



AS3959 Bushfire Attack Level Assessment Report

This report has been prepared using the Simplified Procedure (Method 1) as detailed in Section 2 of AS3959-2018.

Site Details	
Address:	Subdivision Stage 4 - Lake Treeby
Suburb:	Treeby WA 6164
Local Government Area	City of Cockburn
State:	Western Australia
Description of Building Works	Residential lots for Class 1 Dwellings

Report Details			
Report / Job Number:	2021-1199	Report Version	1.0
Assessment Date:	24/11/2022	Report Date	25/11/2022
Assessor Details			
Name:	Rohan Carboon		
Accredited Practitioner	Rohan Carboon Level 3 - BPAD 23160		

Disclaimer:

This report has been prepared in good faith and is derived from sources believed to be reliable and accurate at the time of publication. Nevertheless, this publication is distributed on the terms and understanding that the author is not responsible for results of any actions taken based on information in this publication or for any error in or omission from this publication.

Notwithstanding the precautions adopted in this report, it should always be remembered that bushfires burn under a wide range of conditions. An element of risk, no matter how small always remains. The objective of the standard (AS 3959:2018) is 'to prescribe particular construction details for buildings to reduce the risk of ignition from a bushfire while the front passes' (Standards Australia, 2018). Building to the standard (AS 3959:2018) does not guarantee a building will survive a bushfire.

Site Assessment and Site Plans

The assessment of this development was undertaken on 24/11/2022 by Bushfire Safety Consulting Pty Ltd for the purposes of determining the Bushfire Attack Level for each lot and dwelling in accordance with AS 3959 – 2018 Simplified Procedure (Method 1). The Stage 4 subdivision development creates a further 61 urban residential lots, one POS area and internal roads adjacent to an existing developed area. This assessment has been undertaken to provide BAL ratings for each lot and dwellings in the subdivision stage (below) as outlined in the vegetation classification map.






Vegetation Classification

All vegetation within 150m of the subdivision was classified in accordance with Clause 2.2.3 of AS 3959-2018. There is no vegetation on the lots, the entire area has been cleared and adjacent subdivision stages have also been cleared including the adjacent development. Roads and lots are nearing completion. Classified vegetation within 100 metres only occurs north of the stage in the Bush Forever Reserve and south in the Armadale road reserve.

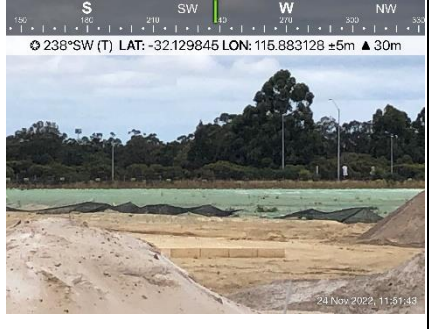




Class A forest and Class B woodland is north of the subdivision stage on the bushfire ever interface and Class C shrubland and Class D Scrub is the dominant vegetation in and south of Armadale Road.

The small Public Open Space (POS) reserve will be developed into a pocket park with turf and fuel load maintained vegetation.

Each distinguishable vegetation plot with the potential to determine the Bushfire Attack Level is identified below and outlined in the Vegetation Classification Plan.

<p>Photo ID: 1</p> <p>Plot Number: 2</p> <p>Vegetation classification or exclusion clause:</p> <p>Class A Forest</p> <p>Description/justification of classification:</p> <p>Remnant euclaypts, banksia trees and middle storey scrub vegetation with canopy exceeding 30% foliage cover.</p>	
<p>Photo ID: 2</p> <p>Plot Number: 2</p> <p>Vegetation classification or exclusion clause:</p> <p>Class A Forest</p> <p>Description/justification of classification:</p> <p>Remnant euclaypts, banksia trees and middle storey scrub vegetation with canopy exceeding 30% foliage cover.</p>	
<p>Photo ID: 3</p> <p>Plot Number: 4</p> <p>Vegetation classification or exclusion clause:</p> <p>Class B Woodland</p> <p>Description/justification of classification:</p> <p>Remnant banksia and allocasuarina trees with low shrubs vegetation with canopy foliage cover 10 - 30%.</p>	

<p>Photo ID: 4</p> <p>Plot Number: 4</p> <p>Vegetation classification or exclusion clause: Class B Woodland</p> <p>Description/justification of classification: Remnant banksia and allocasuarina trees with low shrubs vegetation with canopy foliage cover 10 - 30%.</p>	
<p>Photo ID: 5</p> <p>Plot Number: 9</p> <p>Vegetation classification or exclusion clause: Exclusion Clause 2.2.3.2(f)</p> <p>Description/justification of classification: Cleared area to be revegetated into managed parkland as per approved landscape plans</p>	
<p>Photo ID: 6</p> <p>Plot Number: 9</p> <p>Vegetation classification or exclusion clause: Exclusion Clause 2.2.3.2(f)</p> <p>Description/justification of classification: Cleared area to be revegetated into managed parkland as per approved landscape plans</p>	
<p>Photo ID: 7</p> <p>Plot Number: 10</p> <p>Vegetation classification or exclusion clause: Exclusion Clause 2.2.3.2(e)</p> <p>Description/justification of classification: Cleared development stages for residential lots – no threat vegetation – minimal vegetation proposed in urban landscape.</p>	
<p>Photo ID: 8</p> <p>Plot Number: 10</p> <p>Vegetation classification or exclusion clause: Exclusion Clause 2.2.3.2(e)</p> <p>Description/justification of classification: Cleared development stages for residential lots – no threat vegetation – minimal vegetation proposed in urban landscape.</p>	

<p>Photo ID: 9</p> <p>Plot Number: 10</p> <p>Vegetation classification or exclusion clause: Exclusion Clause 2.2.3.2(e)</p> <p>Description/justification of classification: Cleared development stages for residential lots – no threat vegetation – minimal vegetation proposed in urban landscape.</p>	
<p>Photo ID: 10</p> <p>Plot Number: 10</p> <p>Vegetation classification or exclusion clause: Exclusion Clause 2.2.3.2(e)</p> <p>Description/justification of classification: Cleared development stages for residential lots – no threat vegetation – minimal vegetation proposed in urban landscape.</p>	
<p>Photo ID: 11</p> <p>Plot Number: 10</p> <p>Vegetation classification or exclusion clause: Exclusion Clause 2.2.3.2(e)</p> <p>Description/justification of classification: Cleared development stages for residential lots – no threat vegetation – minimal vegetation proposed in urban landscape.</p>	
<p>Photo ID: 12</p> <p>Plot Number: 10</p> <p>Vegetation classification or exclusion clause: Exclusion Clause 2.2.3.2(e)</p> <p>Description/justification of classification: Cleared development stages for residential lots – no threat vegetation – minimal vegetation proposed in urban landscape.</p>	
<p>Photo ID: 13</p> <p>Plot Number: 10</p> <p>Vegetation classification or exclusion clause: Exclusion Clause 2.2.3.2(e)</p> <p>Description/justification of classification: Cleared development stages for residential lots – no threat vegetation – minimal vegetation proposed in urban landscape.</p>	

Relevant Fire Danger Index

The fire danger index for this site has been determined in accordance with Table 2.1 in AS3959–2018.

Fire Danger Index:	Table
FDI : 80	2.5

Effective Slope

The effective slope under the classified vegetation is outlined in the following table.

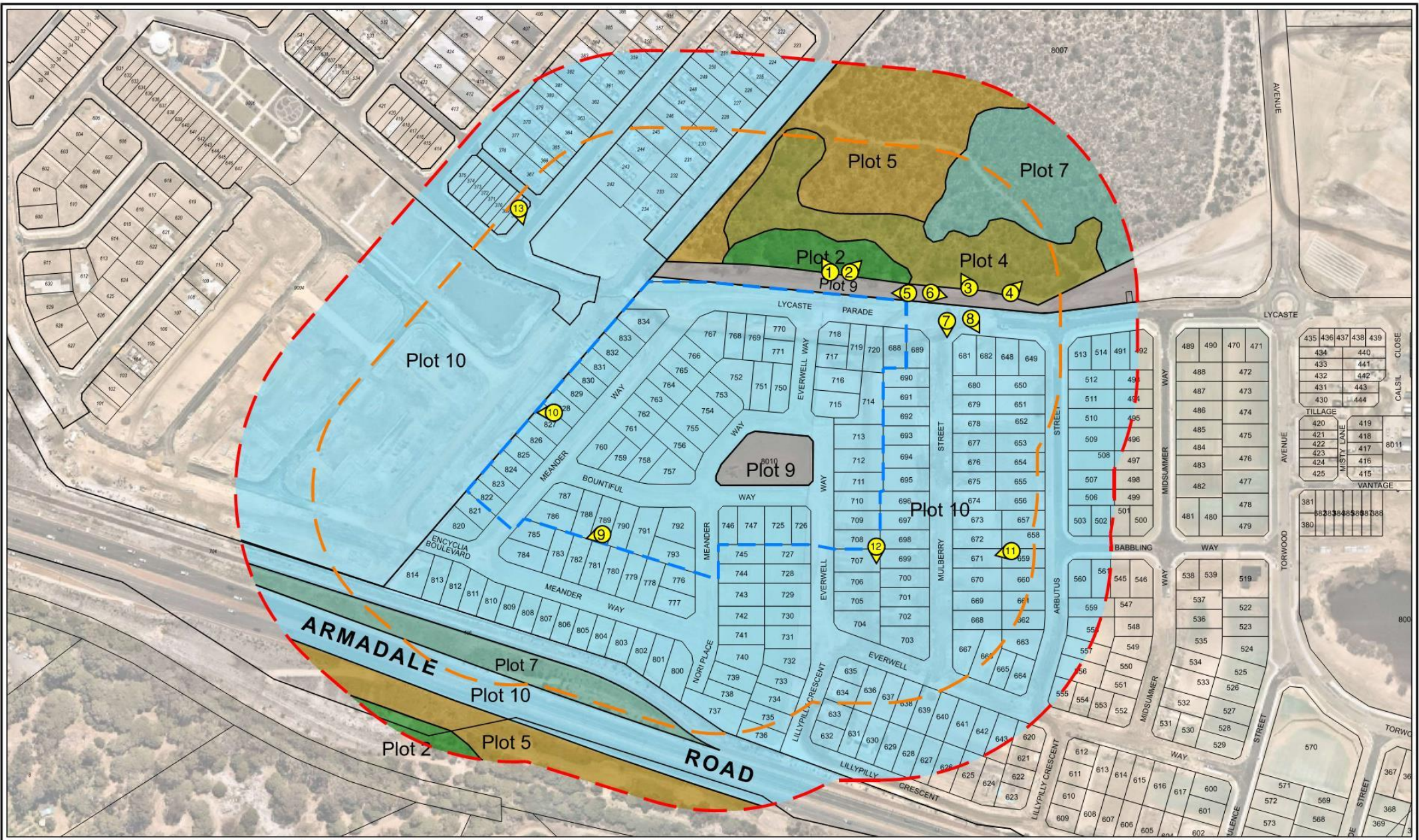
Plot No.	Classified Vegetation	Effective slope
2	Class A Forest	Flat/Upslope
4	Class B Woodland	Flat/Upslope
5	Class D Scrub	Downslope 0-5
7	Class C Shrubland	Flat/Upslope
9	Exclusion Clause 2.2.3.2(f)	N/A
10	Exclusion Clause 2.2.3.2(e)	N/A

Determined Bushfire Attack Level

The determined Bushfire Attack Level (highest BAL) for the lots and future dwellings has been determined in accordance with clause 2.2.6 of AS3959-2018 using the above analysis.

Potential Bushfire Impacts

The predicted radiant heat flux levels into the site from the assessment are outlined below in Table 1 and the BAL Contour Plan.



Location details: Lots 705 & 707 Armadale Road
Treeby - Stage 4

Assessment date: October, 2022

Prepared by: Bushfire Safety Consulting

Accreditation level: Level 3 BPAD Practitioner

Accreditation number: BPAD 23160

Accreditation expiry date: 31st January, 2023

Date aerial photo: August 2022

FIGURE 4 - VEGETATION CLASSIFICATION MAP (BAL CONTOUR MAP)

0 20 40 60 80 100m

SCALE 1:2300 @ A3

DATE: NOVEMBER 2022

- LEGEND:**
- SUBJECT LAND
 - ASSESSMENT AREA (150m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE
 - ASSESSMENT AREA (100m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE

Photo Location & Direction

SOURCE OF PHOTOGRAPHY: NEARMAP

- PLOT 1 CLASS A FOREST - DOWNSLOPE 0-5
- PLOT 2 CLASS A FOREST - FLAT/UPSLOPE
- PLOT 3 CLASS B WOODLAND - DOWNSLOPE 0-5
- PLOT 4 CLASS B WOODLAND - FLAT/UPSLOPE
- PLOT 5 - CLASS D SCRUB - DOWNSLOPE 0-5
- PLOT 6 - CLASS D SCRUB - FLAT/UPSLOPE
- PLOT 7 - CLASS C SHRUBLAND - FLAT/UPSLOPE
- PLOT 8 CLASS G GRASSLAND - FLAT/UPSLOPE
- PLOT 9 EXCLUSION CLAUSE 2.2.3.2(f)
- PLOT 10 - EXCLUSION CLAUSE 2.2.3.2(e)

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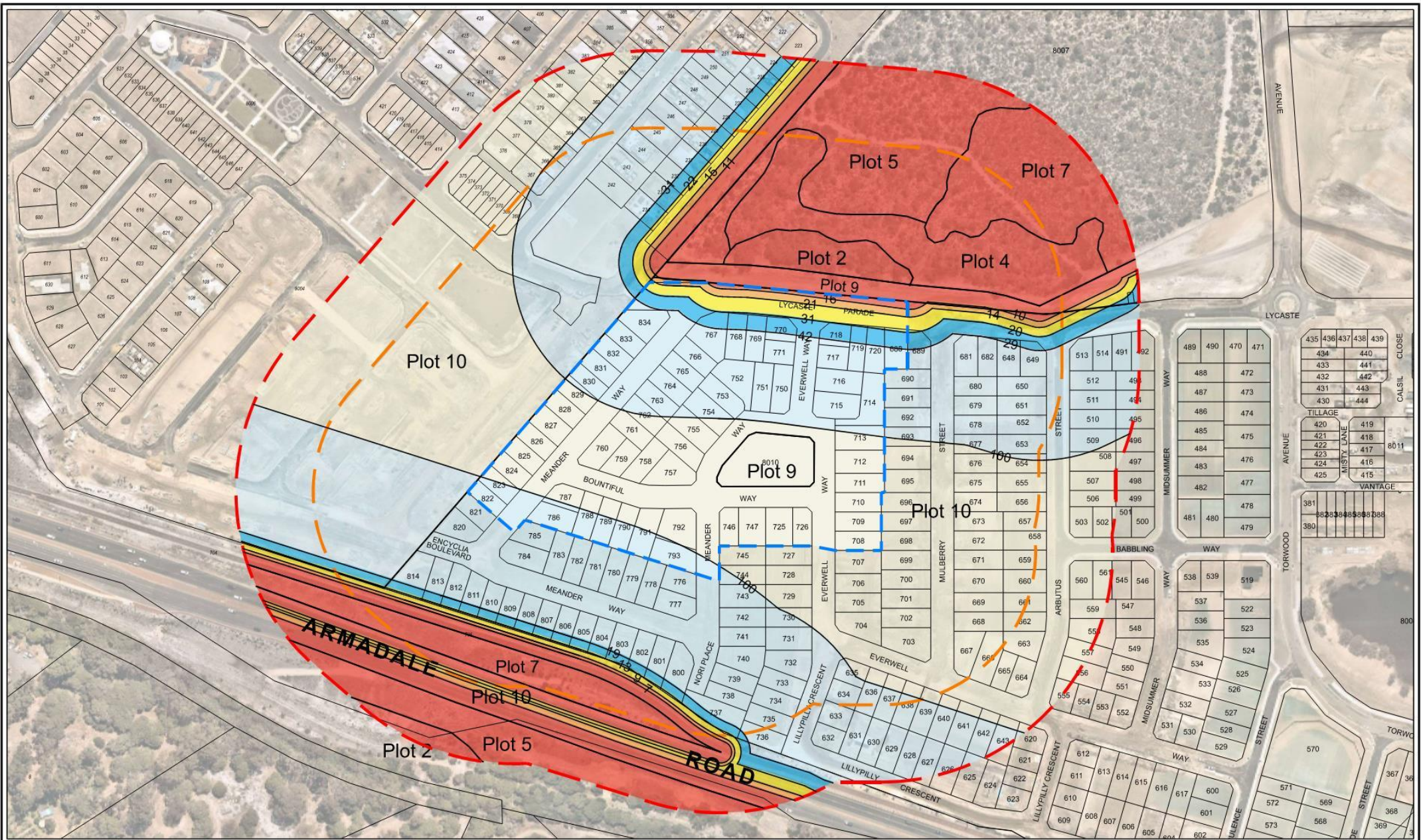
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Table 1: BAL Inputs and BAL Ratings						
Lots	Vegetation Class	Plot No.	Slope	Setback Distance		BAL Rating
				external	Internal lot	
708-712	Class A Forest	2	Flat / upslope	>100 metres	0	BAL-LOW
713	Class A Forest	2	Flat / upslope	92 metres	0	BAL-12.5
714	Class A Forest	2	Flat / upslope	59.5 metres	0	BAL-12.5
715	Class A Forest	2	Flat / upslope	74.5 metres	0	BAL-12.5
716	Class A Forest	2	Flat / upslope	60 metres	0	BAL-12.5
717	Class A Forest	2	Flat / upslope	45 metres	0	BAL-12.5
718	Class A Forest	2	Flat / upslope	30.5 metres	0.5 metres	BAL-19
719	Class A Forest	2	Flat / upslope	30 metres	1 metres	BAL-19
720	Class A Forest	2	Flat / upslope	29.5 metres	1.5 metres	BAL-19
688	Class A Forest	2	Flat / upslope	29 metres	2 metres	BAL-19
725-726	Class C Shrubland	7	Flat / upslope	>100 metres		BAL-LOW
746-747	Class C Shrubland	7	Flat / upslope	>100 metres		BAL-LOW
750-752	Class A Forest	2	Flat / upslope	61.5 metres		BAL-12.5
753	Class A Forest	2	Flat / upslope	71 metres		BAL-12.5
754	Class D Scrub	5	Flat / upslope	80 metres		BAL-12.5
755	Class D Scrub	5	Flat / upslope	91.5 metres		BAL-12.5
756-760	Class D Scrub	5	Flat / upslope	>100 metres		BAL-LOW
761	Class D Scrub	5	Flat / upslope	99.5 metres	0.5 metres	BAL-LOW
762	Class D Scrub	5	Flat / upslope	88.5 metres		BAL-12.5
763	Class D Scrub	5	Flat / upslope	77 metres		BAL-12.5
764	Class D Scrub	5	Flat / upslope	66 metres		BAL-12.5

BAL Assessment: Subdivision Stage 4 – Lake Treeby - Lots 705 & 707 Armadale Road, Treeby

Lot	Vegetation Class	Wind Speed (km/h)	Slope	Distance (metres)	Wind Exposure	BAL Rating
765	Class D Scrub	5	Flat / upslope	56.5 metres		BAL-12.5
766	Class D Scrub	5	Flat / upslope	46.5 metres		BAL-12.5
767-770	Class A Forest	2	Flat / upslope	32 metres		BAL-19
771	Class A Forest	2	Flat / upslope	47 metres		BAL-12.5
786	Class C Shrubland	7	Flat / upslope	81.5 metres		BAL-12.5
787	Class C Shrubland	7	Flat / upslope	96.5 metres		BAL-12.5
788-791	Class C Shrubland	7	Flat / upslope	81.5 metres		BAL-12.5
792	Class C Shrubland	7	Flat / upslope	98 metres	2 metres	BAL-LOW
793	Class C Shrubland	7	Flat / upslope	83 metres		BAL-12.5
822	Class C Shrubland	7	Flat / upslope	78.5 metres		BAL-12.5
823	Class C Shrubland	7	Flat / upslope	88 metres		BAL-12.5
824	Class C Shrubland	7	Flat / upslope	99.5 metres	0.5 metres	BAL-LOW
825-828	Class D Scrub	5	Flat / upslope	>100 metres		BAL-LOW
829	Class D Scrub	5	Flat / upslope	96 metres		BAL-12.5
830	Class D Scrub	5	Flat / upslope	85.5 metres		BAL-12.5
831	Class D Scrub	5	Flat / upslope	73 metres		BAL-12.5
832	Class D Scrub	5	Flat / upslope	60 metres		BAL-12.5
833	Class D Scrub	5	Flat / upslope	48 metres		BAL-12.5
834	Class D Scrub	5	Flat / upslope	31 metres		BAL-12.5



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FIGURE 5
BAL CONTOUR PLAN

0 20 40 60 80 100m
 SCALE 1:2300 @ A3
 DATE: NOVEMBER 2022



LEGEND:
 SUBJECT LAND
 ASSESSMENT AREA (150m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE
 ASSESSMENT AREA (100m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE

SOURCE OF PHOTOGRAPHY: NEARMAP

INDICATIVE BUSHFIRE ATTACK LEVELS

BAL LOW
 BAL 12.5
 BAL 19
 BAL 29
 BAL 40
 BAL FLAME ZONE

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Appendix 1: Additional Information / Advisory Notes

A Bushfire Attack Level (BAL) Assessment is a means of measuring the severity of a buildings potential exposure to ember attack, radiant heat and direct flame contact from a bushfire event, and thereby determining the construction measures required for the dwelling.

The method used to determination of the BAL rating, and subsequent building construction standards, are directly referenced from Australian Standard *AS3959-2018 Construction of buildings in bushfire prone areas*.

The BAL rating is determined through the identification and assessment of the following parameters:

- Fire danger Index (FDI) rating; assumed to be FDI-80 for Western Australia
- All classified vegetation **within 100m** of the subject building
- Separation distance between the building and the classified vegetation
- Slope of the land under the classified vegetation

AS3959-2018 has six (6) levels of BAL, based on the radiant heat flux exposure to the building, and also 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 and levels of exposure	Construction Sections (within AS3959)
BAL-LOW	See Clause 2.2.3.2	There is insufficient risk to warrant specific construction requirements	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 windbourne 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 windbourne 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 windbourne 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 fire front in addition to heat flux and ember attack	3 & 9