Land and environment consultants

16 November 2022

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Subject: Bushfire attack level assessment for Cadence Estate, stages 4a and 4b – 145 Binnies Road and 143-163 Daleys Road, Ripley, Queensland

1 Introduction

Land and Environment Consultants Pty Ltd (**LEC**) was engaged to undertake a bushfire attack level (**BAL**) assessment for the residential lots at Cadence Estate, stages 4a and 4b (**stages 4a and 4b**) at 145 Binnies Road and 143-163 Daleys Road, Ripley (**the site**), properly described as lots 349 and 366/S3173.

The approved subdivision plan for Cadence Estate which shows stages 4b and 4c is provided in Appendix 1.

The site is identified as a bushfire prone area by the Queensland State Planning Policy *Bushfire prone area map* and is a 'designated bushfire prone area' under Section 7 of the Queensland *Building Regulation 2021.* As a result, provisions of the *Building Code of Australia* (ABCB 2019) (**BCA**) and the *Queensland Development Code* (QG 2021) (**QDC**) that apply to a designated bushfire prone area apply to any building assessment work for the site.

Residential dwellings will be constructed in stages 4a and 4b. A residential dwelling is a BCA class 1a building. Compliance with the BCA and QDC requires BCA class 1a buildings, which are located in a designated bushfire prone area, to be designed and constructed in accordance with the BAL construction standards in the *Australian Standard* (**AS 3959-2018**) *Construction of buildings in bushfire prone areas* to reduce the risk of ignition from bushfire.

This report provides a BAL assessment for residential lots in stages 4a and 4b and identifies sections of AS 3959-2018 which are relevant to the construction of residential dwellings within these lots.

2 Classified vegetation and radiant heat exposure model

LEC prepared the bushfire management plan (LEC 2019) (**BMP**) for the site which includes stages 4a and 4b – Ipswich City Council application number 2834/2019/MAPDA/D.

The BMP provides an assessment of vegetation adjoining the site. It assessed land adjoining the northern and eastern boundaries of stages 4a and 4b as a non-bushfire hazard class.

Land adjoining the southern and western boundaries of stages 4a and 4b consists of other stages of Cadence Estate as shown in the approved subdivision plan in Appendix 1 and are a non-bushfire hazard class for the purpose of land use planning and development assessment.

The BMP assessed vegetation within 100 metres (**m**) of the north-western and south-western corners of stages 4a and 4b as classified vegetation. The classified vegetation adjacent to the north-west has since been cleared and is now a non-bushfire hazard class. However, the classified vegetation

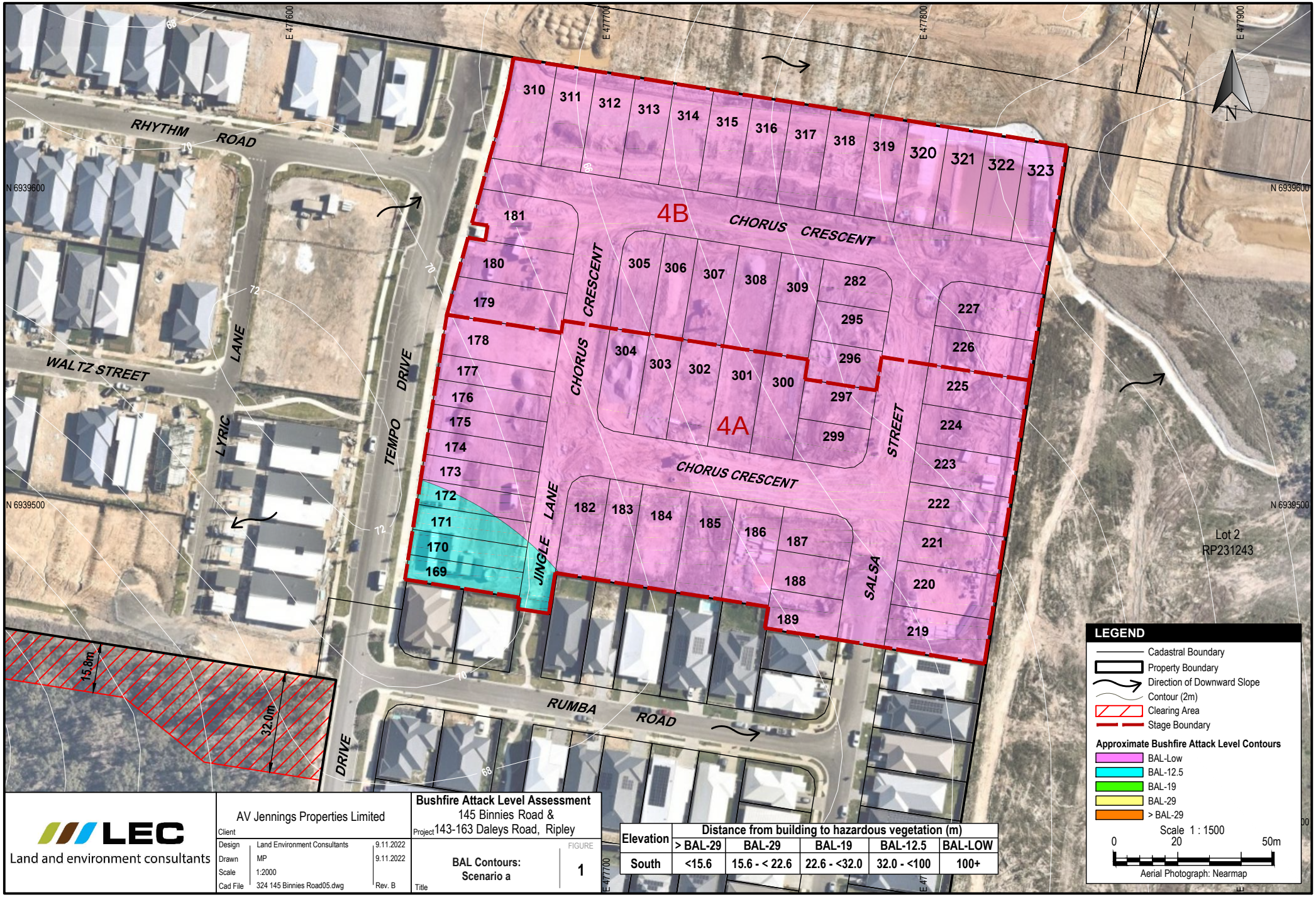
adjacent to the south-western corner is not cleared and remains a possible source of bushfire attack to stages 4a and 4b.

This report considers two scenarios for vegetation retention/management adjacent the south-western corner of stages 4a and 4b. The two scenarios are as follows:

a) a corridor of vegetation is cleared adjacent to the south-western corner of stages 4a and 4b as shown in Figure 1 (**Scenario a**); and

b) vegetation is not cleared adjacent to the south-western corner of stages 4a and 4b as shown in Figure 2 (**Scenario b**).

A radiant heat exposure model of bushfire attack from the classified vegetation adjacent to the south-western corner of stages 4a and 4b was prepared for the BMP and is provided in Appendix 2. It has been used in this report to assign BAL ratings to the residential lots within stages 4a and 4b under Scenario a and Scenario b of vegetation retention/management adjacent to the south-western corner of stages 4a and 4b.



Elevation	Distance from building to hazardous vegetation (m)				
	> BAL-29	BAL-29	BAL-19	BAL-12.5	BAL-LOW
South	<15.6	15.6 - < 22.6	22.6 - <32.0	32.0 - <100	100+

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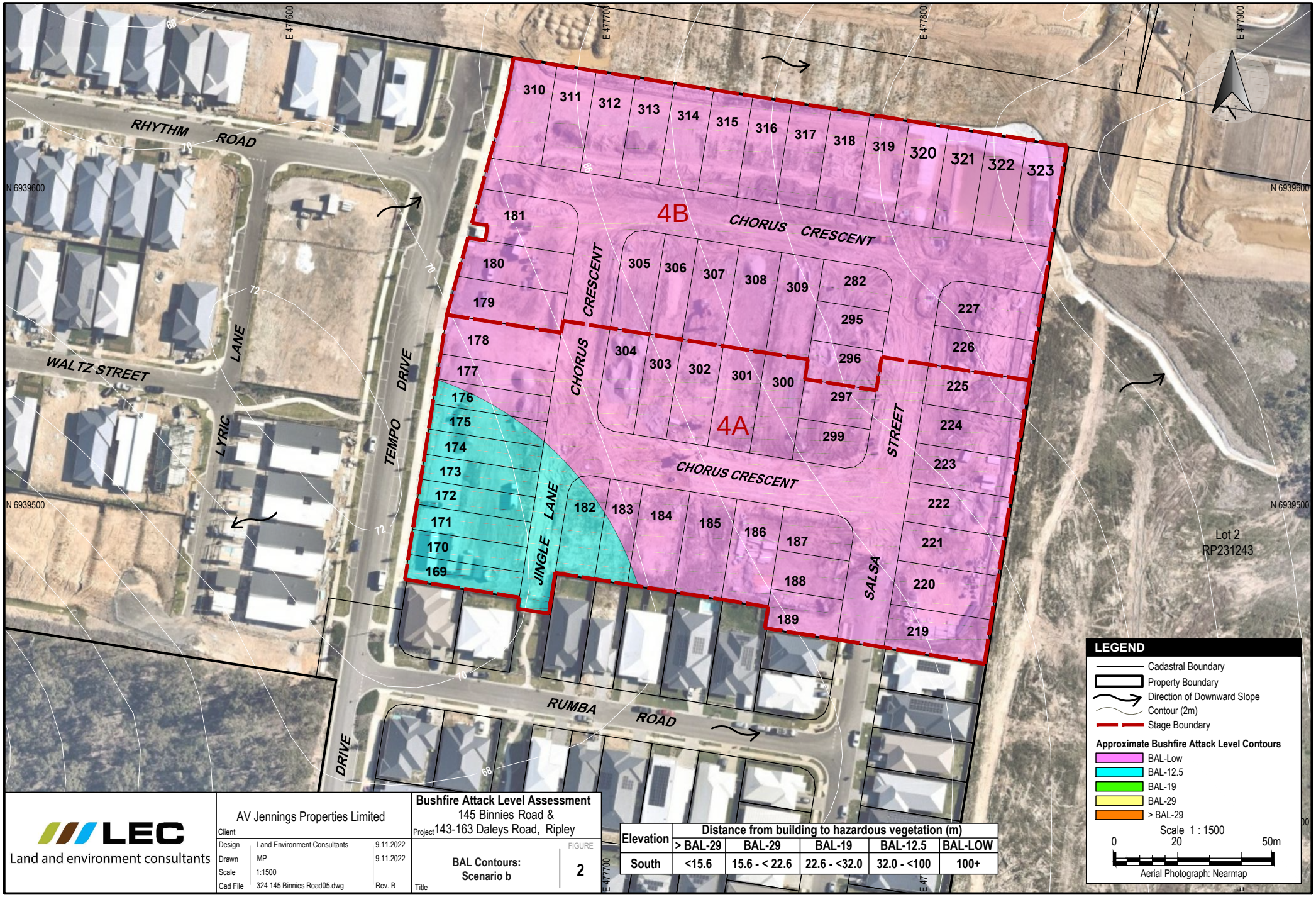
Client: AV Jennings Properties Limited

Design	Land Environment Consultants	9.11.2022
Drawn	MP	9.11.2022
Scale	1:2000	
Cad File	324 145 Binnies Road05.dwg	Rev. B

Bushfire Attack Level Assessment
145 Binnies Road &
Project 143-163 Daleys Road, Ripley

Title: **BAL Contours: Scenario a**

FIGURE 1



LEGEND

- Cadastral Boundary
- Property Boundary
- Direction of Downward Slope
- Contour (2m)
- Stage Boundary

Approximate Bushfire Attack Level Contours

- BAL-Low
- BAL-12.5
- BAL-19
- BAL-29
- > BAL-29

Scale 1 : 1500

0 20 50m

Aerial Photograph: Nearmap

Elevation	Distance from building to hazardous vegetation (m)				
	> BAL-29	BAL-29	BAL-19	BAL-12.5	BAL-LOW
South	<15.6	15.6 - < 22.6	22.6 - <32.0	32.0 - <100	100+

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Bushfire Attack Level Assessment
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Design	Land Environment Consultants	9.11.2022
Drawn	MP	9.11.2022
Scale	1:1500	
Cad File	324 145 Binnies Road05.dwg	Rev. B

Title: **BAL Contours: Scenario b**

FIGURE 2

3 Bushfire attack level assessment

AS 3959-2018 sets out the requirements for the construction of buildings in bushfire prone areas to improve their safety when they are subjected to burning debris, radiant heat or flame contact generated from a bushfire.

BALs are a means of measuring the severity of a building's potential exposure to ember attack, radiant heat and direct flame contact, using increments of radiant heat expressed in kilowatts/square metre, and are the basis for establishing requirements for construction to improve the protection of building elements to attack by bushfire.

The radiant heat exposure model in Appendix 2 identifies the separation distances required from the classified vegetation adjacent to the south-western corner of stages 4a and 4b to achieve different BAL ratings. The separation distances are summarised in Table 1.

Table 1 BAL separation distances

Bushfire attack	**Separation distances to achieve BAL ratings (metres)**				
	>BAL-29	**BAL-29**	**BAL-19**	**BAL-12.5**	**BAL-LOW**
South-western corner	< 15.6	15.6 - < 22.6	22.6 - < 32	32 - < 100	100+

The BAL contours over the residential lots within stages 4a and 4b under Scenario a and Scenario b of vegetation retention/management adjoining the south-western corner of stages 4a and 4b are shown in Figures 1 - 2, respectively. The BAL rating of the residential lots under these scenarios are identified in Table 2.

Table 2 BAL ratings of lots

Lot number	**BAL LOW**	**BAL-12.5**	**BAL-19**	**BAL-29**
Scenario a	173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 219, 220, 221, 222, 223, 224, 225, 226, 227, 282, 295, 296, 297, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322 and 323	169, 170, 171 and 172	-	-
Scenario b	177, 178, 179, 180, 181, 185, 186, 187, 188, 189, 219, 220, 221, 222, 223, 224, 225, 226, 227, 282, 295, 296, 297, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322 and 323	169, 170, 171, 172, 173, 174, 175, 176, 182, 183 and 184[1]		

Note 1 Micro-siting of a residential dwelling within lot 184 may reduce the BAL rating to the next lowest BAL rating, ie BAL-LOW.

4 BAL construction requirements

A residential dwelling must be constructed in accordance with the relevant BAL requirements of AS 3959-2018 based on the BAL rating of the lot which is identified in Table 2.

Please note, Table 2 identifies that the BAL rating of lot 184 under Scenario b of vegetation retention/management adjoining the southern boundary of the site could be reduced to the next lowest level with micro-siting of the residential dwelling within the lot.

Building design and construction specifications for BAL-LOW and BAL-12.5 are provided in the following sections of AS 3959-2018:

- BAL-LOW – section 4; and
- BAL-12.5 – sections 3 and 5.

5 Closing

This report provides a BAL assessment for the residential lots within stages 4a and 4b shown in the approved subdivision plan in Appendix 1. It considers Scenario a and Scenario b of vegetation retention/management adjoining the south-western corner of stages 4a and 4b and identifies sections of AS 3959-2018 which are relevant to the construction of residential dwellings within stages 4a and 4b.

Please contact the undersigned if you have any questions about this report.

Yours sincerely,

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Disclaimer

Notwithstanding the precautions adopted in this report, it should always be remembered that bushfires burn under a range of conditions. An element of risk, no matter how small always remains, and although AS 3959-2018 is designed to improve the performance of such buildings, there can be no guarantee, because of the variable nature of bushfires, that any building will withstand bushfire attack on every occasion.

It should be noted that upon lodgement of a development proposal, State Government, council and/or the fire service may recommend additional construction requirements.

Although every care has been taken in the preparation of this report, Land and Environment Consultants Pty Ltd accept no responsibility resulting from the use of the information in this report.

References

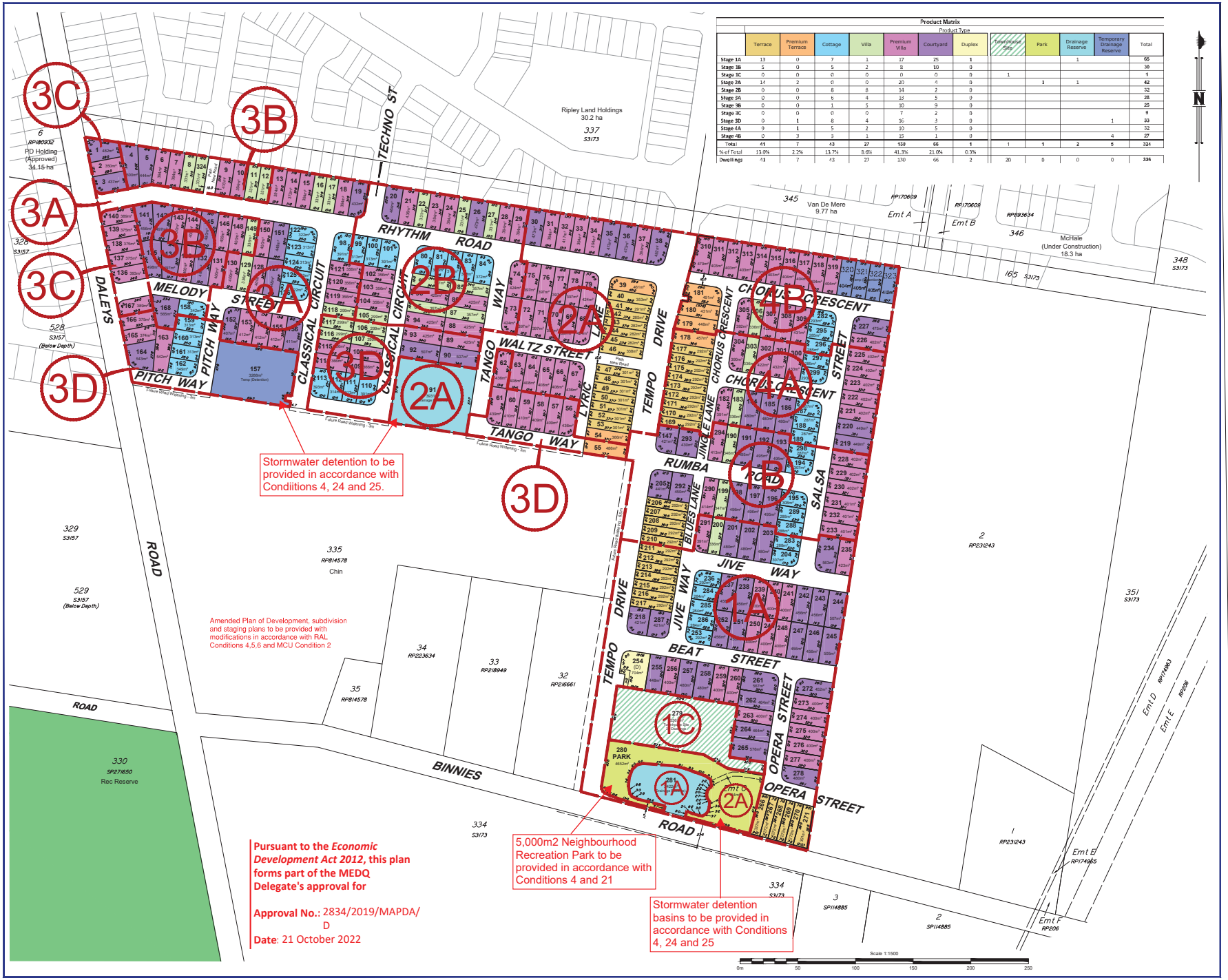
Australian Building Codes Board (ABCB) 2019, *National Construction Code Series, Building Code of Australia Class 1 and Class 10 Buildings, Volume 2*, Australian Government and States and Territories of Australia, Version 2.1 July 2020

Land and Environment Consultants (LEC) 2019, *Bushfire management plan – proposed development at 145 Binnies Road and 143-163 Daleys Road, Ripley, Queensland*, Report 19006, Final, 23 May 2019

Queensland Government (QG) 2021, *Queensland Development Code*, accessed online at https://www.business.qld.gov.au/industries/building-property-development/building-construction/laws-codes-standards/queensland-development-code, last updated March 2021

Standards Australia Limited (Standards Australia) 2018, *Australian Standard 3959-2018 Construction of buildings in bushfire prone areas*, Fourth edition, November 2018

Appendix 1 Approved subdivision plan



Product Matrix

Product Type

	Terrace	Premium Terrace	Cottage	Villa	Premium Villa	Courtyard	Duplex	Townhouse Site	Park	Drainage Reserve	Temporary Drainage Reserve	Total
Stage 1A	13	0	7	1	17	25	1			1		65
Stage 1B	5	0	5	2	8	10	0					30
Stage 1C	0	0	0	0	0	0	0	1				1
Stage 2A	14	2	0	0	20	4	0		1	1		42
Stage 2B	0	0	8	8	14	2	0					32
Stage 3A	0	0	5	4	13	5	0					28
Stage 3B	0	0	1	5	10	9	0					25
Stage 3C	0	0	0	0	7	2	0					9
Stage 3D	0	1	8	4	16	3	0				1	33
Stage 4A	9	1	5	2	10	5	0					32
Stage 4B	0	3	3	1	15	1	0				4	27
Total	41	7	43	27	130	66	1	1	1	2	5	324
% of Total	13.0%	2.2%	13.7%	8.6%	41.3%	21.0%	0.3%					
Dwellings	41	7	43	27	130	66	2	20	0	0	0	336

Norris Clarke & O'Brien Pty Ltd
NCB Licensed Surveyors Town Planners Development Consultants
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email: info@ncob.com.au
ACN 056 870 770 ABN 15 056 870 770

LEGEND:

- Stage Boundary
- 1A Stage Number

DEVELOPMENT SUMMARY

Terrace	(41)
Premium Terrace	(7)
Cottage	(43)
Villa	(27)
Premium Villa	(130)
Courtyard	(66)
(D) Duplex Housing (D)	(1) (2 Dwellings)
Townhouse Site	(1) (20 Dwellings)
Park	(1)
Drainage Reserve	(2)
Temporary Drainage Reserve (5)	

Total Site Area - 19.809 ha

Park Detention Area - 6353 m²

Park - 4652 m²

Total Lots - 324

Total Dwellings - 336

Overall Density - 17.0 dwellings/hectare

NOTES:
1. Drawn to scale on an A1 sheet.
2. All dimensions and areas are subject to ICC approval and confirmation by survey.

Issue	Revision	Int	Date
AD	Lot 157 added, Lots 325-331 & Stages 3E & 4C deleted	TJJ	12/09/2022
AC	Rate St replaced with pathway, Lots 8, 9 & 221-227 amended & Lot 324 added		23/06/2022
AB	Lot 157 removed & Lots 325-331 (Stage 3E) added	TJJ	16/06/2022
AA	Development Summary Table Added	TJJ	18/03/2022
Z	Stage Boundary amended 3A/3B	BRD	11/01/2022
Y	PMT / RMU Added to Stages 2A, 3A & 3C	BRD	15/09/2021
X	Stage Boundary amended 3A/3B/3C	BRD	26/07/2021
W	Stage Boundary amended 3C/3D	BRD	26/05/2021
V	Stage Boundary amended 2A/3D	BRJ	27/01/2021
U	Lots 39-54 Boundaries amended	BRJ	24/09/2020
T	Lots 280 & 281 amended, Emt C in Lot 280 added. Stage boundaries amended	BRJ	15/09/2020
S	Lots 266-271 & Gravel Access Hatching Removed	JEW	4/03/2020
R	Staging & Lots Update	JEW	12/12/2019
Q	Minor Update	SDS	27/08/2019
P	Lot Layout and Stage Boundaries Amended	SDS	31/07/2019
O	Road Names & Lot 254 Updated	JEW	24/06/2019
N	Stage 1A/1C Minor Amendment	JEW	13/03/2019
M	Stage 1A/1B Minor Amendment	JEW	5/11/2018
L	Road 1 Intersection	JEW	18/10/2018
K	Updated Layout	JEW	16/10/2018
J	Detention modified and Park Added	JEW	4/05/2018
I	Updated layout	JKC	15/03/2018
H	Updated Layout	JKC	8/03/2018

Title:

Plan of Proposed Subdivision of Lots 1-324 Staging Plan

(Cancelling Lots 336 & 349 on S3173)

Client: AV JENNINGS

Locality:	RIPLEY		
Local Gov:	ICC	Prepared By:	JKC
Surveyed By:		Approved:	SWM
Date Created:	27/11/2017	Scale:	1:1500
Comp File:			
Plan No:	08070_002_PRO		

A1

Appendix 2 Radiant heat exposure model

Bushfire attack from the south-west

- Forest fire danger index - 58
- Vegetation – VHC 10.1 *Spotted gum dominated open forest*
- Understorey fuel load – 20.8 t/ha
- Total fuel load – 20.8 t/ha[1]
- Effective slope – 3° down slope
- Site slope – 0° slope
- Flame width –100 m

Note 1 Total fuel load taken from *Bushfire Resilient Communities Technical Reference Guide for the State Planning Policy State Interest 'Natural Hazards, Risk and Resilience – Bushfire'* (QFES 2019) (**Bushfire resilient communities**).

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Calculated February 11, 2019, 3:22 pm (MDc v.4.8)

J19006 (N, S1)

Minimum Distance Calculator - AS3959-2009 (Method 2)			
Inputs		Outputs	
Fire Danger Index	58	Rate of spread	1.78 km/h
Vegetation classification	Forest	Flame length	14.07 m
Surface fuel load	20.8 t/ha	Flame angle	50 °, 60 °, 69 °, 75 °, 76 ° & 82 °
Overall fuel load	20.8 t/ha	Elevation of receiver	4.8 m (user defined value)
Vegetation height	n/a	Fire intensity	19,135 kW/m
Effective slope	3 °	Transmissivity	0.874, 0.856, 0.83, 0.804, 0.791 & 0.728
Site slope	0 °	Viewfactor	0.597, 0.4425, 0.3005, 0.204, 0.1658 & 0.045
Flame width	100 m	Minimum distance to < 40 kW/m²	11.69999999999997 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	15.59999999999996 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	22.60000000000005 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	32.00000000000018 m
		Minimum distance to < 10 kW/m²	38.00000000000027 m