, Woodland Class B 15-25 tonnes/ha, Scrub Class D is 25 tonnes/ha and Grassland Class G is 4.5 tonnes/ha.

The dominant vegetation is Scrub Class D with Tuart, Jarrah and Marri Woodland as an overstorey. In the Visual Guide for Bushfire risk assessment in Western Australia (February 2016) it states that: *The vegetation classification guidance provided in AS 3959-2009 considers foliage cover to be the sole determining in classification of vegetation. However with respect to assessing the likely contribution to potential fire behaviour it is often more important to consider structure rather than canopy cover. Canopy cover should not be relied on as the sole determining factor in vegetation classification.*

See Figure 3 for Vegetation Classifications and Type.

## 2.3 Bushfire Hazard Assessment

A Bushfire Hazard Level assessment provides a measure of the likely intensity of a Bushfire and the likely level of bushfire attack on a site by categorising and mapping a site. Bushfire Hazard Assessment is determined by rating the vegetation type in accordance with Appendix 2 Table 3 of the *Guidelines*. It is also based on the underlying assumption that land in Western Australia is predominantly undulating with short, steep inclines. In the *Guidelines* bushfire hazard assessment identifies 3 categories: Low, Moderate and Extreme.

**Table 1 Hazard Levels and Characteristics extracted from the *Guidelines***

HAZARD LEVEL	CHARACTERISTICS
<b>Low</b>	<ul style="list-style-type: none"> <li>devoid of standing vegetation (less than 0.25ha cumulative area);</li> <li>areas which, due to climatic conditions or vegetation (e.g. rainforest), do not experience bushfires;</li> <li>inner urban or suburban areas with maintained gardens and very limited standing vegetation (less than 0.25ha cumulative area);</li> <li>low threat vegetation, including grassland managed in a minimal fuel condition (i.e. to a nominal height of 100mm), maintained lawns, vineyard and orchards; and</li> <li>pasture or cropping areas with very limited standing vegetation that is shrubland, woodland or forest with an effective up slope*, on flat land or an effective down slope* of less than 10 degrees, for a distance greater than 100 metres.</li> </ul>
<b>Moderate</b>	<ul style="list-style-type: none"> <li>areas containing pasture or cropping with an effective down slope* in excess of 10 degrees for a distance greater than 100 metres;</li> <li>unmanaged grasslands;</li> <li>open woodlands;</li> <li>open shrublands;</li> <li>low shrubs on areas with an effective up slope*, on flat land or an effective down slope* of less than 10 degrees, for a distance greater than 100 metres or flat land;</li> <li>suburban areas with some tree cover; and</li> <li>forest and woodlands with a permanent grass understorey or at most, a scrub understorey structure consisting of multiple areas of &lt;0.25ha and not within 20 metres of each other or single areas of &lt;1ha and not within 100 metres of other scrub areas.</li> </ul>
<b>Extreme</b>	<ul style="list-style-type: none"> <li>forests with a scrub understorey which is multi-tiered;</li> <li>woodlands with a scrub understorey which is multi-tiered;</li> <li>tall shrubs; and</li> <li>any area of vegetation not otherwise categorised as low or moderate.</li> </ul>

\*NOTE Effective slope refers to the slope under the classified vegetation in relation to the subject site. Distances less than 100 metres will be deemed to be undulating land, rather than a nominated slope.

### Pre Development

The bushfire hazard assessment for the site Pre Development is:-

Scrub Class D	-	Extreme - Scrub
Woodland Class B	-	Extreme - woodland with a scrub understorey.

### Post Development

In the urban residential/cottage Lots (R20-50 & R60) the whole of each Lot will be cleared of all vegetation and will have a 100 metre cleared area within the site around a stage of land release will also be cleared or as a minimum will comply with the asset Protection Zone requirements. Lots that are within 100 metres of the site boundary will be assessed to determine BAL ratings which will be BAL 29 or less.

In the Special Residential Lots (R5) it is proposed that the Building envelope will be determined and the setback from remnant classified vegetation will be determined with a maximum of a 10metre wide strip being retained (as natural vegetation) at the rear of the Lots.

This vegetation removal detailed above will reduce the Bushfire Hazard level from Extreme to Moderate-Low. All Lots within the Development will achieve a BAL rating of BAL 29 or less.

A Preliminary Clearing Plan is at Figure 5.

#### **2.3.1 Management of Vegetation within Special Residential Lots.**

It is proposed to retain some vegetation at the rear of the Lots to a maximum width of 10 metres within each Lot making a total width of 20 metres. In Section 2.2.3.2 (d) Strips of vegetation less than 20 m in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20 metres of the site or each other, or other areas of vegetation. The BAL for that vegetation will be classified as BAL-LOW.

Also there will be a 20 metre separation between sections of the 20 strips of retained vegetation and other classified vegetation so as to comply with AS3959-2009 Section 2.2.3.2 (d).

The fuel loads in remnant vegetation are to be managed to 5-8 tonnes/ha by the landowner.

Sample Schematic Diagrams showing areas of retained vegetation an, the siting of building envelopes and Asset Protection Zones within each Lot are shown below.



Photo 1 Woodland Class B



Photo 3 Woodland Class B Scrub Understorey



Photo 5 Firebreak within site along western boundary



Photo 7 Woodland Scrub Understorey

Photo 2 RHS of fence Lot 51 LHS fence Development Site



Photo 4 Woodland Scrub Understorey

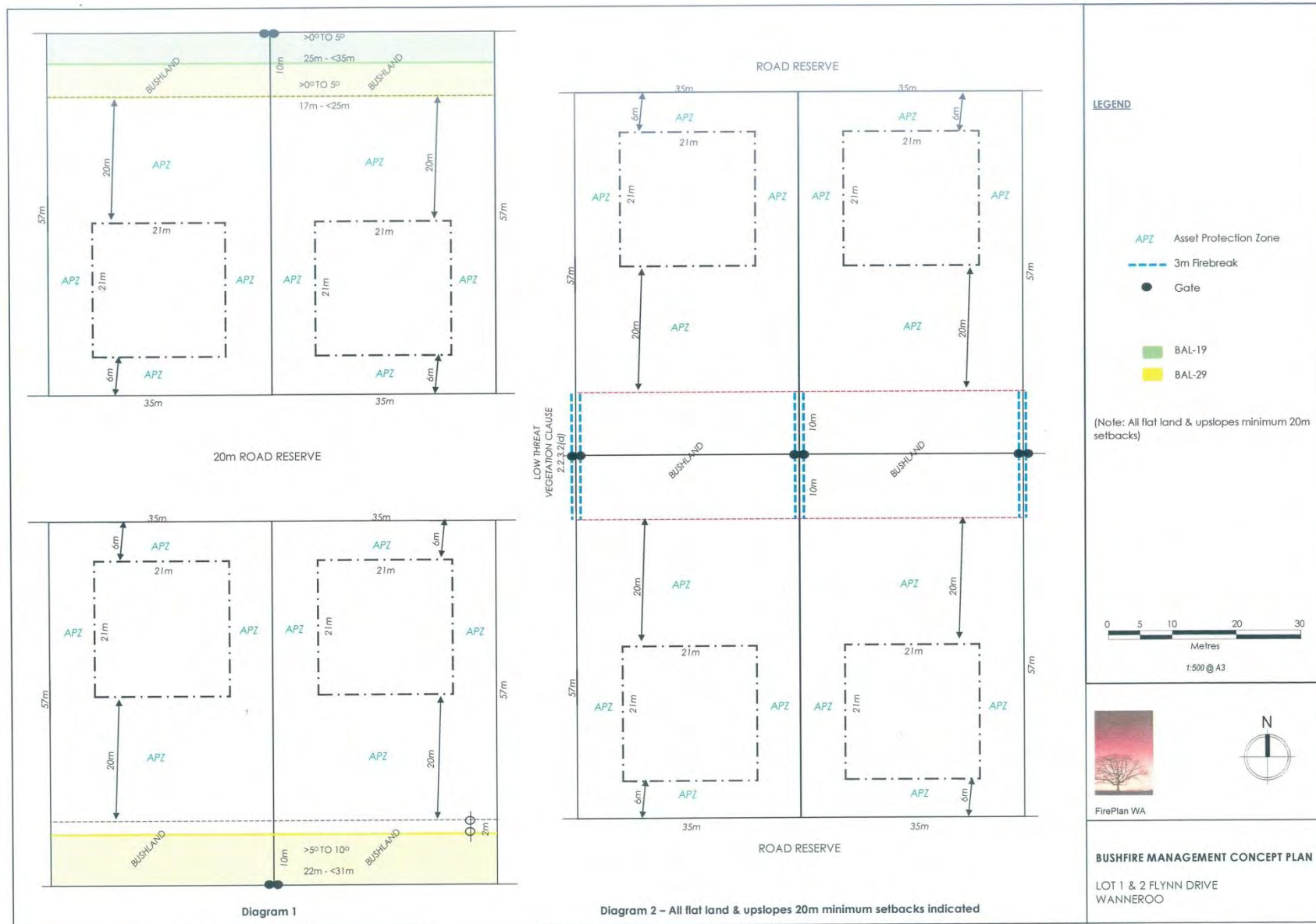


Photo 6 Woodland Scrub Understorey.

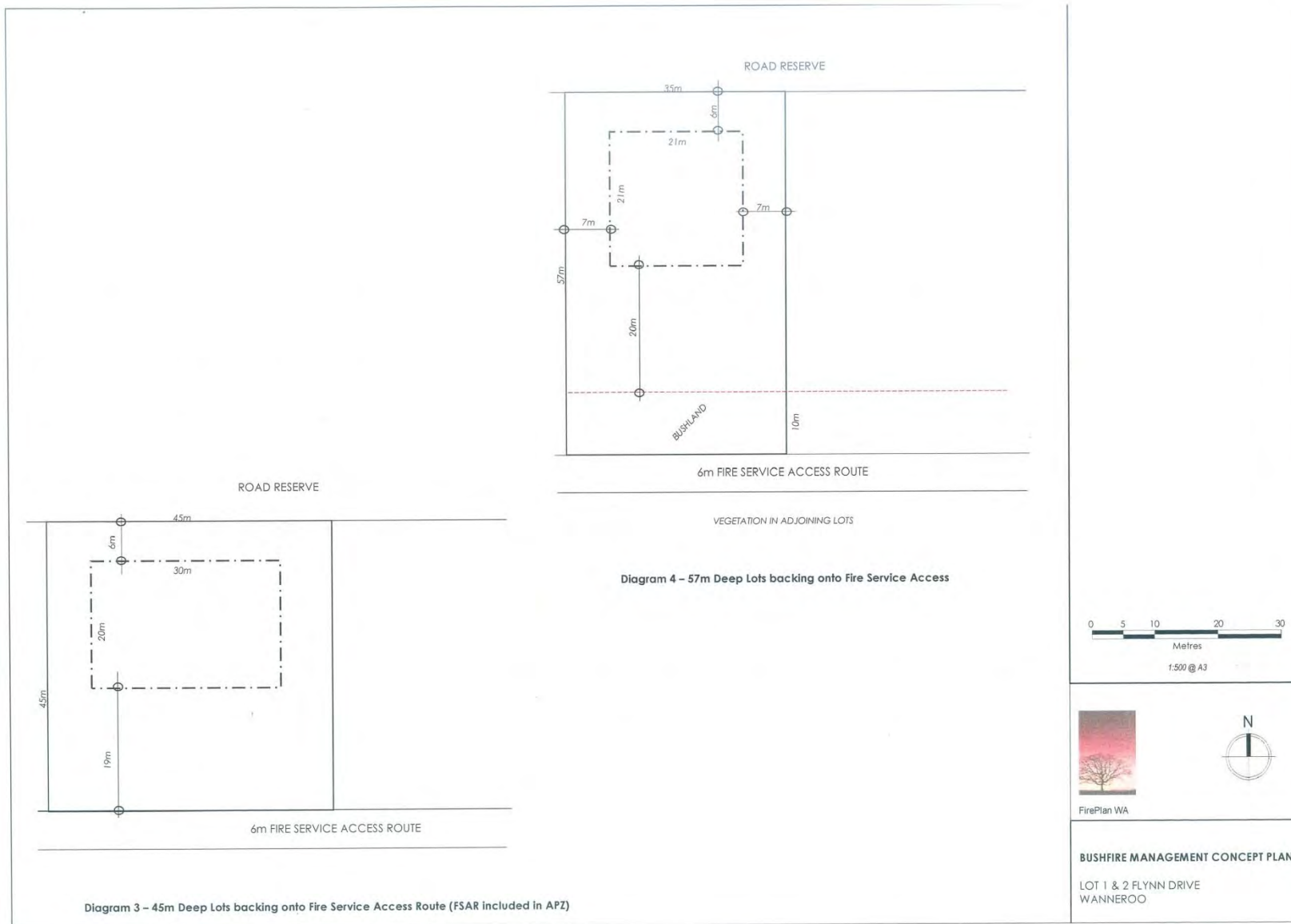


Photo 8 Woodland with Scrub Understorey

Diagram 1 & 2 Impact of Installing Asset Protection Zones and Retained Vegetation.



**Diagram 3 and 4 Impact of Installing Asset Protection Zones, Fire Service Access Way and Retained Vegetation**



## 2.4 Bushfire Attack Level

Bushfire Attack Level (BAL) assessment classifies land into 6 categories based on a combination of vegetation type (fuel type, load and structure), effective slope of the land and the proposed distance from predominant vegetation. BAL assessment for the proposed development is detailed in Section 5.0.

**Table 2 BAL Descriptions**

Bushfire Attack Level (BAL)	Classified Vegetation within 100 metres of the site and heat flux exposure thresholds	Description of predicted bush fire attack and levels of exposure	Construction Section as per AS 3959
BAL-LOW	Low threat vegetation See Clause 2.2.3.2	There is insufficient risk to warrant any specific construction requirements	4
BAL – 12.5	≤12.5 kW/m <sup>2</sup>	Ember attack.	3 and 5
BAL – 19	>12.5 kW/m <sup>2</sup> ≤19 kW/m <sup>2</sup>	Increasing levels of ember attack and burning debris ignited by windborne embers together with increasing heat flux.	3 and 6
BAL – 29	>19 kW/m <sup>2</sup> ≤29 kW/m <sup>2</sup>	Increasing levels of ember attack and burning debris ignited by windborne embers together with increasing heat flux.	3 and 7
BAL – 40	>29 kW/m <sup>2</sup> ≤40 kW/m <sup>2</sup>	There is much increased risk of ember attack and burning debris ignited by windborne embers together with increasing heat flux with the increased likelihood of exposure to flames.	3 and 8
BAL – Flame Zone	>40 kW/m <sup>2</sup>	Direct exposure to flames from fire front in addition to heat flux and ember attack.	3 and 9

**Table 3 Indicative BAL ratings and setbacks**

Vegetation Type	Effective Slope Degrees down slope	Setback from Vegetation metres	BAL RATING
Woodland Class B	Upslope	29-100	12.5
Woodland Class B	Upslope	20-29	19
Woodland Class B	0-5	35-100	12.5
Woodland Class B	0-5	25-35	19
Woodland Class B	5-10	43-100	12.5
Woodland Class B	5-10	31-43	19
Woodland Class B	5-10	22-31	29

In accordance with AS 3959 2009 Table 2.4.3 the required setbacks for vegetation and effective slope that will apply to this site are detailed in the above Table 3.

With the Cottage Lots being cleared and with special residential lots having APZ installed and building enveloped cleared by the developer at the time of site works bushfire hazards will be significantly reduced within the Site. In State Planning Policy it States that a BAL Contour Plan is required as part of a Bushfire Management Plan SPP3.7 - Section 6.4. However as there is considerable modification to the amount of vegetation that will be retained within the Site and the retention of vegetation at the rear of Special Residential Lots that a BAL assessment of the proposed Lots would be more appropriate. Complies with SPP 3.7 Section 6.5(a) (i).

BAL ratings have been determined for all lots within 100 metres of retained vegetation using the data shown in Table 3 above. These BAL are taking into account Private and Public Open Space areas will be designed and in some case will contain some portions of an Asset Protection Zone and will be managed by the HOA, the adjoining vegetation outside of the site and the amount of clearing that will take place within the site.

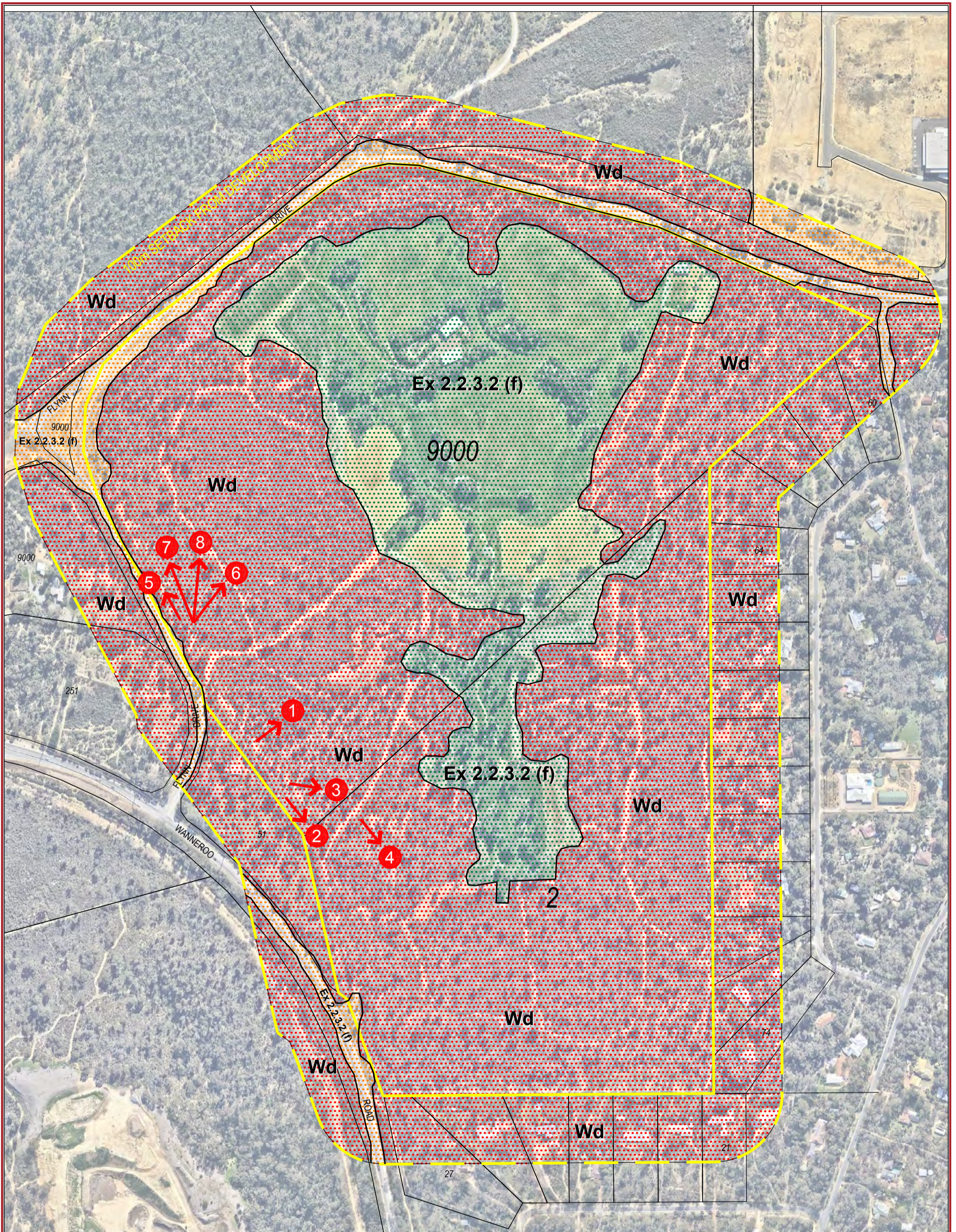
At each stage of land release the developer will provide the City of Wanneroo with a plan showing the indicative BAL Assessment for all lots contained within that Stage.



The BAL Assessment Map for that Stage will be made available to prospective lot purchasers.

At the time of lodgement of a Development Application to Council for development of a lot, the applicant is required to have a BAL Assessment undertaken and a BAL Certificate issued by an accredited BPAD practitioner for the subject lot, which is to accompany the Building Permit Application.

BAL Contour Map shown in Figure 6.



**VEGETATION CLASSIFICATION & BUSHFIRE HAZARD LEVEL ASSESSMENT**

LOTS 2 & 9000 FLYNN DRIVE  
CARRAMAR  
City of Wanneroo

**LEGEND**

SUBJECT LAND SITE PHOTOS

VEGETATION CLASSIFICATION  
Wd - CLASS B WOODLAND  
Ex 2.2.3.2(f) - EXCLUSION CLAUSE 2.2.3.2(f)

BUSHFIRE HAZARD LEVEL

EXTREME

MODERATE

LOW

NORTH

0 50 100 150 200m

SCALE 1:5000 @ A3  
DATE: SEPTEMBER 2016  
Base mapping supplied by Landgate & Nearmap

**FirePlan WA**

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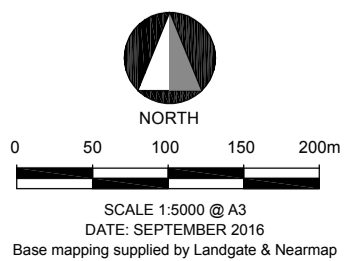


# CLEARING PLAN

LOTS 2 & 9000 FLYNN DRIVE  
CARRAMAR  
City of Wanneroo

## LEGEND

- PROPOSED CLEARING
- VEGETATION TO BE RETAINED
- ASSET PROTECTION ZONE



## FirePlan WA

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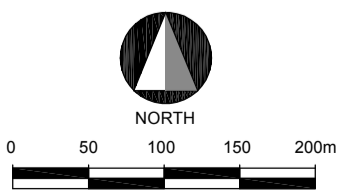


# BAL CONTOUR PLAN

LOTS 2 & 9000 FLYNN DRIVE  
CARRAMAR  
City of Wanneroo

### LEGEND

- BAL FLAME ZONE
- BAL 40
- BAL 29
- BAL 19
- BAL 12.5



SCALE 1:5000 @ A3  
DATE: SEPTEMBER 2016  
Base mapping supplied by Landgate & Nearmap

## FirePlan WA

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### 3.0 PROPOSAL COMPLIANCE AND JUSTIFICATION

This Bushfire Management Plan complies with the following Section of SPP-3.7 and the *Guidelines*.

Policy Measure.	Compliance			Comment
	Yes	No	N/A	
6.1 Higher order strategic Planning documents			✓	
6.2 Strategic Planning proposals, subdivision and development applications	✓			City of Wanneroo TPS 1. See Section 1.1 of BMP
6.3 Information to accompany strategic Planning proposals	✓			BAL rating for each Lot provided in BMP
6.4 Information to accompany subdivision application	✓			BMP prepared in accordance with <i>Guidelines</i>
6.5 Information to accompany Development Applications	✓			BAL rating for each Lot provided in BMP
6.6 Vulnerable or High risk land uses			✓	No Vulnerable or high-risk land use in subdivision
6.7 Strategic Planning proposals, subdivision or development applications in areas with extreme BHL and /or areas where BAL -40 or BAL FZ applies			✓	BAL 29 or less applies to lots Site has an Extreme BHL but will have a Moderate BHL post site works.
6.8 Advice from State/relevant authority/s for emergency services to be sought	✓			
6.9 Advice from State/relevant agency/authorities for environmental protection sought			✓	Referral not required as a condition of rezoning
6.10 Bushfire conditions may be imposed	✓			Notification 70A on Land Title Section 5.1.2
6.11 Precautionary Principle				Acceptable solutions complied with see Section 4.7

Statement against Relevant Documents				
Guidelines for Planning in Bushfire Prone Areas	✓			Performance Criteria and acceptable solution checklist Section 4.7
Any Existing Bushfire Management Plan	✓			2010 & 2013 version approved. This version modified to align to <i>Guidelines</i>
Any existing BHL assessment or BAL assessment prepared over the Site		✓		
Local Planning Strategies references to bushfire risk management	✓			Detailed in Section 1.1
Local Planning Scheme Provisions relating to bushfire management	✓			Detailed in Section 1.1
Any applicable structure Plans , Special control area provisions, previous planning approvals or similar referencing bushfire risk management applicable to the subject site	✓			Detailed in Section 1.1
Any relevant landscaping plans applicable to the subject Site	✓			POS areas will be managed by the HOA- Body Corporate
Firebreak Order applicable to subject site	✓			City of Wanneroo comment Section 4.4.2
AS 3959 Construction of Buildings in Bushfire Prone Areas	✓			Detailed in Section 2.4 & 4.2
BMP complies with Acceptable solutions	✓			Checklist Section 4.7

### 3.1 DISCLAIMER

In the event of large bushfires it is essential that landowners understand that fire appliances may not be available to protect each dwelling/building, landowners are responsible for the protection of their own assets which may require additional protection above the minimum detailed in this Bushfire Management Plan.

## 4.0 BUSHFIRE RISK MANAGEMENT MEASURES

The bushfire management strategies detailed in this BMP are designed to comply with the Performance Criteria and Acceptable Solutions detailed in Guidelines for Planning in Bushfire Prone Areas December 2015

### 4.1 Element 1 – Development Location

The Extreme Bushfire Hazard Level within the Site will be reduced to Moderate as part of site works and the installation of APZ within each Lot prior to sale, construction standards will be BAL 29 or less, thereby complying with acceptable solution A1.1.

### 4.2 Element 2 – Siting and Design of Development

#### 4.2.1 Setback from Classified Vegetation

Bush Fire Prone Areas have been declared for this site, the minimum distance of 100 metres (from vegetation rated ‘Moderate’ or ‘Extreme’) may be reduced in compliance with AS 3959. Under AS 3959 as the distance from the vegetation is reduced, the construction standard must be increased. Table 2.4.3 AS 3959-2009 sets out this relationship and Section 2 of AS 3959-2009 details the methodology of determining the Bushfire Attack Level (BAL).

BAL (Bushfire Attack Level) Determination Using Methodology from Section 2.2.1 of current adopted AS 3959- 2009 and Table 2.4.3 which applies to this development is detailed in Table 3 of this BMP. Also Asset Protection Zone will be installed by the developer and landowner will be responsible for ongoing maintenance. The HOA will have a compliance role to ensure landowner’s meet their responsibilities under this BMP and the City of Wanneroo Firebreak Notice.

### Figure 7 Relationships of APZ and HSZ to Development

Figure 15: Separation distance required where no additional construction standards are proposed  
 In the absence of additional construction standards a minimum separation distance of 100 metres between buildings and the hazard must be provided in order to protect them from burning debris, radiant heat and direct flame contact

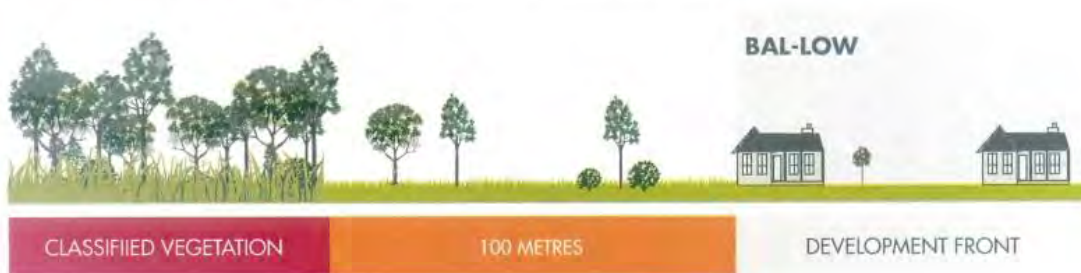


Figure 16: A reduced separation distance may necessitate increased construction standards  
 It may be possible to reduce the minimum distances, for example by increasing the construction standard of the building – in this example the building would need to be constructed to BAL-29



#### 4.2.2 Asset Protection Zone

The aim of the Asset Protection Zones (APZ) is to reduce bush fire intensity close to buildings, and to minimise the likelihood of flame contact with buildings.

The Asset Protection Zone is a low fuel area immediately surrounding a building complying with Acceptable Solution A2.1 detailed in the *Guidelines*.

Asset Protection Zone must fulfil the following conditions:-

- An APZ is to be constructed around Lots with an indicative BAL Rating as shown in Figure 5
- The width of the APZ is to be measured from the walls of the habitable building to classified vegetation.
- Loose flammable material within the APZ should be removed to reduce the fuel load to less than 2 tonnes per hectare and this is to be maintained to this level.
- All grasses within the APZ are to be maintained to a maximum height of a 50mm.
- The crowns of trees are to be separated where possible to create a clear separation distance of 10 metres between adjoining or nearby trees crowns.
- Prune lower branches of trees within the APZ (up to 2 metres off the ground) to stop a surface fire spreading to the canopy of the trees. A small group of trees within close proximity to one another may be treated as one crown provided that the combined crowns do not exceed the area of one large or mature crown for that species
- There are to be no tree crowns or branches overhanging the building or asset and a minimum horizontal clearance of 2 metres is required between tree branches and buildings or assets.
- Do not clump shrubs close to building. Ensure that there is a gap of at least 3 times the height (at maturity) of the shrub away from the building.
- Trees or shrubs in the APZ are to be cleared of any dead material.
- Roof gutters should be free of leaves and other combustible material.
- Sheds within the APZ should not contain flammable materials.

The APZ detailed above is in excess of that required in *Guidelines* but is considered essential for the protection of people and dwellings in this Site

The APZ is to be installed by the Developer and maintained by the landowner in perpetuity.

#### 4.3 Hazard Separation

The landowner must maintain bushfire fuels outside the APZ to a minimum of 5-8 tonnes/ha for Woodland vegetation.

See Table 6 for Landowner Annual Fire Prevention Works.

#### 4.4 Element 3 Access

##### 4.4.1 Road System

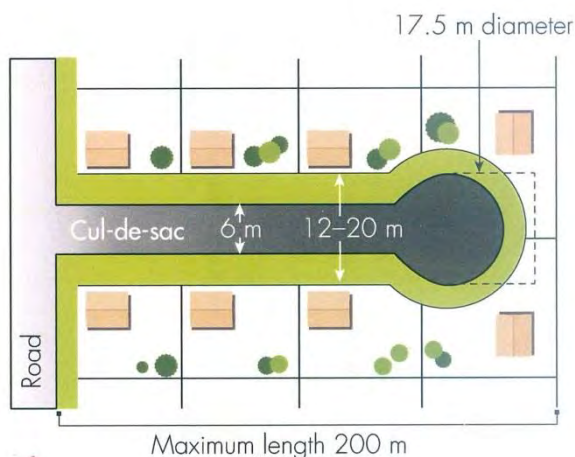
It is proposed to have two access/egress roads out onto Flynn Drive. The main access is located on the western side of the site onto Travertine Way (formerly the Flynn Drive 'dogleg'). A second access out onto Flynn Drive is located in the northeast corner of the site (left in – left out). An emergency access way in the southwest corner is to provide emergency access out onto Wanneroo Road. Complies with A3.1

**4.4.2 Internal Roads A3.2**

All internal roads will as a minimum comply with the Public Road standard as detailed in the Guidelines with specification detailed in Table 4 column A3.2.

**4.4.3 Cul De Sac A3.3**

The use of cul de sac within the site are restricted and only used when the length of the cul de sac is less than the acceptable solution A3.3. All cul de sacs within the site will be constructed to the standard detailed in Table 4 and turn around head in Figure 7.



**4.4.4 Battle Axe Access A3.4**

All Battle Axe accesses are not to exceed 600 metres in length and are to be constructed to the standard detailed in Table 4. Complies with Acceptable solution A3.4



**Figure 19:** Minimum design requirements for a battle-axe

Unless no alternative exists, battle-axe access legs should be avoided in bushfire prone areas. Where deemed appropriate, the minimum design standards are shown.

**4.4.5 Private Driveway A3.5**

As all driveways will be less than 50 metres in length acceptable solution A3.5 does not apply. Driveways and crossover are to comply with the City of Wanneroo’s standards.



#### 4.4.6 Emergency Access Way A3.6

An emergency access way is to be installed by the developer and maintained by the HOA to be located in the southwest corner of the site and is to be constructed to the standards detailed in Table 4. Complies with acceptable solution A3.6.

#### 4.4.7 Fire Service Access (FSAW) A3.7

A Fire Service access way is to be installed by the developer and maintained by the HOA along the western and southern boundaries of the site. The FSAW will comply with acceptable solution A3.7 to the specification detailed in Table 4 and figure. Refer Figure 2 for the location of the FSAR.

Passing Bays are required every 200 metres and turn around areas every 500 metres along the FSAR.

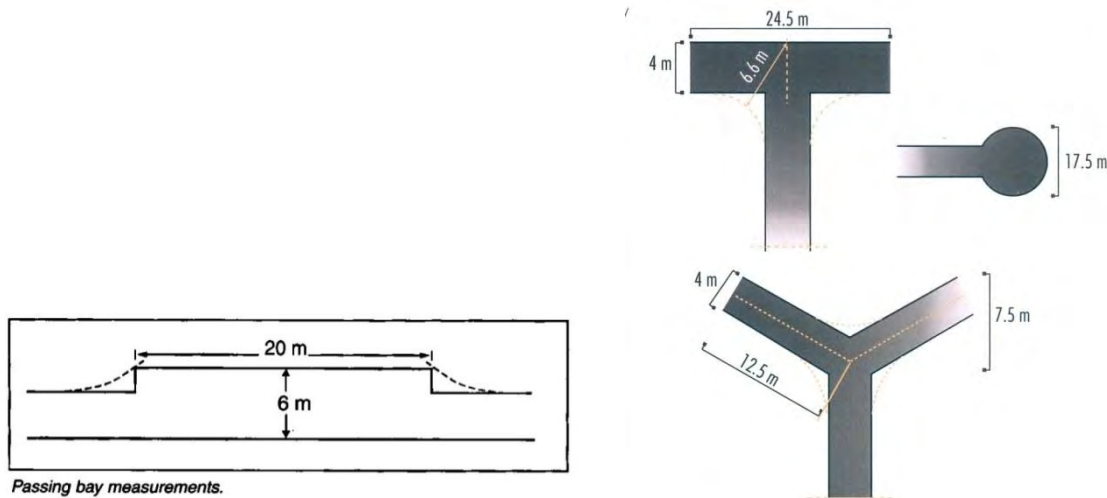
#### 4.4.8 Internal Firebreaks A3.8

In general each landowner shall comply with the City of Wanneroo Fire Management Notice annually and is available on the City of Wanneroo website. An internal firebreak is to be installed on the internal boundary through the retained vegetation so that fire appliance can access lots through the rear of the properties. See Diagram in Section 2.4.4. This firebreak is to be installed by the developer and maintained by the landowners.

Firebreaks are to be installed on the inside of the retained vegetation strip in Lots that adjoining Lot 51 along the western boundary of the Site. This firebreak is to link into the internal road system. A 4.2 metre gate is to be installed in the internal boundary of Lots to provide access from one Lot to another for fire appliances. The firebreak is to be installed on the inside of the retained vegetation (within the APZ) so as to retain as much of the existing landscaped vegetation within the site which acts as screening to the future development of Lot 51.

**Table 4. Vehicle Access Technical Requirements as detailed in *Guidelines Planning in Bushfire Prone Areas 2015***

Technical Requirements	A3.2 Public Roads	A3.3 Cul De sac	A3.4 Battle axes	A3.5 Private Driveways	A3.6 Emergency Access Ways	A3.7 Fire Service Access Routes
Minimum trafficable surface (m)	6*	6	4	4	6	6
Horizontal clearance (m)	6	6	6	6	6	6
Vertical clearance (m)	4.5	N/A	4.5	4.5	4.5	4.5
Maximum grade over <50 metres	1 in 10	1 in 10	1 in 10	1 in 10	1 in 10	1 in 10
Minimum weight capacity (t)	15	15	15	15	15	15
Maximum crossfall	1 in 33	1 in 33	1 in 33	1 in 33	1 in 33	1 in 33
Curves minimum inner radius (m)	8.5	8.5	8.5	8.5	8.5	8.5
		Maximum 200 metres Long	Maximum 600 metres Long	Passing bays and turn around areas are required	Passing bays and turn around areas are required	Passing bays and turn around areas are required

**Figure 8 Turn Around area and Passing Bay Specifications**

#### 4.5 Element 4 Water Supplies

##### 4.5.1 Water for Fire Fighting

Reticulated water is available for this site and the Developer will install fire hydrants in accordance the Water Corporation's *No 63 Water Reticulation Standard*.

##### 4.5.2 Domestic Water Supply and Water for Fire fighting.

Reticulated Water will be provided to each Lot by the Developer.

##### 4.5.3 Additional Water supplies

The Developer has two bore on site which are used for reticulation of turf areas and gardens. The main bore has a capacity of producing 120,000 litres/per hour and the pump will be connected to a back-up generator. The Developer is prepared to provide access to this water supply in the event that the Water Corporation's Fire Hydrant system runs out of water or is insufficient to combat bushfires within of near this development site. It will require collaboration between the City of Wanneroo and the developer to set up access to the auxiliary water supply and the fittings compatible with fire appliances. The water would be supplied as a community service free of charge.

#### 4.6 Additional Measures

##### 4.6.1 Total Fire Ban Days

A Total Fire Ban is declared because of the extreme weather conditions or when fires are seriously stretching fire fighting resources. A Total Fire Ban is declared by DFES following consultation with Governments.

When a Total Fire Ban is declared it prohibits the lighting of any fires in the open air and any activities that might start a fire. The ban includes all open fires for the purpose of cooking or camping. It also includes the use incinerators, welding, grinding, soldering and gas cutting.

The City of Wanneroo may also impose a vehicle movement ban which may apply to the "Site" and may affect the movement of people within the "Site".

The Department of Fire and Emergency Services and the City of Wanneroo are to continue to educate the public on what a Total Fire Ban means and what actions members of the public need to take.

#### **4.6.2 Use of Machinery, Tools, Vehicles and Tractors**

The City of Wanneroo is to continue to provide the community with advice on bush fire prevention and preparedness through brochures, newspaper articles, the Firebreak Notice and Bushfire Information Booklet issued to rate payers and on their web site.

The use of machinery such as tractors and vehicles can be controlled by the City of Wanneroo as detailed in the Bush Fires Act 1954 and Regulations. Landowners within this development will need to comply with these directions. Also if site works are being carried out during the summer months these restrictions may also apply to this operation and work may have to cease during the ban period.

The use of open fires for the purpose of cooking or camping, incinerators, welding, grinding, soldering and gas cutting are controlled by the City of Wanneroo through its powers in the Bush Fires Act 1954 and Regulations.

#### **4.6.3 Public Education**

The developer is to provide a copy of the current City of Wanneroo *Firebreak Management Notice*, *The Homeowners Survival Manual* and *Prepare Act Survive* brochure and this *Bushfire Management Plan* at the time of sale of a Lot. It is essential that the Real Estate agent handling the sale of Lots on behalf of the Developer advises potential landowners that a Bushfire Management Plan exists and the modification of vegetation and ongoing fuel reduction will be required within this development.

Other Public Safety and Community information on Bush Fires is available on the Department of Fire and Emergency Services Authority web site [www.dfes.wa.gov.au](http://www.dfes.wa.gov.au) and the City of Wanneroo website [www.wanneroo.wa.gov.au](http://www.wanneroo.wa.gov.au).

#### **4.6.4 Fire Safer Areas**

In the event of a bush fire, the Incident Controller of Fire Fighting operations will advise if an evacuation is necessary and, in conjunction with the City of Wanneroo Emergency Services, direct residents to Safer Refuge Areas.

#### **4.6.5 Evaporative Air Coolers**

The Building Commission has issued an information Brochure on Roof- Mounted Evaporative Coolers being installed on habitable buildings that are located in designated bushfire Prone Areas must be fitted with non- combustible covers. Details on [www.commerce.wa.gov.au/building-commission](http://www.commerce.wa.gov.au/building-commission)

#### 4.7 Compliance Checklist Performance Criteria and Acceptable Solutions

**Property Details:** Lots 9000 & 2 Flynn Drive Wanneroo.  
**Local Government:** City of Wanneroo

Element		Compliance			Comment
<b>Element 1: Location</b>					
		Yes	No	N/A	
A1.1	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.	✓			Subdivision/development is located on land that is not subject post site works an extreme bushfire hazard or requires construction to BAL 40 or BAL FZ.
<b>Element 2: Siting and Design of Development</b>					
A2.1	Asset Protection Zone	✓			APZ required as detailed in Section 2.4 & 4.2
A2.2	Hazard Separation Zone			✓	Hazard reduction outside the APZ is to be maintained to 5-8 tonnes/ha in retained woodland vegetation Compliance with Firebreak Order
<b>Element 3: Vehicular Access</b>					
A3.1	Two different vehicular access routes, both of which connect to the public Road network, provide safe access and egress to two different destinations and be available to residents/the public at all times and under all weather conditions		✓		Two access/egress routes onto Flynn Drive and Emergency access way in SW corner of Site onto Wanneroo Rd
A3.2	Public Roads	✓			Internal Roads
A3.3	Cul-de-sacs	✓			
A3.4	Battle Axe Access			✓	
A3.5	Private driveways			✓	Driveways will be less than 50 metres long and will comply with City of Wanneroo Standards
A3.6	Emergency access ways	✓			SW corner of site onto Wanneroo Rd
A3.7	Fire services access routes	✓			Along western and southern boundaries of site.
A3.8	Firebreaks	✓			City of Wanneroo Firebreak Notice
<b>Element 4: Water Supplies</b>					
A4.1	Reticulated areas	✓			Fire Hydrants installed by developer. Auxiliary water supply made available to fire services from developers private water supply
A4.2	Non-reticulated areas			✓	
A4.3	Individual Lot non reticulated area			✓	

#### Applicant Declaration:

I declare that the information provided is true and correct to the best of my knowledge.

#### Name of Person Preparing the Fire Management Plan:

Full Name: *B.W. Harris* for FirePlan WA

Date: 15/09/2016

Developer: Full Name: \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## 5.0 IMPLEMENTATION AND ENFORCEMENT OF BUSHFIRE MANAGEMENT PLAN

This Bushfire Management Plan becomes operational as a condition of development approval. In implementing this Bushfire Management Plan, the following responsibilities have been determined.

### 5.1 Responsibilities

#### 5.1.1 Property Owners Responsibilities and HOA

To maintain the reduced level of risk and threat of fire, the owners/occupiers of all lots created by this proposal will be responsible for undertaking, complying and implementing measures protecting their own assets from the threat and risk of bush fire:

- Maintaining the property in good order to minimize potential bushfire fuels to mitigate the risk of fire on the property;
- Ensuring that the Subject land complies with the City of Wanneroo Firebreak Notice. Maintain that Portion of the Fire Service Access Way that is Located within your Lot. To be carried out annually;
- Ensuring that new dwellings are constructed to AS 3959 Table 3 Section 2.4. There will be a Section 70A notification on the Certificate of Title for each Lot advising the Landowner of the existence of this Bushfire Management Plan;
- Complying with the instructions of DFES Fire Services, the City of Wanneroo and/or volunteer fire services in maintaining the property or during the event of a bushfire;
- Ensuring that in the event an evaporative air conditioner is installed at the property, suitable external ember screens are installed to roof mounted units and that they comply with AS 3959, check annually.
- Install Asset Protection Zone and maintain annually the APZ detailed in Section 2.4 & 4.2.
- Implement Landowners responsibilities detailed in Table 5 carry out Annual landowner Fire Prevention Activities detailed in Table 6.
- Maintain Fire Service Access Routes in perpetuity.
- Maintain Emergency Access way in perpetuity as detailed in Section 4.4.
- Maintain all roads within the site to the standards detailed in the BMP and as detailed the HOA Agreement with the City of Wanneroo.

#### 5.1.2 Developer's Responsibilities

As a condition of development the Developer shall be required to carry out works described in Section 6 of this Fire Management Plan to the satisfaction of the WAPC

- A notification pursuant to section 70A of the Transfer of Land Act 1893 is to be placed on the certificate(s) of title of the proposed lot(s). Notice of this notification is to be included on the diagram or plan of survey (deposited plan). The notification is to state as follows; *'The lots are subject to a fire management plan'*
- Install firebreaks as detailed in Section 4.4;
- Install fire hydrants as detailed in Section 4.5;
- Supply a copy of this Bushfire Management Plan and *The Homeowners Bush Fire Survival Manual, Prepare Act Survive (or similar suitable documentation)* and the City of Wanneroo *Firebreak Notice and Fuel Hazard Reduction Notice* to each affected property purchaser on sale of the allotment;
- Install cul de sac accesses as detailed in Section 4.4;
- Install Fire service access way as detailed in Section 4.4; and
- Install Emergency Access Way as detailed in Section 4.4.

### 5.1.3 City of Wanneroo

The responsibility for compliance with the law rests with individual property owners and occupiers and the following conditions are not intended to unnecessarily transfer these responsibilities to the City of Wanneroo.

The City of Wanneroo shall be responsible for:

- Ensuring compliance with the current adopted AS3959, of any new habitable structure, within each lot that is required to have an increased construction standards, is undertaken at the time of Building Permit Application;
- Enforcing the City of Wanneroo Firebreak Notice; and
- Ensuring the development complies with the Bushfire Management Plan on behalf of the WAPC.
- Ensure that the Deed of Agreement with the HOA Incorporated Body and the City of Wanneroo is implemented.

## 6.0 ASSESSMENT OF FIRE MANAGEMENT STRATEGIES

All the actions and recommendations in this BMP, meet the Bushfires Act and Regulations 1954 compliant with the acceptable solutions detailed in *Guidelines for Planning in Bushfire Prone Areas* December 2015 are sound, measurable and practical having been used and proven over time. These recommendations take into account the various costs, alternatives available, benefits for protection of residents and the wider community, the environment and biodiversity protection.

This Bushfire Management Plan will be implemented as a condition of subdivision for the site.

It will be the responsibility of the developer to implement the provisions of this Bushfire Management Plan in order to seek clearance of those conditions of development.

Likewise it is the responsibility of the City of Wanneroo to ensure that all standards required in this Bushfire Management Plan are met by the developer prior to clearing any conditions of subdivision relating to this Bushfire Management Plan.

After any major fires that may occur during or once this development has been completed, the City of Wanneroo may conduct a Post Incident Analysis of the fire, which may include identifying and implementing any changes that may be needed to improve the performance of fire prevention strategies.

## 7.0 WORK PROGRAM

Table 5 Works Program Prior to clearance of conditions of development

<b>Developer Responsibilities</b>				
<b>Activity</b>	<b>Responsibility</b>	<b>Maintenance</b>	<b>Responsibility</b>	<b>Timing</b>
Implement fire protection measures as detailed in Sections 4.2	Developer	Annually maintenance required	HOA	HOA prior to 15 <sup>th</sup> November
Compliance with Firebreak Notice, install internal roads, cul de sac, FSAW & EAW. Details Section 4.4.	Developer	Compliance with Firebreak Notice annually Access standards detailed in S4.4	Developer until Lots sold then HOA ongoing	Developer clearance of Condition of subdivision HOA prior to 15 <sup>th</sup> November
Install Fire Hydrants as detailed in Section 4.5	Developer	Annual Maintenance required.	Water Corporation	Developer clearance of Condition of subdivision the Water Corporation ongoing
Section 70 A notifications on Title of each Lot advising BMP applies to each Lot.	Developer	Maintain Site in accordance with Developer responsibilities	Developer until Lot Sold	Developer clearance of Condition of subdivision then HOA ongoing
Provide a copy of following on sale of Lot:- <i>Bushfire Management Plan</i> <i>Home Owners Survival Manual</i> <i>Prepare Act Survive</i> <i>Fire Control Notice</i>	Developer	Landowners to familiarise themselves and annually update actions in the event of fire and annual maintenance.	Landowner & HOA	Developer clearance of Condition of subdivision
<b>Landowner Responsibilities &amp; HOA</b>				
Compliance with Fire Break Notice. Maintain EAW, FSAW Details Section 4.4.	Developer	Compliance with Firebreak Notice annually. Maintain FSAW & EAW	HOA	Completed by 15 <sup>th</sup> November each year.
Landowner request BAL reassessment to confirm or amend BAL rating. Copy of report to City of Wanneroo	Landowner	Ensure Building design complies with relevant AS 3959 BAL rating	City of Wanneroo to approve Building Permit	Re-assessment completed report sent to City of Wanneroo as part of Building Permit Application
Maintain Asset Protection Zone annually as detailed in Section 4.2	Developer to install	Annual Maintenance	Landowner & HOA	Completed by 15 <sup>th</sup> November each year.

**Table 6 Annual landowner Fire Prevention Activities**

Timing	Activity
<b>Autumn to Winter (May - August)</b>	<p>Tree Pruning – remove lower branches; check that power lines are clear.</p> <p>Reduce fuel levels around the house – clear long grass, leaves, twigs &amp; flammable shrubs.</p> <p>Ensure petrol and other flammables are safely stored away from the main dwelling.</p> <p>Make sure your firefighting equipment is in good working order and serviced where required.</p> <p>Make sure all residents are aware of your emergency plan including evacuation routes.</p> <p>Chemical spraying of firebreaks and low fuel zones – first and second applications.</p>
<b>Spring (September – November)</b>	<p>Move woodpiles and stacked timber away from the main dwelling.</p> <p>Keep grass short.</p> <p>Clean gutters and roof debris.</p> <p>Install fire breaks in accordance with this plan and the Fire Management Notice</p> <p>Mechanically install or Chemical spraying of firebreaks and low fuel zones – final applications and maintenance.</p>
<b>Summer (November – May)</b>	<p>Water lawns, trees &amp; shrubs near the buildings to keep them green.</p> <p>Re-check firefighting equipment, screens, water supplies and that gutters remain clear.</p> <p>Maintain firebreaks in accordance with this plan and the fire management notice by mechanical means or by use of chemical spraying.</p>
<b>Long term precautions</b>	<p>Ensure firebreaks are prepared in accordance with this Bushfire Management Plan, the latest Fire Management Notice and any Variation or Fire Order issued by council.</p> <p>Ensure that any planting of wind breaks or trees is in accordance with this Bushfire Management Plan and will not be detrimental to fire suppression requirements in years to come.</p> <p>Make sure that the buildings are safe – fit wire fly screens and shutters, fill gaps into roof/wall spaces, fit fire screens to evaporative air conditioners and have them operable to provide a water only supply.</p> <p>Give consideration to installing external building sprinkler systems and backup power and emergencies.</p> <p>Ensure the access to water supply for fire fighting has the correct fittings, is unobstructed and the route trafficable.</p> <p>Get basic training in firefighting from your Local Bush Fire Brigade or join your local Brigade.</p>



## 8.0 GLOSSARY

### **Acceptable Solution**

A statement describing an acceptable means of complying with the requirements of corresponding performance criteria.

### **Appliance or Fire Appliance**

A fire fighting appliance (vehicle) with structural, grass and bush fire fighting capabilities, with either a 2000 litres water capacity (2.4 appliance) or a 3000 litre water capacity (3.4 appliance) and four (4) wheel drive.

### **Asset Protection Zone (APZ)**

Low fuel area immediately surrounding buildings. Minimum width 20 metres, increasing with slope. Maintained by the landowner.

**Bushfire Attack Level (BAL)** – an assessed rating of a site’s risk to a bushfire, based on vegetation type, slope of the land and its proximity to buildings.

**Building Construction Standard Buffer** - An area 100 metres wide Including an Asset Protection Zone in which an increase in building construction standard in accordance with AS3959 will apply.

### **Bush**

Under the Bush Fires Act 1954 the term bush is defined to include trees, bushes, plants, stubble, scrub and undergrowth of a kind whatsoever whether dead or alive and whether standing or not standing.

### **Bush Fire or Wildfire**

A general term used to describe fire in vegetation that is not under control.

### **Bush Fire Hazard.**

The flammability, arrangement and quantity of vegetation, dead or alive, that can be burnt in a bush fire. Development is to be avoided in extreme bush fire hazard designated areas.

**Bush fire prone area** - for the purposes of this fire management plan, a bush fire prone area is an area that has been declared as such by the relevant local government responsible for an area. Once an area is declared bush fire prone, then AS 3959 applies to new residential development in it.

### **Bush Fire Risk**

The chance of a bush fire starting that will have harmful consequences on life and property. It is measured in terms of consequences and likelihood and arises from the interaction of hazards, communities and the environment.

### **Development Application**

An application for approval to carry out a development under either a local planning scheme or regional planning scheme.

**Dwelling setback** – the horizontal distance between a wall of the dwelling at any point, and an adjacent lot boundary, measured at right angles (90 degrees) to the boundary.

### **DFES**

The Department of Fire and Emergency Services of Western Australia previously FESA.

### **Emergency Access Way**

Road not normally open but available to the public (using two wheel drive vehicles) for evacuation during a bush fire emergency.

**Fire Break or Firebreak**

Any natural or constructed discontinuity in a fuel bed used to segregate, stop and control the spread of a bush fire or to provide a fire line from which to suppress a bush fire. This is an area cleared to reduce the risk of bush fire damage.

**FDI- Fire Danger Index**

The chance of a fire starting, its rate of spread, its intensity and the difficulty of its suppression, according to various combinations of air temperature, relative humidity, wind speed and both the long and short- term drought effects.

**Fire Protection**

A generic term used to describe the range of services and systems used to mitigate the impact of fire on the community. It encompasses both fire prevention and emergency response.

**Fire Management Plan**

Ongoing, dynamic document that sets out the medium to long term mitigation strategies for fire hazards and risks in particular developments within local government areas.

**Fire Services Access Route**

Accessible by heavy four wheel drive fire fighting vehicles.

**Fuel Reduction also Hazard Reduction**

Removal and modification of bush fire fuel, or increase in building construction standards or a combination of the two.

**Hazard Separation Zone (HSZ)**

The fuel reduction area between an area bush fire hazard and the buildings (and associated Asset Protection Zones) of a development.

**Performance Criteria.**

Statement which specifies the outcomes required for the protection of life and property from bush fires.

**Structural Fire**

A fire in a building.

## 9.0 REFERENCES

*State Planning Policy 3.7 Planning in Bushfire Prone Areas* (December 2015) Department of Planning & Western Australian Planning Commission.

*Guidelines for Planning in Bushfire Prone Areas.* (December 2015) Department of Planning & Western Australian Planning Commission.

Bushfire Management Plan (June 2013) Roger Underwood York Gum Services.

State Administration Tribunal DR26 OF 2014 Outcome of Mediation 27<sup>th</sup> February 2014.