




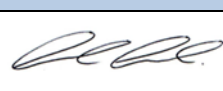
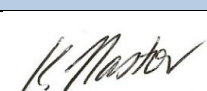
BUSHFIRE HAZARD ASSESSMENT REPORT

**PT LOT 602 YANCHEP BEACH ROAD
YANCHEP**

**Project No: 15297
Report Date: February 2015**

Document Control Record

Site Details:	Pt Lot 602 Yanchep Beach Road, Yanchep
Client:	Primewest (Yanchep Beach Road) Pty Ltd
Prepared By:	Bushfire Prone Planning (BPP Pty Ltd) ABN: 39 166 551 784 M: 0438 946 285/0459 558 986 Email: enquiries@bushfireprone.com.au
	
Reference:	15297
Document Status and Date:	February 2015

Prepared by: Michael Whitelaw 	Approved by: Kathy Nastov 
Date: 06-Feb-15	Date: 06-Feb-15

Revision number:	Description of revision:	Date:	Approved by:

Disclaimer: The measures contained in this Bushfire 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 Bushfire Prone Planning 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 Bushfire Prone Planning has no control. Notwithstanding anything contained therein, Bushfire Prone Planning 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 provided by the consultants.

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1 Introduction and Purpose

Burgess Design Group commissioned Bushfire Prone Planning to develop a Bushfire Hazard Assessment Report to support the subdivision of Pt Lot 602 Yanchep Beach Road, Yanchep located within the City of Wanneroo. The proponent is seeking to subdivide Pt Lot 602 Yanchep Beach Road into 581 residential Lots, public open space and strategic open space. This Report relates to bushfire protection measures recommended for consideration for the proposed subdivision.

The purpose of this report is to provide guidance on how to plan for and manage the potential bushfire threat of the specified area. The Report identifies the bushfire risk and any potential requirements of local government to ensure the proposed development can meet the performance requirements of the Planning for Bushfire Guidelines. This report is a preliminary strategic assessment and a Bushfire Management Plan may be required at a later stage.

2 Site Details

The subject site (Part Lot 602) is located on Yanchep Beach Road located within the City of Wanneroo (Figures 1 & 2). Pt Lot 602 is situated on the northern side of Yanchep Beach Road and sits primarily within a residential zone with a minor portion zoned as business (City of Wanneroo District Planning Scheme No. 2) in the locality of Yanchep. Pt Lot 602 is 42.6 hectares in size with the proposed development comprising 581 residential lots, 4.55 hectares of public open space and 5.79 hectares of strategic open space.

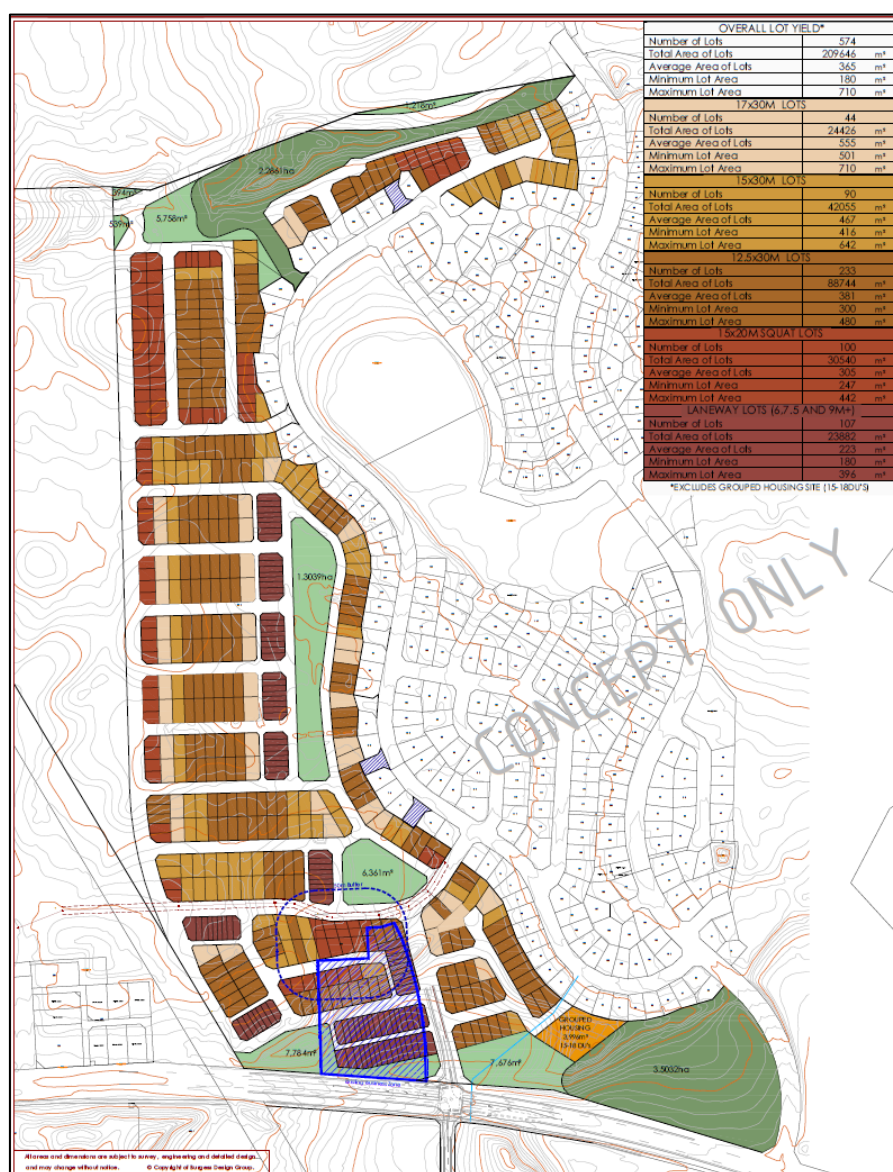


Figure 1: Pt Lot 602 Yanchep Beach Road, Yanchep with Proposed Development (Source: Burgess Design Group)

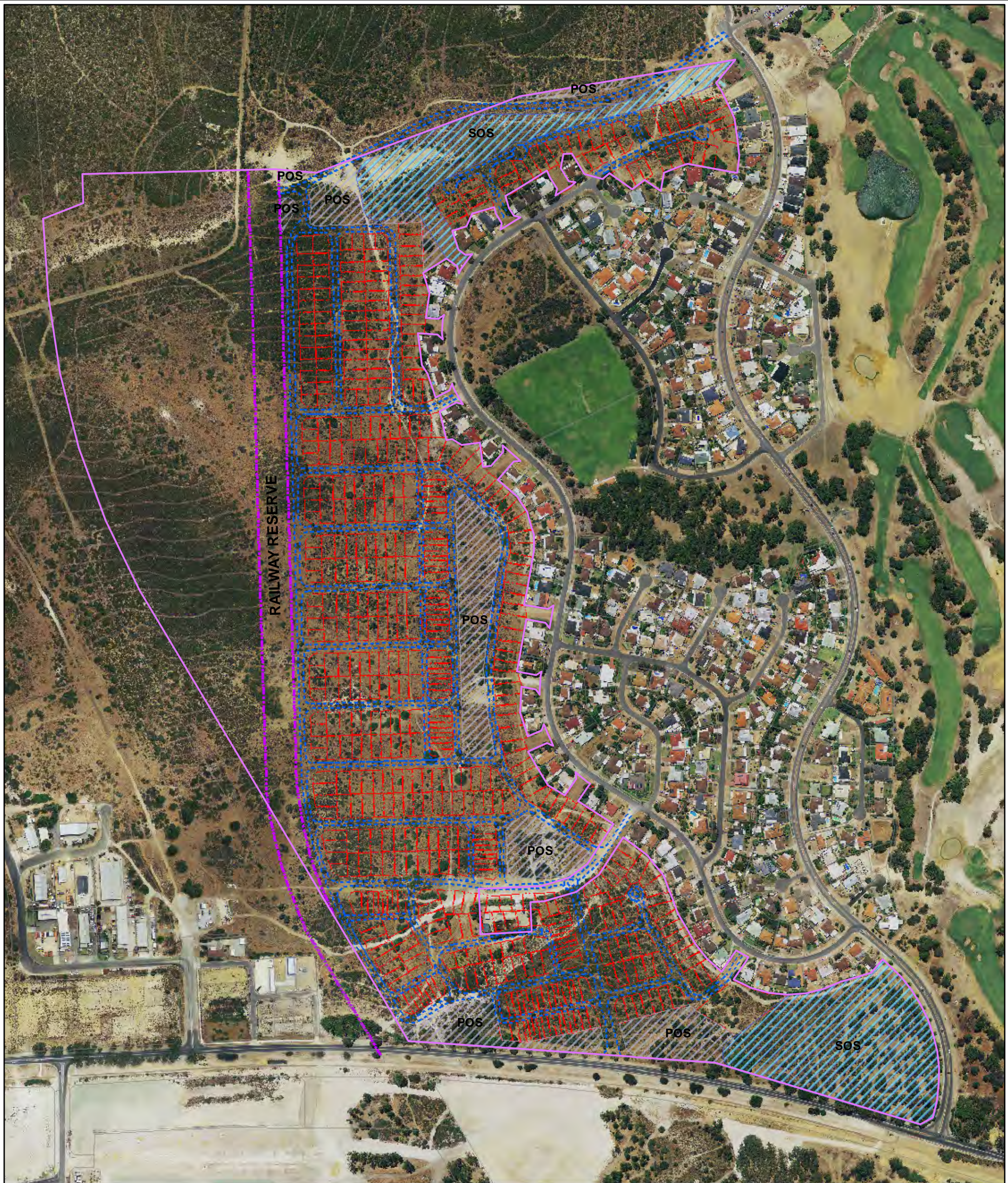
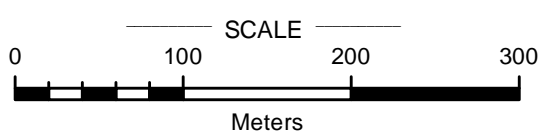


Figure 2.
Proposed Development

Pt Lot 602 Yanchep Beach Rd,
Yanchep



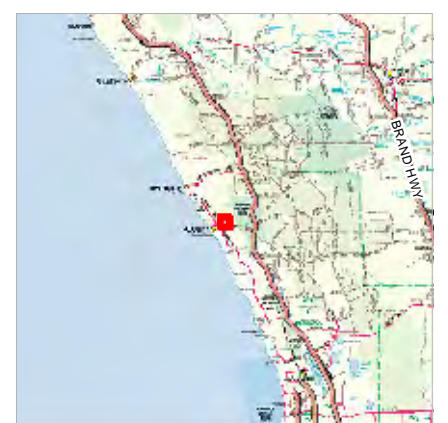
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LEGEND

- Pt Lot 602
- Other Cadastre
- Proposed New Lot
- Road Alignment
- Railway Reserve
- Public Open Space
- Strategic Open Space

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2.1 Development Proposal

Pt Lot 602 Yanchep Beach Road is proposed for development into 581 Lots, public open space and strategic open space (Figures 1 & 2). The development of Pt Lot 602 forms part of a greater Structure Plan for the area as shown in Figure 3.

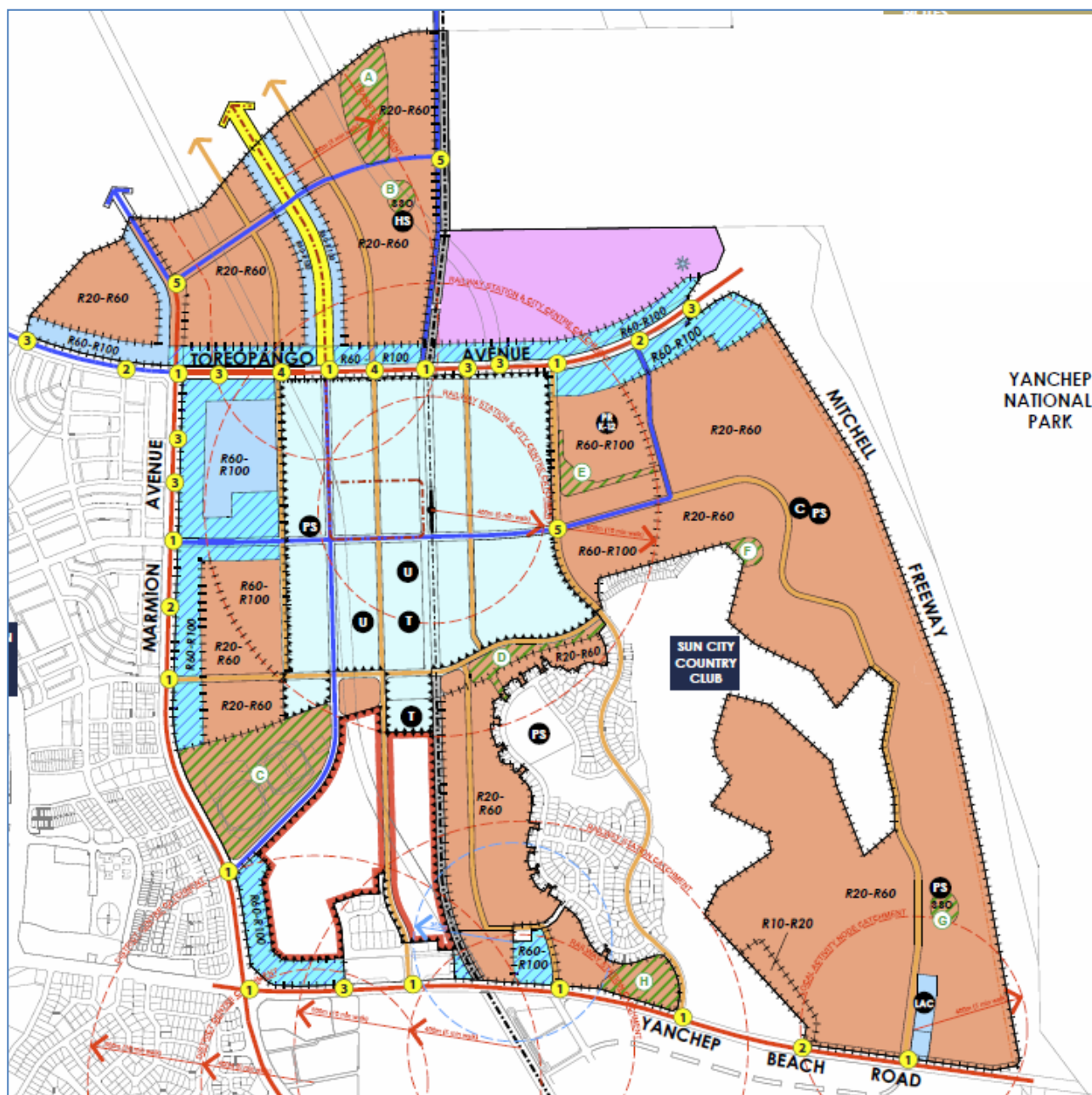


Figure 3. Yanchep City Structure Plan (source: Burgess Design Group).

2.2 Vegetation

The subject site is predominately comprised of Open Scrubland and Banksia Woodland. The classification and type being a mixture of Scrubland and Woodland with approximately 15% foliage cover (Figures 3 & 4).



Figure 4: Open Scrubland



Figure 5: Open Woodland

3 Statutory Conditions

This Bushfire Hazard Assessment has been prepared to accompany a subdivision proposal to the City of Wanneroo and the WA Planning Commission.

This Bushfire Hazard Assessment is aligned to the following policies and guidelines:

- Planning for Bushfire Protection Guidelines, Department for Planning and Infrastructure and Department of Fire and Emergency Services
- Australian Standards (AS) 3959-2009 Construction of buildings in bushfire prone-areas, Standards Australia
- City of Wanneroo Bushfire Notice
- City of Wanneroo District Planning Scheme No 2
- Bush Fires Act 1954 (as amended).

4 Bushfire Hazard Assessment

4.1 Method of Assessment

There are two processes for determining the bushfire hazard level of an area. The first assessment is a broad assessment intended to be used at strategic level planning to identify the suitability of an area for the intensification of land use and to determine if the area is bushfire prone. Hazard levels are based on the prominent vegetation at the location and are identified as being either Low, Moderate or Extreme bushfire risk. The method for determining the bushfire hazard at the strategic level is aligned to the Western Australian Planning for Bushfire Protection Guidelines, 2010.

The second assessment, the Bushfire Attack Level (BAL) is a more detailed assessment of the site that is applied after the bushfire hazard and land capability assessment has been conducted. The BAL is required at the development stage to determine the potential level of construction standard as specified in *AS 3959-2009 Construction of buildings in bushfire prone areas*. Within this Report the BAL assessment is an overview for the purpose of the proposed subdivision of Pt Lot 602 and a more specific assessment prior to the construction of any buildings may be required.

4.2 Hazard Assessment – Strategic Level

The assessment of bushfire risk takes into consideration existing site conditions, which include:

- Topography with particular reference to ground slopes and accessibility;
- Vegetation cover – both remnant and likely re-vegetation;
- Relationship to surrounding development.

Based on these considerations the strategic Bushfire Hazard Assessment for Pt Lot 602 Yanchep Beach Rd, Yanchep is a combination of Low, Moderate and Extreme. The hazard ratings for the adjoining areas are also a combination of hazard ratings being Low, Moderate and Extreme (Figure 6).

At present the bushfire threat posed to the existing residential subdivision located directly to the east of the proposed Pt Lot 602 subdivision is rated as Moderate to Extreme. Lots and dwellings located on the outer areas of the subdivision exposed to existing vegetation are also subject to

increased threat. With the subdivision development of Pt Lot 602 as per the proposal, the bushfire threat will be reduced to the existing Sun City Country Club residential development to the east as a buffer will be provided to the existing dwellings.

The modification of vegetation by means of mechanical clearing in the northern and western areas surrounding the proposed subdivision will significantly reduce the overall bushfire threat level to proposed Pt Lot 602 to Low. This is dependent on the timing of development for the remainder of the areas proposed for development as per the Structure Plan as shown in Figure 1.

The proposed subdivision and development of Pt Lot 602 will be developed to meet the Performance Criteria of the *State Planning for Bushfire Protection Guidelines*, ensuring that the bushfire hazard is managed appropriately. Additionally the subdivision layout and design will ensure that the BAL's of new dwellings do not exceed BAL 29.



Figure 6.
Bushfire Hazard Mapping - Strategic

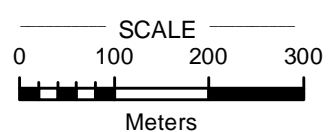
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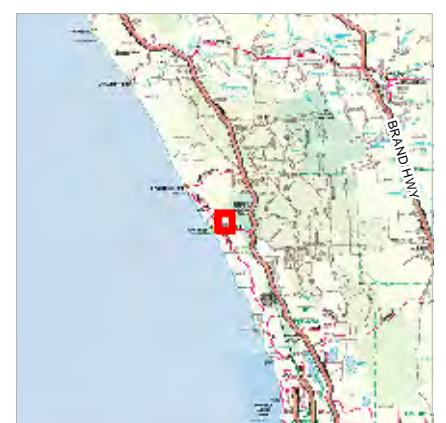
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LEGEND

- Pt Lot 602
- Other Cadastre
- Railway Reserve
- Low Bushfire Hazard
- Moderate Bushfire Hazard
- Extreme Bushfire Hazard



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4.3 Bushfire Attack Level (BAL)

The methodology rates bushfire attack using a combination of vegetation type, slope and distance from the building or building envelope to the predominant vegetation. In Western Australia it assumes a Forest Fire Danger Index (FFDI) of 80. The BAL assessment involves the following process in accordance with the Australian Standard- *Construction of Buildings in Bush Fire Prone Areas* (AS 3959 – 2009) (Method 1);

- Determination of the area to be assessed
- Identification of vegetation type and class
- Determination of distance of the site from classified vegetation
- Determination of average slope (under the classified vegetation)
- Determination of a BAL
- Determination of construction standards

AS 3959 – 2009 has six categories of BAL. These categories are based on heat flux exposure thresholds as illustrated below. Where there is a risk of ember attack, the lowest BAL will be 12.5.



4.4 Bushfire Hazard Management

Vegetation has been classified in accordance with AS3959-2009 methodology and Figure 7 details the provisional Bushfire Attack Levels for the subdivision based on the surrounding vegetation.

There are 2 scenarios resulting in different BAL's for the site and thus different risk levels to the proposed subdivision. One option considers the removal of vegetation to the north and west of the proposed subdivision, as proposed for future development out to 100m from the residential Lots. This scenario would result in BAL LOW for all subdivided Lots within the residential area. This is dependent on the staging of development and consequent vegetation removal for the area. It is noted that these buffer areas fall under the same land ownership for Lot 602. The second scenario considers earthworks solely completed for the residential subdivision, but inclusive of the railway reserve earthworks without additional vegetation clearing on the western boundary at the residential development stage. The resultant BAL's for this scenario for the residential subdivision are BAL 12.5 and LOW as shown in Figure 7. It is to be noted that this BAL map is based on planning advice inclusive of the proposed development of the railway reserve being undertaken prior to or at the same time as development of the residential subdivision.

A Landscape Plan will be required for the Public Open Space (POS) and Strategic Open Space (SOS) located in the north of the residential subdivision (as shown in Figure 2). This is to ensure that vegetation replanted in these areas consist of low threat species so that future vegetation growth does not increase the bushfire threat or BAL on the dwellings surrounding the POS and SOS.

Additionally, the Public Open Space (POS) and Strategic Open Space (SOS) located in the south of the residential subdivision (as shown in Figure 2) will require a management regime detailed within the Bushfire Management Plan developed for the area. This will ensure that the areas are maintained public reserves and fuel loads do not exceed limits that would pose a threat to the residential subdivision. A buffer of 100m measuring from within the existing vegetation to the north behind Lots located on Moorpark Avenue is required to be developed and maintained as public reserve as well as a 100m buffer within the reserve of 100m on the north-east of the SOS and north-west of the POS to reduce and maintain a low bushfire threat to the area proposed as Grouped Housing. The 100m buffer can exist as a combination of paths, access ways and low threat vegetation. The Landscape Plan and Bushfire Management Plan for the area will need to

ensure that these spaces are maintained reserves with a management regime to ensure fuel loads do not build up to unacceptable levels over time.

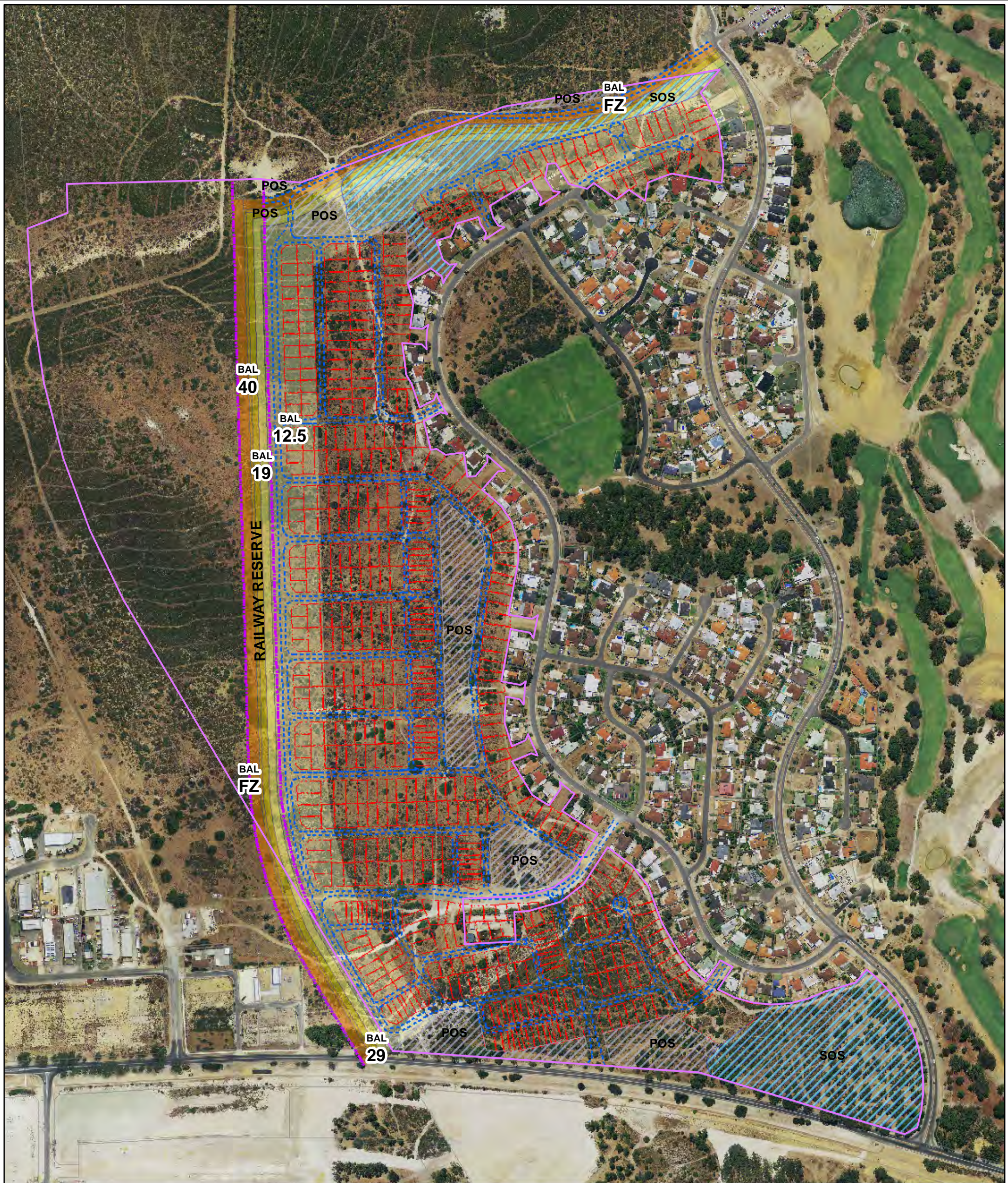


Figure 7.
Bushfire Attack Level Determination

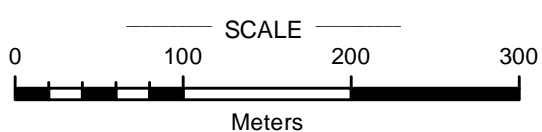
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Yanchep



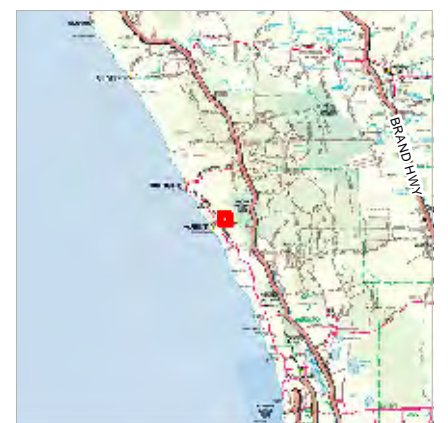
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LEGEND

- | | |
|---|--|
| Pt Lot 602 | BAL FZ |
| Other Cadastre | BAL 40 |
| Proposed New Lot | BAL 29 |
| Road Alignment | BAL 19 |
| Railway Reserve | BAL 12.5 |
| Public Open Space | |
| Strategic Open Space | |



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5 Fire Protection Performance Criteria

The site will be required to meet the Performance Criteria for Extreme Hazard, taking into consideration the following as per the Planning for Bushfire Protection Guidelines, 2010;

- Location (P1)
- Vehicular access (P2)
- Water (P3)
- Siting of development (P4)
- Design of development (P5)

5.1 Location (P1)

The subdivision is located in an area where the bush fire hazard level is manageable.

5.1.1 Development Location

The site sits primarily within a residential setting. The Lot is located in a Low to Extreme bushfire hazard area. Any future construction on the site will be required to comply with the construction requirements and vegetation separation distances as detailed in Figure 7 of this Report.

5.2 Vehicular Access (P2)

The internal layout, design and construction of public and private vehicular access in the subdivision allows emergency and other vehicles to move through it safely at all times.

5.2.1 Two Access Routes

Access to the development site is provided via Yanchep Beach Road to the south which provides two access routes (east and west). The development site internal road network provides two directional accesses to the majority of the lots, but does include one cul-de-sac in the north western corner less than 200 metres in length, meeting the performance requirements of the Planning for Bushfire Guidelines (Refer to Figure 1).

5.2.2 Public Roads

Road construction must meet the City of Wanneroo road construction standards or as a minimum the standards detailed in Table 1 below.

Table 1: Minimum Standard for Public Roads.

Standard	Public Road
Minimum trafficable surface	6 metres (6 metre trafficable surface width does not necessarily mean paving width, it could, for example , include 4 metre wide paving and 1 metre wide constructed road shoulders).
Horizontal clearance	6 metres
Vertical clearance	4 metres
Maximum grades	1 in 8
Maximum grade over <50m	1 in 5
Maximum average grade	1 in 7
Minimum weight capacity	15 tonnes
Maximum crossfall	1 in 33
Curves minimum inner radius	12 metres

5.2.3 Cul-de-sacs

The construction of cul-de-sac must at a minimum meet the standards set out in Table 2 and Figure 7.

Table 2: Minimum Standard for Cul-de-sacs.

Standard	Public Road
Maximum length	200 meters (if emergency access is provided between cul-de-sac heads maximum length can be increased to 600 meters provided no more than 8 lots are serviced)
Minimum trafficable surface	6 metres
Horizontal clearance	6 metres
Maximum grades	1 in 8
Maximum grade over <50m	1 in 5
Maximum average grade	1 in 7
Minimum weight capacity	15 tonnes
Maximum crossfall	1 in 33
Curves minimum inner radius	12 metres
Turnaround areas	As per turn around area requirements – including 21 metre diameter head. To accommodate 3.4 fire appliance and enable them to turn around safely.

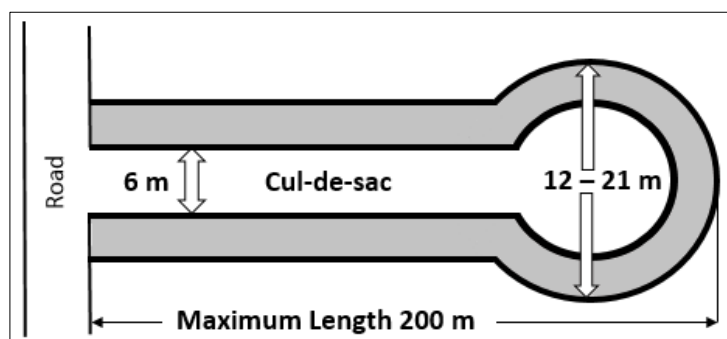


Figure 7: Cul-de-sac turnaround requirements

5.2.4 Battle Axes

Not applicable.

5.2.5 Private Driveways

Not applicable.

5.2.6 Emergency Access Ways and Walk Trails/Tracks

Walk trails and tracks within POS and SOS are to be constructed to carry light fire appliances (Light Tankers).

5.2.7 Firebreak Widths

The Subdivision will meet the requirements of the City of Wanneroo Firebreak Notice as applicable to the subdivision.

5.3 Water (P3)

The development is provided with a permanent and secure water supply that is sufficient for firefighting purposes.

5.3.1 Reticulated Areas

A reticulated water supply is available in the subject area and hydrants will be installed throughout the subdivision with maximum 200 metre hydrant spacing.

5.3.2 Non-Reticulated Areas

Not applicable.

5.3.3 Non-Reticulated Areas- Dams

Not applicable.

5.4 Siting of Development (P4)

The siting (including paths and landscaping) of the development minimises the bushfire risk to life and property.

5.4.1 Hazard Separation-Moderate to Extreme Bushfire Hazard Level

Refer to Section 3.4 for acceptable solution.

5.4.2 Hazard Separation-Low Bushfire Hazard Level

Not applicable.

5.4.3 Building Protection Zone (BPZ)

BPZ is inclusive of BAL

5.4.4 Hazard Separation Zone (HSZ)

HSZ is inclusive of BAL

5.4.5 Reduction in Bushfire Attack Level Due to Shielding

Not applicable.

5.5 Design of Development (P5)

The design of the development is appropriate to the level of bush fire hazard that applies to the development site.

5.5.1 Compliant Development

The proposed subdivision will meet the requirements of the City of Wanneroo and the Planning for Bushfire Protection Guidelines 2nd Edition. This will ensure the bushfire hazard level is kept as low as feasible on existing and future dwellings on the site.

5.5.2 Non-Compliant Development

The proposed property subdivision and subsequent construction of buildings will comply with necessary Bushfire Attack Level construction and vegetation separation distance requirements as set out in AS 3959-2009.

6 Fire Fighting Service and Predicted Head Fire Rates of Spread

This development site is within 2.5 km/10 minute average turn out response zone from the DFES Yanchep Volunteer Fire & Rescue Service Brigade.

Table 3 shows the predicted head fire behaviour in the vegetation assemblages found in the locality as relevant to this location. Fire fighter safety during fire suppression activities is taken into consideration and the BPZ and HSZ is to be maintained around surrounding buildings in respect of this. The fire behaviour rate of spread and fire line intensity is set out below and is calculated for the 95% percentile weather conditions relating to the area.

Table 3. Head Fire Behaviour Classes for the Site (Source: Muller, 2008).

HEAD FIRE BEHAVIOUR CLASSES
5 Indirect attack likely to fail Intensity > 4000 kW/m and/or ROS > 800 m/hr in forest/woodland Intensity > 8000 kW/m and/or ROS > 2000 m/hr in shrubland ROS > 10000 m/hr in grassland
4 Direct attack not possible/unlikely to succeed. Intensity > 2000 kW/m and/or ROS > 400 m/hr in forest/woodland Intensity > 2000* kW/m and/or ROS > 1000 m/hr in shrubland Intensity > 5000 kW/m and/or ROS > 6500 m/hr in grassland
3 Direct machine and tanker attack possible Intensity < 2000 kW/m and/or ROS < 400 m/hr in forest/woodland Intensity < 2000* kW/m and/or ROS < 1000 m/hr in shrubland Intensity < 5000 kW/m and/or ROS < 6500 m/hr in grassland
2 Hand tool attack possible Intensity < 800 kW/m and/or ROS < 140 m/hr in forest/woodland and shrubland Intensity < 800 kW/m and/or ROS < 300 m/hr in grassland
1 Readily suppressed. Intensity < 800 kW/m and/or ROS < 60 m/hr in all fuels

7 Implementation and Responsibilities

The proposed development of Pt Lot 602 Yanchep Beach Road, Yanchep will meet the minimum criteria as per the Western Australian Planning for Bushfire Protection guidelines, AS 3959-2009, City of Wanneroo District Planning Scheme No 2 and other requirements as stipulated in the development process.

7.1 Property Owner's Responsibilities

A Bushfire Management Plan will require owners/occupiers of the site or Lots to be responsible for undertaking, complying with and implementing measures protecting their own assets from the threat and risk of bush fire:

7.2 Developer's Responsibilities

Prior to development approval by the City of Wanneroo, the developer shall be required to carry out works to comply with requirements set out in a Bushfire Management Plan.

7.3 Builders Responsibility

Future structures must comply with Construction Standards as set out in Bushfire Management Plan (may require detailed BAL assessment prior to design and construction).

7.4 City of Wanneroo Responsibilities

The responsibility for compliance with the law rests with individual property owners. The City of Wanneroo shall be responsible for:

- Developing and maintaining district firefighting facilities.
- Maintain road network
- Maintain hydrants

8 References

- Western Australian Planning Commission & Fire and Emergency Services Authority 2010, *Planning for bush fire protection guidelines*, edition 2, State of Western Australia.
- City of Wanneroo *District Planning Scheme No 2*
- Standards Australia 2009, *Australian Standard, Construction of buildings in bushfire prone areas*, AS 3959-2009 (incorporating Amendment No 1, 2 and 3), NSW Australia.

9 Appendices

Appendix 1. Compliance Checklist for Performance Criteria and Acceptable Solutions

Element 1: Location	Compliance
Does the proposal comply with the performance criteria by applying acceptable solution A1.1?	Yes
Element 2: Vehicular Access	Compliance
Does the proposal comply with the performance criteria by applying acceptable solution A2.1?	Yes - Refer Section 5.2.1
Does the proposal comply with the performance criteria by applying acceptable solution A2.2?	Yes - Refer Section 5.2.2
Does the proposal comply with the performance criteria by applying acceptable solution A2.3?	Yes - Refer Section 5.2.3
Does the proposal comply with the performance criteria by applying acceptable solution A2.4?	N/a
Does the proposal comply with the performance criteria by applying acceptable solution A2.5?	N/a
Does the proposal comply with the performance criteria by applying acceptable solution A2.6?	N/a
Does the proposal comply with the performance criteria by applying acceptable solution A2.7?	N/a
Does the proposal comply with the performance criteria by applying acceptable solution A2.8?	N/a
Does the proposal comply with the performance criteria by applying acceptable solution A2.9?	N/a
Does the proposal comply with the performance criteria by applying acceptable solution A2.10?	N/a
Element 3: Water	Compliance
Does the proposal comply with the performance criteria by applying acceptable solution A3.1?	Yes – Hydrants will be installed within the required spacing (refer 5.3.1)
Does the proposal comply with the performance criteria by applying acceptable solution A3.2?	N/a
Does the proposal comply with the performance criteria by applying acceptable solution A3.3?	N/a

Element 4: Siting of Development	Compliance
Does the proposal comply with the performance criteria by applying acceptable solution A4.1?	Yes – Refer Section 4.4. Note 2 alternative options
Does the proposal comply with the performance criteria by applying acceptable solution A4.2?	Yes – Refer Section 4.4. Note 2 alternative options
Does the proposal comply with the performance criteria by applying acceptable solution A4.3?	Yes – As a minimum future buildings must comply with specified separation distance from vegetation (BPZ) (Inclusive of BAL separation distance)
Does the proposal comply with the performance criteria by applying acceptable solution A4.4?	Yes – It is recommended existing and future buildings to comply with specified HSZ distance (If applicable)
Does the proposal comply with the performance criteria by applying acceptable solution A4.5?	N/a - Existing and future developments may be assessed if requested.

Element 5: Design of Development	Compliance
Does the proposal comply with the performance criteria by applying acceptable solution A5.1?	Yes - Vegetation modification will be undertaken to achieve separation distances in conjunction with A5.2
Does the proposal comply with the performance criteria by applying acceptable solution A5.2?	Yes - Building construction standards will be increased to comply with AS 3959-2009, and appropriate separation distances provided where possible.