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Bushfire Management Plan Coversheet

This Coversheet and accompanying Bushfire Management Plan has been prepared and issued by a person accredited by Fire Protection Association Australia under the Bushfire Planning and Design (BPAD) Accreditation Scheme.

Bushfire Management Plan and Site Details

Site Address / Plan Reference: Lot 9008 Pipidiny Road (Stages 7-8 & 10-22 Allara Estate)

Suburb: Eglinton

State: WA

P/code: 6034

Local government area: City of Wanneroo

Description of the planning proposal: Subdivision application

BMP Plan / Reference Number: SPG18511_01

Version: R001 Rev 0

Date of Issue: 20/11/2018

Client / Business Name: Satterley Property Group

Reason for referral to DFES

Yes

No

Has the BAL been calculated by a method other than method 1 as outlined in AS3959 (tick no if AS3959 method 1 has been used to calculate the BAL)?

Have any of the bushfire protection criteria elements been addressed through the use of a performance principle (tick no if only acceptable solutions have been used to address all of the BPC elements)?

Is the proposal any of the following special development types (see SPP 3.7 for definitions)?

Unavoidable development (in BAL-40 or BAL-FZ)

Strategic planning proposal (including rezoning applications)

Minor development (in BAL-40 or BAL-FZ)

High risk land-use

Vulnerable land-use

If the development is a special development type as listed above, explain why the proposal is considered to be one of the above listed classifications (E.g. considered vulnerable land-use as the development is for accommodation of the elderly, etc.)?

N/A

Note: The decision maker (e.g. local government or the WAPC) should only refer the proposal to DFES for comment if one (or more) of the above answers are ticked "Yes".

BPAD Accredited Practitioner Details and Declaration

Name	Accreditation Level	Accreditation No.	Accreditation Expiry
Zac Cockerill	Level 2	BPAD37803	31/08/2019
Company	Contact No.		
Strategen Environmental	9792 4797		

I declare that the information provided within this bushfire management plan is to the best of my knowledge true and correct

Signature of Practitioner

Date 20/11/2018



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Subdivision application: Stages 7-8 & 10-22 Allara Estate, Eglinton

Bushfire Management Plan

Prepared for
Satterley Property Group
by Strategen

November 2018



**Subdivision application:
Stages 7-8 & 10-22 Allara
Estate, Eglinton**

Bushfire Management Plan

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November 2018

Limitations

Scope of services

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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.

Document control

Client: Satterley Property Group

Report Version	Revision No.	Purpose	Strategen author	Reviewed by	Submitted to Client	
					Form	Date
Draft Report	Rev A	For review by client	Brodie Mastrangelo (BPAD45985)	Zac Cockerill (BPAD37803)	Electronic (email)	14/11/2018
Final Report	Rev 0	Issued for use: to accompany subdivision application	Brodie Mastrangelo (BPAD45985)	Zac Cockerill (BPAD37803)	Electronic (email)	20/11/2018

Filename: SPG18511_01 R001 Rev 0 - 20 November 2018

Table of contents

1. Proposal details	1
1.1 Background	1
1.2 Site description	1
1.3 Purpose	1
1.4 Other plans/reports	1
2. Environmental considerations	5
2.1 Native vegetation – modification and clearing	5
2.2 Revegetation / Landscape Plans	6
3. Bushfire assessment results	8
3.1 Assessment inputs	8
3.1.1 Classified vegetation and effective slope	8
3.2 Assessment outputs	10
4. Identification of bushfire hazard issues	12
4.1 Bushfire context	12
4.2 Bushfire hazard issues	12
5. Assessment against the bushfire protection criteria	13
5.1 Compliance table	13
5.2 Discussion of bushfire management strategies	14
6. Responsibilities for implementation and management of the bushfire measures	17

List of tables

Table 1: Summary of environmental values	5
Table 2: Summary of classified vegetation and exclusions	8
Table 3: Method 1 BAL calculation	11
Table 4: Bushfire protection criteria	13
Table 5: Responsibilities for implementation of the bushfire measures by the developer	17
Table 6: Responsibility for implementation and management of the bushfire measures	18

List of figures

Figure 1: Plan of subdivision	3
Figure 2: Site overview	4
Figure 3: Vegetation classification and effective slope	9
Figure 4: BAL contour map and spatial representation of the bushfire management strategies	16

List of appendices

Appendix 1 Landscape masterplan
Appendix 2 Site photographs
Appendix 3 Asset Protection Zone Standards (Schedule 1, the Guidelines)
Appendix 4 Guideline vehicular access technical requirements
Appendix 5 City of Wanneroo Firebreak Notice

1. Proposal details

1.1 Background

Satterley Property Group is seeking to lodge a subdivision application to facilitate ongoing residential development of Allara Estate (i.e. Stages 7–8 and 10–22, hereon referred to as the project area), located within a portion of Lot 9008 Pipidinny Road, Eglinton in the City of Wanneroo. The subdivision plan (Figure 1) identifies:

- a total of 628 proposed residential lots
- internal road layout
- eight areas of Public Open Space (POS) (including drainage)
- five areas of associated residential land uses (community indoor recreation site, commercial sites, a primary school and a high school)
- a balance lot to be retained within Lot 9008.

The project area is zoned 'Development Contribution Area' as per the City of Wanneroo Town Planning Scheme No.2, which is consistent with existing residential development within broader areas of Allara Estate.

The project area is located within a designated bushfire prone area (Plate 1), as per the WA Map of Bush Fire Prone Areas (DFES 2018).

1.2 Site description

The project area comprises approximately 74.2 ha within Lot 9008 and is surrounded by (see Figure 2):

- remnant vegetation to the north, east and south in varying degrees of condition
- existing Allara Estate residential development/Marmion Avenue to the west.

1.3 Purpose

This Bushfire Management Plan (BMP) has been prepared to address requirements under Policy Measure 6.4 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

The BAL assessment outlined in this report is the most up to date assessment relating to the project area and therefore supersedes any previous Strategen BAL assessments/contour assessments undertaken within the project area, including those documented in the following BAL compliance report previously prepared by Strategen:

- Stage DV2 Allara BAL compliance report (Strategen 2018).

Other plans/reports relating to this development include:

- North Eglinton Local Structure Plan No. 93 (2014)
- Amendment No. 1 to the North Eglinton Structure Plan No. 93
- Structure plan amendment BMP by FirePlan WA.

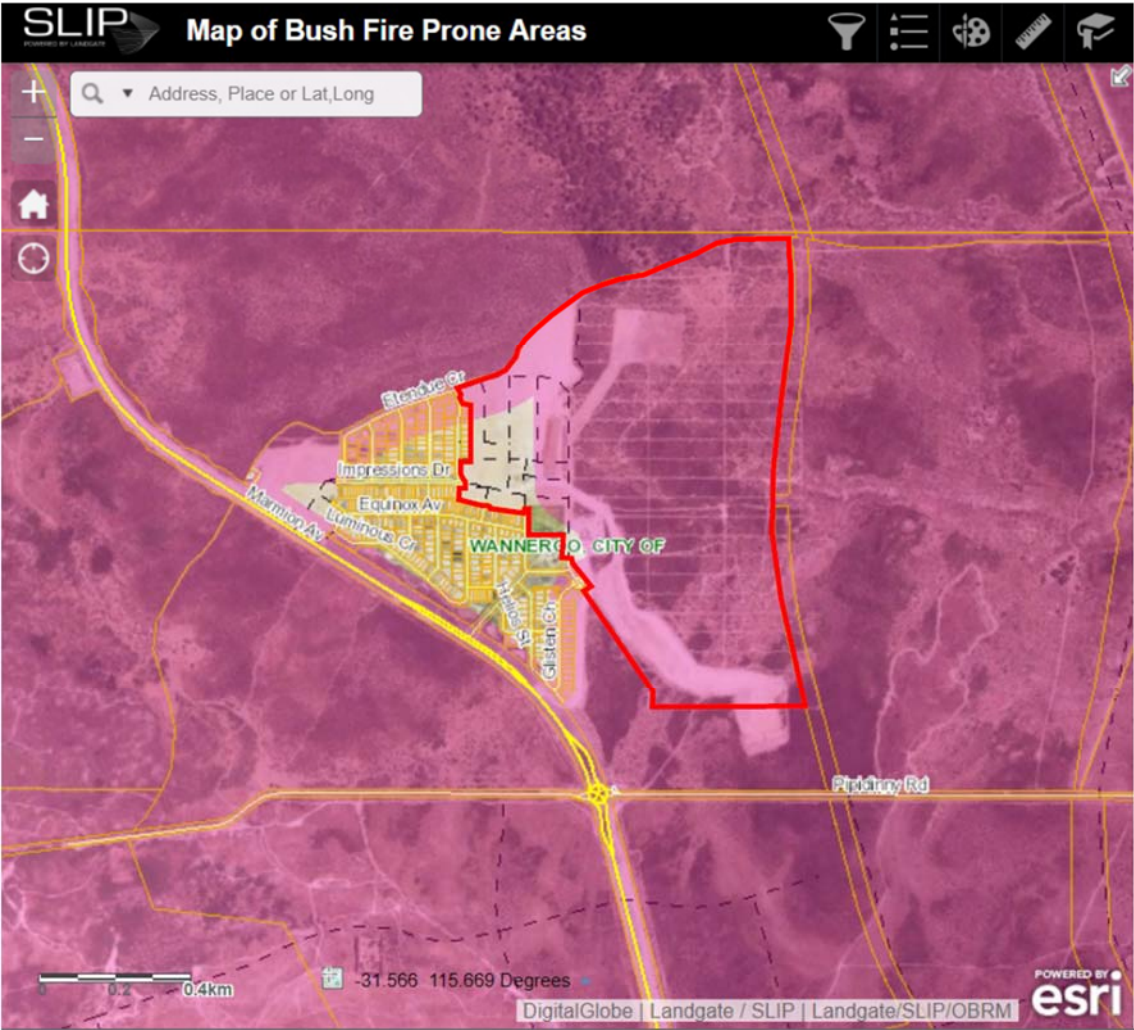


Plate 1: Bush Fire Prone Areas map

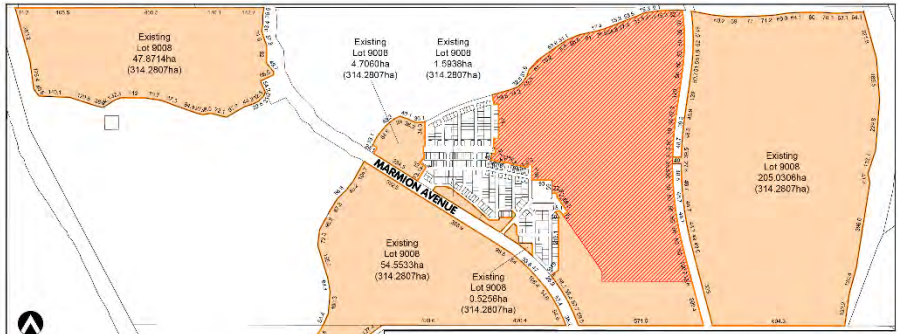
PROPOSED LAND USE/DEVELOPMENT

Zone	Lot Size	No. of Lots
Residential	180m ² - 234m ²	26
Residential	235m ² - 319m ²	83
Residential	320m ² - 449m ²	212
Residential	450m ² - 499m ²	140
Residential	500m ² - 549m ²	68
Residential	550m ² - 599m ²	28
Residential	600m ² - 699m ²	58
Residential	700m ² - 799m ²	10
Residential	900m ² - 999m ²	1
Residential	1000m ² - 1400m ²	1
Residential	1500m ² - 1999m ²	1
Other	Over - 25ha	1
TOTAL		629

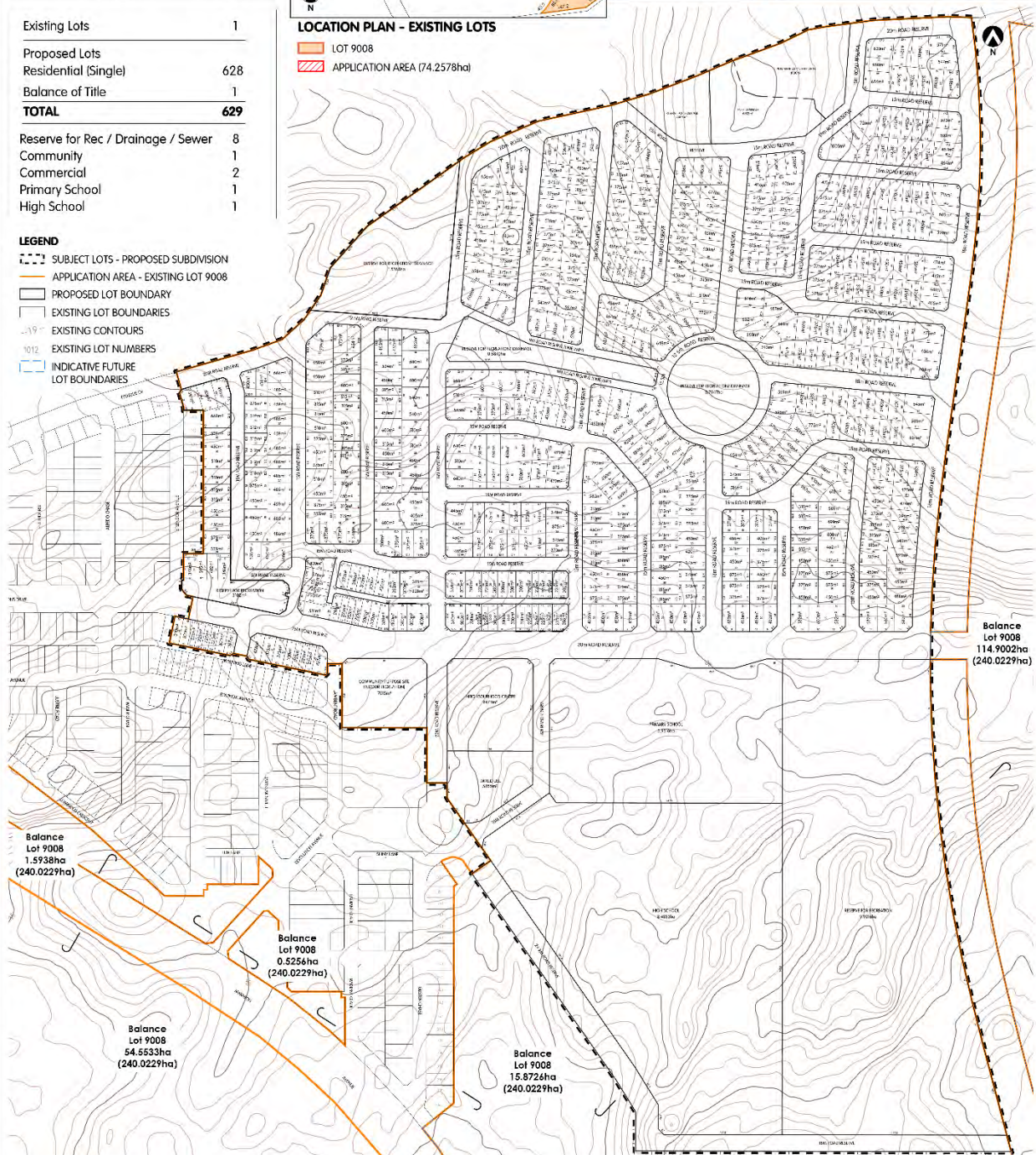
Existing Lots	1
Proposed Lots	
Residential (Single)	628
Balance of Title	1
TOTAL	629
Reserve for Rec / Drainage / Sewer	8
Community	1
Commercial	2
Primary School	1
High School	1

LEGEND

- SUBJECT LOTS - PROPOSED SUBDIVISION
- APPLICATION AREA - EXISTING LOT 9008
- PROPOSED LOT BOUNDARIES
- EXISTING LOT BOUNDARIES
- EXISTING CONTOURS
- EXISTING LOT NUMBERS
- INDICATIVE FUTURE LOT BOUNDARIES



LOCATION PLAN - EXISTING LOTS
 LOT 9008
 APPLICATION AREA (74.2578ha)



CADASTRAL INFORMATION
 SOURCE: MIA
 YWAMBI 31028
 3100784-3100835-3100840-3100841
 PROJECTION: PC954



SCALE: 1:1000
 D: meters

REV	DESCRIPTION	DATE	BY	CHK	APP'D
F	VARIOUS CHANGES	15/09/09	HH	DP	
E	SCHEMATIC CHANGES	15/09/09	HH	DP	
D	DEVELOPMENT CODES INCLUDED	15/09/09	HH	DP	
C	UPDATED LEGEND	15/09/09	HH	DP	
B	INCLUDED 5 LOTS AREA	15/07/09	ACT	HH	
A	50% PLAN AREA	15/07/09	ACT	HH	
REV	DESCRIPTION	DATE	BY	CHK	APP'D
			YVWVDE	DAWNY	APPRD

SUBDIVISION PLAN
Lot 9008 Marmion Avenue, Eglington
 City of Wanneroo

REF NO. SAT EQL
 DRAW NO. RDI 315
 REV. F

(THIS DRAWING REPRESENTS THE PRELIMINARY DESIGN AND IS SUBJECT TO APPROVAL BY THE LOCAL GOVERNMENT)


Source: Roberts Day 2018

Figure 1: Site plan





Figure 2: Site overview

<p>N</p> <p>Scale 1:5,000 at A3</p> <p>0 100 200 m</p> <p>Coordinate System: GDA 1994 MGA Zone 50</p> <p>Date: 9/11/2018</p>	<p>Legend</p> <p> Project area</p> <p> 100m assessment area</p> <p> 150m assessment area</p> <p> Cadastre</p>	
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© 2017. Whilst every care has been taken to prepare this map, Strategen & Satterley Property Group makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.

Data source: Nearmap: Aerial image, flown 10/2018. Landgate: Cadastre, 07/2018. Client: Satterley Property Group, Development layout, 10/2018. Created by: jcrute

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	Present within or adjacent to project area	Description
Environmentally Sensitive Area	Within and adjacent	The project area is mapped as an ESA as a result of occurrences of Threatened Ecological Communities (TECs) in the broader area. ESAs are only relevant in the context of exemptions for the requirement of a clearing permit under Part V of the EP Act. Clearing within the project area will be assessed through the subdivision process, which provides a valid exemption regardless of the presence of an ESA.
Swan Bioplan Regionally Significant Natural Area	No	N/A
Wetlands	Adjacent	There are no wetlands mapped within the LSP/project area. There are conservation and resource enhancement wetlands located 1-1.5 km to the east of the project area within Yanchep National Park.
Waterways	No	There are no waterways within the LSP/project area.
Threatened Ecological Communities listed under the EPBC Act	Within and adjacent	A database search indicates there are Threatened Ecological Communities known to occur within and adjacent to the project area, while a Priority Ecological Community is present 1 km to the east of the project area. Banksia Woodlands of the Swan Coastal Plain are mapped as having potential to occur across the project area and adjacent to the project area immediately to the northeast. Tuart Woodlands are also mapped as occurring immediately north of the project area.
Threatened and priority flora	Adjacent	A desktop search indicates a Priority 3 Flora species occurs 1 km to the west of the project area while a Priority 4 Flora species occurs 1.5 km to the south of the project area. No Declared Rare Flora (DRF) species or threatened EPBC listed flora species have been identified within the LSP area, although three different species of Priority flora were identified in the proposed ROS area, which is not being developed.
Fauna habitat listed under the EPBC Act	Within and adjacent	A desktop search indicates the project area has been confirmed to contain Carnaby's Black Cockatoo breeding, roosting and feeding areas. There is potential quenda habitat within and adjacent to the project area. Fauna surveys undertaken by RPS (2008) and Ecological (2011) recorded Carnaby's Black Cockatoo as having the potential to occur within the LSP area.
Threatened and priority fauna	Adjacent/near boundary of Project area	There are Threatened and Priority Fauna occurring adjacent to the project area, with one Priority species occurring near the eastern boundary of the project area.
Bush Forever Site	Adjacent	Bush Forever site 289 is located immediately north and west of the project area. Bush Forever site 288 is located 1 km to the east and Bush Forever 397 is located to the west, along the coast.

Environmental value	Present within or adjacent to project area	Description
DBCA managed lands and lands and waters (includes legislated lands and waters and lands of interest)	Adjacent	Yanchep National Park is located 1 km to the east of the project area.

The following information was taken from the 2014 LSP with regard to environmental considerations:

- Heddle (1980) indicates the project area is representative of the Quindalup Vegetation Complex No. 55 – coastal dune complex. A Level 2 spring survey was undertaken by GHD in 2010. Vegetation condition varies across the project area and is rated from good to degraded. Disturbances include recreational off-road vehicles, illegal rubbish dumping and weed invasion. No Threatened Ecological Communities or Priority Ecological Communities were recorded in the LSP area, although a number are evident within the proposed ROS area. These will not be impacted on by the proposed development. No Declared Rare Flora (DRF) species or threatened EPBC listed flora species have been identified within the LSP area, although three different species of Priority flora were identified in the proposed ROS area which is not being developed. Fauna surveys undertaken by RPS (2008) and Ecological (2011) recorded Carnaby's Black Cockatoo as having the potential to occur in the LSP area.
- Slope varies from 2% to 33% and ground conditions comprise sand overlying limestone, with some limestone outcropping. There are no wetland/water flows within the LSP area. Groundwater levels beneath the site range from 0 m AHD –3 m AHD inland. There are no RAMSAR or Conservation Category Wetlands located within the LSP area. Pipidiny Swamp, a Conservation Category Wetland, is the closest wetland to the site, located approximately 500 metres to the east of the Local Structure Plan area.

Native vegetation occurs across a large portion of the project area, with the exception of cleared tracks, firebreaks and areas already cleared in the western portions of the site.

The proposed development will necessitate clearing/modification of native vegetation within the project area and adjacent 100 m wide low threat staging buffers. Strategen understands that all relevant environmental approvals have been sought up to this point in time. Subdivision approval will provide a valid clearing exemption to undertake the necessary subdivisional and clearing works required to properly implement this BMP.

2.2 Revegetation / Landscape Plans

As previously mentioned, eight POS areas are proposed throughout the project area, as indicated on Figure 3. Any retained or introduced vegetation within on-site POS areas or street-scaping will be designed and engineered in accordance with landscape plans to be excludable under one or a combination of Clauses 2.2.3.2 (b), (c), (d), (e) and/or (f) of AS3959, except for POS 6, which is a reserve for conservation and will comprise retained vegetation (as discussed in Section 2.2). Final determination of the applicable exclusion clauses will be confirmed as part of detailed landscape design once final size, location, density and species selection are known.

Based on conceptual landscape information available (see Appendix 1), proposed POS will constitute the following (see Figure 3):

- POS 1 (exclusion clauses 2.2.3.2 (b), (e) and/or (f) – vegetated components less than 1 ha and greater than 100 m from any other classified vegetation, with additional areas of non-vegetated land and low threat managed vegetation): passive open space comprising rest stops along the pedestrian and cycle network consisting of low threat tree and shrub planting along the periphery, seating and informal pathways footpaths, playgrounds, shrub and tree planting
- POS 2 (exclusion clauses 2.2.3.2 (c), (d), (e) and/or (f)): areas of drainage, low threat vegetation (i.e. turf) and non-vegetated areas (i.e. dual use paths, outdoor cinema and shelter)

- POS 3 (exclusion clauses 2.2.3.2 (c), (d), (e) and/or (f)): areas of drainage, non-vegetated land and low threat managed vegetation
- POS 4 (exclusion clauses 2.2.3.2 (c), (d), (e) and/or (f)): areas of drainage, non-vegetated land and low threat managed vegetation
- POS 5 (exclusion clauses 2.2.3.2 (b), (c), (d), (e) and (f) – vegetated components less than 1 ha and greater than 100 m from any other classified vegetation, with additional areas of non-vegetated land and low threat managed vegetation): comprising sporting fields, permanent car park, sporting club rooms and community buildings
- POS 6 (Class B woodland): reserve for conservation comprising remnant vegetation
- POS 7 (exclusion clauses 2.2.3.2 (e) and (f)): non-vegetated land and low threat managed vegetation comprising parkland and temporary Waste Water Pump Station
- POS 8 (exclusion clauses 2.2.3.2 (c), (d), (e) and/or (f)): areas of drainage, non-vegetated land and low threat managed vegetation.

3. Bushfire assessment results

3.1 Assessment inputs

3.1.1 Classified vegetation and effective slope

Strategen assessed classified vegetation, exclusions and effective slope within 150 m of proposed development through on-ground verification on 14 September and 7 November 2018 in accordance with AS 3959—2009 *Construction of Buildings in Bushfire-Prone Areas* (AS 3959; SA 2009). Results are depicted in Figure 3 and georeferenced site photos are contained in Appendix 2.

A summary of the assessed classified vegetation, effective slope and exclusions are provided in

Table 2.

As previously discussed, all POS will be excluded from classification under a combination of Clauses 2.2.3.2 (b), (c), (d), (e) and/or (f) of AS 3959, except for POS 6, which will comprise retained Class B woodland vegetation. Detailed landscape planning and design will need to be consistent with the provisions of this BMP with regards to any exclusions/managed land proposed.

Classified vegetation currently situated within 100 m of the project area to the south and east is under control of the proponent and is temporary, subject to future clearing, earthworks and development as part of staged subdivision in accordance with LSP 93. This vegetation is to be modified/cleared as part of this subdivision application and associated subdivisional works to form a 100 m wide low threat staging buffer within the balance land along the southern and eastern boundaries. The predominant low threat exclusion clause for the staging buffer will be Clause 2.2.3.2 (f); however, other low threat exclusions may be adopted to suit site specific conditions, such as Clauses 2.2.3.2 (c) and (d) where appropriate. This will mitigate the impact of temporary vegetation and will ensure there is no unnecessary BAL impact on proposed development from these interfaces.

The proposed railway extension along the eastern interface of the project area occurs within a 40 m wide corridor, which in turn forms part of the 100 m wide low threat staging buffer to the east. This easement will ultimately comprise railway infrastructure including sunken railway tracks (north and south) on either side of a central overhead line. The corridor is likely to contain steep vegetated embankments on either side of the sunken railway infrastructure; however, these vegetated components will be less than 20 m in width, greater than 20 m from each other, proposed development and other areas of classified vegetation. On this basis, the narrow vegetated embankments within the railway corridor will be excludable under Clause 2.2.3.2 (d) of AS 3959.

Table 2: Summary of classified vegetation and exclusions

Vegetation plot	Applied vegetation classification/exclusion	Effective slope under the classified vegetation (degrees)
1	Class A forest	Flat/up-slope (0)
2	Class B woodland	Flat/up-slope (0)
3	Class B woodland	Down-slope (>0–5)
4	Class D scrub	Flat/up-slope (0)
5	Class D scrub	Down-slope (>0–5)
6	Class C shrubland	Flat/up-slope (0)
7	Class C shrubland	Down-slope (>0–5)
N/A	Excluded under Clause 2.2.3.2 (e) and (f)	N/A

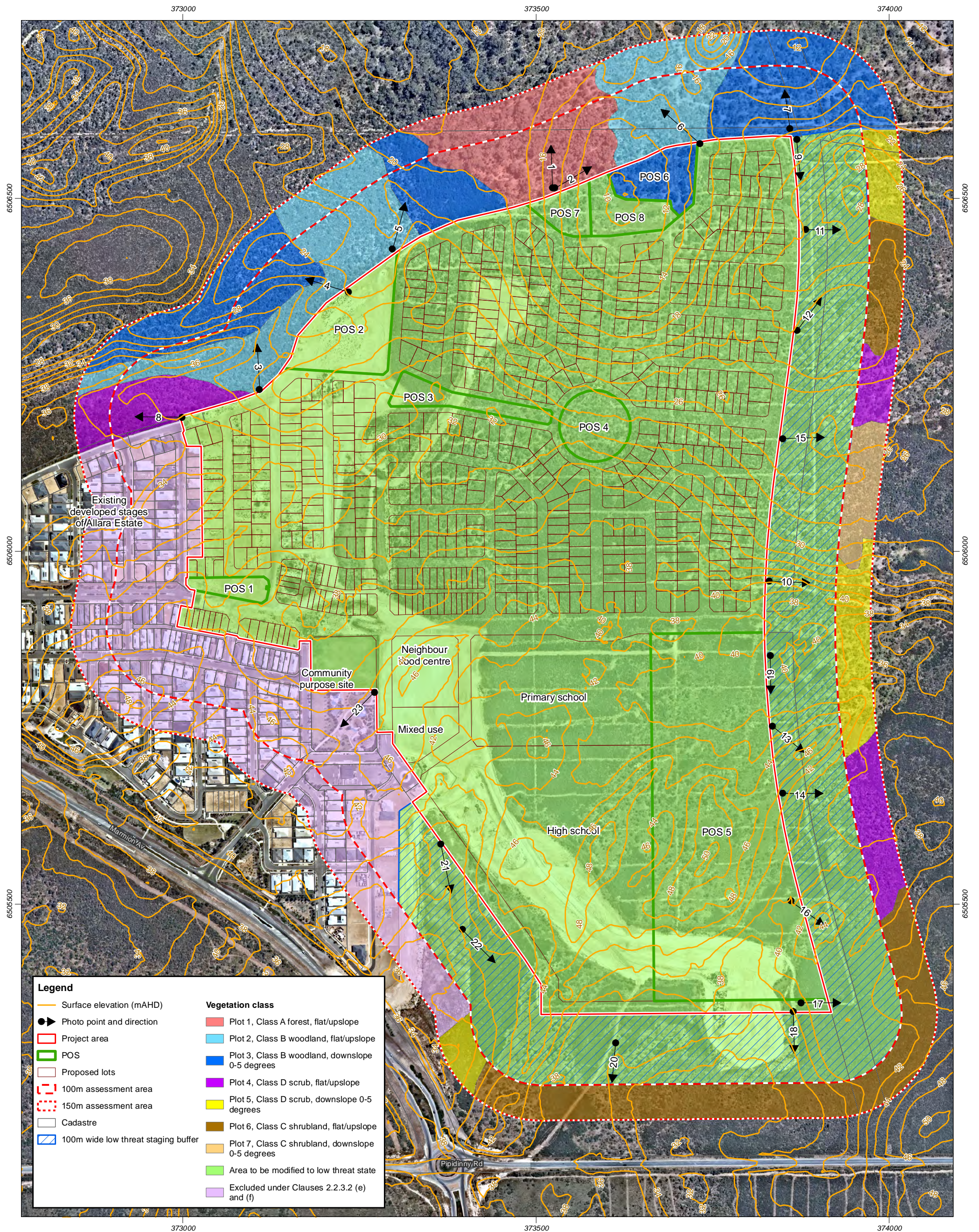
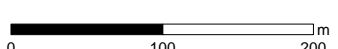


Figure 3: Vegetation classification and effective slope



 Scale 1:5,000 at A3



 Coordinate System: GDA 1994 MGA Zone 50

 Date: 19/11/2018



3.2 Assessment outputs

Any proposed habitable buildings that cannot achieve a full 100 m wide low fuel separation distance from post development classified vegetation will require application of AS 3959 to determine appropriate siting of development and potential increased building construction standards in response to the assessed BAL. Strategen has undertaken a BAL contour assessment for the project area in accordance with Method 1 of AS 3959 and Appendix 3 of the Guidelines (Figure 4). The Method 1 procedure for calculating the BAL (as outlined in AS 3959) incorporates the following factors:

- state-adopted FDI 80 rating
- vegetation class
- 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. Strategen recognises that mandatory compliance of proposed buildings with the AS 3959 building construction standards is required for this development as proposed buildings will be a Class 1, 2, 3 or associated Class 10a building under the National Construction Code.

The assessed BAL contours are depicted in Figure 4. The width of each BAL contour in Figure 4 is set in accordance with AS 3959 and reflects the relevant BAL rating applicable to the respective Class A forest, Class B woodland, Class D scrub or Class C shrubland vegetation types situated on the assessed slopes (refer to Table 3). Where different BAL contours converge/conflict, the highest (worst case) BAL has been applied.

The BAL contours are based on the vegetation classification and effective slope assessed at the time of inspection and take into consideration the vegetation exclusions and separation distances achieved in line with the subdivision plan following development works, including the proposed 100 m wide low threat staging buffer to the south and east of the project area, as depicted in Figure 3. Should there be any changes in development design or classified vegetation extent that results in a modified BAL outcome, then the BAL contours will need to be reassessed for the affected areas and documented in a brief addendum to this BMP prepared to accompany a future planning/building application.

Table 3: Method 1 BAL calculation

Classified vegetation	Effective slope	BAL contour width	BAL contour	Comment
Plot 1 Class A forest	All up-slopes and flat land (0 degrees)	<16	BAL-FZ	No development is proposed in this area
		16-<21	BAL-40	No development is proposed in this area through implementation of the APZ and standard R-Code Building setback
		21-<31	BAL-29	Development will occur in this area
		31-<42	BAL-19	Development will occur in this area
		42-<100	BAL-12.5	Development will occur in this area
Plot 2 Class B woodland	All up-slopes and flat land (0 degrees)	<10	BAL-FZ	No development is proposed in this area
		10-<14	BAL-40	No development is proposed in this area
		14-<20	BAL-29	No development is proposed in this area
		20-<29	BAL-19	Development will occur in this area
		29-<100	BAL-12.5	Development will occur in this area
Plot 3 Class B woodland	Down-slope (>0-5 degrees)	<13	BAL-FZ	No development is proposed in this area
		13-<17	BAL-40	No development is proposed in this area
		17-<25	BAL-29	Development will occur in this area
		25-<35	BAL-19	Development will occur in this area
		35-<100	BAL-12.5	Development will occur in this area
Plot 4 Class D scrub	All up-slopes and flat land (0 degrees)	<10	BAL-FZ	No development is proposed in this area
		10-<13	BAL-40	No development is proposed in this area
		13-<19	BAL-29	No development is proposed in this area
		19-<27	BAL-19	Development will occur in this area
		27-<100	BAL-12.5	Development will occur in this area
Plot 5 Class D scrub	Down-slope (>0-5 degrees)	<11	BAL-FZ	No development is proposed in this area
		11-<15	BAL-40	No development is proposed in this area
		15-<22	BAL-29	No development is proposed in this area
		22-<31	BAL-19	No development is proposed in this area
		31-<100	BAL-12.5	No development is proposed in this area
Plot 6 Class C shrubland	All up-slopes and flat land (0 degrees)	<7	BAL-FZ	No development is proposed in this area
		7-<9	BAL-40	No development is proposed in this area
		9-<13	BAL-29	No development is proposed in this area
		13-<19	BAL-19	No development is proposed in this area
		19-<100	BAL-12.5	No development is proposed in this area
Plot 7 Class C shrubland	Down-slope (>0-5 degrees)	<7	BAL-FZ	No development is proposed in this area
		7-<10	BAL-40	No development is proposed in this area
		10-<15	BAL-29	No development is proposed in this area
		15-<22	BAL-19	No development is proposed in this area
		22-<100	BAL-12.5	No development is proposed in this area

4. Identification of bushfire hazard issues

4.1 Bushfire context

The project area comprises a combination of fragmented remnant vegetation, cleared land and degraded land. Remnant forest, woodland, scrub and shrubland vegetation occurs to the north of the project area and has the potential to support long fire runs. Bushfire behaviour under this scenario from the north has the potential to result in significant fire escalation and resulting elevated levels of radiant heat and ember attack, particularly on days of extreme and catastrophic fire danger in association with predominant winds from the northern quadrant.

Intact remnant vegetation is also contained on surrounding land to the east and south. However, the provision of 100 m wide low threat staging buffers at these interfaces provides significant separation and defendable space and will mitigate all BAL impact under AS 3959 requirements.

All other land within the project area and adjacent 150 m, including residential development to the west, is already excluded under Clauses 2.2.3.2 (e) or (f). A summary of these exclusions is provided as follows:

- existing non-vegetated land (i.e. existing buildings, roads, paths, etc) is excluded under Clause 2.2.3.2 (e)
- existing low threat managed land (i.e. road verges, vacant lots, managed gardens/landscaping, etc) is excluded under Clause 2.2.3.2 (f)
- existing POS to the northwest within The Ridge Park and Playground is excluded under Clause 2.2.3.2 (f).

It is considered that the bushfire risk to the proposed development posed by these hazards can be managed through standard application of acceptable solutions under the Guidelines (see Table 4), as well as through a direct bushfire suppression response if required. On this basis, Strategen considers the bushfire hazards adjacent to the project area and the associated bushfire risks are readily manageable.

4.2 Bushfire hazard issues

The greatest permanent bushfire threat to the proposed development is from remnant vegetation to the north. Separation from this mixture of forest, woodland, scrub and shrubland vegetation is provided by interfacing road reserves and managed POS areas (i.e. POS 2, 7 and 8), which form permanent and substantial buffers and access between proposed development and classified vegetation. Fire-rated construction will also be incorporated into building construction as required under AS 3959.

The intact vegetation within the project area is proposed to be cleared, including provision of a staging buffer to the south and east, which will eliminate bushfire threat in these areas.

If subdivisional works are to be staged internal to the project area, the following staging provisions may need to be implemented as required and in advance of lot creation within each development stage to negate any unnecessary bushfire risk from progressive development stages:

- internal 100 m wide low threat staging buffers
- provision of temporary compliant cul-de-sacs and turn-around points (if staged road construction is to be less than 200 m long), until such time that formal through access can be achieved through extension onto adjacent development stages
- provision of temporary compliant Emergency Access Ways (EAWs) to achieve through access for each internal development stage if the access route is longer than 200 m, but within 600 m, and cannot be dealt with via a compliant cul-de-sac.

These provisions will not apply for internal stages that are subject to BAL-LOW.

5. Assessment against the bushfire protection criteria

5.1 Compliance table

An acceptable solutions assessment against the bushfire protection criteria is provided in Table 4.

Table 4: Bushfire protection criteria

Bushfire protection criteria	Method of compliance	Proposed bushfire management strategies
	Acceptable solutions	
Element 1: Location	A1.1 Development location	The BAL contour assessment (see Figure 4 and Table 3) identifies all lots as having capacity to achieve BAL-29 or lower. One lot in the north will require a 1 m building setback to avoid BAL-40. This will be enforced through mandatory R-code setbacks in accordance with a Local Development Plan (LDP) imposed as a condition of subdivision and is not considered prohibitive to development.
Element 2: Siting and design	A2.1 Asset Protection Zone	The BAL contour assessment identifies all development as having the capacity to achieve APZs within surrounding permanent low threat road reserves, POS, R-code setbacks (as above) and 100 m wide low threat staging buffers to ensure BAL-29 or lower is achieved (see Figure 4). APZs are to be subject to ongoing management in accordance with standards outlined in the Guidelines (see Appendix 3).
Element 3: Vehicular access	A3.1 Two access routes.	The proposed internal vehicular access network will provide all occupants with the option of travelling to two different destinations via two connections to Marmion Avenue (i.e. at Revolution Avenue and Impressions Drive). Strategen understands that direct access to Marmion Avenue via an extension of Impressions Drive will be established as part of development of Stage 9, which is expected to occur prior to development of the project area. Additionally, a temporary EAW is proposed to resolve a non-compliant dead-end in the subdivision plan (discussed below), which will form a third access point to the surrounding public road network in Pipidiny Road to the south. This link will ensure residents have the option of travelling west to Marmion Avenue (and north/south thereon) or south to Pipidiny Road (and east/west thereon) in a bushfire emergency. Temporary compliant EAWs/cul-de-sacs may be required to resolve any temporary dead-ends created throughout development staging.
	A3.2 Public road	All public roads will be constructed to the relevant technical requirements of the Guidelines (see Appendix 4)
	A3.3 Cul-de-sac (including a dead-end-road)	No cul-de-sacs are proposed as part of this development. However, temporary cul-de-sacs may be required to resolve temporary dead-ends created throughout development staging as per the following: <ul style="list-style-type: none"> all cul-de-sacs will be less than 200 m in length, will include minimum 17.5 m diameter turn-around heads and will be constructed to relevant technical requirements under the Guidelines (see Appendix 4).

Bushfire protection criteria	Method of compliance	Proposed bushfire management strategies
	Acceptable solutions	
	A3.4 Battle-axe	Two battle-axe blocks are proposed as part of this development. However, these blocks will be situated in areas of BAL-Low post development. Notwithstanding, the length of each battle-axe leg is approximately 12 m, meaning fire-fighting appliances would operate from the street frontage rather than accessing the battle-axe leg.
	A3.5 Private driveway longer than 50 m	N/A. No private driveways longer than 50 m are proposed as part of this development.
	A3.6 Emergency access way	An EAW is proposed to the southeast of the project area to resolve the non-compliant dead-end in the subdivision plan (see Figure 4). The EAW will form a temporary connection of less than 600 m in length between the dead-end and Pipidinny Road to the south of the project area. The proposed EAW will be located within a future road reserve on land under control by the proponent, as indicated in the LSP for Allara Estate and will therefore not result in unnecessary clearing. The proposed temporary EAW will meet Guideline technical requirements in Appendix 4. Additional temporary EAWs may be required to provide through access during internal staging of development.
	A3.7 Fire service access routes (perimeter roads)	N/A. No fire access routes are proposed or required as part of this development.
	A3.8 Firebreak width	Firebreaks will be implemented as required to comply with the City of Wanneroo Fire Hazard Reduction Notice (refer to Appendix 5).
Element 4: Water	A4.1 Reticulated areas	The proposed development will be serviced by reticulated water supply and a network of hydrants in accordance with Water Corporation Design Standard DS63.
	A4.2 Non-reticulated areas	N/A. Proposed development will be reticulated.
	A4.3 Individual lots within non-reticulated areas (Only for use if creating 1 additional lot and cannot be applied cumulatively)	N/A. Proposed development will be reticulated.

5.2 Discussion of bushfire management strategies

Strategen has provided a detailed discussion of the bushfire management strategies to inform ongoing planning stages of the development and increase the level of bushfire risk mitigation across the site:

1. **On-site staging buffers:** if development (and therefore clearing) is to occur on a staged basis, clearing in advance will 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, on-site cleared or low threat buffer prior to development. Once the buffers are created, they will need to be maintained on a regular and ongoing basis at a fuel load less than 2 t/ha to achieve a low threat minimal fuel condition 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.

Various proposed staging buffers have been identified adjacent south and east of the project area (see Figure 4). Additional staging buffers may be required to address internal staging of development.

2. Fuel management within cleared vacant lots and POS: cleared lots and POS areas 1–5, 7 and 8 will be managed on a regular and ongoing basis by the developer until sale of lots after which time landowners and the City will be responsible for ongoing management respectively. Management may involve slashing/mowing of grassland and weeds to height of less than 10 cm in accordance with the APZ standards in the Guidelines (see Appendix 3) and the current City of Wanneroo annual firebreak notice (refer to Appendix 5).
3. Provision of temporary vehicular access provisions: temporary cul-de-sacs and/or EAWs may be required in advance of lot creation within each relevant stage to achieve vehicular access compliance for each internal stage of development. Where staged road construction is less than 200 m long, temporary compliant cul-de-sacs could be adopted with suitable turn-around heads until such time that through access is provided onto adjacent development stages. If staged dead-ends are longer than 200 m, but less than 600 m, then temporary compliant EAWs will be required to provide connections through to constructed public roads, thereby achieving through access. These provisions will not apply for internal stages that are subject to BAL-LOW.
4. Road verge fuel management: surrounding road verges that have been excluded as low threat will need to continue 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. Ongoing road verge management is the responsibility of the City.
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.
6. Building construction standards: development will include Class 1, 2, 3 and associated Class 10a buildings. Therefore, there is a statutory requirement for proposed buildings to meet the construction requirements of AS 3959 in accordance with the assessed BAL.
7. BAL compliance and/or individual lot BAL assessment at future stages: a BAL compliance report and/or individual lot BAL assessment may be prepared at the discretion of the City/WAPC following completion of subdivisional works and prior to lot title to validate and confirm the accuracy of BAL assessments depicted in the BMP or demonstrate any change in the assessed BAL or other management measures documented in this BMP, which may occur as a result of changes in building location, vegetation class or bushfire management approach.
8. Compliance with annual firebreak notice: the developer/land manager and prospective land purchasers are to comply with the current City of Wanneroo annual firebreak notice (refer to Appendix 5).
9. POS landscape plans: the developer will be required to prepare detailed landscape plans for proposed POS areas 1–5, 7 and 8 to demonstrate that these areas will be excluded from classification in accordance with the provisions of this BMP and to inform the BAL compliance process. Should the landscape design process result in vegetation that is not excludable, updated BAL contour mapping of the modified BAL impact would need to be undertaken to demonstrate compliance (i.e. at BAL compliance stage).
10. Bushfire Emergency Evacuation Plans (BEEPs): Development Application (DA) for the proposed school site (and any other vulnerable land use such as a childcare centre, aged care facility, etc) will need to have consideration of the bushfire prone status at time of development and may need to be accompanied by a DA-specific BMP and Bushfire Emergency Evacuation Plan (BEEP) to address standard bushfire compliance requirements, as well as emergency evacuation of proposed occupants as part of vulnerable land use requirements under Policy Measures 6.5 and 6.6 of SPP3.7. Based on the current subdivision design, it is likely that the proposed school site will be subject to BAL-Low post-development and BMP/BEEP provisions at the DA stage may not be required.

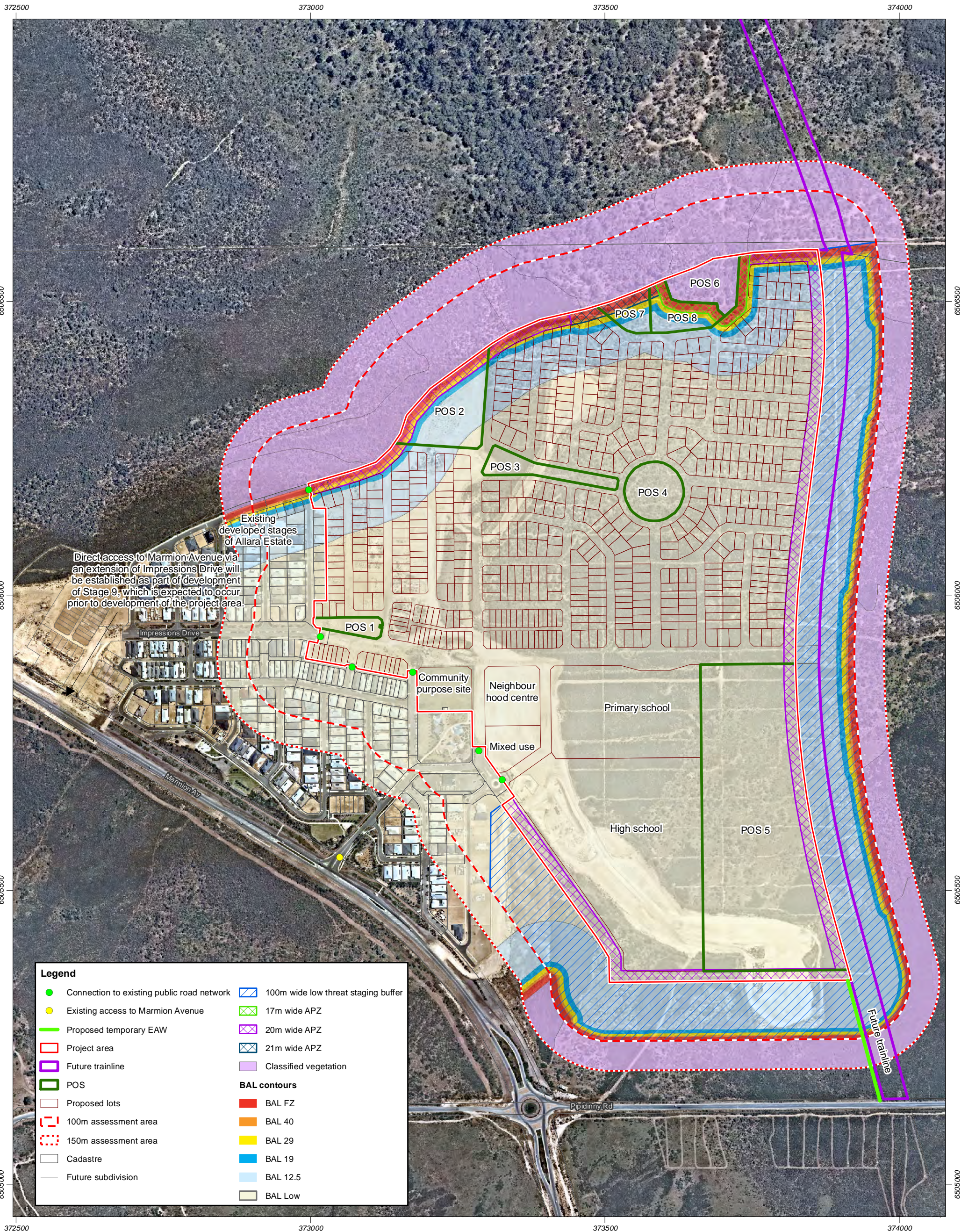


Figure 4: BAL contour map and spatial representation of bushfire management measures

Scale 1:6,000 at A3

0 100 200 m

Coordinate System: GDA 1994 MGA Zone 50

Date: 19/11/2018

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ENVIRONMENTAL

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Data source: Nearnap; Aerial image, flown 10/2018. Landgate: Cadastre, 07/2018. Client: Satterley Property Group, Development layout, 10/2018. Created by: jcrute

6. Responsibilities for implementation and management of the bushfire measures

This section is to set out the responsibilities of the developer/s, landowner/s and local government with regards to the initial implementation and ongoing maintenance of the required actions.

Table 5: Responsibilities for implementation of the bushfire measures by the developer

Developer – prior to issue of titles		
No.	Implementation action	Subdivision clearance
1	Construct public roads, temporary cul-de-sacs and temporary EAWs as required to achieve vehicular access compliance to the standards stated in this BMP	<input type="checkbox"/>
2	Establish 100 m wide low threat staging buffers as required to the standards stated in this BMP	<input type="checkbox"/>
3	Establish and maintain all created lots in a low threat state to achieve exclusion Clause 2.2.3.2 (f) of AS 3959, including slashing/mowing of grassland and weeds to height of less than 10 cm	<input type="checkbox"/>
4	Establish and maintain road reserves, verges and POS to be excluded as low threat vegetation under the relevant exclusion clauses of AS 3959, including slashing/mowing of grassland and weeds to height of less than 10 cm and engineering of POS exclusions through detailed landscape design	<input type="checkbox"/>
5	Place notification on the Certificates of Title of all proposed lots with a BAL rating of 12.5 or above	<input type="checkbox"/>
6	BAL compliance to demonstrate reassessment of the management measures documented in this BMP (such as the APZ and/or BALs)	<input type="checkbox"/>
7	Provision of reticulated water supply	<input type="checkbox"/>
8	Provision of detailed POS landscape plans demonstrating exclusion from classification for POS areas 1–5, 7 and 8.	<input type="checkbox"/>

Certification by Bushfire Consultant

I _____ certify that at the time of inspection, the BAL ratings contained within this BMP are correct; and implementation actions 1 – 3 have been undertaken in accordance with the BMP.

Clearance is recommended.

Signature: _____ Date: _____

Table 6: Responsibility for implementation and management of the bushfire measures

Developer/Landowner/occupier – ongoing management	
No.	Management action
1	Maintain the various staging buffers, POS areas, road verges and titled lots to meet the exclusion clauses outlined in this BMP
2	Comply with the City of Wanneroo annual firebreak notice issued under s33 of the Bush Fires Act 1954
3	Maintain vehicular access routes and reticulated water supply to the required technical standards in this BMP
Local government – ongoing management	
No.	Management action
1	Maintain POS and road reserves to a low threat vegetation standard in accordance with the exclusion clauses outlined in this BMP

Appendix 1
Landscape masterplan



Appendix 2
Site photographs



Photo ID: 1

Plot number		Plot 1
Vegetation classification or exclusion clause	Existing	Class A forest
	Post-development	Class A forest
Description / justification for classification		Trees greater than 10 meters in height, dominated by eucalypts with a multi-tier fuel structure.



Photo ID: 2

Plot number		Plot 1
Vegetation classification or exclusion clause	Existing	Class A forest
	Post-development	Class A forest
Description / justification for classification		Trees greater than 10 meters in height, dominated by eucalypts with a multi-tier fuel structure.



Photo ID: 3

Plot number		Plot 2
Vegetation classification or exclusion clause	Existing	Class B woodland
	Post-development	Class B woodland
Description / justification for classification		Dominated by Banksias, trees 5-10 m in height.



Photo ID: 4

Plot number		Plot 2
Vegetation classification or exclusion clause	Existing	Class B woodland
	Post-development	Class B woodland
Description / justification for classification		Dominated by Banksias, trees 5-10 m in height.



Photo ID: 5

Plot number		Plot 2
Vegetation classification or exclusion clause	Existing	Class B woodland
	Post-development	Class B woodland
Description / justification for classification		Dominated by Banksias, trees 5-10 m in height.



Photo ID: 6

Plot number		Plot 2
Vegetation classification or exclusion clause	Existing	Class B woodland
	Post-development	Class B woodland
Description / justification for classification		Dominated by Banksias, trees 5-10 m in height.

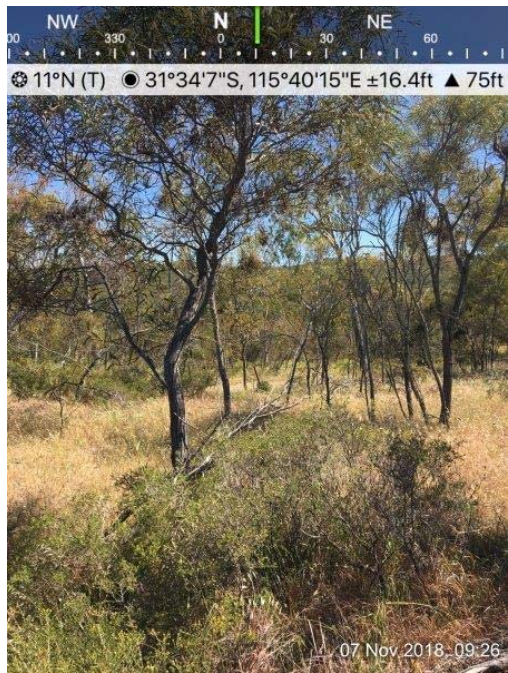


Photo ID: 7

Plot number		Plot 3
Vegetation classification or exclusion clause	Existing	Class B woodland
	Post-development	Class B woodland
Description / justification for classification		Trees 5-10 m in height, grassy understorey and lacking a shrubby middle layer.



Photo ID: 8

Plot number		Plot 4
Vegetation classification or exclusion clause	Existing	Class D scrub
	Post-development	Class D scrub
Description / justification for classification		Shrubs greater than 2 m in height with continuous vertical fuel structure.



Photo ID: 9

Plot number		N/A
Vegetation classification or exclusion clause	Existing	Class D scrub
	Post-development	Excluded under Clause 2.2.3.2 (e) and (f)
Description / justification for classification		Area proposed to be cleared within the 100 m wide low threat staging buffer to the east.



Photo ID: 10

Plot number		N/A
Vegetation classification or exclusion clause	Existing	Class D scrub
	Post-development	Excluded under Clause 2.2.3.2 (e) and (f)
Description / justification for classification		Area proposed to be cleared within the 100 m wide low threat staging buffer to the east.



Photo ID: 11

Plot number		N/A
Vegetation classification or exclusion clause	Existing	Class C shrubland
	Post-development	Excluded under Clause 2.2.3.2 (e) and (f)
Description / justification for classification		Area proposed to be cleared within the 100 m wide low threat staging buffer to the east.



Photo ID: 12

Plot number		N/A
Vegetation classification or exclusion clause	Existing	Class C shrubland
	Post-development	Excluded under Clause 2.2.3.2 (e) and (f)
Description / justification for classification		Area proposed to be cleared within the 100 m wide low threat staging buffer to the east.

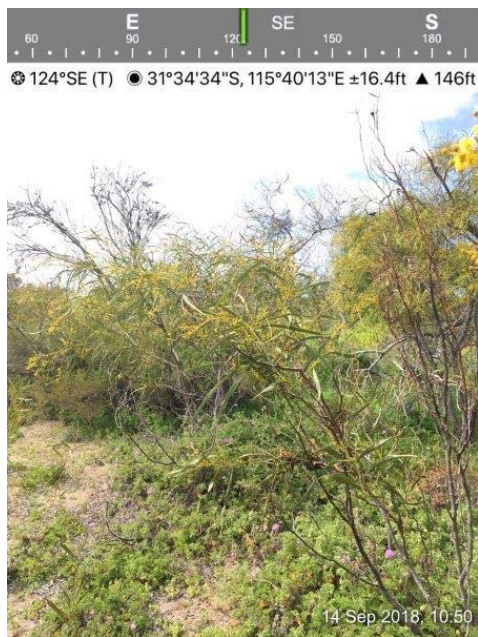


Photo ID: 13

Plot number		N/A
Vegetation classification or exclusion clause	Existing	Class D scrub
	Post-development	Excluded under Clause 2.2.3.2 (e) and (f)
Description / justification for classification		Area proposed to be cleared within the 100 m wide low threat staging buffer to the east.



Photo ID: 14

Plot number		N/A
Vegetation classification or exclusion clause	Existing	Class C shrubland
	Post-development	Excluded under Clause 2.2.3.2 (e) and (f)
Description / justification for classification		Area proposed to be cleared within the 100 m wide low threat staging buffer to the east.



Photo ID: 15

Plot number		N/A
Vegetation classification or exclusion clause	Existing	Class C shrubland
	Post-development	Excluded under Clause 2.2.3.2 (e) and (f)
Description / justification for classification		Area proposed to be cleared within the 100 m wide low threat staging buffer to the east.



Photo ID: 16

Plot number		N/A
Vegetation classification or exclusion clause	Existing	Class C shrubland
	Post-development	Excluded under Clause 2.2.3.2 (e) and (f)
Description / justification for classification		Area proposed to be cleared within the 100 m wide low threat staging buffer to the east.



Photo ID: 17

Plot number		N/A
Vegetation classification or exclusion clause	Existing	Class C shrubland
	Post-development	Excluded under Clause 2.2.3.2 (e) and (f)
Description / justification for classification		Area proposed to be cleared within the project area and 100 m wide low threat staging buffer to the east.



Photo ID: 18

Plot number		N/A
Vegetation classification or exclusion clause	Existing	Class C shrubland
	Post-development	Excluded under Clause 2.2.3.2 (e) and (f)
Description / justification for classification		Area proposed to be cleared within the 100 m wide low threat staging buffer to the south.



Photo ID: 19

Plot number		N/A
Vegetation classification or exclusion clause	Existing	Class C shrubland
	Post-development	Excluded under Clause 2.2.3.2 (e) and (f)
Description / justification for classification		Area proposed to be cleared within the 100 m wide low threat staging buffer to the east.



Photo ID: 20

Plot number		N/A
Vegetation classification or exclusion clause	Existing	Class C shrubland
	Post-development	Excluded under Clause 2.2.3.2 (e) and (f)
Description / justification for classification		Area proposed to be cleared within the 100 m wide low threat staging buffer to the south.



Photo ID: 21

Plot number		N/A
Vegetation classification or exclusion clause	Existing	Excluded under Clause 2.2.3.2 (e) and (f)
	Post-development	Excluded under Clause 2.2.3.2 (e) and (f)
Description / justification for classification		Existing 100 m wide low threat staging buffer adjacent to Stage DV2.



Photo ID: 22

Plot number		N/A
Vegetation classification or exclusion clause	Existing	Class C shrubland
	Post-development	Excluded under Clause 2.2.3.2 (e) and (f)
Description / justification for classification		Area proposed to be cleared within the 100 m wide low threat staging buffer to the south.

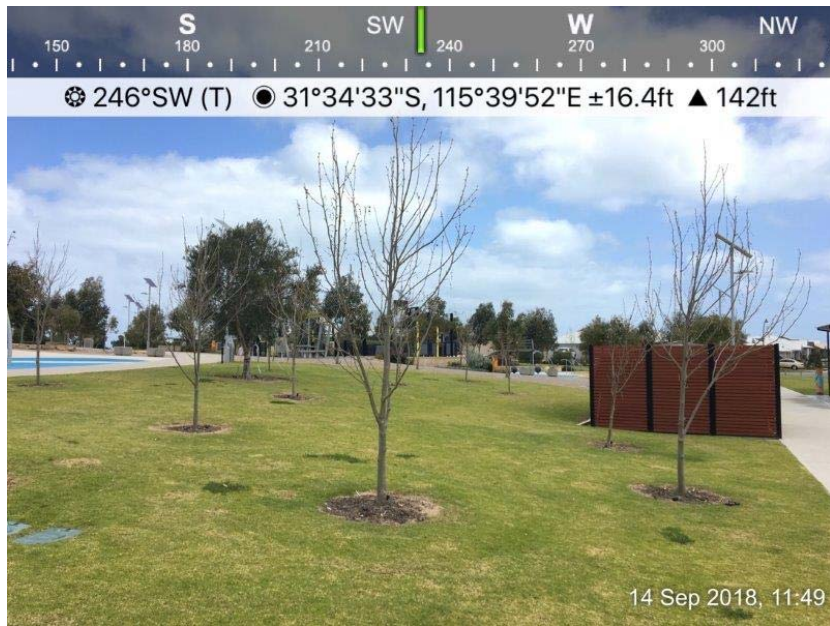


Photo ID: 23

Plot number		N/A
Vegetation classification or exclusion clause	Existing	Excluded under Clause 2.2.3.2 (e) and (f)
	Post-development	Excluded under Clause 2.2.3.2 (e) and (f)
Description / justification for classification		Existing low threat POS in adjacent developed stages of Allara Estate. Manicured lawns, managed gardens and sparse planting of trees.

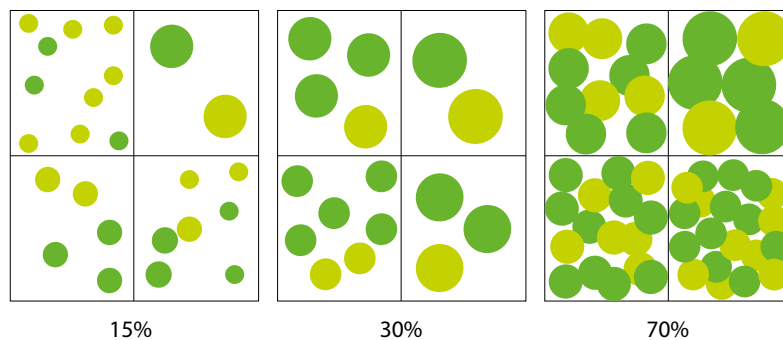
Appendix 3
Asset Protection Zone Standards
(Schedule 1, the Guidelines)

ELEMENT 2: SITING AND DESIGN OF DEVELOPMENT

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.

Figure 16: Tree canopy cover – ranging from 15 to 70 per cent at maturity



- **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 5m² 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 4
Guideline vehicular access technical
requirements

Contents	1 Introduction	2 Policy framework overview	3 Bushfire prone areas	4 Assessing bushfire risk in the planning context	5 Applying SPP 3.7	6 Roles and responsibilities	Appendices
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ELEMENT 3: VEHICULAR ACCESS

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

PERFORMANCE PRINCIPLE

The intent may be achieved where:

P3

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

ACCEPTABLE SOLUTIONS

To achieve the intent, all applicable 'acceptable solutions' must be addressed.

A3.1 Two access routes

Two different vehicular access routes are provided, both of which connect to the public road network, provide safe access and egress to two different destinations and are available to all residents/the public at all times and under all weather conditions.

A3.2 Public road

A public road is to meet the requirements in Table 4, Column 1.

A3.3 Cul-de-sac (including a dead-end road)

A cul-de-sac and/or a dead end road should be avoided in bushfire prone areas. Where no alternative exists (i.e. the lot layout already exists and/or will need to be demonstrated by the proponent), the following requirements are to be achieved:

- Requirements in Table 4, Column 2;
- 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); and
- Turn-around area requirements, including a minimum 17.5 metre diameter head.

A3.4 Battle-axe

Battle-axe access leg should be avoided in bushfire prone areas. Where no alternative exists, (this will need to be demonstrated by the proponent) all of the following requirements are to be achieved:

- Requirements in Table 4, Column 3;
- Maximum length: 600 metres; and
- Minimum width: six metres.

Contents	1	2	3	4	5	6	Appendices
	Introduction	Policy framework overview	Bushfire prone areas	Assessing bushfire risk in the planning context	Applying SPP 3.7	Roles and responsibilities	

ELEMENT 3: VEHICULAR ACCESS

PERFORMANCE PRINCIPLE

ACCEPTABLE SOLUTIONS

A3.5 Private driveway longer than 50 metres

A private driveway is to meet all of the following requirements:

- Requirements in Table 4, Column 3;
- Required where a house site is more than 50 metres from a public road;
- 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);
- 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; and
- Any bridges or culverts are able to support a minimum weight capacity of 15 tonnes.
- All-weather surface (i.e. compacted gravel, limestone or sealed).

A3.6 Emergency access way

An access way that does not provide through access to a public road is to be avoided in bushfire prone areas. Where no alternative exists (this will need to be demonstrated by the proponent), an emergency access way is to be provided as an alternative link to a public road during emergencies. An emergency access way is to meet all of the following requirements:

- Requirements in Table 4, Column 4;
- No further than 600 metres from a public road;
- Provided as right of way or public access easement in gross to ensure accessibility to the public and fire services during an emergency; and
- Must be signposted.

A3.7 Fire service access routes (perimeter roads)

Fire service access routes are to be established to provide access within and around the edge of the subdivision and related development to provide direct access to bushfire prone areas for fire fighters and link between public road networks for fire-fighting purposes. Fire service access routes are to meet the following requirements:

- Requirements Table 4, Column 5;
- Provided as right of ways or public access easements in gross to ensure accessibility to the public and fire services during an emergency;
- Surface: all-weather (i.e. compacted gravel, limestone or sealed)
- Dead end roads are not permitted;
- 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);
- No further than 600 metres from a public road;
- Allow for two-way traffic and;
- Must be signposted.

Contents	1 Introduction	2 Policy framework overview	3 Bushfire prone areas	4 Assessing bushfire risk in the planning context	5 Applying SPP 3.7	6 Roles and responsibilities	Appendices
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ELEMENT 3: VEHICULAR ACCESS

PERFORMANCE PRINCIPLE

ACCEPTABLE SOLUTIONS

A3.8 Firebreak width

Lots greater than 0.5 hectares must have an internal perimeter firebreak of a minimum width of three metres or to the level as prescribed in the local firebreak notice issued by the local government.

Table 4: Vehicular access technical requirements

TECHNICAL REQUIREMENTS	1 Public road	2 Cul-de-sac	3 Private driveway	4 Emergency access way	5 Fire service access routes
Minimum trafficable surface (m)	6*	6	4	6*	6*
Horizontal clearance (m)	6	6	6	6	6
Vertical clearance (m)	4.5	N/A	4.5	4.5	4.5
Maximum grade <50 metres	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 (m)	8.5	8.5	8.5	8.5	8.5

*Refer to E3.2 Public roads: Trafficable surface

EXPLANATORY NOTES

E3.1 Two access routes

It is essential that residents and the community, as well as emergency services, have safe access and egress from both the subdivision and individual houses/development. It is the developer's responsibility, as part of the Bushfire Hazard Level assessment, to ensure that subdivision and development design allow for bushfire protection criteria to be met regarding driveways and turnaround areas at house sites.

It is also necessary that the public have two safe access options leading to two different destinations that can withstand all weather conditions. This applies to access routes leading into a subdivision, as well as those within a subdivision. This acceptable solution allows for the situation if a vehicular access/egress route to a subdivision or lot becomes blocked during a fire then there is an alternative vehicular access/egress route which provides access to a different destination. Accordingly, road widening in lieu of providing two different access routes should not be supported. All access should be suitable to accommodate type 3.4 fire appliances (i.e. fire trucks with a four-wheel-drive 7-tonne chassis).

Two-way access should be provided as a public road; however, where a public road cannot be provided, (this will need to be demonstrated by the proponent providing justification for why this cannot be achieved) an emergency access way may be considered.

Contents	1	2	3	4	5	6	Appendices
	Introduction	Policy framework overview	Bushfire prone areas	Assessing bushfire risk in the planning context	Applying SPP 3.7	Roles and responsibilities	

ELEMENT 3: VEHICULAR ACCESS

EXPLANATORY NOTES

E3.2 Public road

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.

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.

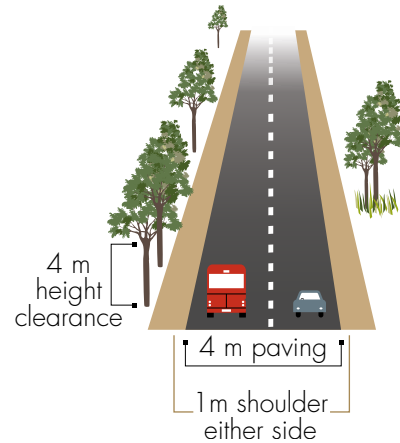


Figure 17: Minimum design requirements for a public road

E3.3 Cul-de-sac

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.

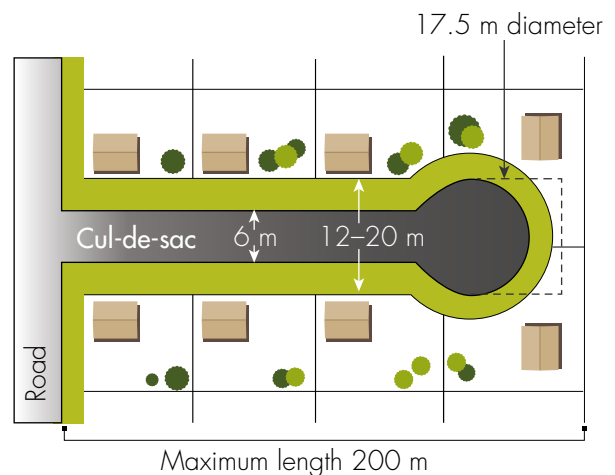


Figure 18: Minimum design requirements for a cul-de-sac

Contents	1	2	3	4	5	6	Appendices
	Introduction	Policy framework overview	Bushfire prone areas	Assessing bushfire risk in the planning context	Applying SPP 3.7	Roles and responsibilities	

ELEMENT 3: VEHICULAR ACCESS

EXPLANATORY NOTES

E3.4 Battle-axe

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.

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.

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.

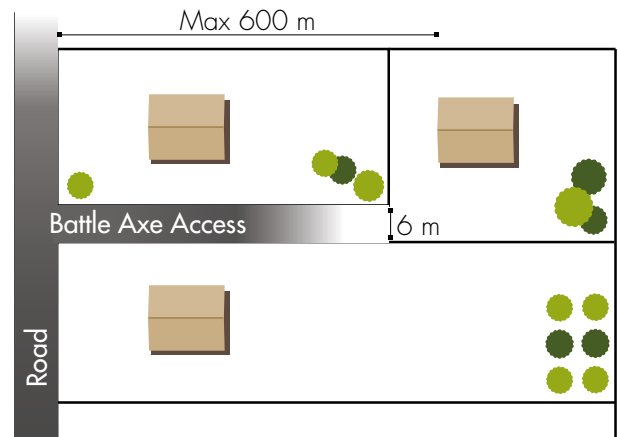


Figure 19: Minimum design requirements for a battle-axe

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

E3.5 Private driveway longer than 50 metres

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 turn-around areas should be available for both conventional two-wheel drive vehicles of residents and type 3.4 fire appliances.

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.

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.

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.

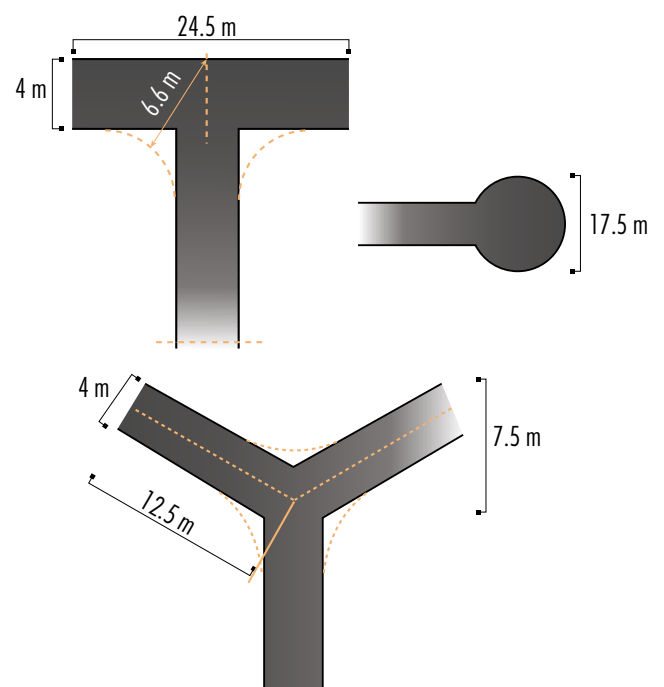


Figure 20: Design requirements for a private driveway longer than 50 metres

Turning areas should allow type 3.4 fire appliances to turn safely

Contents	1	2	3	4	5	6	Appendices
	Introduction	Policy framework overview	Bushfire prone areas	Assessing bushfire risk in the planning context	Applying SPP 3.7	Roles and responsibilities	

ELEMENT 3: VEHICULAR ACCESS

EXPLANATORY NOTES

E3.6 Emergency access way

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.

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.

Where an emergency access way is constructed on private land, a right of way or easement in gross is to be established.

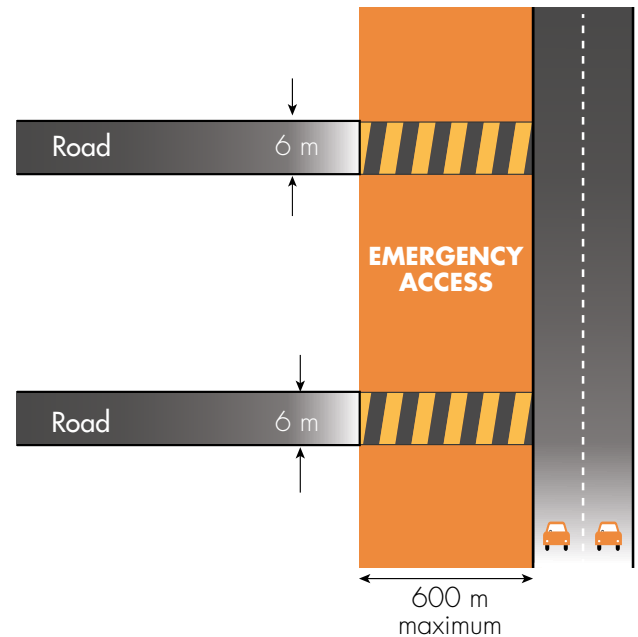


Figure 21: Minimum design requirements for an emergency access way

Two different vehicular access routes, both of which connect to the public road network, should be available to all residents at all times



Figure 22: Emergency access ways may be used to link up with roads to allow alternative access during emergencies

Contents	1	2	3	4	5	6	Appendices
	Introduction	Policy framework overview	Bushfire prone areas	Assessing bushfire risk in the planning context	Applying SPP 3.7	Roles and responsibilities	

ELEMENT 3: VEHICULAR ACCESS

EXPLANATORY NOTES

E3.7 Fire service access routes (perimeter roads)

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:

- Link up with the road network at regular intervals – the development and road network forms part of the fire service access system;
- Be adequately signposted;
- Allow for two-way traffic – that is, two fire appliances must be able to safely pass each other;
- Have an all-weather surface (i.e. compacted gravel, limestone or sealed); and
- Have erosion control measures in place.

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.

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.

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:

- Individual property owners being responsible for maintaining fire service access routes where these fall on their property;
- Providing such access as a right-of-way or easement in gross to ensure accessibility to fire services during an emergency; and/or
- A levy system administered by local government to cover the cost of maintaining fire service access routes.

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.

Appendix 5
City of Wanneroo Firebreak Notice

Under the Bushfires Act (1954), all owners and occupiers of land in Western Australia must establish and maintain fire breaks.

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

Land with an area of less than 4,000m²

- A fire break, not less than three (3) metres wide must be cleared immediately inside (or as close as possible) around all external boundaries of the land.
- All tree branches that over-hang a fire break must be trimmed back to a minimum height of three and a half (3.5) metres above ground level and the growth on the fire break cannot exceed fifty (50) millimetres high.

Land with an area of 4,000m² or more

- A fire break, not less than three (3) metres wide, must be cleared immediately inside (or as close as possible) around all external boundaries of the land.
- All tree branches that over-hang a fire break must be trimmed back to a minimum height of three and a half (3.5) metres above ground level and the growth on the fire break cannot exceed fifty (50) millimetres high.

Buildings

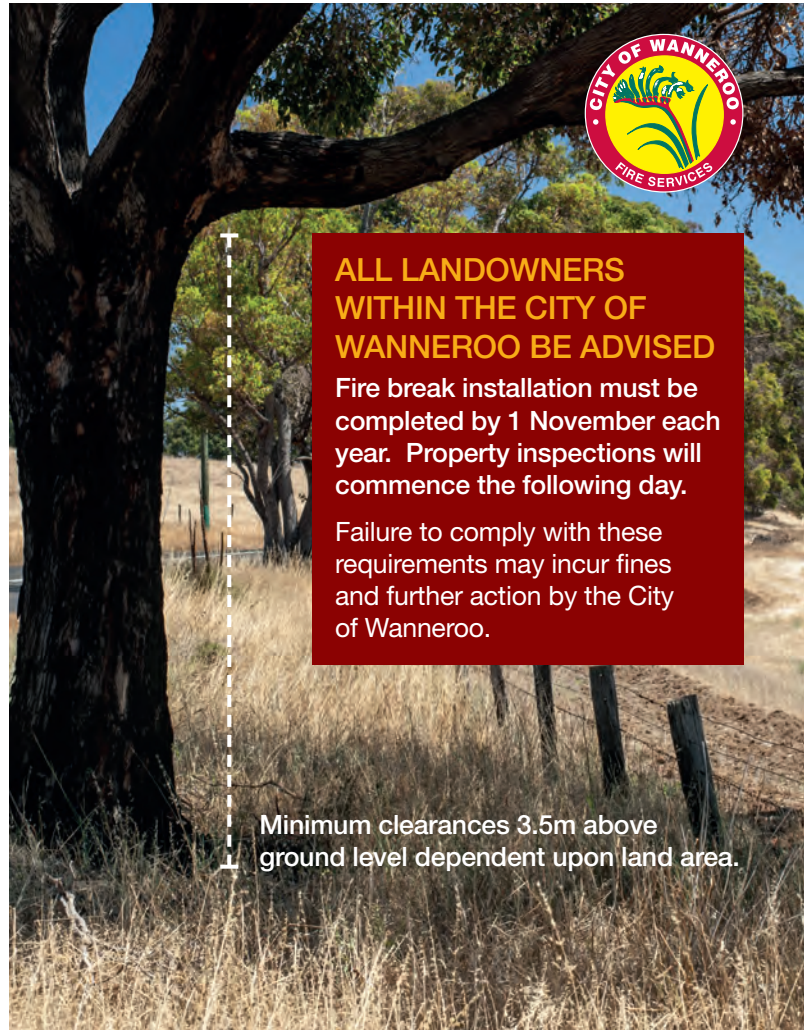
- Install and maintain a twenty (20) metre building protection zone surrounding all buildings, large hay stacks and fuel storage areas. A building protection zone includes undertaking measures such as pruning all lower tree branches to prevent fire entering the trees, ensuring three (3) metre spacing between tree canopies to prevent treetop fires spreading between trees, keeping all grasses to a height of not more than fifty (50) millimetres and storing all firewood piles more than twenty (20) metres away from the buildings.

APPLICATION TO VARY THE ABOVE REQUIREMENTS

If it is considered impracticable for any reason to implement any of the requirements of this Notice, application may be made not later than the 18th of October annually to the Council or its authorised officer for permission to provide alternative fire protection measures. If permission is not granted the requirements of this Notice must be complied with.

ADDITIONAL WORKS

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



Minimum clearances 3.5m above ground level dependent upon land area.



Non-compliant: no fire break installed inside boundary fence



Compliant: grass slashed to ground level



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



Compliant: mineral earth fire break



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



Compliant: cleared buffer zone around power poles

