



Attachment C

strategen

JBS&G

Aigle Royal Developments  
Bushfire Management Plan (Subdivision Application)

Lots 11 and 74, Beenyup Road, Banjup

21 January 2021

58534/128,132 (Rev 1)

JBS&G Australia Pty Ltd T/A Strategen-JBS&G

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Appendix D	Water technical standards of the Guidelines
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Appendix F	City of Cockburn Firebreak Notice 2020/2021

## 1. Proposal details

### 1.1 Background

Aigle Royal Developments are proposing to submit a local structure plan for the proposed development of Lots 11 and 74, Beenyup Road, Banjup (the project area) which is located in the City of Cockburn (the City).

The Structure Plan (depicted in Figure 1) identifies:

- residential lots
- restricted and unrestricted public open space (POS)
- an ecological linkage subject to further environmental investigation in the southern portion of the project area and;
- internal road layout

### 1.2 Site description

The project area is bound by the following:

- existing residential dwellings and the existing Jandakot Regional Park, Bush Forever site 492 to the west
- undeveloped parts of Lots 11 & 74 Beenyup Road and the Conservation Category Wetland (CCW) area to the east
- Gibbs Road East and Tapper Road to the north, with existing residential dwelling north of the roads
- an ecological corridor (connecting the CCW to Jandakot Regional Park) of retained native vegetation within Lot 74 Beenyup Road, to the south.

The project area is designated as bushfire prone on the *Map of Bush Fire Prone Areas* (DFES 2021; see Plate 1).

### 1.3 Purpose

This Bushfire Management Plan (BMP) has been prepared to address requirements under *Policy Measure 6.3 of State Planning Policy 3.7 Planning in Bushfire-Prone Areas* (SPP 3.7; WAPC 2015) and *Guidelines for Planning in Bushfire-Prone Areas* (the Guidelines; WAPC 2017).

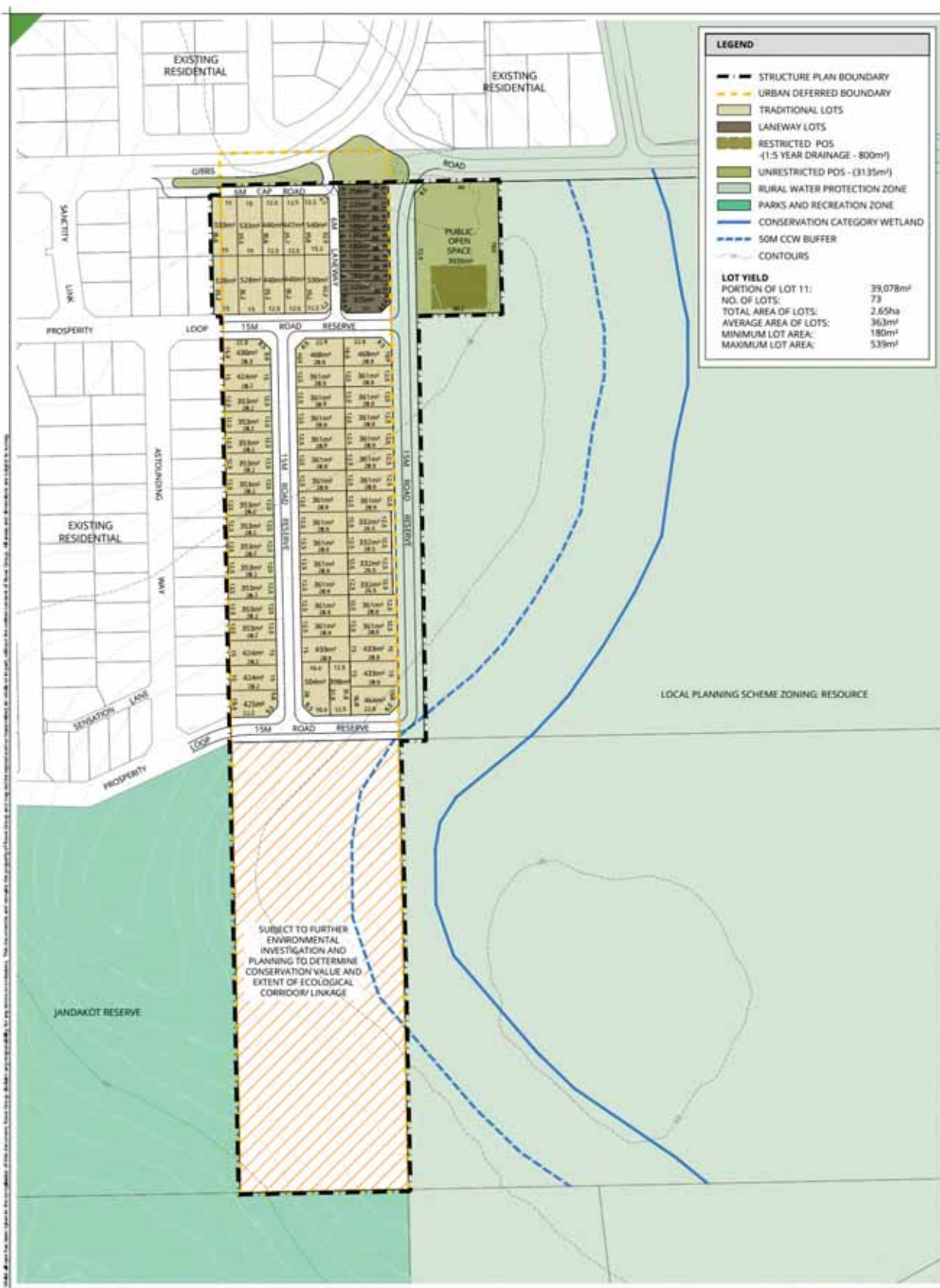
### 1.4 Other plans/reports

Other reports that have been prepared for the project area include:

- Local Structure Plan: Environmental Assessment Report (dated April 2020) prepared by 360 Environmental
- Peer Review: Structure Plan for Subdivision, Lots 11 and 74 Beenyup Road, Banjup (draft; dated 28 October 2020) prepared by Envision Bushfire Protection (see Appendix E)
  - This peer review was conducted of the previous Bushfire Management Plan (dated 24 April 2020) and DFES and City comments
  - The comments relating to vegetation classification have been incorporated into this BMP, primarily the classification of banksia dominated scrub as Class D Scrub, rather than Class B Woodland.



Plate 1: Map of Bush Fire Prone Areas (DFES 2021)



**INDICATIVE PLAN OF SUBDIVISION**  
 LOT 11 AND LOT 74 GIBBS ROAD  
 BANJUP

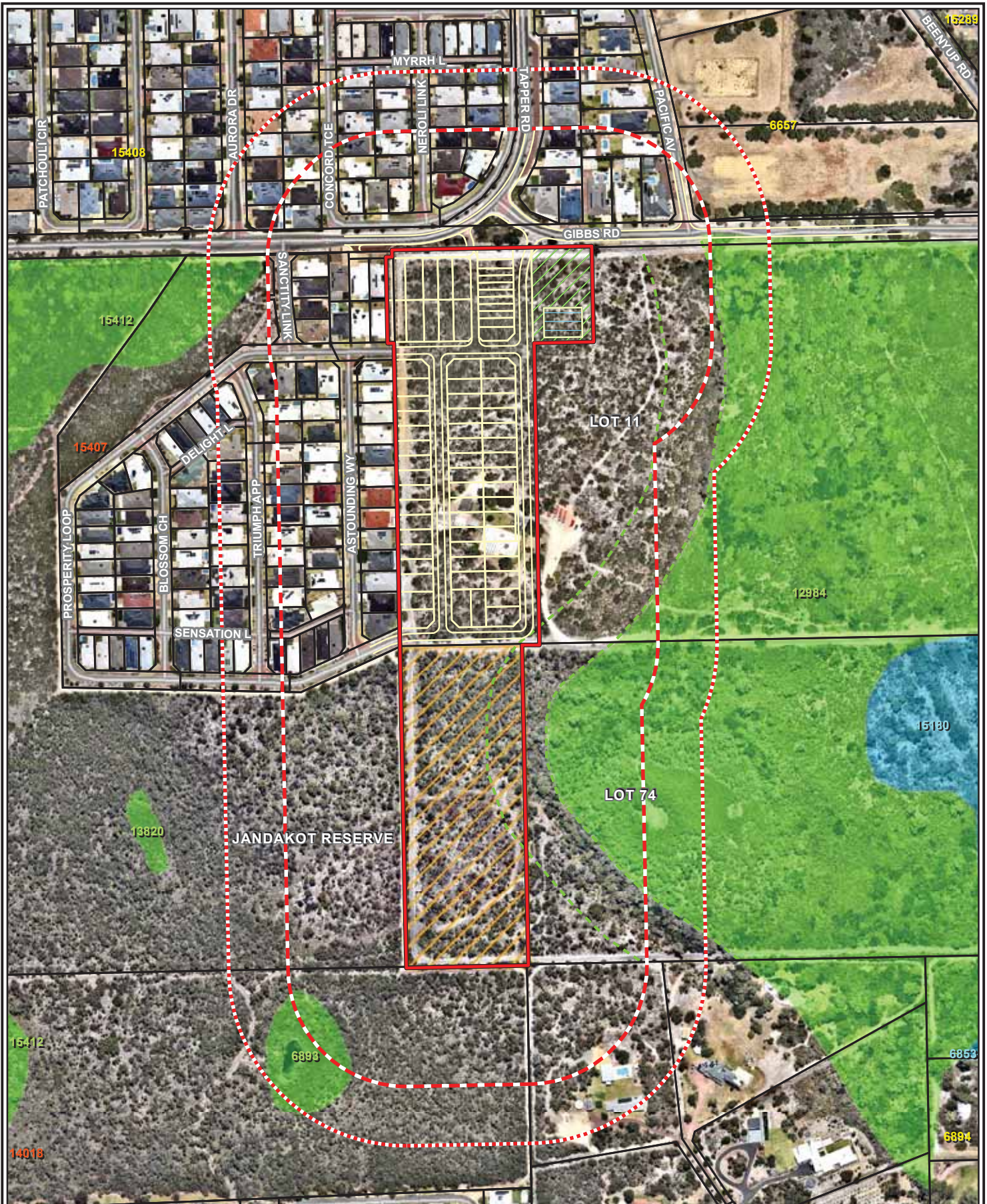



**ROWE GROUP**  
 DESIGN

4080-CON-02-A

Figure 1: Local Structure Plan





<b>Legend:</b> Project area 100m assessment area 150m assessment area Cadastral boundary Restricted POS Unrestricted POS Area subject to further environmental investigation 		<b>Geomorphic Wetlands (DBCAs)</b> Conservation Resource Enhancement Proposed development 50m buffer CCW boundary Roads (MRWA)		Scale 1:4,250 at A4  Coord. Sys. GDA 1994 MGA Zone 50 		<b>Lot 11 and 74, Gibbs Rd Banjup, WA</b>  <b>SITE OVERVIEW</b>	
Job No: 58534 Client: Aigle Royal		Version: A Date: 18-Jan-2021		<b>FIGURE 2</b> 			
Drawn By: jcrute		Checked By: LW					

## 2. Environmental considerations

### 2.1 Native vegetation - modification and clearing

The majority of the project area contains remnant vegetation, which will be cleared as part of the proposal. Table 1 provides a summary of a search of publicly available environmental data.

**Table 1: Summary of environmental values**

Environmental value	Not mapped as occurring within or adjacent to the project area	Mapped as occurring within or adjacent to the project area		Description
		Within	Adjacent	
Environmentally Sensitive Area		✓	✓	An Environmentally Sensitive Area occurs within and adjacent to the project area.
Swan Bioplan Regionally Significant Natural Area	✓			
Ecological linkages		✓	✓	The majority of the northern portion of the project area is mapped as containing a Perth Regional Ecological Linkage, in addition to land to the west, north and east.
Wetlands		✓	✓	A Conservation Category Wetland (CCW; 12984) extends along the eastern project area boundary, with the 50 m buffer extending into south-eastern portion of the project area.  Other small CCWs also exist to the north-west (15412), west (13820) and south-west (6893) of the project area. Adjacent areas also contain Resource Enhancement Category Wetlands and Multiple Use Category Wetlands.  No Ramsar sites are mapped as occurring.
Waterways		✓	✓	A Conservation Category wetland intersects the assessment area with the 50 m buffer extending into the south-western part of the project area.
Threatened Ecological Communities listed under the EPBC Act		✓	✓	Endangered Banksia Woodlands of the Swan Coastal Plain TEC is mapped as being likely to occur within project area. No Tuart Woodlands are mapped as occurring.
Threatened and priority flora	✓			
Fauna habitat listed under the EPBC Act		✓	✓	Potential Quenda habitat is mapped as occurring within and adjacent to the project area. With respect to Carnaby's Black Cockatoo, the project area is mapped as containing confirmed roosting areas and potential feeding areas.
Threatened and priority fauna		✓	✓	The buffer zone for a Priority Fauna species occurs on the western edge of the project area. Two Threatened Fauna species occur 330 m to the south of the project area.
Bush Forever Site			✓	Bush Forever site 492 occurs immediately to the west of the project area.



Environmental value	Not mapped as occurring within or adjacent to the project area	Mapped as occurring within or adjacent to the project area		Description
		Within	Adjacent	
DBCA managed lands and waters (includes legislated lands and waters and lands of interest)	✓			
Conservation covenants	✓			N/A

Regional vegetation surveys and mapping of the Swan Coastal Plain indicates the project area and adjacent land is contained within the Bassendean Complex – Central and South. This vegetation complex is described as:

- Vegetation ranges from woodland of *E. marginata* – *A. fraseriana* – *Banksia* spp. to low woodland of *Melaleuca* spp. and sedgelands on the moister sites. This area includes the transition of *E. marginata* to *E. todtiana* in the vicinity of Perth.

In addition to the publicly available environmental data outlined above, the project Environmental Assessment Report (360 Environmental, 2020) also identifies the following key environmental values, however it is noted the southern portion of the project area is subject to further investigation:

- **Wetlands**
  - Entire site is mapped as within the Gibbs Road Swamp System wetland listed under the Directory of Nationally Important Wetlands
- **Jandakot Underground Water Pollution Control Area**
  - The site forms part of the Jandakot Underground Water Pollution Control Area and is classified as Priority 3.
- **Remnant Vegetation**
  - The site contains remnant vegetation which consists of Floristic Community Type (FCT) representative of the Threatened Ecological Community: Banksia Woodlands of the Swan Coastal Plain.
  - It is proposed that the ecological linkage which contains Banksia Woodlands TEC in 'Excellent' condition will be subject to further investigation.
- **Black Cockatoo Habitat**
  - The site contains Black Cockatoo foraging habitat and four potential breeding trees.
  - The project will involve the clearing of foraging habitat and the five potential breeding trees are located outside the proposed clearing footprint, mostly in the area subject to further investigation.
- **Environmentally Sensitive Areas**
  - The site is mapped as an Environmentally Sensitive Area (ESA) which relates to the Gibbs Road Swamp System and its associated buffers.
  - ESA's are protected by legislation and areas within the extent of an ESA are not subject to native vegetation clearing exemptions (such as exemptions associated with subdivision approval)

- **Hydrology and Water Quality**

- A Local Water Management Strategy (LWMS) has been developed to support the LSP processes.
- The LWMS provides management strategies to ensure hydrological flows and regimes reflect predevelopment flows of the site and prevent water quality degradation from the development.

In response to identification of the above environmental values, the project environmental consultant has identified the following key environmental outcomes associated with the proposed development:

- There are no potential Black Cockatoo breeding trees recorded within the proposed clearing footprint associated with the future dwellings.
- All the vegetation on site is considered to be Black cockatoo foraging habitat and representative of Banksia Woodland SCP TEC
- Vegetation to be cleared is in 'Very Good' to 'Good' and 'Degraded' and 'Completely Degraded' condition. No vegetation in 'Very Good' to 'Excellent' or 'Excellent' condition is proposed to be impacted.
- No proposed development is within the adjoining CCW 50m buffer.
- The ecological linkages in the south of the project area, which provides a continues linkage from the adjacent Bush Forever Site/Jandakot Regional Park and remnant vegetation and CCW located east of the site, is contained in the area subject to further investigation.

From a bushfire compliance perspective, in addition to the retention of key vegetation and habitat, the construction of proposed dwellings to BAL-29 will minimise environmental impacts from Asset Protection Zones (APZs) required to achieve a compliant outcome.

Environmental impacts resulting from implementation of the proposal will need to be addressed under standard State and Federal environmental assessment and referral requirements under the Environmental Protection Act 1986 and Environment Protection and Biodiversity Conservation Act 1999.

## **2.2 Revegetation / Landscape Plans**

Existing vegetation within the southern portion of the project area, including the CCW buffer within the project area, is to be retained while this area is subject to further investigation.

No significant revegetation is proposed as part of the proposal. It is expected that the drainage basins associated with the creation of the POS area along the eastern boundary, will likely require revegetation with nutrient stripping vegetation consistent with Class C shrubland vegetation. and would require sufficient separation provided to ensure a compliant BAL outcome on adjacent habitable development.

Any onsite landscaping proposed will consist of low threat and managed gardens and street scaping in accordance with AS 3959 Clause 2.2.3.2 (f) and Schedule 1 of the Guidelines (refer to Appendix B).

### 3. Bushfire assessment results

#### 3.1 Assessment inputs

##### 3.1.1 Vegetation classification

Strategen-JBS&G assessed classified vegetation and exclusions within the 150 m assessment area through on-ground verification on 6 March 2020 in accordance with *AS 3959-2018 Construction of Buildings in Bushfire-Prone Areas* (AS 3959; SA 2018) and the *Visual Guide for Bushfire Risk Assessment in Western Australia* (DoP 2016).

The peer review of the previous BMP undertaken by Envision Bushfire Protection (attached in Appendix E) provides guidance regarding the classification of banksia dominated scrub vegetation as Class D scrub, and this has been incorporated into the revised vegetation classifications within this BMP, including the increased extent of Class A forest in the CCW.

Georeferenced site photos and a description of the vegetation classifications and exclusions are contained in Table 2, depicted in Figure 3, with additional and more recent photos from October 2020 within Appendix A of the peer review.

Post development vegetation is expected to include:

- Class D scrub vegetation
  - occurring as banksia dominated scrub throughout the project area and adjacent areas, with height generally ranging from 4-5 m with occasional taller trees which form less than 10% of the area. The vegetation presents predominantly as a scrub structure which at times is quite dense, and in other areas it becomes sparser and patchier. Onsite retention of vegetation within the project area is expected to occur within the southern portion of the project area which is under further investigation and includes the small section of CCW buffer that extends into the south-eastern boundary.
  - occurs within an existing drainage basin to the north-west of the project area
- Class A forest vegetation
  - occurs to the southeast within the CCW, and is dominated by banksia with a shrubby understorey and eucalypt overstorey with trees of between 8 – 15m high.
- Class G grassland
  - within rural residential lots to the north-east of the project area, which is not required to be managed in perpetuity under the Shire's firebreak notice.
- Class C shrubland
  - Likely to be associated with future revegetation of the proposed drainage basin within the proposed POS

Exclusions identified within the project area and adjacent 150 m assessment area include the following:

- Clause 2.2.3.2 (e): non-vegetated areas (i.e. buildings, roads, mulched road verges, mineral earth firebreaks, driveways, carparks)
- Clause 2.2.3.2 (f): low threat vegetation (i.e. manicured lawns, managed gardens, slashed road verges).

Post-development vegetation classifications and exclusions depicted in Figure 3 will be achieved through clearing within the project area (other than the southern portion which is subject to further investigation and includes the CCW buffer), which will replace on-site scrub vegetation with

residential development and roads to achieve exclusion as non-vegetated or low threat vegetation (i.e. excluded under Clauses 2.2.3.2 (e) and (f)).

One POS area including a drainage basin are to be created as part of the development, with the vegetation in the POS area will be largely managed and therefore excluded as low threat vegetation. Should there be any classified vegetation associated with the drainage basin post-development, it is expected to be sedges and reeds which would likely form a Class C shrubland classification.

### 3.1.2 Effective slope

Strategen-JBS&G assessed effective slope under classified vegetation within the 150 m assessment area through on-ground verification on 6 March 2020 in accordance with AS 3959. Results were cross-referenced with DPIRD 2m contour data and are depicted in Figure 3.

The project area is predominately sloping from west to east with land flattening to the east of the assessment area. The effective slope beneath the classified vegetation is downslope (0° - 5°) with some land to the west of the project area assessed as flat/upslope (0°).

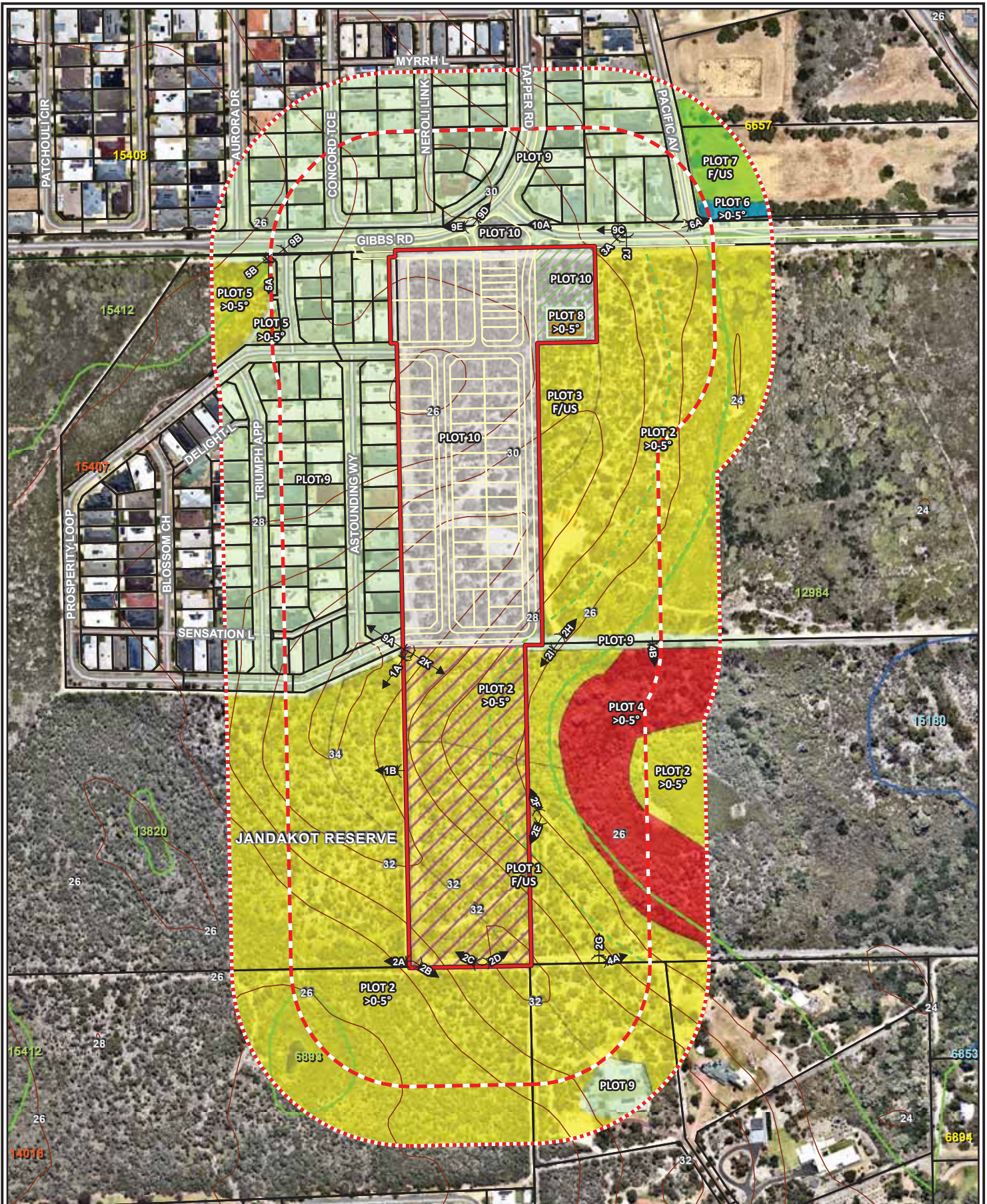
### 3.1.3 Summary of inputs

Figure 3 illustrates the anticipated post-development vegetation classifications and exclusions following completion of subdivision works and implementation of low threat landscaping throughout the project area and adjacent 150 m. The post-development vegetation classifications/exclusions and effective slope are summarised in Table 2.

The post-development vegetation classifications for all land external to the project area are expected to remain the same as for the pre-development classifications, other than the management of vegetation to a low threat state at the main entrance from Gibbs Road. If external vegetation other than the Gibbs Road reserve is altered prior to future planning stages, the change in vegetation condition is to be captured through a future BHL assessment or BAL contour map assessment.

**Table 2: Summary of post-development vegetation classifications, exclusions and effective slope**

Vegetation plot	Vegetation classification	Effective slope	Comments
1	Class D Scrub	Flat/upslope (0°)	Banksia dominated scrub vegetation within Jandakot Reserve
2	Class D Scrub	Downslope >0–5°	Banksia dominated scrub vegetation within the project area, to the east and south-east and within parts of the CCW
3	Class D Scrub	Flat/upslope (0°)	Banksia dominated scrub vegetation within the project area and to the south-west and east
4	Class A Forest	Downslope >0–5°	Eucalyptus dominated forest vegetation within the CCW.
5	Class D Scrub	Downslope >0–5°	Scrub vegetation within small drainage basin to the north west of the project area
6	Class B Woodland	Downslope >0–5°	Woodland vegetation associated with the windbreak to the north-east
7	Class G Grassland	Flat/upslope (0°)	Unmanaged grassland within rural landholdings to the north-east
8	Class C Shrubland	Downslope >0–5°	Likely revegetation of a proposed drainage basin within the project area
9	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	Existing non-vegetated and low threat vegetation
10	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	Existing unmanaged vegetation to be modified to a non-vegetated or low threat state



**Legend**

- |   |   |   |
|---|---|---|
| <ul style="list-style-type: none"> <li><span style="border: 1px solid red; display: inline-block; width: 15px; height: 10px; margin-right: 5px;"></span> Project area</li> <li><span style="border: 1px dashed red; display: inline-block; width: 15px; height: 10px; margin-right: 5px;"></span> 100m assessment area</li> <li><span style="border: 1px dotted red; display: inline-block; width: 15px; height: 10px; margin-right: 5px;"></span> 150m assessment area</li> <li><span style="border: 1px solid black; display: inline-block; width: 15px; height: 10px; margin-right: 5px;"></span> Cadastral boundary</li> <li><span style="border: 1px solid blue; display: inline-block; width: 15px; height: 10px; margin-right: 5px;"></span> Restricted POS</li> <li><span style="border: 1px solid green; display: inline-block; width: 15px; height: 10px; margin-right: 5px;"></span> Unrestricted POS</li> <li><span style="border: 1px solid green; display: inline-block; width: 15px; height: 10px; margin-right: 5px;"></span> Geomorphic Wetlands (DBCAs)</li> <li><span style="border: 1px solid green; display: inline-block; width: 15px; height: 10px; margin-right: 5px;"></span> Conservation</li> <li><span style="border: 1px solid blue; display: inline-block; width: 15px; height: 10px; margin-right: 5px;"></span> Resource Enhancement</li> <li><span style="border: 1px solid purple; display: inline-block; width: 15px; height: 10px; margin-right: 5px;"></span> Area subject to further environmental investigation</li> <li><span style="border: 1px solid yellow; display: inline-block; width: 15px; height: 10px; margin-right: 5px;"></span> Proposed development</li> <li><span style="border: 1px solid brown; display: inline-block; width: 15px; height: 10px; margin-right: 5px;"></span> Topographic contours (mAHD)</li> </ul> | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: red; margin-right: 5px;"></span> Class A Forest</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: orange; margin-right: 5px;"></span> Class B Woodland</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: yellow; margin-right: 5px;"></span> Class C Shrubland</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: lightgreen; margin-right: 5px;"></span> Class D Scrub</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: darkgreen; margin-right: 5px;"></span> Class G Grassland</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: lightgrey; margin-right: 5px;"></span> Clause 2.2.3.2 (e) &amp; (f)</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: lightgrey; margin-right: 5px;"></span> Area to be modified to non-vegetated and low threat state</li> </ul> | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; border-bottom: 1px solid black; margin-right: 5px;"></span> Photo point and direction</li> <li><span style="display: inline-block; width: 15px; height: 10px; border-bottom: 1px solid black; margin-right: 5px;"></span> Roads (MRWA)</li> </ul> |
|---|---|---|

Scale 1:4,250 at A4 0 50 100 metres

Coord. Sys. GDA 1994 MGA Zone 50 Z

Job No: 58534

Client: Aigle Royal

Version: A Date: 20-Jan-2021

Drawn By: jcrute Checked By: LW

**Lot 11 and 74, Gibbs Rd  
Banjup, WA**

**VEGETATION CLASSIFICATION  
AND EFFECTIVE SLOPE**

**FIGURE 3**



## 3.2 Assessment outputs

### 3.2.1 Bushfire Hazard Level (BHL) assessment

Post-development vegetation extents have been assigned a bushfire hazard level in accordance with the methodology detailed in Appendix Two of the Guidelines as outlined in Table 3.

**Table 3: Bushfire hazard levels and characteristics**

Bushfire hazard level	Characteristics*
Extreme	<ul style="list-style-type: none"> <li>Class A Forest</li> <li>Class B Woodland (05)</li> <li>Class D Scrub</li> <li>Any classified vegetation with a greater than 10° slope.</li> </ul>
Moderate	<ul style="list-style-type: none"> <li>Class B Low woodland (07)</li> <li>Class C Shrubland</li> <li>Class E Mallee/Mulga</li> <li>Class G Grassland, including sown pasture and crops</li> <li>Class G Grassland: Open woodland (06), Low open woodland (08), Open shrubland (09)</li> <li>Vegetation that has a low hazard level but is within 100 metres of vegetation classified as a moderate or extreme hazard, is to adopt a moderate hazard level.</li> </ul>
Low	<ul style="list-style-type: none"> <li>Low threat vegetation may include areas of maintained lawns, golf courses, public recreation reserves and parklands, vineyards, orchards, cultivated gardens, commercial nurseries, nature strips and windbreaks</li> <li>Managed grassland in a minimal fuel condition (insufficient fuel is available to significantly increase the severity of the bushfire attack). For example, short-cropped grass to a nominal height of 100 millimetre</li> <li>Non-vegetated areas including waterways, roads, footpaths, buildings and rock outcrops.</li> </ul>
*Vegetation classifications from AS 3959-2018 Table 2.3.	

#### 3.2.1.1 Post-development

Strategen-JBS&G has mapped the potential post-development bushfire hazard levels to demonstrate that the future bushfire hazard levels will be acceptable for future development to occur within the project area. The bushfire hazard levels have been assigned on the basis of the vegetation discussed in Section 3.1 and the future expected vegetation extent within and surrounding the project area.

The post-development BHL assessment (refer to Figure 4) demonstrates that all future habitable development will be located on land with either a Low or Moderate bushfire hazard level.

#### 3.2.2 Bushfire Attack Level (BAL) contour assessment

Strategen-JBS&G has undertaken a BAL contour assessment in accordance with Method 1 of AS 3959 for the project area to provide greater clarity on the anticipated BAL ratings expected on future habitable development. The Method 1 procedure incorporates the following factors:

- state-adopted FDI 80 rating
- vegetation classification
- effective slope
- distance maintained between proposed development areas and the classified vegetation.

The BAL rating gives an indication of the level of bushfire attack (i.e. the radiant heat flux) that may be received by proposed future development and subsequently informs the standard of building construction and/or setbacks required for proposed habitable development to potentially withstand such impacts.

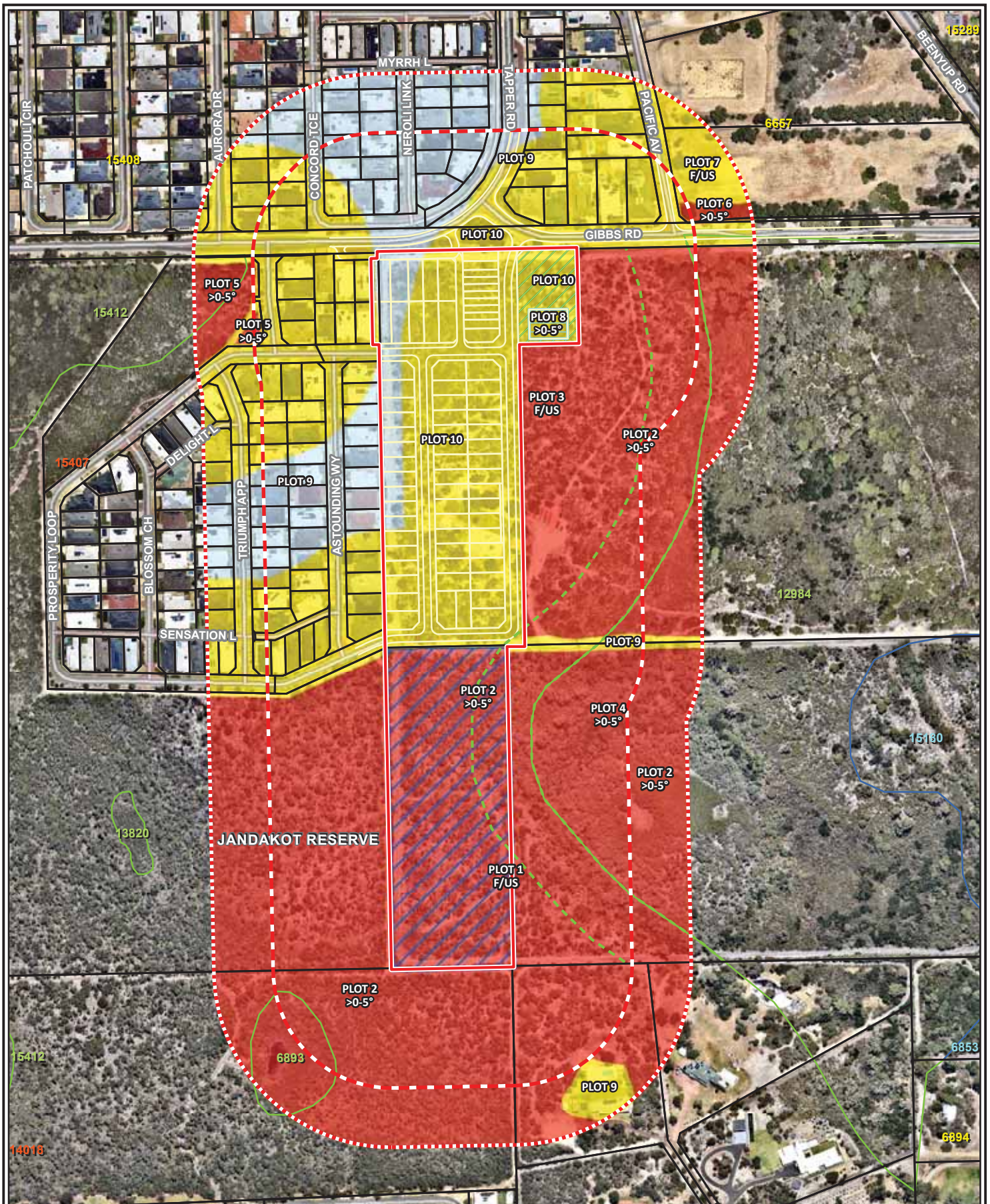
The BAL contours are based on:

- the post-development vegetation classifications and effective slope observed at the time of inspection as well as consideration of the proposed on-site clearing extent, resultant vegetation exclusions and separation distances achieved in line with the proposed Local Structure Plan.

The results of the BAL contour assessment are detailed in Table 4 and illustrated in Figure 5. The highest BAL applicable to the external boundary of the proposed lots is BAL-29 or lower. Implementation of building setbacks at the building stage may result in further BAL reductions for various lots.

**Table 4: BAL contour assessment results**

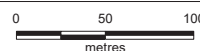
Method 1 BAL determination				
Plot	Vegetation classification	Effective slope	Minimum Separation distance	Highest BAL (to lot boundary)
1	Class D Scrub	Flat/upslope (0°)	19 m	BAL-19
2	Class D Scrub	Downslope >0-5°	15 m	BAL-29
3	Class D Scrub	Flat/upslope (0°)	15 m	BAL-29
4	Class A Forest	Downslope >0-5°	74 m	BAL-12.5
5	Class D Scrub	Downslope >0-5°	95 m	BAL-12.5
6	Class B Woodland	Downslope >0-5°	>100 m	BAL-Low
7	Class G Grassland	Flat/upslope (0°)	>50 m	BAL-Low
8	Class C Shrubland	Downslope >0-5°	25 m	BAL-12.5
9	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	N/A	BAL-Low
10	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	N/A	BAL-Low



**Legend:**

- |                                    |   |
|------------------------------------|---|
| Project area                       | Area subject to further environmental investigation |
| 100m assessment area               | <b>Bushfire hazard level</b>                        |
| 150m assessment area               | Extreme   |
| Cadastral boundary                 | Moderate  |
| Restricted POS                     | Low   |
| Unrestricted POS                   | Proposed development                                |
| <b>Geomorphic Wetlands (DBCAs)</b> | 50m buffer CCW boundary                             |
| Conservation                       | Roads (MRWA)  |
| Resource Enhancement               |   |

Scale 1:4,250 at A4



Coord. Sys. GDA 1994 MGA Zone 50

**Z**

Job No: 58534

Client: Aigle Royal

Version: A

Date: 20-Jan-2021

Drawn By: jcrute

Checked By: CT

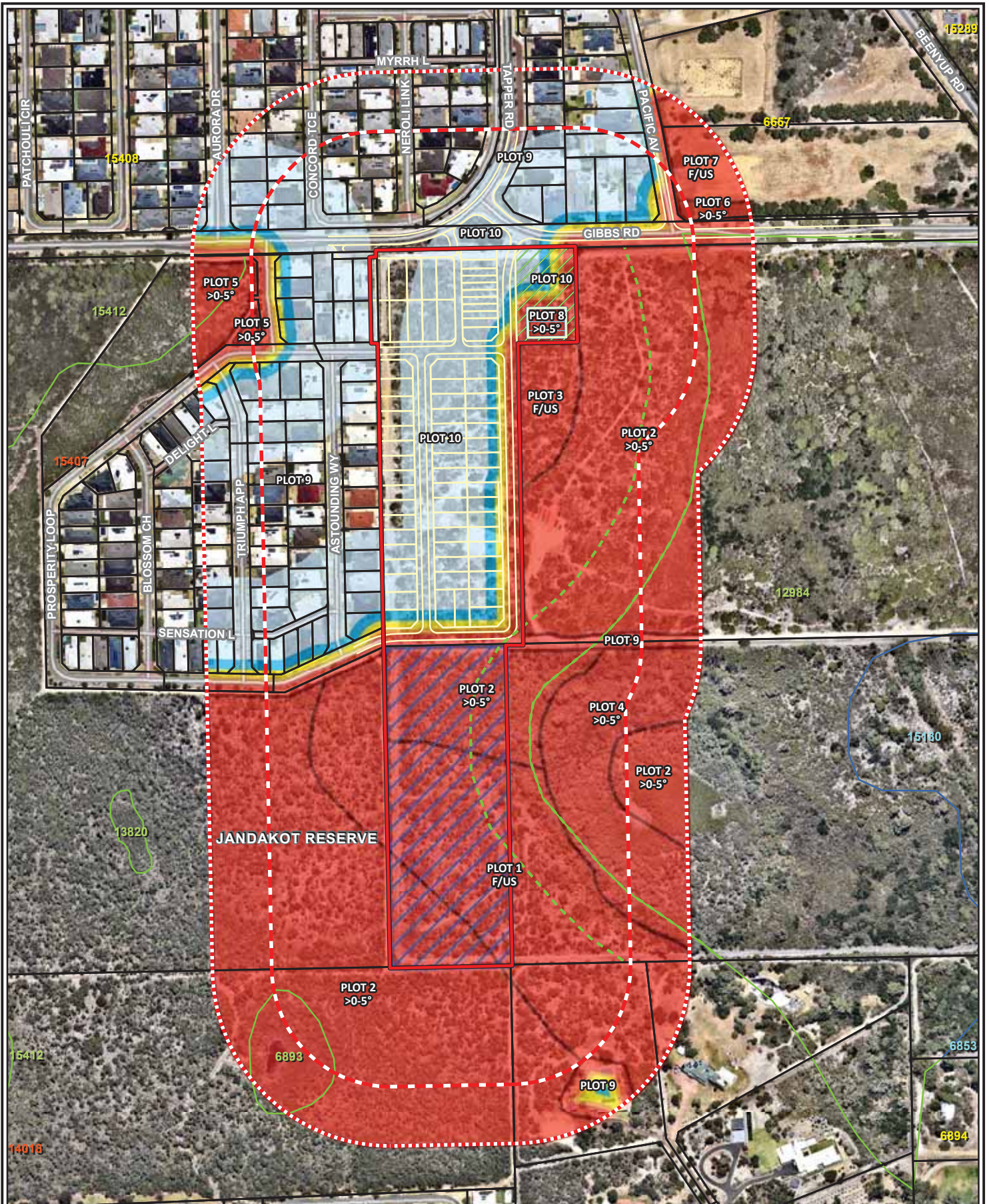
**Lot 11 and 74, Gibbs Rd  
Banjup, WA**

**BUSHFIRE HAZARD  
LEVEL ASSESSMENT**

**FIGURE 4**



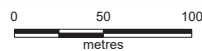




**Legend:**

- Project area
- 100m assessment area
- 150m assessment area
- Cadastral boundary
- Classified vegetation
- Restricted POS
- Unrestricted POS
- Geomorphic Wetlands (DBCAs)
- Conservation
- Resource Enhancement
- Area subject to further environmental investigation
- BAL contours
- BAL FZ
- BAL 40
- BAL 29
- BAL 19
- BAL 12.5
- BAL Low
- Proposed development
- 50m buffer CCW boundary
- Roads (MRWA)

Scale 1:4,250 at A4



Coord. Sys. GDA 1994 MGA Zone 50



Job No: 58534

Client: Aigle Royal

Version: A

Drawn By: jcrute

Date: 20-Jan-2021

Checked By: CT

**Lot 11 and 74, Gibbs Rd  
Banjup, WA**

**BAL CONTOURS**

**FIGURE 5**



## 4. Identification of bushfire hazard issues

### 4.1 Bushfire context

The main bushfire risk to the proposed development is from a fire travelling east, west or north-west, predominantly through scrub vegetation located to the west, east and south of the project area. Forest and scrub vegetation will be retained as part of the Conservation Category Wetland located to the south-east of the project area, an ecological linkage (subject to further investigation) to the south and a Bush Forever site to the west. Maximum potential fire runs through this scrub and forest vegetation could be up to 700 m, however future urban development in this area may lead to fragmentation of the fire run.

Given the adjacent vegetation is to be retained in perpetuity, Strategen-JBSG considers this bushfire scenario to pose the principal bushfire risk to future assets of the project area, particularly should a bushfire occur in this area under standard morning conditions in summer associated with prevailing winds from the east, which has the potential to result in moderate to elevated levels of radiant heat and ember attack at the bushland interface. Therefore, bushfire management for the project area should focus on providing adequate hazard separation, in the form of APZs, increased building construction standards for individual lots where required in accordance with AS 3959, and vehicle access at the eastern, southern and western interfaces for resident/public egress and firefighter access.

It is acknowledged that the bushfire risk to the proposed development posed by these hazards can be managed through standard application of acceptable solutions under the Guidelines, as well as through a direct bushfire suppression response if required. Bushfire mitigation strategies applicable to the proposed development are addressed in Section 5 of this BMP.

### 4.2 Bushfire hazard issues

Examination of strategic development design in accordance with the Structure Plan and post-development bushfire hazard levels has identified the following bushfire hazard issues to be considered at future planning stages:

- A direct vegetation interface exists between proposed development around much of the perimeter of the project area, with key interfaces in the south and east with Class D scrub and Class A forest vegetation retained in the conservation areas. Future stages of planning are to ensure that sufficient separation exists for future habitable development to achieve BAL-29 or lower.
- Ensuring any POS and drainage areas to the east of the proposed urban development are created and maintained in a low threat state, or otherwise excludable under AS3959 Clause 2.2.3.2, to ensure sufficient APZ setbacks provided to achieve BAL-29. Setback distances will be determined at future planning stages (i.e. subdivision) through the development of a Landscaping Plan.
- Given the potential bushfire risk to the site, appropriate vehicular access is required for both egress by residents and public but also for firefighter access to, and around, the project area.
  - The internal vehicular access network will comply with the requirements of the Guidelines, with a focus on preventing trapping of the public or firefighters in a bushfire scenario.
  - Ensuring perimeter public roads are created at the main bushfire hazard interfaces to proposed habitable development to facilitate firefighter access to and around the development and to undertake bushfire fighting operations at these interfaces.

- Creation of an additional public road connection to Gibbs Road addresses a legacy non-compliance for the existing residential development to the west, by creating another vehicular access route from the area.
- Water supply for bushfire fighting operations will be critical to protection of development from bushfire impact.
  - A compliant reticulated water supply, complete with street hydrants, is proposed for the development.
- Given the location of the proposed development, resident bushfire awareness and preparation will be critical to ensuring appropriate response in a bushfire emergency, thereby reducing the burden on fire and emergency services.
  - A section on bushfire is to be included in the resident information package issued to all landowners upon purchase of their lot. This will include information on bushfire behaviour, building construction and APZ specifications, vehicular access, firebreak requirements and ongoing maintenance and housekeeping requirements for buildings and APZs. Additionally, information will also be provided on developing a bushfire survival plan for the residence including evacuation planning, and where to access information on bushfire status.

Based on the above, Strategen-JBS&G considers the bushfire hazards within and adjacent to project area and the associated bushfire risks are readily manageable through standard management responses outlined in the Guidelines and AS 3959. These responses have been factored in to proposed development as early as possible at all stages of the planning process to ensure a suitable, compliant and effective bushfire management outcome is achieved for protection of future life, property and environmental assets.

## 5. Assessment against bushfire protection criteria

### 5.1 Compliance table

An acceptable solutions assessment against the bushfire protection criteria is provided in Table 5.

**Table 5: Compliance with the bushfire protection criteria of the Guidelines**

Bushfire protection criteria	Method of compliance Acceptable solutions	Proposed bushfire management strategies
Element 1: Location	A1.1 Development location	<p>The post-development BHL assessment (Figure 4) identifies that on completion of development, all developable land will comprise either a Low or Moderate bushfire hazard level.</p> <p>A preliminary BAL contour assessment (depicted on Figure 5) has also been produced to assess the BAL impact across the proposed development and to review the anticipated level of compliance at future planning stages. The BAL contour assessment demonstrates that sufficient separation between unmanaged vegetation and all proposed lots can be implemented to achieve a rating of BAL-29 or lower which complies with Acceptable Solution A1.1.</p>
Element 2: Siting and design	A2.1 Asset Protection Zone	<p>APZs sufficient to achieve BAL — 29 are to be implemented for all lots subject to a BAL above BAL-LOW.</p> <p>The required APZs are to be identified at future planning stages based on future subdivision/development design and following a BAL contour assessment. As outlined above, a preliminary BAL contour assessment identifies all proposed lots are already located in BAL-29 or lower and have the capacity to achieve compliant APZs within the project area boundary including surrounding permanent low fuel roads and POS areas.</p> <p>APZs are to be implemented and maintained in accordance with Schedule 1 of the Guidelines (Appendix B) and the City's Firebreak and Fuel Hazard Reduction Notice (see Appendix E).</p>
Element 3: Vehicular access	A3.1 Two access routes	<p>A combination of existing public roads and the proposed internal vehicle access network will provide all occupants with the option of travelling to more than two different destinations:</p> <ul style="list-style-type: none"> <li>• connection to Gibbs Road at two points along the northern project area boundary providing the option of travelling east to Liddlelow Road, west towards Kwinana Freeway or north on Tapper Road into a residential built-up area</li> <li>• connection to Prosperity Loop at two points to the west of the development providing the option of travelling north to Gibbs Road, where travel is available west, north or east.</li> </ul> <p>In this regard, the proposed development is provided with at least two access routes which meets the requirements of Acceptable Solution A3.1. Additionally, no less than two access routes are to be provided during staging of development.</p>
	A3.2 Public road	<p>All public roads will be constructed to the relevant technical requirements of the Guidelines (see Appendix C).</p>

Bushfire protection criteria	Method of compliance Acceptable solutions	Proposed bushfire management strategies
	A3.3 Cul-de-sac (including a dead-end-road)	<p>No cul-de-sacs are proposed as part of the subdivision and the project area is not serviced by an existing cul-de-sac. The existing residential development to the west of this proposal is currently only served by a single connection to Gibbs Road, with a second to be provided following completion of this development, rectifying this legacy non-compliance.</p> <p>Currently no permanent cul-de-sacs are proposed; however if development and vehicular access construction is to be staged, any proposed temporary cul-de-sacs or any introduced into the subdivision design, are to be less than 200 m in length and constructed in accordance with the relevant technical requirements of the Guidelines (see Appendix C).</p>
	A3.4 Battle-axe	<p>No battle-axes are currently proposed as part of the subdivision and the project area is not serviced by an existing battle-axe. Should any battle-axes be proposed as part of future planning stages, they will be less than 600 m in length and will be constructed to relevant technical requirements under the Guidelines (see Appendix C), including passing bays at 200 m intervals and turn-around areas for fire appliances where battle-axes are longer than 500 m.</p>
	A3.5 Private driveway longer than 50 m	<p>The proposed lots are of size where all future habitable development will be located within 50 m of a public road. Should any private driveways exceed 50 m in length, they are to be constructed to the relevant technical requirements of the Guidelines (see Appendix C), including turn-around areas within 50 m of each building, passing bays if driveways are longer than 200 m and additional turn-around areas for fire appliances every 500 m.</p>
	A3.6 Emergency access way	<p>The proposed subdivision design does not require Emergency Access Ways (EAWs) to provide through access to a public road.</p> <p>Whilst no permanent emergency access ways (EAW) are proposed, if development and vehicular access construction is to be staged, any proposed temporary EAW is to be constructed to the relevant technical requirements of the Guidelines (see Appendix C).</p>
	A3.7 Fire service access routes (perimeter roads)	<p>The proposed subdivision design does not require fire service access routes (FSARs) to achieve access within and around the perimeter of the project area.</p> <p>Although no permanent fire service access routes (FSARs) are proposed; if development and construction of vehicular access is to be staged, any proposed temporary FSAR is to be constructed to the relevant technical requirements of the Guidelines (see Appendix C).</p>
	A3.8 Firebreak width	<p>Given that all lots will be cleared and developed, lot boundary firebreaks will not be required around the proposed residential lots. A perimeter firebreak will still be required around the undeveloped southern portion of the project area subject to further investigation, in accordance with the City's firebreak notice (refer Appendix F)</p>
Element 4: Water	A4.1 Reticulated areas	<p>The proposed development will be connected to reticulated water supply via surrounding development in accordance with Water Corporations Design Standard 63 requirements, complete with compliant street hydrants (refer to Appendix D).</p>

Bushfire protection criteria	Method of compliance Acceptable solutions	Proposed bushfire management strategies
	A4.2 Non-reticulated areas	Although the proposed development is to be provided with a compliant reticulated water supply, should this not be achievable, a non-reticulated water supply will need to be provided in accordance with the Guidelines.
	A4.3 Individual lots within non-reticulated areas (Only for use if creating 1 additional lot and cannot be applied cumulatively)	N/A

## **5.2 Additional management strategies**

Strategen-JBS&G makes the following additional bushfire management recommendations to inform ongoing planning stages of the development and increase the level of bushfire risk mitigation across the site.

### **5.2.1 On-site staging buffers**

If future development (and therefore clearing) is to occur on a staged basis, clearing in advance of adjacent areas may need to occur to ensure building construction is not inhibited by a temporary vegetation extent located within adjacent development stages yet to be cleared. This can be achieved by ensuring that each approved stage subject to construction is surrounded by a 100-m wide (or other width confirmed by an accredited bushfire practitioner), on-site cleared or low threat buffer prior to development (not including vegetation proposed to be retained). Once the buffers are created, they will need to be maintained on a regular and ongoing basis in accordance with AS 3959 Clause 2.2.3.2 (f) (including the management of grassland at 100 mm or lower) to achieve a low threat minimal fuel condition all year round until such time that the buffer area is developed as part of the next development stage. This will assist in managing the current on-site temporary vegetation hazards.

### **5.2.2 Staging of access**

If development (and therefore construction of vehicular access) is to occur on a staged basis, vehicular access arrangements will need to ensure that all occupiers and visitors are provided with at least two access routes at all stages. This can be achieved via construction of access in advance of stages or through provision of temporary emergency access ways until two formal access roads are available.

### **5.2.3 Fuel management within cleared vacant lots**

Cleared vacant lots are to be managed on a regular and ongoing basis by the developer until sale of lots after which time landowners will be responsible for ongoing management. Maintenance is to be in accordance with Clause 2.2.3.2 (f) of AS 3959 and Schedule 1 of the Guidelines (refer to Appendix B) and will involve slashing/mowing of grassland and weeds to height of less than 100 mm.

### **5.2.4 Road verge fuel management**

Existing and proposed road verges that have been excluded as low threat are to be managed to ensure the understorey and surface fuels remain in a low threat, minimal fuel condition in accordance with Clause 2.2.3.2 (f) of AS 3959. Management of proposed road verges is expected to be by the Developer initially, and the City following handover, while ongoing management of existing road verges management is the responsibility of the City.

### **5.2.5 Notification on title**

Notification is to be placed on the Title of proposed lots subject to BAL-12.5 or higher (either through condition of subdivision or other head of power) to ensure landowners/proponents and prospective purchasers are aware that their lot is subject to an approved BMP and BAL assessment; however, since the lot is situated within a designated bushfire prone area (at creation of title), the BAL for proposed buildings may, at the discretion of the City of Cockburn, need to be confirmed at the development application or building permit stage.

### **5.2.6 Building construction standards**

Future Class 1, 2, 3 and associated 10a buildings in areas subject to BAL-12.5 or higher are required to comply with the bushfire specific building construction requirements of AS 3959.

### **5.2.7 BMP compliance and/or individual lot BAL assessment at future stages**

A BMP compliance report will be prepared following completion of subdivisional works and prior to issue of title, to confirm the accuracy of BAL contour assessments and to validate that relevant management measures of this BMP have been implemented appropriately to achieve the intended bushfire management outcomes and compliance with bushfire protection criteria.

### **5.2.8 Landscaping Plan**

The BAL contour assessment depicted is reliant on all onsite landscaping, POS and drainage being excludable as low threat vegetation. A detailed landscaping design, in particular with regard to proposed POS and drainage areas, will be required at future planning stages to demonstrate how proposed vegetation will achieve this exclusion, or if any vegetation is required to be classified, how sufficient separation will be provided to achieve a compliant BAL outcome.

### **5.2.9 Compliance with annual firebreak notice**

The developer/land manager and prospective land purchasers are to comply with the current City of Cockburn annual firebreak notice as amended (refer to Appendix E).

### **5.2.10 Resident bushfire information**

Include a section relating to bushfire in the resident information package issued to all landowners upon purchase of their lot. This is to include information on bushfire behaviour, building construction and APZ specifications, vehicular access, firebreak requirements, ongoing maintenance and housekeeping requirements for buildings and APZs. Information on how to develop a bushfire survival plan should also be provided including evacuation planning, and where to access information on bushfire status.



## 6. Responsibilities for implementation and management of the bushfire measures

This BMP has been prepared as a strategic guide to demonstrate how development compliance will be delivered at future planning stages in accordance with the Guidelines. Aside from the preparation of future BMPs to accompany future subdivision and development applications where appropriate, there are no further items to implement, enforce or review at this strategic stage of the planning process.

Future BMPs prepared for subsequent subdivision and development applications are to meet the relevant commitments outlined in this strategic level BMP, address the relevant requirements of SPP 3.7 (i.e. Policy Measures 6.4 and 6.5 respectively) and demonstrate in detail how the proposed development will incorporate the relevant acceptable solutions or meet the performance requirements of the Guidelines. Future BMPs are to include the following detailed information:

- proposed lot layout, including any public open space (POS) and drainage areas
- detailed landscaping design/plans in regard to POS and drainage areas, consistent with the provisions of this BMP
- post development classified vegetation extent and effective slope
- BAL contour map demonstrating that proposed development areas will achieve BAL-29 or lower (may require designation of building envelopes)
- width and alignment of compliant APZs/setbacks
- confirmation of how bushfire management will be addressed during development staging
- proposed approach to fuel management or AS 3959 application in response to on-site POS
- vehicular access provisions, including demonstration that a minimum of two access routes will be achieved for each stage of development in accordance with Acceptable Solution A3.1
- water supply provisions with regards to reticulated water
- future requirements for any future vulnerable land uses, such as provision of a Bushfire Emergency Evacuation Plan (if relevant)
- future requirements for any future high-risk land uses, such as provision of a Bushfire Risk Management Plan (if relevant)
- provisions for notification on Title for any future lots with a rating of BAL-12.5 or greater as a condition of subdivision
- compliance requirements with the current City's annual firebreak notice as amended
- construction of Class 1, 2, 3 or associated 10a buildings in accordance with AS 3959 to the assessed BAL rating
- requirements for BMP/BAL compliance reports as conditions of subdivision
- compliance with performance principles of the bushfire protection criteria (where required)
- proposed implementation and audit program outlining all measures requiring implementation and the appropriate timing and responsibilities for implementation.

On the basis of the information contained in this BMP, Strategen-JBS&G considers the bushfire hazards both within and adjacent to the project area and the associated bushfire risks are readily manageable through standard management responses outlined in the Guidelines and AS 3959. Strategen-JBS&G considers that on implementation of the proposed management measures, the

project area will be able to be developed with a manageable level of bushfire risk whilst maintaining full compliance with the Guidelines and AS 3959.

## 7. References

- 360 Environmental 2020, *Local Structure Plan: Environmental Assessment Report*, 360 Environmental, Leederville, Perth
- Department of Fire and Emergency Services (DFES) 2021, *Map of Bush Fire Prone Areas*, [Online], Government of Western Australia, available from:  
<http://www.dfes.wa.gov.au/regulationandcompliance/bushfireproneareas/Pages/default.aspx>.
- Department of Planning (DoP) 2016, *Visual guide for bushfire risk assessment in Western Australia*, Department of Planning, Perth, WA.
- Standards Australia (SA) 2018, *Australian Standard AS 3959–2018 Construction of Buildings in Bushfire-prone Areas*, Standards Australia, Sydney.
- Western Australian Planning Commission (WAPC) 2015, *State Planning Policy 3.7 Planning in Bushfire-Prone Areas*, Western Australian Planning Commission, Perth.
- Western Australian Planning Commission (WAPC) 2017, *Guidelines for Planning in Bushfire-Prone Areas*, Western Australian Planning Commission, Perth.

## 8. Limitations

### Scope of services

This report ("the report") has been prepared by Strategen-JBS&G in accordance with the scope of services set out in the contract, or as otherwise agreed, between the Client and Strategen-JBS&G. In some circumstances, a range of factors such as time, budget, access and/or site disturbance constraints may have limited the scope of services. This report is strictly limited to the matters stated in it and is not to be read as extending, by implication, to any other matter in connection with the matters addressed in it.

### Reliance on data

In preparing the report, Strategen-JBS&G has relied upon data and other information provided by the Client and other individuals and organisations, most of which are referred to in the report ("the data"). Except as otherwise expressly stated in the report, Strategen-JBS&G has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report ("conclusions") are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. Strategen-JBS&G has also not attempted to determine whether any material matter has been omitted from the data. Strategen-JBS&G will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to Strategen-JBS&G. The making of any assumption does not imply that Strategen-JBS&G has made any enquiry to verify the correctness of that assumption.

The report is based on conditions encountered and information received at the time of preparation of this report or the time that site investigations were carried out. Strategen-JBS&G disclaims responsibility for any changes that may have occurred after this time. This report and any legal issues arising from it are governed by and construed in accordance with the law of Western Australia as at the date of this report.

### Environmental conclusions

Within the limitations imposed by the scope of services, the preparation of this report has been undertaken and performed in a professional manner, in accordance with generally accepted environmental consulting practices. No other warranty, whether express or implied, is made.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

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## Appendix A Site Photographs



Photo ID: 1a



Photo ID: 1b

<b>Plot number</b>		Plot 1
<b>Vegetation classification</b>	<b>Pre-development</b>	Class D Scrub
	<b>Post-development</b>	Class D Scrub
<b>Description / justification</b>		Banksia dominated scrub with vegetation height less than 6 m height

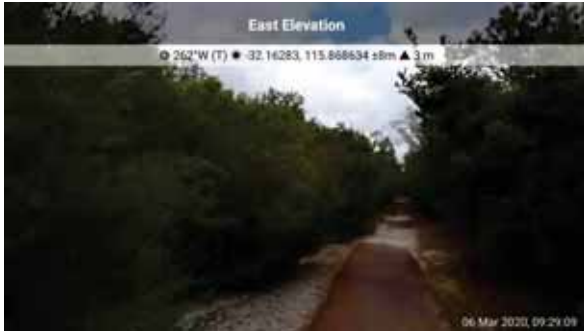


Photo ID: 2a



Photo ID: 2b



Photo ID: 2c



Photo ID: 2d



Photo ID: 2e



Photo ID: 2f

<b>Plot number</b>		Plot 2
<b>Vegetation classification</b>	<b>Pre-development</b>	Class D Scrub
	<b>Post-development</b>	Class D Scrub
<b>Description / justification</b>		Banksia dominated scrub with vegetation height less than 6 m height

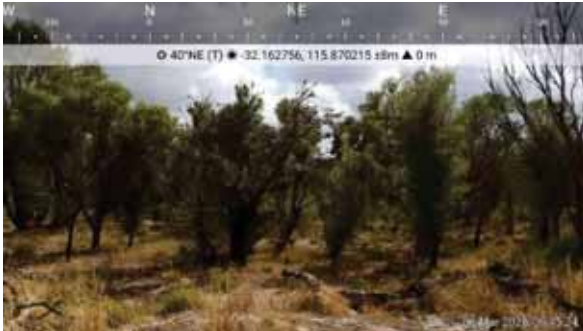


Photo ID: 2g



Photo ID: 2h



Photo ID: 2i



Photo ID: 2j



Photo ID: 2k

<b>Plot number</b>		Plot 2
<b>Vegetation classification</b>	Class B Woodland	Class D Scrub
	Class B Woodland	Class D Scrub
<b>Description / justification</b>	Banksia dominated scrub with vegetation height less than 6 m height	



Photo ID: 3a

<b>Plot number</b>		Plot 3
<b>Vegetation classification</b>	<b>Pre-development</b>	Class D Scrub
	<b>Post-development</b>	Class D Scrub
<b>Description / justification</b>		Banksia dominated scrub with vegetation height less than 6 m height





Photo ID: 4a



Photo ID: 4b

Plot number	Plot 4	
Vegetation classification	Pre-development	Class A Forest
	Post-development	Class A Forest
Description / justification	Forest vegetation dominated by banksia with a multi-tiered fuel structure including a shrubby understorey, scrub mid-storey and eucalypt overstorey.	



Photo ID: 5a



Photo ID: 5b

Plot number	Plot 5	
Vegetation classification	Pre-development	Class D Scrub
	Post-development	Class D Scrub
Description / justification	Scrub vegetation in small drainage basin	



Photo ID: 6a

<b>Plot number</b>	Plot 6	
<b>Vegetation classification</b>	<b>Pre-development</b>	Class B Woodland
	<b>Post-development</b>	Class B Woodland
<b>Description / justification</b>	Mature trees with grassy understorey	



Photo ID: 9a



Photo ID: 9b



Photo ID: 9c



Photo ID: 9d



Photo ID: 9e

<b>Plot number</b>		Plot 9
<b>Vegetation classification</b>	<b>Pre-development</b>	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])
	<b>Post-development</b>	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])
<b>Description / justification</b>		Non-vegetated areas (i.e. buildings, roads, mulched road verges, mineral earth firebreaks, driveways, carparks) and low threat vegetation (i.e. manicured lawns, managed gardens, slashed road verges).



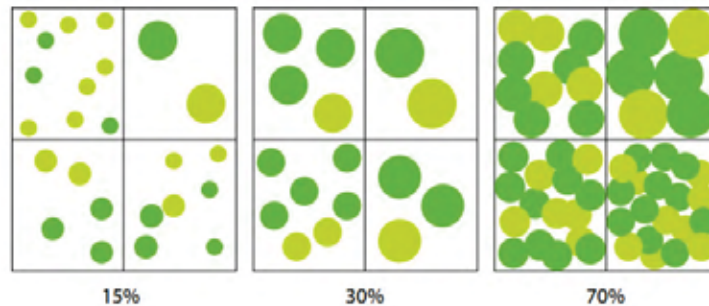
Photo ID: 10a

<b>Plot number</b>	Plot 10	
<b>Vegetation classification</b>	<b>Pre-development</b>	Class D Scrub
	<b>Post-development</b>	Modified to non-vegetated (exclusion 2.2.3.2 [e]) and/or low threat (exclusion 2.2.3.2 [f]) state
<b>Description / justification</b>	Area to be modified to a low threat state.	

## Appendix B APZ standards (Schedule 1 of the Guidelines)


### Schedule 1: Standards for Asset Protection Zones

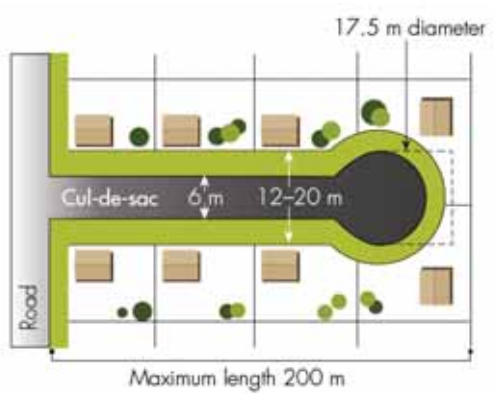
- **Fences:** within the APZ are constructed from non-combustible materials (e.g. iron, brick, limestone, metal post and wire). It is recommended that solid or slatted non-combustible perimeter fences are used.
- **Objects:** within 10 metres of a building, combustible objects must not be located close to the vulnerable parts of the building i.e. windows and doors.
- **Fine Fuel load:** combustible dead vegetation matter less than 6 millimetres in thickness reduced to and maintained at an average of two tonnes per hectare.
- **Trees (> 5 metres in height):** trunks at maturity should be a minimum distance of 6 metres from all elevations of the building, branches at maturity should not touch or overhang the building, lower branches should be removed to a height of 2 metres above the ground and or surface vegetation, canopy cover should be less than 15% with tree canopies at maturity well spread to at least 5 metres apart as to not form a continuous canopy.



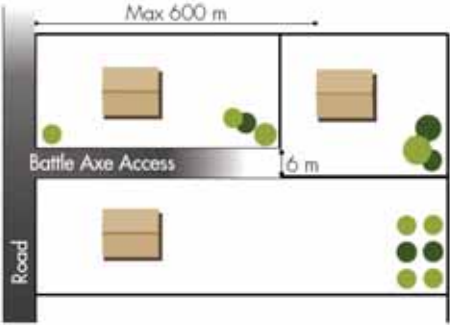
- **Shrubs (0.5 metres to 5 metres in height):** should not be located under trees or within 3 metres of buildings, should not be planted in clumps greater than 5m<sup>2</sup> in area, clumps of shrubs should be separated from each other and any exposed window or door by at least 10 metres. Shrubs greater than 5 metres in height are to be treated as trees.
- **Ground covers (<0.5 metres in height):** can be planted under trees but must be properly maintained to remove dead plant material and any parts within 2 metres of a structure, but 3 metres from windows or doors if greater than 100 millimetres in height. Ground covers greater than 0.5 metres in height are to be treated as shrubs.
- **Grass:** should be managed to maintain a height of 100 millimetres or less.

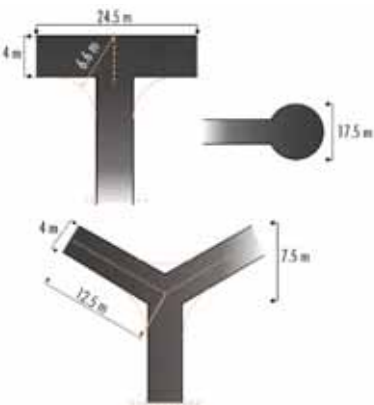
## Appendix C Vehicular access technical standards of the Guidelines

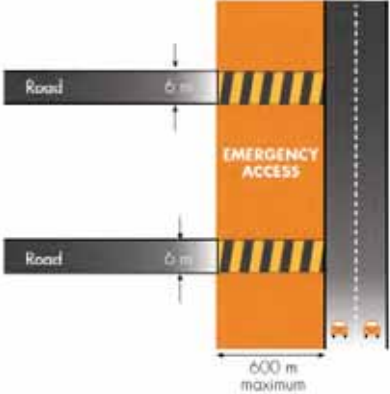
Public roads	
Acceptable solution A3.2	A public road is to meet the requirements in Table 1, Column 1.
Explanatory note E3.2	<p>Trafficable surface: Widths quoted for access routes refer to the width of the trafficable surface. A six metre trafficable surface does not necessarily mean paving width. It could, for example, include four metre wide paving one metre wide constructed road shoulders. In special circumstances, where eight lots or less are being serviced, a public road with a minimum trafficable surface of four metres for a maximum distance of 90 metres may be provided subject to the approval of both the local government and Department of Fire and Emergency Services.</p> <p>Public road design: All roads should allow for two-way traffic to allow conventional two-wheel drive vehicles and fire appliances to travel safely on them.</p>  <p>The diagram illustrates a road cross-section. It shows a central paved area that is 4 meters wide, with a 1-meter shoulder on both the left and right sides. A total height clearance of 4 meters is indicated on the left side. A red fire truck and a blue car are shown driving on the road. Trees are depicted on both sides of the road.</p>

Cul-de-sac (including a dead-end road)	
Acceptable solution A3.3	<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), the following requirements are to be achieved:</p> <ul style="list-style-type: none"> <li>• Requirements in Table 1, Column 2</li> <li>• Maximum length: 200 metres (if public emergency access is provided between cul-de-sac heads maximum length can be increased to 600 metres provided no more than eight lots are serviced and the emergency access way is no more than 600 metres)</li> <li>• Turn-around area requirements, including a minimum 17.5 metre diameter head.</li> </ul>
Explanatory note E3.3	<p>In bushfire prone areas, a cul-de-sac subdivision layout is not favoured because they do not provide access in different directions for residents. In some instances it may be possible to provide an emergency access way between cul-de-sac heads to a maximum distance of 600 metres, so as to achieve two-way access. Such links must be provided as right of ways or public access easements in gross to ensure accessibility to the public and fire services during an emergency. A cul-de-sac in a bushfire prone area is to connect to a public road that allows for travel in two directions in order to address Acceptable Solution A3.1.</p> <div style="text-align: center;">  <p>The diagram illustrates a cul-de-sac layout. On the left, a vertical road is labeled 'Road'. A horizontal road, labeled 'Cul-de-sac', branches off to the right. The width of this cul-de-sac is indicated as 6m. The cul-de-sac continues for a length of 12-20m before ending in a circular turn-around area with a diameter of 17.5m. The total length of the cul-de-sac from the main road to the end of the turn-around area is labeled as 'Maximum length 200 m'. The diagram also shows several residential lots (represented by brown rectangles) and trees (represented by green circles) along the cul-de-sac.</p> </div>



Battle-axe	
Acceptable solution A3.4	<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) all of the following requirements are to be achieved:</p> <ul style="list-style-type: none"> <li>• Requirements in Table 1, Column 3</li> <li>• Maximum length: 600 metres</li> <li>• Minimum width: six metres.</li> </ul>
Explanatory note E3.4	<p>In bushfire prone areas, lots with battle-axe access legs should be avoided because they often do not provide two-way access and egress for residents and may be easily blocked by falling trees or debris. In some instances, however; it may be appropriate for battle-axe access to be used to overcome specific site constraints. Where used, they should comply with the minimum standards for private driveways.</p> <p>Passing bays should be provided at 200 metre intervals along battle-axe access legs to allow two-way traffic. The passing bays should be a minimum length of 20 metres, with the combined width of the passing bay and the access being a minimum of six metres.</p> <p>Turn-around areas should allow type 3.4 fire appliances to turn around safely (i.e. kerb to kerb 17.5 metres) and should be available at house sites and at 500 metre intervals along the access leg.</p> <div style="text-align: center;">  </div>

<b>Private driveway longer than 50 metres</b>	
Acceptable solution A3.5	<p>A private driveway is to meet all of the following requirements:</p> <ul style="list-style-type: none"> <li>Requirements in Table 1, Column 3</li> <li>Required where a house site is more than 50 metres from a public road</li> <li>Passing bays: every 200 metres with a minimum length of 20 metres and a minimum width of two metres (i.e. the combined width of the passing bay and constructed private driveway to be a minimum six metres)</li> <li>Turn-around areas designed to accommodate type 3.4 fire appliances and to enable them to turn around safely every 500 metres (i.e. kerb to kerb 17.5 metres) and within 50 metres of a house</li> <li>Any bridges or culverts are able to support a minimum weight capacity of 15 tonnes</li> <li>All-weather surface (i.e. compacted gravel, limestone or sealed).</li> </ul>
Explanatory note E3.5	<p>For a driveway shorter than 50 metres, fire appliances typically operate from the street frontage however where the distance exceeds 50 metres, then fire appliances will need to gain access along the driveway in order to defend the property during a bushfire. Where house sites are more than 50 metres from a public road, access to individual houses and turnaround areas should be available for both conventional two-wheel drive vehicles of residents and type 3.4 fire appliances.</p> <p>Turn-around areas should be located within 50 metres of a house. Passing bays should be available where driveways are longer than 200 metres and turn-around areas in driveways that are longer than 500 metres. Circular and loop driveway designs may also be considered. These criteria should be addressed through subdivision design.</p> <p>Passing bays should be provided at 200 metre intervals along private driveways to allow two-way traffic. The passing bays should be a minimum length of 20 metres, with the combined width of the passing bay and the access being a minimum of six metres.</p> <p>Turn-around areas should allow type 3.4 fire appliances to turn around safely (i.e. kerb to kerb 17.5 metres) and should be available at the house sites and at 500 metre intervals along the driveway.</p> <div style="text-align: center; margin-top: 20px;">  </div>

Emergency access way	
Acceptable solution A3.6	<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 all of the following requirements:</p> <ul style="list-style-type: none"> <li>• Requirements in Table 1, Column 4</li> <li>• No further than 600 metres from a public road</li> <li>• Provided as right of way or public access easement in gross to ensure accessibility to the public and fire services during an emergency</li> <li>• Must be signposted.</li> </ul>
Explanatory note E3.6	<p>An emergency access way is not a preferred option however may be used to link up with roads to allow alternative access and egress during emergencies where traffic flow designs do not allow for two-way access. Such access should be provided as a right-of-way or easement in gross to ensure accessibility to the public and fire emergency services during an emergency.</p> <p>The access should comply with minimum standards for a public road and should be signposted. Where gates are used to control traffic flow during non-emergency periods, these must not be locked. Emergency access ways are to be no longer than 600 metres and must be adequately signposted where they adjoin public roads.</p> <p>Where an emergency access way is constructed on private land, a right of way or easement in gross is to be established.</p> <div style="text-align: center;">  </div>

<b>Fire service access routes (perimeter roads)</b>	
Acceptable solution A3.7	<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 firefighting purposes. Fire service access routes are to meet the following requirements:</p> <ul style="list-style-type: none"> <li>• Requirements in Table 1, Column 5</li> <li>• Provided as right of ways or public access easements in gross to ensure accessibility to the public and fire services during an emergency</li> <li>• Surface: all-weather (i.e. compacted gravel, limestone or sealed)</li> <li>• Dead end roads are not permitted</li> <li>• Turn-around areas designed to accommodate type 3.4 appliances and to enable them to turn around safely every 500 metres (i.e. kerb to kerb 17.5 metres)</li> <li>• No further than 600 metres from a public road</li> <li>• Allow for two-way traffic</li> <li>• Must be signposted.</li> </ul>
Explanatory note E3.7	<p>Fire service access routes should be established to separate bushfire prone areas from developed areas, and to provide access within and around the edge of subdivisions and related development. Fire service access is used during bushfire suppression operations but can also be used for fire prevention work. Fire service access routes should:</p> <ul style="list-style-type: none"> <li>• Link up with the road network at regular intervals - the development and road network forms part of the fire service access system</li> <li>• Be adequately signposted</li> <li>• Allow for two-way traffic - that is, two fire appliances must be able to safely pass each other</li> <li>• Have an all-weather surface (i.e. compacted gravel, limestone or sealed)</li> <li>• Have erosion control measures in place.</li> </ul> <p>Driveways may be used as part of the designated fire service access system, provided they meet the minimum standard for fire service access routes. It is beneficial to link the fire service access routes with individual driveways to allow quick access to properties and houses during fire emergencies.</p> <p>Where gates are used, these should be wide enough to accommodate type 3.4 fire appliances (minimum width of 3.6m) with the design and construction to be approved by the relevant local government. Gates on fire service access routes may be locked to restrict access provided that a common key system is used and such keys are made available for fire appliances and designated fire officers within the local government area and/or surrounding district. Gates should be installed where fences cross fire service access routes.</p> <p>Management and access arrangements should be in place to ensure that the maintenance of fire service access routes will occur in the long term after an area has been subdivided. A number of options can be used to achieve this, including but not limited to:</p> <ul style="list-style-type: none"> <li>• Individual property owners being responsible for maintaining fire service access routes where these fall on their property</li> <li>• Providing such access as a right-of-way or easement in gross to ensure accessibility to fire services during an emergency; and/or</li> <li>• A levy system administered by local government to cover the cost of maintaining fire service access routes.</li> </ul> <p>Such arrangements should be documented in the relevant planning application (such as a structure plan, subdivision plan or development plan) and should be agreed to by local government.</p>

Technical requirement	1	2	3	4	5
	Public road	Cul-de-sac	Private driveway longer than 50 m	Emergency access way	Fire service access routes
Minimum trafficable surface (m)	6*	6	4	6*	6*
Horizontal distance (m)	6	6	6	6	6
Vertical clearance (m)	4.5	N/A	4.5	4.5	4.5
Maximum grade <50 m	1 in 10	1 in 10	1 in 10	1 in 10	1 in 10
Minimum weight capacity (t)	15	15	15	15	15
Maximum crossfall	1 in 33	1 in 33	1 in 33	1 in 33	1 in 33
Curves minimum inner radius	8.5	8.5	8.5	8.5	8.5

\* Refer to E3.2 Public roads: Trafficable surface

## Appendix D Water technical standards of the Guidelines

Reticulated areas	
Acceptable solution A4.1	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.
Explanatory note E4.1	Water supply authorities in Western Australia include the Water Corporation, Aqwest and the Busselton Water Board. The Water Corporation's 'No. 63 Water Reticulation Standard' is deemed to be the baseline criterion for developments and should be applied unless local water supply authorities' conditions apply.

Non-reticulated areas	
Acceptable solution A4.2	Water tanks for firefighting purposes with a hydrant or standpipe are provided and meet the following requirements: <ul style="list-style-type: none"> <li>• Volume: minimum 50,000 litres per tank</li> <li>• Ratio of tanks to lots: minimum one tank per 25 lots (or part thereof)</li> <li>• Tank location: no more than two kilometres to the further most house site within the residential development to allow a 2.4 fire appliance to achieve a 20 minute turnaround time at legal road speeds</li> <li>• Hardstand and turn-around areas suitable for a type 3.4 fire appliance (i.e. kerb to kerb 17.5 metres) are provided within three metres of each water tank</li> <li>• Water tanks and associated facilities are vested in the relevant local government.</li> </ul>
Explanatory note E4.2	A procedure must be in place to ensure that water tanks are maintained at or above the designated capacity, including home tanks on single lots, at all times. This could be in the form of an agreement with the local government and the fire service.

## Appendix E BMP Peer Review

# Peer Review

Structure Plan for Subdivision  
Lots 11 and 74, Beenyup Road, Banjup

Client –City of Cockburn

28 October 2020



# Expert Details

## Name and Address

Name: Anthony Rowe  
Title: Principal Bushfire Consultant  
Company: Envision Bushfire Protection  
Address: 124 Derby Road Shenton Park  
Email: admin@envisionbp.com.au  
Telephone: 0428 066 147

## Qualifications

### Tertiary qualifications:

- Bachelor's degree in planning (1984) from the University of South Australia
- Post Graduate qualification in Urban and Regional Planning (1988) from the University of South Australia
- Master's in business administration (1995)
- Post Graduate qualification in Bushfire Protection (2017) from the University of Western Sydney.

### Professional recognitions:

- Registered Practicing Planner from the Planning Institute of Australia (BPAD 36690)
- Minister's Bushfire Protection Accreditation Scheme Level 3, administered by the Fire Protection Association Australia, valid December 2020 (renewed annually)

## Skills and Expertise

### Bushfire planning and design

- I have 30 years' experience in the administration of planning legislation including the administration of the *Planning and Development Act 2005*, and *Building Act 2011*, and their equivalents in South Australia.
- I am a member of the Fire Protection Association Australia (FPA) Working Party (WA) contributing advice on the operation of the Western Australia Bushfire Risk Management Framework.
- I have provided training to local government and local government planners, at the invitation of the West Australian Local Government Association, the Fire Protection Association Australia, and the National Bushfire Hazards Cooperative Research Centre (CRC).

## Preparation

In preparing this advice I have considered

Administrative references:

- Planning and Development Act 2005
- The Planning and Development Regulations 2009
- Planning and Development (Local Planning Schemes) Regulation 2015
- The map of bushfire prone areas
- State Planning Policy 3.4 Natural Hazards and Disasters
- State Planning Policy 3.7 Planning in Bushfire Prone Area December 2015 (**SPP 3.7**)
- Guidelines for Planning in Bushfire Prone Areas Version 1.3 December 2017 (**the Guidelines**)
- The Department of Planning visual guide for bushfire risk assessment in Western Australia Reference tool for Level 1 Bushfire Attack Level Assessors February 2016
- WAPC Position Statement: Planning in bushfire prone areas – Demonstrating Element 1: Location and Element 2: Siting and design – November 2019
- The Department of Planning **BMP Template** to support a Bushfire Hazard Level (BHL) assessment for strategic planning proposals
- Australian Standard Construction of buildings in bushfire prone areas AS3959:2009
- Australian Standard Construction of buildings in bushfire prone areas AS3959:20189 (**the Standard**)
- Metropolitan Regional Planning Scheme (**the MRS**)
- The City of Cockburn Planning Scheme (**the local planning scheme**)
- HARMANIS HOLDINGS NO. 2 PTY LTD and WESTERN AUSTRALIAN PLANNING COMMISSION [2019] WASAT 43

Planning assessment:

- Aigle Royal Developments Bushfire Management Plan (Subdivision Application) Lots 11 and 74, Beenyup Road, Banjup 24 April 2020 ,58534/128,132 (Rev 0), JBS&G Australia Pty Ltd T/A Strategen-JBS&G (**the BMP**)
- The Department of Fire and Emergency Services (DFES) referral comments 12 June 2020
- JBS&G Australia reply to (DFES) referral comments 13 July 2020
- The Department of Fire and Emergency Services (DFES) referral comments 8 October 2020

## Client Relationship

The Planning and Development Regulations 2009, at regulation 49, provides in the additional costs and expenses payable by applicants the costs and expenses of any specific assessment, and the costs and expenses of specialist advice in relation to the application.

I have been engaged by Aigle Royal Developments to report to the City of Cockburn following Planning and Development Regulations 2009 at regulation 49(e).

My involvement in this matter is limited to my objective review (Peer Review) following Planning and Development Regulations 2009 at regulation 49(e).

I have no private, personal or other interest in this matter that has influenced the content of this advice.

## Site inspection

In preparing this review I inspected the site on 26 October 2020.

## Declaration

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

Signature:



Name: Anthony Rowe

Envision Bushfire Protection

Date: 28 October 2020

BPAD Accreditation: BPAD no. 36690

# 1 Introduction

Aigle Royal Developments have submitted a Bushfire Management Plan (BMP) to support a local structure plan leading to the future subdivision of Lots 11 and 74, Beenyup Road, Banjup (the project area). The project area is located in the City of Cockburn (the City). The project area includes the development site (where the lots are to be created), and adjoining area 150 m from the development site.

The project area is located in a bushfire prone area (Map of Bush Fire Prone Areas OBRM 2019). All strategic planning proposals, subdivisions and development applications within an area identified as bushfire prone are subject to consideration under the Planning and Development Act 2005 and State Planning Policy 3.7 – Planning in Bushfire Prone Areas (SPP 3.7) and the Guidelines for Planning in Bushfire Prone Areas Version 1.3 (the Guidelines) (WAPC and DFES 2017).

The development site comprises an elongated parcel of land approximately 120 m along Gibbs Road at its north boundary and extending 600 m south. The development site is an urban interface with vegetation, classified as a bushfire threat, west (portion 40%), south and east of the site. The site is to be developed for medium residential development R30 and R60.

It features a perimeter road and includes two parcels of Geomorphic wetland to be set aside as public open space (POS) and a southern portion to be contributed to an ecological corridor north of the public accessway that will join the Conservation Category Wetland (CCW) with the Jandakot Regional Park.

SPP 3.7, does not require that there be no increase at all in the threat of bushfire to people property or infrastructure, but instead, the intention is to 'implement effective, risk based land use planning and development to preserve life and reduce the impact of bushfire on property and infrastructure'.

The BMP was referred to the Department of Fire and Emergency Services. A copy of its advice 12 June 2020 is attached. In summary DFES did not support the classification of the vegetation in the project area (Plots 1, 2, 3 and 4), immediate to the development site, as Woodland, instead suggesting it is Forest. The classification determines the inputs (bushfire fuels and structure) used to determine the bushfire behaviour and intensity (risk), and in response the required building setbacks and building construction requirements (risk treatments). Forest is reflective of a high bushfire intensity and a further distance from forest is required (than from other vegetation classifications) to achieve an acceptable construction level of BAL-29. On this basis DFES contend the BAL contour ratings are underestimated.

In response to the DFES advice, the applicant replied 13 July 2020 to the City of Cockburn to reaffirm its assessment, but in its response suggesting the classification was conservative as Woodland and that a classification of Scrub, a minorly reduced intensity, is most reflective of the conditions.

The City referred the matter to DFES. The subsequent DFES advice October 2020 reaffirmed its previous advice.

The City subsequently reflected the following concerns to the applicant

*The Department of Fire and Emergency Services (DFES), as initially indicated by you at the start of the structure planning process, have objected to the proposal, with the following key matters raised:*

- *Technical concerns regarding the Bushfire Management Plan - DFES do not support the assumptions made within the Bushfire Management Plan, in particular the methodology used to classify vegetation pursuant to the State Planning Policy 3.7. DFES indicate that there is insufficient evidence to support the classification of vegetation and as such require modification to the Bushfire Management Plan. Informing*

*the BAL contours, should the vegetation be incorrect, the assumption of BAL-29 is not supported. As such, the City has inferred that the BAL rating may be of greater impact than indicated within the BMP, and as such, may not be able to comply with AS 3959.*

- *Of key concern, DFES has indicated objection towards the subdivision of Lot 74 at all, as in their view, the lot presents an unreasonable level of risk to life and property. The subject lot is surrounded by significant bush fire risk on all three sides of development. It is difficult to see how this can be re-designed. The City considers that the level of modifications required to satisfy DFES present a fatal flaw in support of the structure plan design in its current form, and that likely modifications to address these concerns would trigger the need for additional advertising and a revised approach.*

The paragraph was not evident in the DFES comments but is understood to be a city concern in relation to other initiatives affecting Lot 74.

The purpose of a Peer assessment is to provide an independent review of the proposal for its compliance with SPP 3.7 and in particular the bushfire protection criteria element as they follow the Policy Intent, the Policy Objectives and the Policy Measures (provided in SPP 3.7). Given the context for the issues raised by DFES and the City, particular consideration will be given to Element 1 'Location' and orderly and proper planning in relation to the City concern regarding Lot 74. Consideration will also be given to the vegetation classification in relation to the advice from DFES and in turn compliance with Element 2 'Siting and design'. This has included site inspection and photographic evidence. The review will also assess the proposal's compliance with the technical requirement in Element 3, 'Vehicle Access' and compliance with Element 4 'Water' and observations.

## 2 ASSESSMENT

The assessment of a Structure Plan, (MRS Amendment?) as opposed to higher order strategic planning proposals, is to ensure (provide guidance) that the future subdivision and development applications can achieve compliance with the bushfire protection criteria; the four Elements described in the Guidelines at Appendix 4.

### ELEMENT 1: LOCATION

Intent: 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

### ELEMENT 2: SITING AND DESIGN OF DEVELOPMENT

Intent: To ensure that the siting and design of development minimises the level of bushfire impact

### ELEMENT 3: VEHICULAR ACCESS

Intent: To ensure that the vehicular access serving a subdivision/development is available and safe during a bushfire event

### ELEMENT 4: WATER

Intent: To ensure that water is available to the subdivision, development, or land use to enable people, property and infrastructure to be defended from bushfire

Bushfire Protection Criteria under each element provides acceptable solutions as one predetermined way the Intent may be met. Each Element also enables 'alternative solutions' guided by a 'performance principle' that can demonstrate the Intent will be achieved.

## 2.1 Element 1

The City has expressed concern regarding the appropriate development of lot 74, and the fundamental suitability of this section from a consideration of orderly and proper planning and SPP 3.4. Natural Hazards and Disasters.

The WAPC, in order to clarify the consideration of the word 'area' following HARMANIS HOLDINGS NO. 2 PTY LTD and WESTERN AUSTRALIAN PLANNING COMMISSION [2019] WASAT 43, and confusion regarding the difference between Element 1, introduced the Position Statement Planning in bushfire prone areas – Demonstrating Element 1: Location and Element 2: Siting and design – November 2019

The Position Statement clarified that the consideration was applicable to higher order strategic documents, where the area context would be considered together with strategic infrastructure networks. Subdivision and development applications should demonstrate a developable area that can achieve BAL-29 within the site.

In this instance the relevant higher order strategic document is the MRS.

As a general approach expansion into 'extreme' (Appendix 2 method from the Guidelines) bushfire hazard level areas is to be avoided and it is desirable to minimise the surface area ratio.

Orderly expansions from urban areas where the risk is from one aspect can have a positive benefit of putting contemporary bushfire resistant construction in line of the approaching bushfire; instead of buildings vulnerable to bushfire attack. As an expansion from an existing urban area it can offer safe access into the urban area in the opposite

direction of the firefront. Services to assist suppression are also located close by, including a reticulated water supply, the close location of emergency services for intervention, and community presence, that may attend after the first passing to extinguish small fires, that might otherwise ignite a house. These things all assist to minimise the impact of bushfire and the penetration of bushfire into the urban area.

The MRS as the higher order strategic document has allocated the subject site for urban development. As such it is treated as a legacy, notwithstanding the introduction of the of the bushfire reforms, and within the present hierarchy of documents and the consideration at hand, Element 2 and the mitigation of bushfire impacts through setbacks, perimeter road access and water supply are the applicable considerations.

The proposal is compliant with the Position Statement Planning in bushfire prone areas – Demonstrating Element 1: Location and Element 2: Siting and design – November 2019.



**Plate 1: Metropolitan Regional Scheme. The development site illustrated as urban deferred, bordered by urban (west and north), rural east and Bush forever area (west) and south**

## Element 2

Whilst this Peer Review has undertaken a separate assessment, for context some comment is made on the BMP and the DFES comments, as it relates to the classification of the adjacent vegetation, and in turn the outcome of this assessment.

The Plots in contention are Plots 1, 2, 3 (Woodland classification) and Plot 4 (forest extent). Plot 6 is outside of 100 m and separated from the subject site by urban development. It has little relevance to the intensity of a fire arriving at the site. It is part of the larger Jandakot Reserve which could contribute to embers arriving at the site, but it is not in itself considered influential. The consideration of Plot 6 is not required to be considered further.

It is noted the BMP has relied upon the Environmental Assessment Report (dated April 2020) prepared by 360 Environmental, and notably the classification of Banksia Woodlands. In the BMPs vegetation classification, it references the findings were derived through an on-ground verification on 6 March 2020 in accordance with AS 3959:2018 and the Visual Guide for Bushfire Risk Assessment in Western Australia (DoP 2016).

The BMP findings based upon this methodology were that Plot 1, 2, 3 are classified as Woodland. The applicant's reply 13 July 2020 identified the consideration of Scrub when it had made its assessment, but it chose the more conservative classification of Woodland (requiring longer setbacks than required for Scrub).

It is important to understand that AS 3959:2009 was replaced by AS3959:2018, and significant amongst its changes was the classifications for Forest, Woodland and Scrub. It also clarified the practice for the determination of vegetation, explicitly removing the references to 'worst case' instead placing an emphasis 'to ensure that a sufficient level of distance is used to determine the predominant vegetation', the basis being to understand the bushfire behaviour rather than individual exception that will not affect the overall behaviour, either to overestimate or underestimate the risk. It is no longer appropriate to find the worst example, as the basis to broadly assume a fire behaviour. Allowance is also to be made to recent changes that may affect the steady state of the vegetation observed. Account should be made for recent fires and the process of regeneration. The observation of tree skeletons and reference to historical photos, as well as the consideration of future land use should also be used to inform the classification.

Prior to the operation of AS3959:2018, the definition in standard and accompanying diagrams supported a wide application of the classification of Woodland, and this was reflected in the Visual Guide for Bushfire Risk Assessment in Western Australia (DoP 2016). With the changes to the description and diagrammatic representation in AS3959:2018 some aspects previously identified as Woodland were placed under the category of Forest, and other aspects were placed under Scrub. Woodland became narrowed to sparsely separate trees up to 30% foliage cover over a grassy understorey.

Scrub in turn was broadened to be a dense cover up to 6 m in height. The images in the Visual Guide for Bushfire Risk Assessment in Western Australia (DoP 2016) are no longer relevant to the definition and diagrams for Woodland in AS3959:2018 but are now a closer approximation of Scrub in AS3959:2018, and of Banksia Woodland.

An ecologist's definition of Woodland (as a profession) has now departed from the definition of Woodland provided in AS3959:2018 for bushfire purposes.

The definitions for each type from AS3959:2018 is provided below.

*Forest: Trees over 30 m high; 30%-70% foliage cover (may include understorey of sclerophyllous low trees or shrubs). Typically dominated by eucalypts, melaleuca or callistemon (may include riverine and wetland environments) and callitris. Includes eucalypt plantations.*

*Woodland: Trees 10 m - 30 m high; 10% - 30% foliage cover dominated by eucalypts and/or callitris with a prominent grassy understorey. May contain isolated shrubs.*

*Scrub: Found in wet areas and/or areas affected by poor soil fertility or shallow soils; >30% foliage cover. Dry heaths occur in rocky or sandy areas. Shrubs >2 m high. Typical of coastal areas and tall heaths up to 6 m in height. May be dominated by **Banksia**, Melaleuca or Leptospermum with heights of **up to 6 metres***

An inspection of the development site was undertaken on 26 October 2020. Photographic evidence was taken at 50 m intervals, a Nikon Forestry Pro was used to measure the slope under vegetation, and a 2 m measuring stick was used as a visual guide to height.

The results have been mapped with the geo referenced photo locations and this is attached in appendix A.

It was generally observed that the Conservation Category Wetland (CCW) area to the east of the subject land was level and contained trees between 8 m -15 m; with a foliage cover greater than 30% and having an elevated understorey. This area corresponds to a Forest (it comprises Plot 4 but it is a larger area than mapped in the BMP). Outside the



Conservation Category Wetland (CCW) area the soil profile is sand and gently undulating. The vegetation as evidenced in the photos is predominantly a height of 4 - 5 m with occasional taller trees; foliage cover is greater than 30% in height. The trees exceeding 6 m in height were mostly between 8 m-10 m and by aerial review, comprise up to 6% of the area. The area is considered typical of a mature Banksia Woodland. There was no evidence of widespread tree skeletons and historic aerial photography shows little change, supporting the vegetation is in a mature state.

Plots 1, 2, and 3, therefore correspond to a Scrub classification in AS3959:2018. Plot 4 should be expanded to encompass the Conservation Category Wetland (CCW) area.

It is recommended that the BMP Figure 3, Figure 5 and the text, accordingly be revised based upon a classification of Plots 1, 2, 3 and that Plot 4 be expanded.

The consequence of these changes will reduce the BAL contour widths by a small amount, thereby reducing the building setback requirement from Plots 1, 2, and 3. This is shown in

**Table 1**

Plot and slope	Distance from vegetation to achieve BAL 29	
	Woodland	Scrub
Plot 1 flat	14	13
Plot 2 down slope 0-5 <sup>0</sup>	17	15
Plot 3 upslope	14	13

The expanded Plot 4 because of its distance to the development site, requires no change to the setbacks previously identified.

## **2.2 Element 3: Vehicular Access**

The road layout illustrates a perimeter road of a width that is compliant with the Technical Specifications Element 3 Table 6 column 1 (public road).

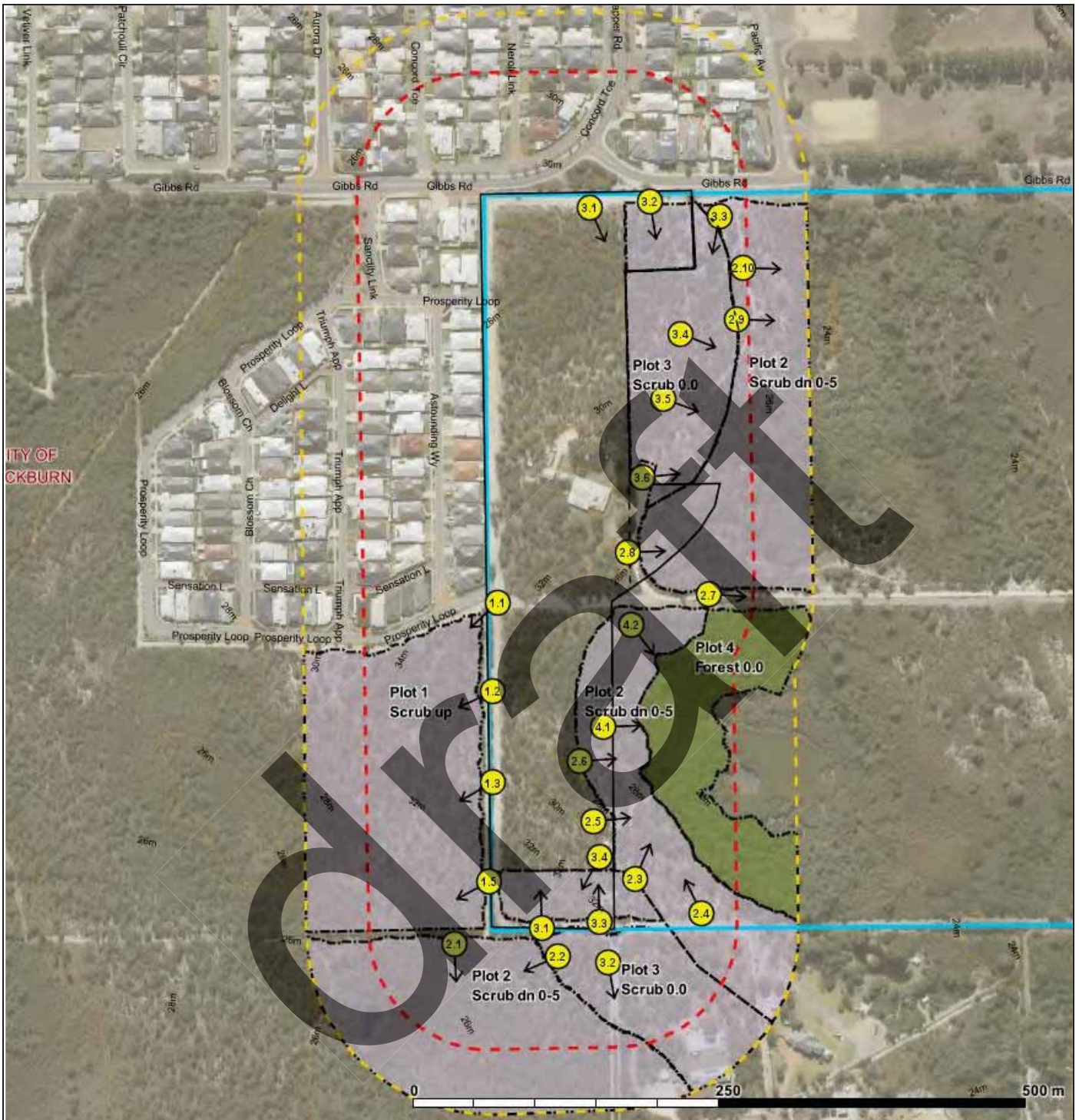
The arrangement will provide an additional access onto Gibbs Road to assist the residential estate west of the site which presently relies upon a single access to Gibbs Road. Whilst both access points are onto Gibbs Road, north of the project area they lead onto the BAL Low residential road network on the north side of Gibbs Road.

## **2.3 Element 4: Water**

The proposal will be provided with a reticulated water supply and hydrant in accordance with the Water corporation standard No 63.

draft

**APPENDIX A**



**Figure 2: Vegetation Classification**

Assessment Date:  
4 October 2020  
Prepared: Anthony Rowe  
Accreditation Level: BPAD L3  
Accreditation Number: 36690  
Accreditation Expiry: Dec 2020  
FPA A FIRE MAP 2020  
GADA 1994 MGA Zone 50

	Site boundary		Class A Forest		Class D Scrub
	150m are assessment		Photo point		Class G Grassland
	100m area assessment		Plot / Veg Class/Slope		Class C Shrubland
					Excluded

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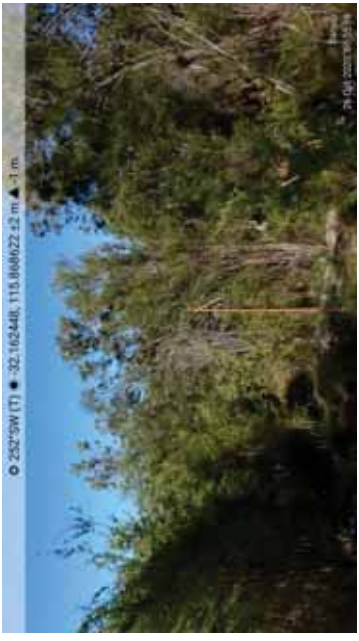
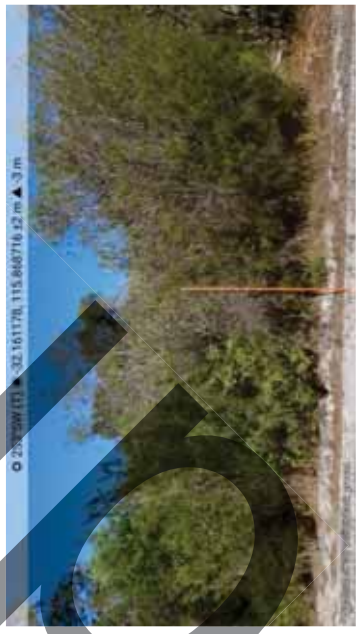






**Figure 3: BAL Contour Post Development**

<p>Assessment Date: 26 October 2020 Prepared: Anthony Rowe Accreditation Level: BPAD L3 Accreditation Number: 36690 Accreditation Expiry: Dec 2020 FPAA FIRE MAP 2020 GADA 1994 MGA Zone 50</p>	<p> Site boundary</p> <p> 150m area assessment</p> <p> 100m area assessment</p>	<p> BAL FZ</p> <p> BAL 40</p> <p> BAL 29</p> <p> BAL 19</p> <p> BAL 12.5</p> <p> BAL Low</p>	<p>© 2020 Any conclusions drawn, or recommendations made in this report are made in good faith. No responsibility is taken for how this information and the report are used subsequently by others.</p>
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### Vegetation Classification

All vegetation within 150m of the site / proposed development was classified in accordance with Clause 2.2.3 of AS 3959-2018. Each distinguishable vegetation plot with the potential to determine the Bushfire Attack Level is identified below.

PLOT: 1	
<b>Vegetation Classification</b>	PHOTO ID: 1.1
Class D Scrub - Closed scrub D-13	
<b>Slope</b>	PHOTO ID: 1.2
Flat	
<b>Description (AS3959)</b>	PHOTO ID:
<i>Found in wet areas and/or areas affected by poor soil fertility or shallow soils; &gt;30% foliage cover. Dry heaths occur in rocky or sandy areas. Shrubs &gt;2 m high. Typical of coastal areas and tall heaths up to 6 m in height. May be dominated by Banksia, Melaleuca or Leptospermum with heights of up to 6 metres</i>	
<b>Observation/Justification for classification</b>	PHOTO ID:
A 2m orange stick for height has been shown. Foliage cover is greater than 30%. The predominant vegetation height is approximately 4 m. Trees exceeding 6 m, upto 15 m high are spread and less than 6% of the foliage coverage and over a high (4m ) understorey.	
<b>Post development</b>	
Retained	



PLOT: 2	
<b>Vegetation Classification</b>	PHOTO ID: 2.1
Class D Scrub - Closed scrub D-13	
<b>Slope</b>	PHOTO ID: 2.2
Downslope 0-5	
<b>Description (AS3959)</b>	
<i>Found in wet areas and/or areas affected by poor soil fertility or shallow soils; &gt;30% foliage cover. Dry heaths occur in rocky or sandy areas. Shrubs &gt;2 m high. Typical of coastal areas and tall heaths up to 6 m in height. May be dominated by Banksia, Melaleuca or Leptospermum with heights of up to 6 metres</i>	
<b>Observation/Justification for classification</b>	PHOTO ID: 2.3
The predominant vegetation height is approximately 4 -5 m. Trees exceeding 6 m, upto 15 m high are spread and less than 6% of the foliage coverage and over a high (4m ) understorey.	
<b>Post development</b>	
Retained	



PLOT: 2	
<b>Vegetation Classification</b>	PHOTO ID: 2.5
Class D Scrub - Closed scrub D-13	
<b>Slope</b>	PHOTO ID: 2.6
Downslope 0-5	
<b>Description (AS3959)</b>	PHOTO ID: 2.7
<i>Found in wet areas and/or areas affected by poor soil fertility or shallow soils; &gt;30% foliage cover. Dry heaths occur in rocky or sandy areas. Shrubs &gt;2 m high. Typical of coastal areas and tall heaths up to 6 m in height. May be dominated by <b>Banksia</b>, <b>Melaleuca</b> or <b>Leptospermum</b> with heights of <b>up to 6 metres</b></i>	
<b>Observation/Justification for classification</b>	PHOTO ID: 2.8
	
<b>Post development</b>	
Retained	Power poles provide a long view height reference.

PLOT: 2	
<b>Vegetation Classification</b>	PHOTO ID: 2.10
Class D Scrub - Closed scrub D-13	
<b>Slope</b>	PHOTO ID: 2.9
Downslope 0-5	
<b>Description (AS3959)</b>	PHOTO ID:
<i>Found in wet areas and/or areas affected by poor soil fertility or shallow soils; &gt;30% foliage cover. Dry heaths occur in rocky or sandy areas. Shrubs &gt;2 m high. Typical of coastal areas and tall heaths up to 6 m in height. May be dominated by <b>Banksia</b>, <b>Melaleuca</b> or <b>Leptospermum</b> with heights of <b>up to 6 metres</b></i>	
<b>Observation/Justification for classification</b>	
<b>Post development</b>	
Retained	



PLOT: 3		
<b>Vegetation Classification</b>	PHOTO ID: 3.1	PHOTO ID: 3.2
Class D Scrub - Closed scrub D-13		
<b>Slope</b>	PHOTO ID: 3.3	PHOTO ID: 3.4
Downslope 0-5		
<b>Description (AS3959)</b>	<p><i>Found in wet areas and/or areas affected by poor soil fertility or shallow soils; &gt;30% foliage cover. Dry heaths occur in rocky or sandy areas. Shrubs &gt;2 m high. Typical of coastal areas and tall heaths up to 6 m in height. May be dominated by <b>Banksia</b>, <b>Melaleuca</b> or <b>Leptospermum</b> with heights of <b>up to 6 metres</b></i></p>	
<b>Observation/Justification for classification</b>	<p>The predominant vegetation height is approximately 4 -5 m. Trees exceeding 6 m, upto 15 m high are spread and less than 6% of the foliage coverage and over a high (4m ) understorey.</p>	
<b>Post development</b>	<p>Retained</p>	

PLOT: 3	
<b>Vegetation Classification</b>	PHOTO ID: 3-6
Class D Scrub - Closed scrub D-13	
<b>Slope</b>	
<b>Upslope</b>	
<b>Description (AS3959)</b>	
Found in wet areas and/or areas affected by poor soil fertility or shallow soils; >30% foliage cover. Dry heaths occur in rocky or sandy areas. Shrubs >2 m high. Typical of coastal areas and tall heaths up to 6 m in height. May be dominated by <b>Banksia</b> , <b>Melaleuca</b> or <b>Leptospermum</b> with heights of <b>up to 6 metres</b>	
<b>Observation/Justification for classification</b>	PHOTO ID:
<b>Post development</b>	
Retained	

PLOT: 4		
<b>Vegetation Classification</b>	<b>PHOTO ID: 4.1</b>	<b>PHOTO ID: 4.2</b>
Class A Forest - Low open forest A-04		
<b>Slope</b>	Flat	
<b>Description (AS3959)</b>	Trees over 30 m high; 30%-70% foliage cover (may include understorey of sclerophyllous low trees or shrubs). Typically dominated by eucalypts, melaleuca or callistemon (may include riverine and wetland environments) and callitris. Includes eucalypt plantations.	
<b>Observation/Justification for classification</b>	A higher proportion of trees upto 20m closer set and over a high (4m) understorey. Understorey foliage in the wetland area is more dense than across the sandy areas, and upto 70%. The sandy areas range between 30-70%	
<b>Post development</b>	Retained	
	<b>PHOTO ID:</b>	<b>PHOTO ID:</b>

**CONSTRUCTION REQUIREMENTS – Note: bushfire construction requirements do not apply to class 8 buildings, the BAL is used to determine the siting of all habitable buildings at BAL 29 or less.**

AS 3959 – 2009 has six (6) levels of BAL based on the radiant heat flux exposure to the building, and identifies the relevant sections for building construction, as detailed below;

Bushfire Attack Level (BAL)	Classified vegetation within 100m of the site and heat flux exposure thresholds	Description of predicted bushfire attack levels of exposure	Construction Section (within AS 3959)
BAL-LOW	See clause 2.2.3.2	There is insufficient risk to warrant specific construction requirements	Nil (s.4)
BAL-12.5	$\leq 12.5 \text{ kW/m}^2$	Ember Attack	3 & 5
BAL-19	$> 12.5 \text{ kW/m}^2$ to $\leq 19 \text{ kW/m}^2$	Increasing levels of ember attack and burning debris ignited by windborne embers together with increasing heat flux	3 & 6
BAL-29	$> 19 \text{ kW/m}^2$ to $\leq 29 \text{ kW/m}^2$	Increasing levels of ember attack and burning debris ignited by windborne embers together with increasing heat flux	3 & 7
BAL-40	$> 29 \text{ kW/m}^2$ to $\leq 40 \text{ kW/m}^2$	Increasing levels of ember attack and burning debris ignited by windborne embers together with increasing heat flux with the increased likelihood of exposure to flames	3 & 8
BAL-FZ	$> 40 \text{ kW/m}^2$	Direct exposure to flames from the fire front in addition to heat flux and ember attack	3 & 9

**BAL CONSTRUCTION LEVELS IN CONTEXT**



Direct exposure to flames, radiant heat and embers from the fire front.

Increasing ember attack and windborne debris, radiant heat between 29 kW/m<sup>2</sup> and 40 kW/m<sup>2</sup>. Exposure to flames from fire front likely.

Increasing ember attack and windborne debris, radiant heat between 19 kW/m<sup>2</sup> and 29 kW/m<sup>2</sup>.

Increasing ember attack and windborne debris, radiant heat between 12.5 kW/m<sup>2</sup> and 19 kW/m<sup>2</sup>.

Ember attack radiant heat below 12.5 kW/m<sup>2</sup>

There is insufficient risk to warrant any specific construction requirements but there is still some risk.

## Appendix F City of Cockburn Firebreak Notice 2020/2021



Aboriginal and Torres Strait Islander people are warned that this website may contain images and voices of deceased persons.

## Fire Control Order

### Find on this page

» Definitions

» All property (vacant or developed) –less than 4,047m<sup>2</sup>

» All property (vacant or developed) – 4,047m<sup>2</sup> or greater

» Firebreak Specifications

» Additional Works

» Fire Control Order Variations

» Burning

» Penalties

» More Information and contact

## City of Cockburn Fire Control Order - Effective from 10 May 2018

### First and Final Notice

Pursuant to *Section 33* of the *Bush Fires Act 1954* owners or occupiers of land situated within the City of Cockburn are required by law to comply with the prescribed Fire Control Order here within.

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**All Property (vacant or developed) - less than 4,047m<sup>2</sup>**



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To reduce the fire hazard on your land and to comply with the requirements of this Fire Control Order you are required to:

1. Have all flammable materials such as dry grass and weeds slashed, mown or trimmed down by other means to a maximum height of 50mm across the entire property for the duration of this firebreak time; and
2. Remove all dead vegetation.

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## All property (vacant or developed) - 4,047m<sup>2</sup> or greater

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To reduce the fire hazard on your land and to comply with the requirements of this Fire Control Order you are required to:

1. Construct a firebreak (as defined within section 3 of this order) immediately inside all external property boundaries, this includes those adjacent to roads, drains, rail reserves and any public open space reserves
2. Remove all dead vegetation surrounding and over all habitable structures to a radius of 3 metres except living trees, shrubs, maintained grass and gardens under cultivation.

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## Firebreak Specifications

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A firebreak is an area of land cleared of flammable material, installed to minimise the spread or extension of a fire and to provide suitable access for fire fighting vehicles. The standards of a compliant firebreak are as follows:

1. A firebreak must be constructed of bare earth, stone, or sealed surfaces and be clear of all flammable materials to create a 3 metre wide trafficable surface
2. Maintained grass may occupy a firebreak
3. Overhanging branches must be pruned to provide a 4 metre vertical clearance above the full width of the 3 metre firebreak surface
4. A firebreak must be a continuous trafficable surface for a fire fighting vehicle, clear of any obstructions and must not terminate in a cul-de-sac (dead end).

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## Additional Works

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Regardless of land size and location, the City of Cockburn or its Authorised Officer(s) may require you to undertake additional work(s) on your property to improve access and/or undertake further works where in the opinion of that Authorised Officer(s), these works would be conducive to preventing the outbreak and/or the spread or extension of a fire.

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## Fire Control Order Variations

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A variation will be considered where the owner and/or occupiers believe it is impractical to meet the compliance requirements of this Fire Control Order.

Approved structure's occupying a firebreak will not require a variation approval. However, a firebreak will be required to be installed as close as practical around the approved structure.

If approved, variations will be valid in perpetuity, unless a new variation has been approved or the property changes ownership.

The City of Cockburn reserves the right to review, amend or revoke an existing variation in writing at any time. Should a request to vary the Fire Control Order requirements on your property not be approved in writing, this Fire Control Order must be complied with as applicable in its entirety.

If you cannot comply with the above requirements you can complete the online firebreak variation application form.

### [Firebreak Variation Application Form](#)

**Approved:** You must comply with the conditions of the approved variation.

**Not approved:** You must comply with the requirements of the Fire Control Order.

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## Burning

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During the declared prohibited burning time, owners and/or occupiers must not undertake any bush or garden refuse burning activities.

During the declared restricted burning time only, owners and/or occupiers may:

1. Apply for a permit to burn the bush for bush fire risk mitigation purposes, by following the conditions imposed on a permit to burn as issued by an Authorised Officer.



2. In areas zoned rural by the Metropolitan Region Scheme you may undertake burning of leaves, tree branches, and other dry vegetation in piles no larger than 1m<sup>3</sup> in size, without a permit to burn, subject to the following conditions:
3. No flammable material (other than that being burned) is to be within 5 metres of the fire at any time while the fire is burning
4. The fire is lit between 6pm and 11pm and is completely extinguished before midnight on the same day
5. At least one person is present at the site of the fire at all times until it is completely extinguished
6. When the fire is no longer required, the person ensures that the fire is completely extinguished by the application of water or earth.

During the unrestricted burning time, owners and/or occupiers in areas zoned rural under the Metropolitan Region Scheme may burn garden refuse and set fire to bush on their land without a permit 'To Set Fire To The Bush'. Burning of the bush must be in accordance with all relevant State legislative requirements.

Burning of garden refuse in areas not zoned rural should not be undertaken within the City of Cockburn, unless approved by an Authorised Officer. Burning of household waste is prohibited in all areas of the City of Cockburn.

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## Penalties



Failing to comply with this Fire Control Order will result in a penalty of up to \$5,000. A person in default is also liable whether prosecuted or not to pay the costs of performing the work directed by a City's Authorised Officer.

Any owner and/or occupier who engages a contractor to undertake works on their behalf is responsible to ensure that the works completed meet the requirements of this Fire Control Order.

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## Definitions

Authorised Officer	A person appointed by the City of Cockburn Chief Executive Officer as an authorised person/officer to exercise the powers and duties set out in the Local Government Act 1995, Bush Fires Act 1954 and Local Law(s).
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## Definitions

Flammable Material	Any dead or dry grass, vegetation, substance, object, thing or material (except living flora including live and/ or habitat standing trees) that may or is likely to catch fire and burn or any other thing deemed by an Authorised Officer to be capable of combustion.
Maintained Grass	Soil covered land, planted with grasses or other durable plants, maintained green and less than 50mm in height.
Prohibited Burning Time	The time of each year where it is unlawful to set fire to the bush at any time. This time is normally from 1 December of each year until and including 31 March of the following year. This time may be amended, subject to prevailing seasonal conditions.
Restricted Burning Time	The time of each year where it is unlawful to set fire to the bush without a valid Permit to Set Fire To The Bush issued by an Authorised Officer. This period is normally from 1 April until and including 31 May and from 1 October until and including 30 November of any year. This time may be amended, subject to the prevailing seasonal conditions.
Unrestricted Burning Time	The time of each year where it is lawful to set fire to the bush at any time, in areas zoned rural under the Metropolitan Region Scheme. This time is normally from 1 June until and including 30 September. This time may be amended, subject to the prevailing seasonal conditions.
Firebreak Time	The time of each year where fire hazard reduction works must be maintained as specified in this Fire Control Order. This time is 1 November of each year until and including 15 April of the following year.
Structure	A building, as defined in the Building Codes of Australia (BCA) may be made up of a number of classes if it has a mixed use.








Any Fire Control Order previously published by the City of Cockburn in the Government Gazette or in any Western Australian newsprint is hereby revoked.

By Order of Council

## More information and contact

Please contact the City's Fire and Emergency Services for more information on firebreaks and burning permits on 08 9411 3444 or at [customer@cockburn.wa.gov.au](mailto:customer@cockburn.wa.gov.au)

## Related Pages

-  [Fire and Emergency Management](#)
-  [Fire Pits](#)
-  [Prepare your home for Fire Season](#)
-  [Proposed Prescribed Burning Areas](#)
-  [Water Suppliers for Fire Fighters](#)
-  [Cockburn Emergency Management Plans](#)
-  [Home Emergency Plan](#)

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**Document Status**

Report version	Rev No.	Purpose	Author	Reviewed and Approved for Issue	
				Name	Date
Draft Report	Rev A	For client review	Linden Wears (BPAD 19809, Level 3)	Linden Wears (BPAD 19809, Level 3)	16 April 2020
Final Report	Rev 0	For approval	Linden Wears (BPAD 19809, Level 3)	Linden Wears (BPAD 19809, Level 3)	24 April 2020
Final Report	Rev 1	For approval	Linden Wears (BPAD 19809, Level 3)	Linden Wears (BPAD 19809, Level 3)	21 January 2021

