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Bushfire Management Plan

Capricorn Yanchep

Prepared for
Acumen Development Solutions
by Strategen

May 2016

Bushfire Management Plan

Capricorn Yanchep

Strategen is a trading name of
Strategen Environmental Consultants Pty Ltd
Level 1, 50 Subiaco Square Road Subiaco WA 6008
ACN: 056 190 419

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Client: Acumen Development Solutions

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Table of contents

1. Introduction	11
1.1 Background	11
1.2 Purpose and application of the plan	11
2. Spatial consideration of bushfire threat	13
2.1 Existing site characteristics	13
2.1.1 Location	13
2.1.2 Zoning and land use	13
2.1.3 Assets	13
2.1.4 Access	13
2.1.5 Water and power supply	13
2.2 Existing fire environment	14
2.2.1 Vegetation	14
2.2.2 Site topography and slope under vegetation	14
2.2.3 Bushfire weather conditions	18
2.2.4 Bushfire history, fuel age, risk of ignition and potential ignition sources	18
2.2.5 Potential bushfire scenarios	19
2.2.6 Bushfire suppression response capability	19
2.3 Bushfire hazard assessment	19
2.4 BAL assessment	19
2.4.1 Fire Danger Index	20
2.4.2 Vegetation class	20
2.4.3 Slope under classified vegetation	22
2.4.4 Distance between proposed development areas and the classified vegetation	22
2.4.5 Method 1 BAL calculation	22
3. Bushfire management measures	24
3.1 Hazard separation distances (APZs)	24
3.2 Increased building construction standards	24
3.3 Vehicular access	25
3.4 Reticulated water supply	25
3.5 Additional measures	25
4. Proposal compliance and justification	28
5. Implementation and enforcement	32
5.1 Document review	32
5.2 Stakeholder consultation	32
6. References	33

List of tables

Table 1: Method 1 BAL calculation	23
Table 2: Vehicular access technical requirements	25
Table 3: Acceptable solutions assessment against bushfire protection criteria	29
Table 4: Proposed works program	32

List of figures

Figure 1: Site overview	12
Figure 2: Vegetation class	15
Figure 3: Site topography	17
Figure 4: Bushfire hazards	21
Figure 5: Bushfire Management Plan: Stages 4C, 8C and 9C	27

List of appendices

Appendix 1 January wind profiles for Gingin Aero Weather Station
Appendix 2 City of Wanneroo protect your home and property from bushfires guidelines

1. Introduction

1.1 Background

Acumen Development Solutions (Acumen) are the appointed project managers for Capricorn Village Joint Venture, who are proposing to develop Stages 4C, Stage 8C and Stage 9C of Capricorn Yanchep (the project area), located in Yanchep, Western Australia. The subdivision concept plan aims to create:

- 31 residential lots and one Public Open Space (POS) area in Stage 4C
- 24 residential lots in Stage 8C
- 34 residential lots in Stage 9C (Figure 1).

Due to the extent of adjacent vegetation, the project area is designated as bushfire prone, as depicted in the Western Australian State *Map of Bush Fire Prone Areas* (DFES 2016).

Strategen has prepared this Bushfire Management Plan (BMP) to accompany a subdivision application in order to meet requirements triggered under State Planning Policy 3.7 *Planning in Bushfire Prone Areas* (SPP 3.7; WAPC 2015a). This BMP has been prepared in accordance with *Guidelines for Planning in Bushfire-Prone Areas* (the Guidelines; WAPC 2015b).

1.2 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 area 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.

2. Spatial consideration of bushfire threat

2.1 Existing site characteristics

2.1.1 Location

The project area comprises Stage 4C, Stage 8C and Stage 9C of Capricorn Yanchep in the City of Wanneroo (CoW), located approximately 51 km north-northwest of the Perth Central Business District. The project area is bound by the following, as depicted in Figure 1:

- POS and residential properties to the east and south-east
- native bushland to the west and south-west (Bush Forever Site 397)
- POS and Capricorn Caravan Park to the north.

2.1.2 Zoning and land use

The project area is zoned as 'Urban Development' under provisions of the City of Wanneroo District Planning Scheme No. 2 (DPS 2). Land to the north, north-west, east and south-east is also zoned as 'Urban Development'. The foreshore reserve (Bush Forever Site 397) to the west and south-west is zoned as 'Regional Parks and Recreation' under DPS 2.

The on-site POS areas will comprise of low fuel areas that will not pose a significant bush fire risk to life and property. Long term management of POS areas will be the responsibility of the City of Wanneroo.

2.1.3 Assets

The project area contains no on-site assets with the area cleared of vegetation in preparation to be developed. Proposed development of the project area will significantly increase the critical life and property assets of the site. This will significantly intensify the number of residents, 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 is currently accessed via Summerhome Parade to the east and Capricorn Esplanade to the south (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 development, which will result in provision of a reticulated water supply including emergency use fire hydrants, hose reels and underground power supply for proposed residences.

2.2 Existing fire environment

2.2.1 Vegetation

The project area is located in the South Western Botanical Province of Western Australia, in the Darling Botanical District and the Swan Coastal Plain subregion of the Drummond Botanical District (Beard 1990). Vegetation types of the project area are dominated by the Quindalup vegetation complex (Heddlé et al. 1980). This complex can be described as:

- a coastal dune complex consisting mainly of two alliances - the strand and fore dune alliance and the mobile and stable dune alliance. Local variations include low closed forest of *Melaleuca lanceolata* - *Callitris preissii* and closed scrub of *Acacia rostellifera*.

The project area and adjacent land has been subject to various levels of vegetation disturbance through clearing. Clearing is most prominent within the project area and to the south-east and east of the project area as a result of residential development.

Adjacent vegetation to the south-west of the project area however, is associated with (Bush Forever site 397 and contains Class C shrubland vegetation (Plate 1 and Plate 2).

Strategen has assessed vegetation classes in accordance with AS 3959-2009 within the project area and adjacent 100 m through on-ground verification. The following provides a summary of this investigation, as depicted in Figure 2:

- on-site vegetation is completely cleared
- adjacent vegetation is a combination of:
 - * Class C shrubland to the west (will be cleared prior to development)
 - * Class C shrubland to the south-west (Plate 1 and Plate 2)
 - * a modified coastal heath structure (associated with POS Area 2) to the north to be managed as "Low Threat Vegetation" under Clause 2.2.3.2 (f) of AS3959-2009.

2.2.2 Site topography and slope under vegetation

Strategen assessed the effective slope under classified vegetation within the project area and adjacent 100 m, as depicted in Figure 3.

The majority of the project area is dominated by undulating topography formed by the dune systems which vary in height from approximately 15 metres Australian Height Datum (mAHD) to 26 mAHD.

Topographic elevation within Bush Forever Site No. 397 to the south-west ranges from approximately 15 mAHD in the south-west to approximately 26 mAHD in the centre of the project area. This equates to an effective slope of approximately 4 degrees under vegetation. This vegetation is situated down-slope from proposed development.

The effective slope under classified vegetation described above has been used to inform the BAL assessment for proposed lots (refer to Section 2.4).

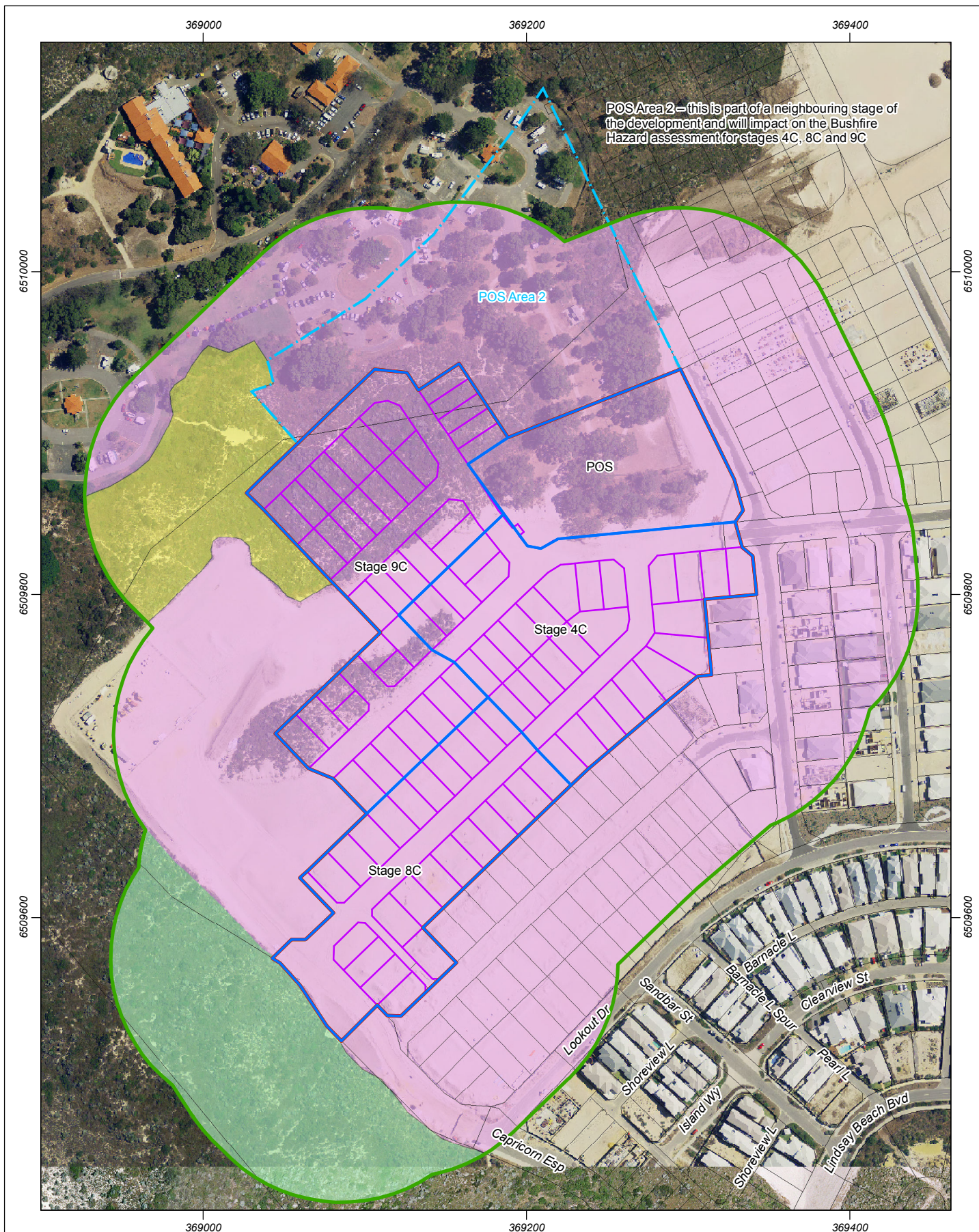
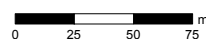


Figure 2: Vegetation Class

Scale 1:3,200 at A4



Coordinate System: GDA 1994 MGA Zone 50
Note that positional errors may occur in some areas
Date: 5/05/2016
Author: JCrute

Source: Aerial image: Landgate, flown 02/2015. Background aerial image: SLIP, Landgate approx. 2006. Subdivision: Client 04/2016. Existing cadastre: SLIP, Landgate 2016.

Legend

- Proposed lots
- Existing cadastre
- Stage boundary

- Project area
- 100m wide assessment area
- POS Area 2

Vegetation class

- Class C Shrubland
- Cleared for development
- To be cleared for future development

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Plate 1: Classified Class C shrubland vegetation south-west of the project area



Plate 2: Classified Class C shrubland vegetation south-west of the project area

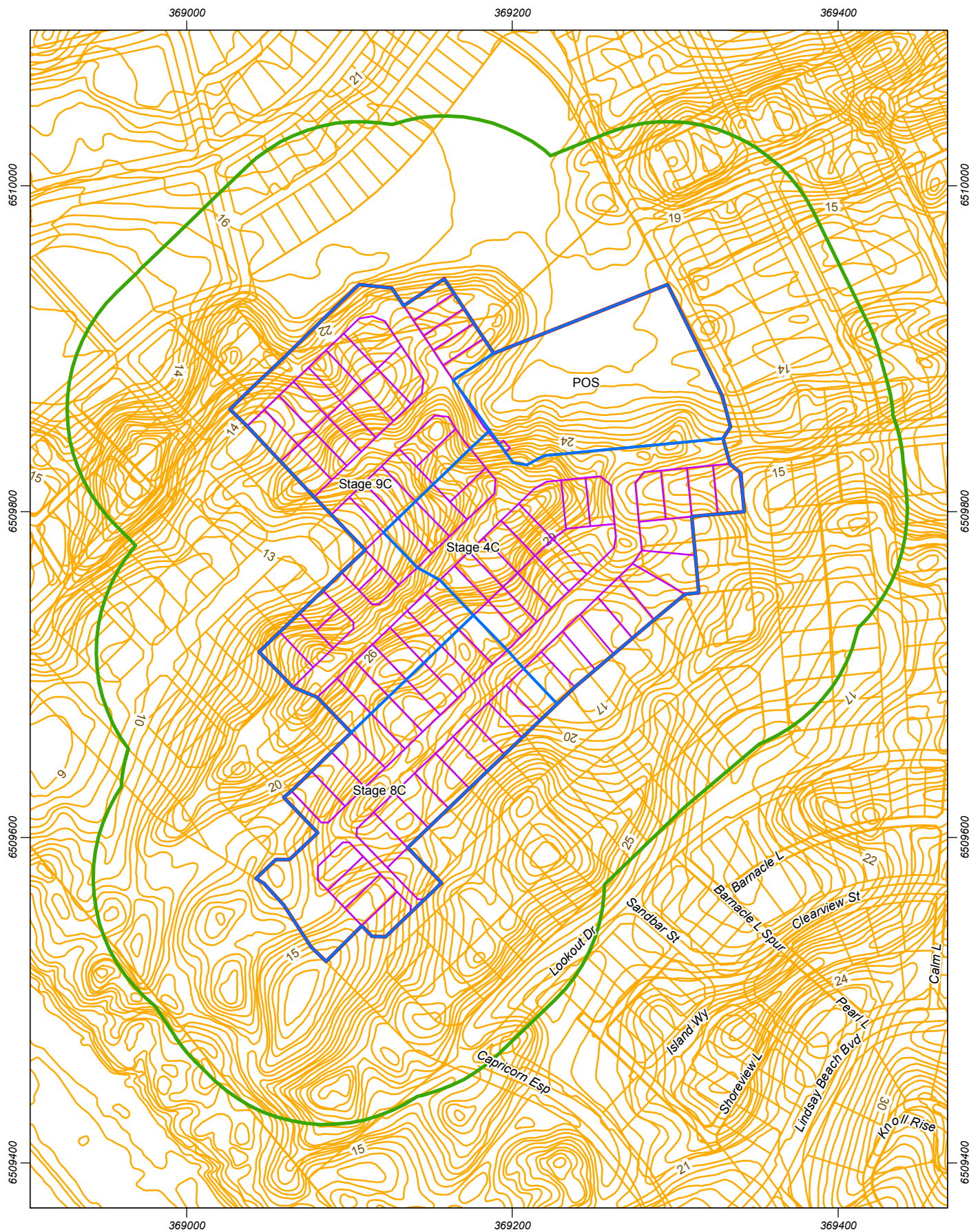


Figure 3: Site topography

Scale 1:3,200 at A4

0 25 50 75 m



Coordinate System: GDA 1994 MGA Zone 50

Note that positional errors may occur in some areas

Date: 15/04/2016

Author: JCrute

Source: Aerial image: Landgate, flown 02/2015. Background aerial image: SLIP, Landgate approx. 2006. Subdivision: Client 04/2016. Existing cadastre: SLIP, Landgate 2016.

Legend

- Proposed lots
- Existing cadastre
- Stage boundary
- Project area
- 100m wide assessment area
- Surface elevation (mAHD)

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2.2.3 Bushfire weather conditions

Worst case bushfire weather condition

South-west 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 bush fire 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 Gingin Aero weather station (the closest weather station to Yanchep, 25 km away to the north-east) are contained in Appendix 1. These illustrate that the predominant winds during the designated bush fire season are from the east and southeast in the morning averaging around 20.9 km/h; and from the southwest in the afternoon averaging around 25.5 km/h (BoM 2016).

The mean 9:00 am and 3:00 pm relative humidity for Gingin Aero weather station during the designated bush fire season is around 48% and 33% respectively, with average monthly maximum temperatures peaking at around 33.3°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. Given the nature of the understorey within these areas, the resulting fuel loads are moderate.

The risk of ignition pre-development was assessed as low throughout the site due to the low levels of public access and visitation. However, Strategen considers that the risk of ignition will increase due to the long unburnt nature of the site, fuel loads and increasing levels of public access and resident occupancy at the bushland interface.

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

Strategen considers a fire front approaching the site from the west within Bush Forever Site No. 397 to be the worst case bushfire scenario. The direct fire run in this direction is limited (100–200 m) to the coastline through long unburnt coastal Class C shrubland fuels downslope from the site; however, the vegetation stretches continuously in a north–south direction along the coastal fringe from Two Rocks (approximately 6 km north of the project area), to Alkimos (approximately 10 km south of the project area). North and South of Yanchep this vegetation also links up with vegetation that continues inland for distances in excess of 2 km.

Bushfire impacts are likely to be greatest under predominant afternoon summer weather conditions, where the likely prevailing winds from the south-west have the potential to direct a bushfire towards the site and the resulting fire behaviour is likely to escalate over this time and contribute elevated levels of radiant heat and ember attack on the proposed development. Therefore, the bushfire response at the western and south-western interface should incorporate sufficient defendable space and vehicular access to address the heightened bushfire risk.

2.2.6 Bushfire suppression response capability

Local Bush Fire Brigades stationed at Two Rocks, Quinns Rocks and Wanneroo are expected to provide a best case emergency suppression response time of 30 minutes should a bushfire threaten lives or homes on or adjacent to the project area.

2.3 Bushfire hazard assessment

Strategen has mapped the bushfire hazard levels within 100 m of the project area (refer to Figure 4) 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 C shrubland south-west of the project area (associated with Bush Forever Site No. 397): 'Moderate'.

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).

Only a small portion of the proposed lots within the project area will be located within 100 m of vegetation assessed as having a 'Moderate' bushfire hazard level, which will require a BAL response in accordance with AS 3959–2009 (Figure 5). This is not completely consistent with findings of the *WA State Map of Bush Fire Prone Areas*. Several areas (including the project area itself) mapped as bushfire prone in (DFES 2016) are no longer considered to be bushfire prone due to absence of classified vegetation.

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. 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 C shrubland vs. BAL 19 in Class C shrubland – BAL 19 would be the end result).

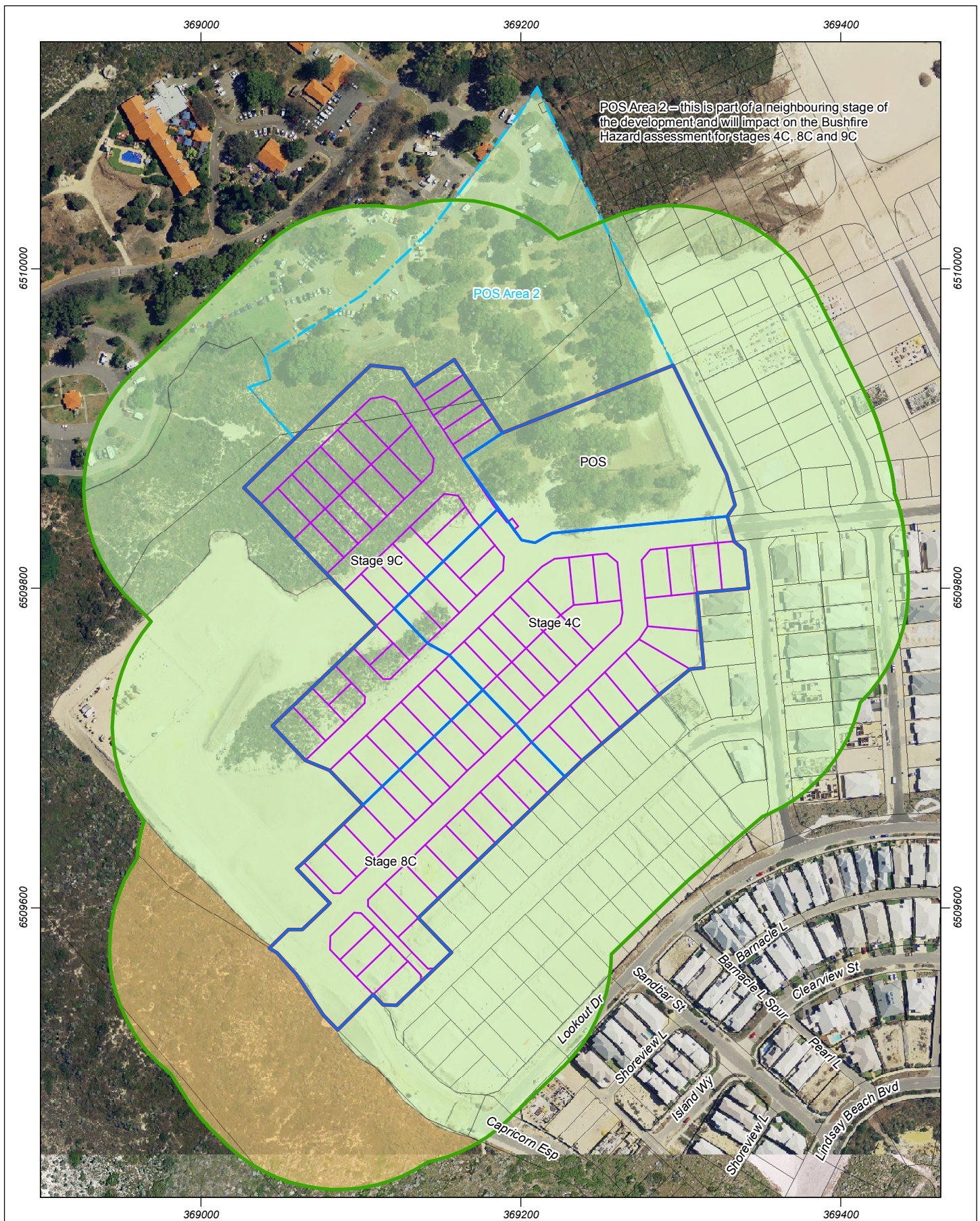


Figure 4: Bushfire Hazards

Scale 1:3,200 at A4

0 25 50 75 m



Coordinate System: GDA 1994 MGA Zone 50

Note that positional errors may occur in some areas

Date: 5/05/2016

Author: JCrute

Source: Aerial image: Landgate, flown 02/2015. Background aerial image: SLIP, Landgate approx. 2006. Subdivision: Client 04/2016. Existing cadastre: SLIP, Landgate 2016.

Legend

- Proposed lots
- Existing cadastre
- Stage boundary
- Project area
- 100m wide assessment area
- POS Area 2

Bushfire hazard levels

- Low
- Moderate

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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 3:

- vegetation surrounding the project area is downslope of proposed lots within the project area at a maximum of five degrees.

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 dwelling and subsequently informs the standard of building construction required for that dwelling to withstand such impacts.

The proposed development site is totally cleared to enable development of a significant built and landscaped footprint.

A portion of the development site will be located within 100 m of vegetation assessed as having an 'Extreme' or 'Moderate' bush fire hazard level, which will require implementation of AS 3959–2009 and increased building construction standards for proposed built assets (refer to Figure 5). The 'Moderate' bushfire hazard applies to Class C shrubland to the south-west. A total of five lots in the north of the project area (adjacent to POS Area 2) will be classified as having BAL 19 in line with the previous bushfire assessment, *Bushfire hazard and BAL assessment: Capricorn Coastal Node – Lots fronting POS area 2* (Strategen 2015). All vegetation is located downslope to the project area at a maximum angle of five degrees.

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

Proposed lots	Classified vegetation	Effective slope	Hazard separation distance to be provided	Corresponding separation distance range from Table 2.4.3 of AS 3959-2009	BAL rating
Five proposed lots along the northern site boundary	modified coastal heath structure (associated with POS Area 2)	N/A	N/A	Classified as BAL 19 in line with Strategen (2015) bushfire assessment on lots fronting POS Area 2.	BAL 19
1 lots proposed along the western site boundary	Class C Shrubland	Downslope from proposed development at a maximum of five degrees	98 m	22–<100	BAL 12.5
11 lots proposed along the south-west site boundary	Class C Shrubland	Downslope from proposed development at a maximum of five degrees	27–100 m	22–<100	BAL 12.5

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 5 (where applicable) and discussed in the following subsections.

3.1 Hazard separation distances (APZs)

Strategen has designated areas of hazard separation between classified vegetation and proposed lots in the form of APZs. The width of each dwelling's APZ has been determined on the basis of compliance with a BAL 12.5 and BAL 19 rating under AS 3959–2009, as outlined in Table 1, to demonstrate that bushfire management compliance can be achieved for this site.

Eleven (11) lots within 100 m of Class C shrubland vegetation to the south-west will be constructed in accordance with BAL 12.5 with a minimum 27 m APZ in the form of a proposed road reserve and land cleared for future development. The BAL 12.5 for one of these lots may be avoided if the building is constructed with the appropriate setback from its lot boundary.

One lot within 100 m of Class C shrubland vegetation along the western boundary of the site boundary will be constructed in accordance with BAL 12.5 with a minimum 98 m APZ in the form of land cleared for future development. The BAL 12.5 for this lot may be avoided if the building is constructed with the appropriate setback from its lot boundary.

Five lots adjacent to POS Area 2 will be constructed in accordance with BAL 19 as per the assessment made by Strategen in 2015 (Strategen 2015).

The APZs are low fuel areas around each building 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 protect your home and property from bushfires guidelines (Appendix 2), which specifies all buildings must have a minimum 3 m wide firebreak cleared immediately around all external walls with height of vegetation maintained below 20 mm, as far as reasonably practicable.

Lawns, managed gardens, paving, driveways and swimming pools are also suitable within the APZ. Buildings are not permitted within the APZ.

Hazard Separation Zones (HSZs) are not required around individual lot APZs in this instance, since proposed construction for each proposed dwelling meets the standard appropriate to the BAL for that location and does not exceed BAL 29 (WAPC 2015b).

3.2 Increased building construction standards

Strategen has designated BAL requirements for each proposed lot in accordance with AS 3959–2009. This has resulted in a combination of BAL 19 and BAL 12.5 being applied for 17 lots within the project area.

3.3 Vehicular access

The proposed vehicular access network will provide numerous links to the surrounding public road network to the south and east of the project area. The proposed vehicular access network will also provide buffers and access for emergency service vehicles between proposed residences and adjacent vegetation.

The cul-de-sacs or dead end roads within the south-western portion of the project area is not considered a significant vehicle access risk to the proposed subdivision. They will eventually link to the surrounding public road network when the area to the south of the project area is developed.

Public roads, cul-de-sacs and private driveways longer than 50 m 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	Cul-de-sac	Private driveway	EAW
Minimum trafficable surface (m)	6*	6	4	6*
Horizontal distance (m)	6	6	6	6
Vertical clearance (m)	4.5	N/A	4.5	4.5
Maximum grade <50 m	1 in 10	1 in 10	1 in 10	1 in 10
Minimum weight capacity (t)	15	15	15	15
Maximum crossfall	1 in 33	1 in 33	1 in 33	1 in 33
Curves minimum inner radius	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 from surrounding areas of residential development, which will result in provision of a reticulated mains water supply for proposed residences.

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

Strategen makes the following additional recommendations to inform ongoing planning stages of the development:

1. **Notification on Title:** Strategen recommends that a 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 that increased building construction standards will apply to future buildings. The notification on title is also to include that the site is subject to a Bushfire Management Plan.
2. **BAL assessment at future planning stages:** Management measures recommended in the BMP for individual dwellings (i.e. BAL ratings and APZs) are currently based on indicative lot locations (i.e. a concept subdivision plan) and bushfire prone vegetation of which may change at some future stage. Consequently, Strategen recommends that BALs be reassessed following any modification to the surrounding vegetation extent or proposed lot layout, or at the building licence stage once final lot layout and vegetation extent is confirmed.

3. Compliance with the City of Wanneroo 'protect your home and property from bushfires guidelines':
the developer/land manager and prospective land purchasers are to comply with the current the City of Wanneroo protect your home and property from bushfires guidelines bushfire information (Appendix 2).

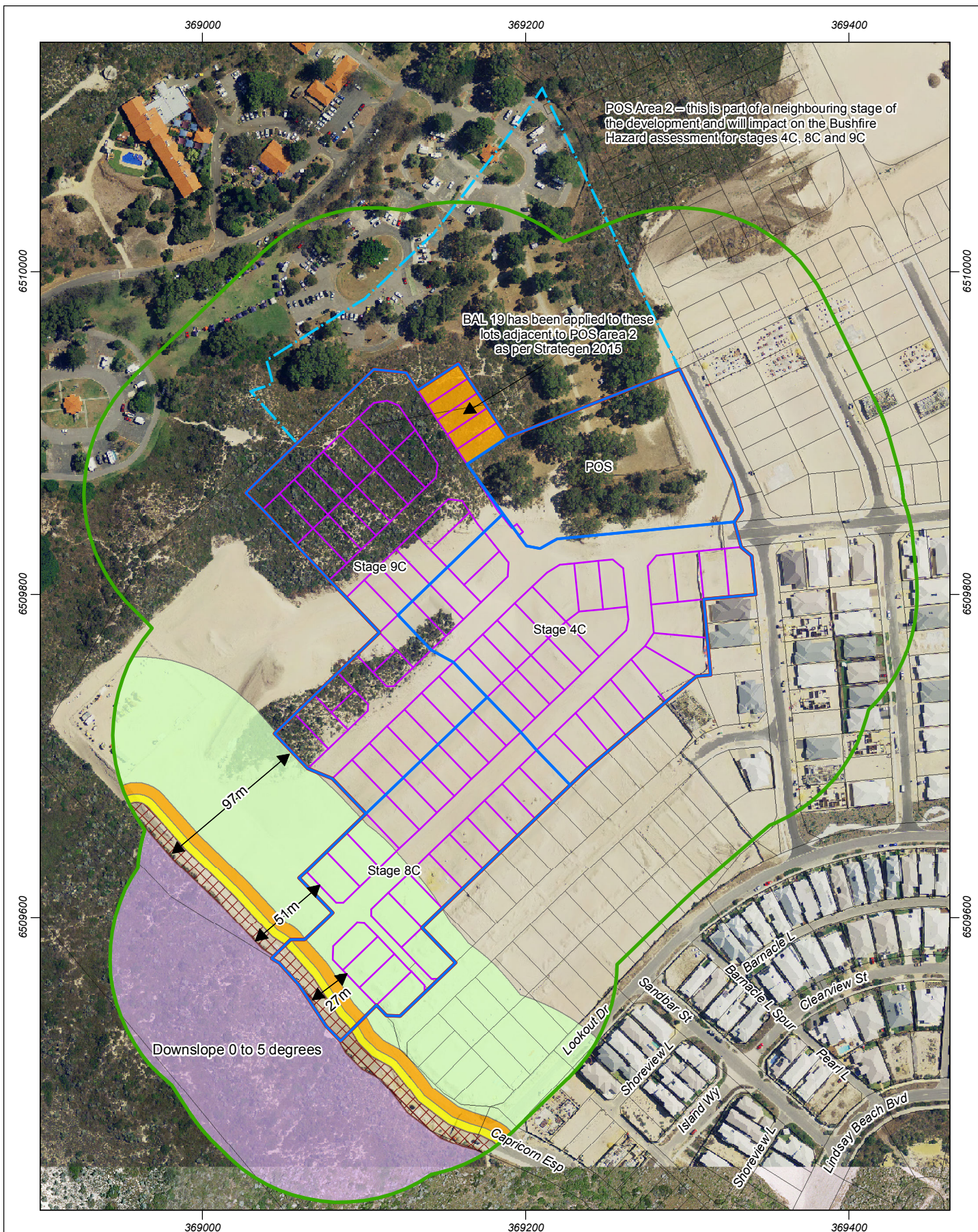


Figure 5: Bushfire Management Plan: Stages 4C, 8C and 9C

Scale 1:3,200 at A4

0 25 50 75 m



Coordinate System: GDA 1994 MGA Zone 50
 Note that positional errors may occur in some areas
 Date: 5/05/2016
 Author: JCrute

Source: Aerial image: Landgate, flown 02/2015. Background aerial image: SLIP, Landgate approx. 2006. Subdivision: Client 04/2016. Existing cadastre: SLIP, Landgate 2016.

Legend

- Proposed lots
- Existing cadastre
- Stage boundary
- Project area
- 100m wide assessment area
- POS Area 2
- Bushfire prone vegetation
- 10m wide APZ
- BAL 29
- BAL 19
- BAL 12.5

4. Proposal compliance and justification

Proposed development of Capricorn Yanchep - Stages 4C, 8C and 9C 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.

6.3 Information to accompany strategic planning proposals

Any strategic planning proposal to which policy measure 6.2 applies is to be accompanied by the following information prepared in accordance with the Guidelines:

- a) (i) the results of a BHL assessment determining the applicable hazard level(s) across the subject land, in accordance with the methodology set out in the Guidelines. BHL assessments should be prepared by an accredited Bushfire Planning Practitioner; or
- a) (ii) where the lot layout of the proposal is known, a BAL Contour Map to determine the indicative acceptable BAL ratings across the subject site, in accordance with the Guidelines. The BAL Contour Map should be prepared by an accredited Bushfire Planning Practitioner; and
- b) the identification of any bushfire hazard issues arising from the relevant assessment; and
- c) clear demonstration that compliance with the bushfire protection criteria in the Guidelines can be achieved in subsequent planning stages. This information can be provided in the form of a Bushfire Management Plan or an amended Bushfire Management Plan where one has been previously endorsed.

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 development will only occur in areas of BAL 19 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 road reserves and land cleared for future development between proposed lots and bushfire prone vegetation.	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.	HSZs are not proposed since individual dwelling construction meets the standard appropriate to 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 5, which demonstrate that a minimum of two different vehicular access routes will be provided for all proposed lots via the internal road network.	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 Table 2 of the Guidelines.	

Bushfire protection criteria	Intent	Solution	Proposed bushfire management measures	Compliance statement
		<p>A3.3 Cul-de-sac (including a dead-end-road)</p> <p>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).</p>	Refer to Section 3.3, which demonstrates that all proposed cul-de-sacs will meet minimum requirements outlined in Table 2 of the Guidelines.	
		<p>A3.4 Battle-axe</p> <p>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>	N/A No battle-axes are proposed as part of the development.	
		<p>A3.5 Private driveway longer than 50 m</p> <p>A private driveway is to meet detailed requirements (refer to the Guidelines for detailed private driveway requirements).</p>	N/A No private driveways longer than 50 m are proposed as part of the development.	
		<p>A3.6 Emergency access way</p> <p>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>	N/A No emergency access ways are proposed as part of the development.	

Bushfire protection criteria	Intent	Solution	Proposed bushfire management measures	Compliance statement
		<p>A3.7 Fire service access routes (perimeter roads)</p> <p>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>	N/A No fire service access routes are proposed as part of the development.	
		<p>A3.8 Firebreak width</p> <p>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>	N/A No firebreaks are proposed as part of the development.	
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</p> <p>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 all proposed lots will be provided a reticulated water supply and network of hydrants in accordance with local water authority, City and DFES requirements.	The measures proposed are considered to comply and meet the intent of Element 4 Water
		<p>A4.2 Non-reticulated areas</p> <p>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>	N/A The proposed development will not occur within a non-reticulated area.	
		<p>A4.3 Individual lots within non-reticulated areas (Only for use if creating 1 additional lot and cannot be applied cumulatively)</p> <p>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>	N/A The proposed development will not occur within a non-reticulated area.	

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
Implementation of increased building construction standards	On development of individual lots	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, or at the building licence stage once final lot layout and vegetation extent is confirmed	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 City of Wanneroo will be the authority responsible for updating and revising the BMP.

5.2 Stakeholder consultation

Strategen has undertaken consultation with the developer and City of Wanneroo to ensure aims and objectives of the BMP are in accordance with stakeholder expectations and the BMP maintains compliance with the Guidelines.

6. References

- Bureau of Meteorology (BoM) 2016, *Climate statistics for Australian locations: Monthly climate statistics for Jandakot Aero*, [Online], Commonwealth of Australia, available from:
http://www.bom.gov.au/climate/averages/tables/cw_009172.shtml, [07 April 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) 2015, *Map of Bush Fire Prone Areas*, [Online], Government of Western Australia, available from:
<http://www.dfes.wa.gov.au/regulationandcompliance/bushfireproneareas/Pages/default.aspx>, [07 April 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 Gingin Aero
Weather Station

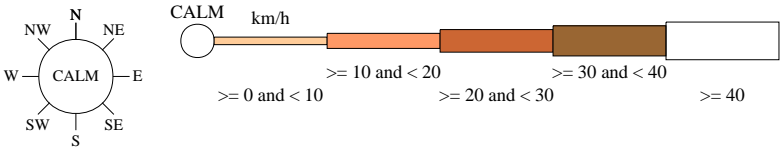
Rose of Wind direction versus Wind speed in km/h (01 May 1996 to 30 Sep 2010)

Custom times selected, refer to attached note for details

GINGIN AERO

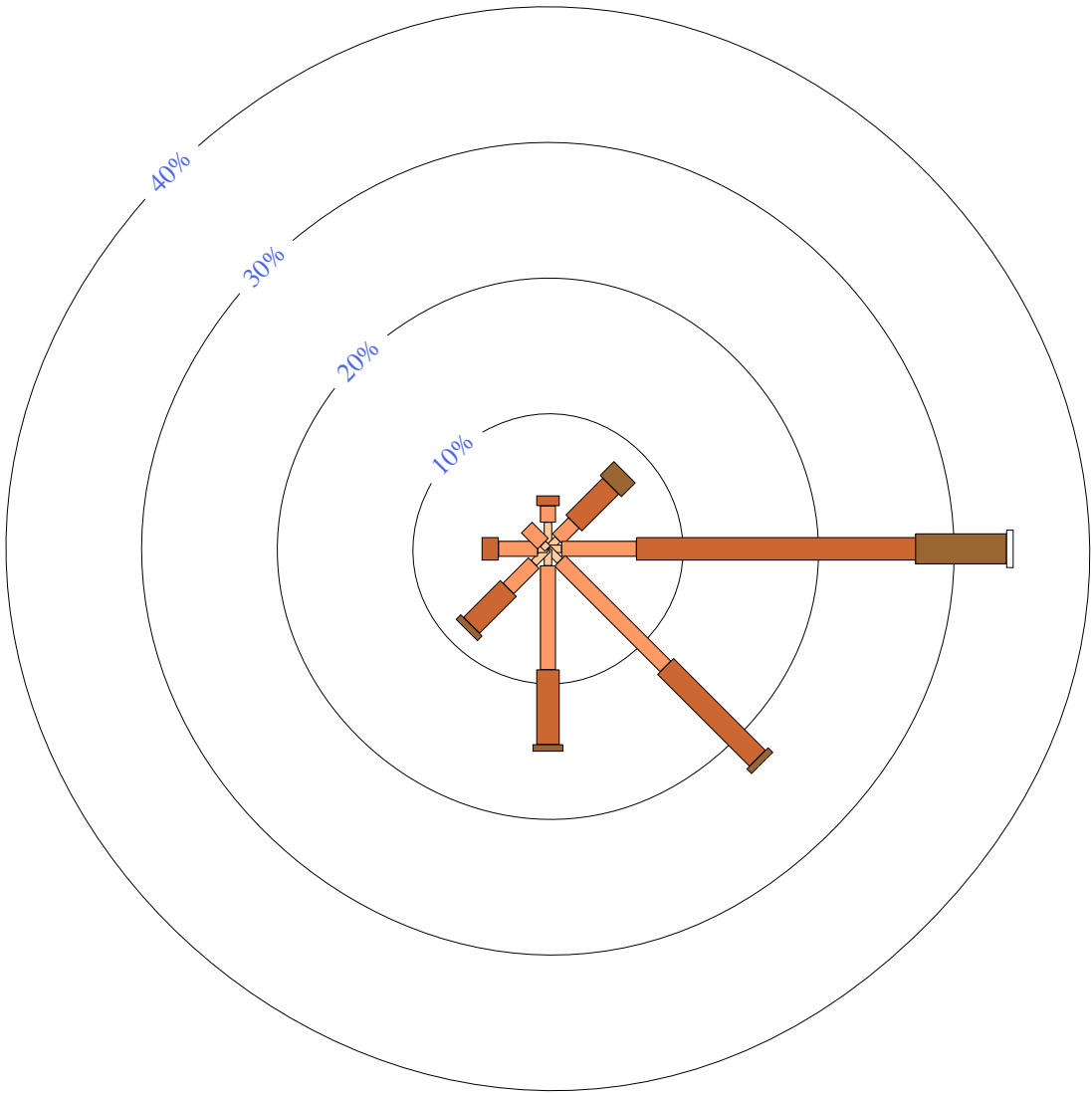
Site No: 009178 • Opened Jan 1968 • Still Open • Latitude: -31.4628° • Longitude: 115.8642° • Elevation 73m

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
411 Total Observations

Calm *



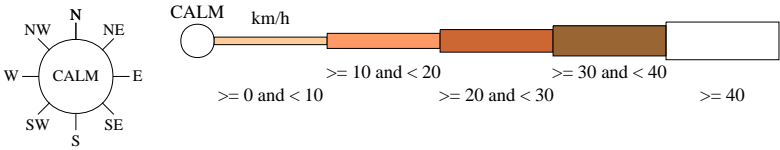
Rose of Wind direction versus Wind speed in km/h (01 May 1996 to 30 Sep 2010)

Custom times selected, refer to attached note for details

GINGIN AERO

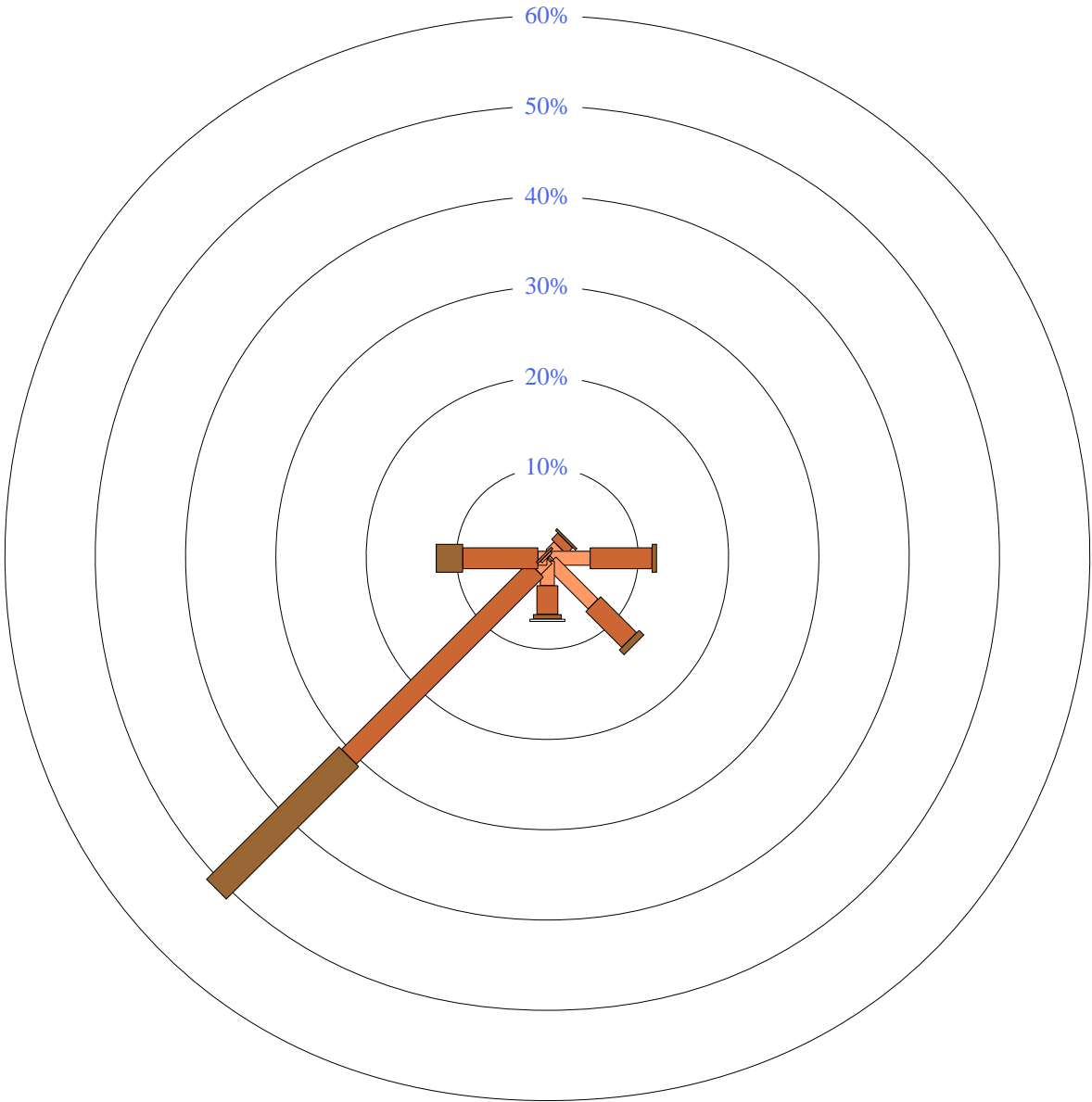
Site No: 009178 • Opened Jan 1968 • Still Open • Latitude: -31.4628° • Longitude: 115.8642° • Elevation 73m

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
410 Total Observations

Calm *



Appendix 2
City of Wanneroo protect your home
and property from bushfires guidelines

Protect your home and property from bushfires

NOTICE TO ALL OWNERS OR OCCUPIERS OF LAND IN THE DISTRICT OF THE CITY OF WANNEROO REGARDING FIREBREAKS.

The City of Wanneroo hereby gives notice pursuant to Section 33 of the **Bush Fires Act 1954** to all owners or occupiers of land in its district that they are required on or before 15 November, or within 14 days of becoming the owner or occupier of the land if that occurs after the 15 November, to annually plough, cultivate, scarify, or otherwise clear firebreaks as specified in this Notice and thereafter up to, and including the 30 April, annually, to maintain the firebreaks clear of flammable matter.

1. Land having an area of 2000m² or more

A firebreak not less than 3 metres wide and 3 metres high immediately inside and around all external boundaries of the land must be cleared.

2. Land having an area of less than 2000m²

A firebreak not less than 2 metres wide and 2 metres high immediately inside and around all external boundaries of the land must be cleared.

3. Buildings

A firebreak not less than 3 metres wide immediately around all external walls of every building must be cleared. Whenever a firebreak is cleared by burning the provisions of the Act and Regulations made thereunder must be observed. If pursuant to Item (2) of this Notice, mowing or slashing is carried out the height of vegetation thereafter must not exceed, as far as is reasonably practicable, 20mm over the entire area of the firebreak. The use of chemicals is subject to all restrictions imposed by the Department of Agriculture. Attention is drawn to the Flammable Liquids Regulations made under the Explosives and Dangerous Goods Act 1961, which requires a site on which flammable liquid is stored to be totally cleared of all flammable material for a minimum distance of 5 metres surrounding the site.

If it is considered to be impracticable for any reason to comply with the provisions of this Notice, 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 requirements of this Notice must be complied with.

Penalty

An owner or occupier of land who fails or neglects in any respect to comply with the requirements of this Notice is liable to a maximum fine of \$5,000.

DATES TO REMEMBER

- Firebreaks must be cleared by **15 November (AND KEPT CLEAR UNTIL APRIL 30)**
- Burning permits required all year round
- Burning prohibited between **1 December to 31 March**

When and how to obtain a fire permit

Permits are available from the City of Wanneroo at the following locations:

WANNEROO ANIMAL CARE CENTRE

Located at the rear of the Ashby Operations Centre,
1204 Wanneroo Road, Ashby

The City's Rangers / Fire Control Officers are available to issue permits 7 days a week* from 4pm - 6pm

*Except Good Friday

CITY OF WANNEROO CIVIC CENTRE

23 Dundobar Road, Wanneroo

The City's Fire Control Officers / Permit Issuing Officers are available to issue permits Monday to Friday 9am - 4pm

NEED ADVICE?

Further advice about how to protect your home, constructing firebreaks, and when and how to burn off, is available from the City of Wanneroo during office hours on 9405 5000.



23 Dundobar Road, Wanneroo, WA 6065

Locked Bag 1, Wanneroo, WA 6946

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

After Hours : 1300 13 83 93

E : enquiries@wanneroo.wa.gov.au

wanneroo.wa.gov.au  

PROTECT YOUR HOME
AND PROPERTY FROM
BUSHFIRES



Keeping your home safe from fire

There are a number of ways you can help keep your home safe from fire:

- Install smoke detectors in your home
- Clear vegetation away from the walls of your home
- Clear all rubbish and flammable material from around your home to create a 20 metre circle of safety
- Store firewood, timber, petrol, and kerosene well away from your home
- Prior to summer, clean all leaves and debris from your gutters
- Don't have flammable trees such as conifers near buildings
- Have branches trimmed that overhang the house or powerlines
- Fit wire insect screens or shutters to windows and glass doors

If a firebreak is impractical along your boundary for environmental or other reasons notify the City of Wanneroo by 1 October to obtain permission to install firebreaks in alternative positions, or of a different nature.

ALTERNATIVE METHODS OF REDUCING FIRE HAZARDS ON VACANT LAND

- For urban land less than 2000m², if mowing or slashing is carried out, the height of the vegetation must not exceed, as far as is reasonably practical, 20mm over the entire area of the firebreak
- The use of chemicals is subject to all restrictions imposed by the Department of Agriculture
- Mulching • Disposal at an authorised rubbish tip site

When and how to burn

NO BURNING FROM 1 DECEMBER - 31 MARCH

Burning off - that is, bush/running fire including grass, on any land is totally prohibited between 1 December and 31 March. Fire permits for burning material other than garden rubbish are required all year round.

A person in control of the fire must stay with the fire until it is completely extinguished.

GARDEN RUBBISH AND REFUSE

The burning of garden refuse is permitted between the hours of 6pm and 11pm, provided the fire danger rating is not VERY HIGH, SEVERE, EXTREME or CATASTROPHIC or a TOTAL FIRE BAN has been declared.

Fire danger rating signs are located at the following locations:

- 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
- Gnaragara Road, Landsdale • Country Side Drive, Two Rocks

Other points to remember when burning garden refuse and rubbish are:

- All bush and flammable material must be thoroughly cleared within two metres of all points of the site of the fire
- The material must be on the ground, and be no more than one metre wide and one metre high

Only one heap may be burnt at any one time
Incinerators may be used providing:

- The incinerator is properly constructed and designed to prevent the escape of sparks of burning material
- The incinerator is situated not less than two metres away from a building or fence
- An area of two metres surrounding the incinerator is clear of all flammable material

BARBECUES

Only gas or electric barbecues may be lit during VERY HIGH, SEVERE, EXTREME or CATASTROPHIC fire danger rating or declared TOTAL FIRE BAN. The lighting of solid fuel barbecues is not permitted on these days.

SMOKE NUISANCES

City of Wanneroo residents are advised to be mindful of smoke issues associated with any burning that they conduct. Steps should be taken to avoid undue smoke impact to neighbours and adjacent roads. Smoke across roadways can severely impact motorists' visibility and therefore road safety. Issues of smoke nuisance are regulated by the Waste Avoidance and Resource Recovery Act 2007.

CAMPFIRES

Campfires must not be lit on VERY HIGH, SEVERE, EXTREME or CATASTROPHIC fire danger days or declared TOTAL FIRE BAN. A person must remain in attendance at the site during the whole time the fire is burning. The user must extinguish the fire using water or earth before leaving the area.

Hints for safer burning

- Don't light a fire on a hot or windy day
- Don't burn more than you can control
- Let your neighbours know you'll be burning material
- Make sure smoke and sparks will not affect your neighbour's washing or enter open windows
- Cut or rake long grass around trees, building and fences before burning
- Burn against the wind
- On a sloping block, burn from the top down
- Keep a hose or spray pack at hand to dampen down fierce fires
- If in doubt, don't burn material yourself - call the Volunteer Fire Brigade
- Stay with the fire until it is completely extinguished
- Where possible, don't burn any closer than 20 metres from your home or other buildings

Penalties

Under the Bush Fires Act 1954, failing to comply with regulations can result in a fine ranging from \$250 to \$250,000 or imprisonment.

Failure to maintain 2/3 metre firebreak \$250
as per firebreak order

Offence relating to lighting fire in the open air \$250

Setting fire to bush during prohibited burning times \$250

Failure of occupier to extinguish bush fire \$250

Major offences result in Court action with fines ranging from \$250 to \$250,000 or imprisonment for 14 years.

THE BIGGEST PENALTY OF ALL

The biggest penalty of all would be losing your loved ones or home to fire. Please ensure you, your family and your home are kept safe by taking the necessary precautions.

Special rural and residential land

Owners and occupiers of special rural and special residential land should be aware of their responsibilities to take bush fire prevention measures, while ensuring they do not contravene Town Planning Scheme provisions which control the removal of vegetation in Special Residential and Special Rural Zones.

These special rural zones were created in areas of natural flora, and the Scheme recognises the importance of preserving the natural environment in these areas. Anyone found cutting down, lopping or damaging trees in these areas without City approval may be guilty of an offence.

However, bush fire prevention, including the installation of firebreaks, is essential regardless of the zoning of the land.

Below are some guidelines for installing firebreaks in special rural zones to prevent bush fires, while minimising damage to the natural environment.

- A 3 metre wide and 3 metre high firebreak should be cleared around the perimeter of special rural or special residential lots
- These firebreaks need not be strictly around the perimeter, but may deviate according to the flora
- The firebreak does not have to be ploughed but can instead be created by clearing and removing all flammable material
- Care should be taken to avoid damaging or removing significant trees and shrubs
- Avoid the build up of undergrowth and leaf litter

