
Bushfire management plan

Proposed reconfiguration of a lot | 2 Jarvis Road | Waterford | Queensland
Prepared for Oxford Heights Pty Ltd | 8 April 2020

Bushfire management plan

Final V1

Report 18056 | Prepared for Oxford Heights Pty Ltd | 8 April 2020

Prepared by Robert Janssen

Position Managing principal

Signature



Date 8 April 2020

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Document control

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Appendix 3	Bushfire hazard overlay code

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 3959-2009 is designed to improve the performance of such buildings, there can be no guarantee, because of the variable nature of bushfires, that any one building will withstand bushfire attack on every occasion.

It should be noted that upon lodgement of a development application, 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 accept no responsibility resulting from the use of the information in this report.

1 Introduction

Land and Environment Consultants (LEC) was engaged to undertake a bushfire hazard assessment and prepare a bushfire management plan for the proposed development (reconfiguring 1 lot into a 34 lot residential subdivision) at 2 Jarvis Road, Waterford (the site), properly described as lot 3/RP136027.

The site is affected by the Logan Planning Scheme 2015 *Bushfire hazard overlay* (Bushfire hazard overlay) map for medium and high potential bushfire hazard and potential impact areas. Therefore, under the Logan Planning Scheme 2015 *Bushfire hazard overlay code* (Bushfire hazard overlay code) a bushfire hazard assessment and bushfire management plan are required for the proposed development to ensure the risk of bushfire hazards associated with the site and the proposed development are identified and mitigated to a tolerable level.

This bushfire management plan has been prepared in general accordance with the Logan Planning Scheme 2015 *Policy 6 - Management of bushfire hazard* (Bushfire planning scheme policy). It documents the bushfire hazard assessment for the site and identifies strategies that the proposed development will implement to mitigate the potential impacts of bushfire on life, property and the environment and includes:

- an introduction (this section) and description of methods and information resources used for the bushfire hazard assessment;
- description of the site and the proposed development;
- bushfire hazard assessment;
- identification of bushfire hazards associated with the site;
- identification of bushfire hazards associated with the proposed development;
- radiant heat exposure assessment;
- a plan for mitigating bushfire hazards; and
- assessment of the proposed development against the Bushfire hazard overlay code.

1.1 Method

To meet the requirements of the Bushfire planning scheme policy the following steps were undertaken:

- desktop review of the Bushfire hazard overlay map on the Logan City Council online mapping system;
- desktop review of the Queensland regional ecosystem (RE) map (version 10), vegetation hazard class (VHC) map and severe fire weather map on the Queensland Fire and Emergency Services (QFES) online mapping system (redi-portal);
- assessment of the site and land within 100 m of the site, including:
 - vegetation characteristics and current management practices;
 - slope; and
 - evidence of previous fires;
- site-specific bushfire hazard assessment in accordance with Part B of the Queensland State Planning Policy (SPP) Natural Hazards, Risk and Resilience Technical Manual – A *‘fit-for-purpose’ approach in undertaking natural hazard studies and risk assessments* (April 2016) (SPP bushfire hazard assessment manual) and the patch and corridor filters in the Commonwealth Scientific and Industrial Research Organisation (CSIRO) guideline *Estimating the potential bushfire hazard of vegetation patches and corridors* (June 2017)(CSIRO patch and corridor filters);
- radiant heat exposure assessment using the Fire Protection Association of Australia *BAL calculator V4.7* which models the ‘method 2’ bushfire attack level (BAL) assessment procedure in the *Australian Standard for Construction of Buildings in Bushfire Prone Areas* (AS 3959-2009); and
- assessment of the proposed development against the Bushfire hazard overlay code.

Aerial imagery of the site was accessed online from Google Earth and the Queensland Globe to assist in validating observations and measurements made during the site assessment.

1.2 Suitably qualified person

This bushfire management plan was prepared by Robert Janssen who is a suitably qualified and experienced bushfire management consultant.

Robert is the managing principal at LEC and has over 20 years of experience in bushfire planning and operations. He has prepared bushfire management plans for residential, commercial and industrial property developments, utilities, government facilities and conservation estates.

Robert's formal qualifications as an environmental scientist and consulting experience are coupled with 10 years of experience as a fire-fighter with the national parks and wildlife service in New South Wales and Queensland.

2 Description of the site and the proposed development

2.1 Site description

The location of the site is shown on Figure 2.1. It is 2.026 hectares (ha), accessed from Easterly Street and is developed with a residential building, associated buildings and maintained vegetation, ie lawn with native specimen trees.

The site is surrounded by residential and commercial development with Easterly Street adjoining the north boundary and Jarvis Road adjoining the east boundary.

A waterway corridor which is mapped under the Logan Planning Scheme 2015 OM-13.00 *Waterway corridors and wetlands* map occurs along the south boundary of the site and has unmanaged vegetation.

The site will be cleared in preparation for civil works.

2.2 Proposed development

The proposed development involves reconfiguration of 1 lot into a 34 lot residential subdivision with roads and a 2,384 m² bio-retention basin/drainage reserve, as shown on the plan of development at Appendix 1. Proposed lots will range in size from 300-509 m².

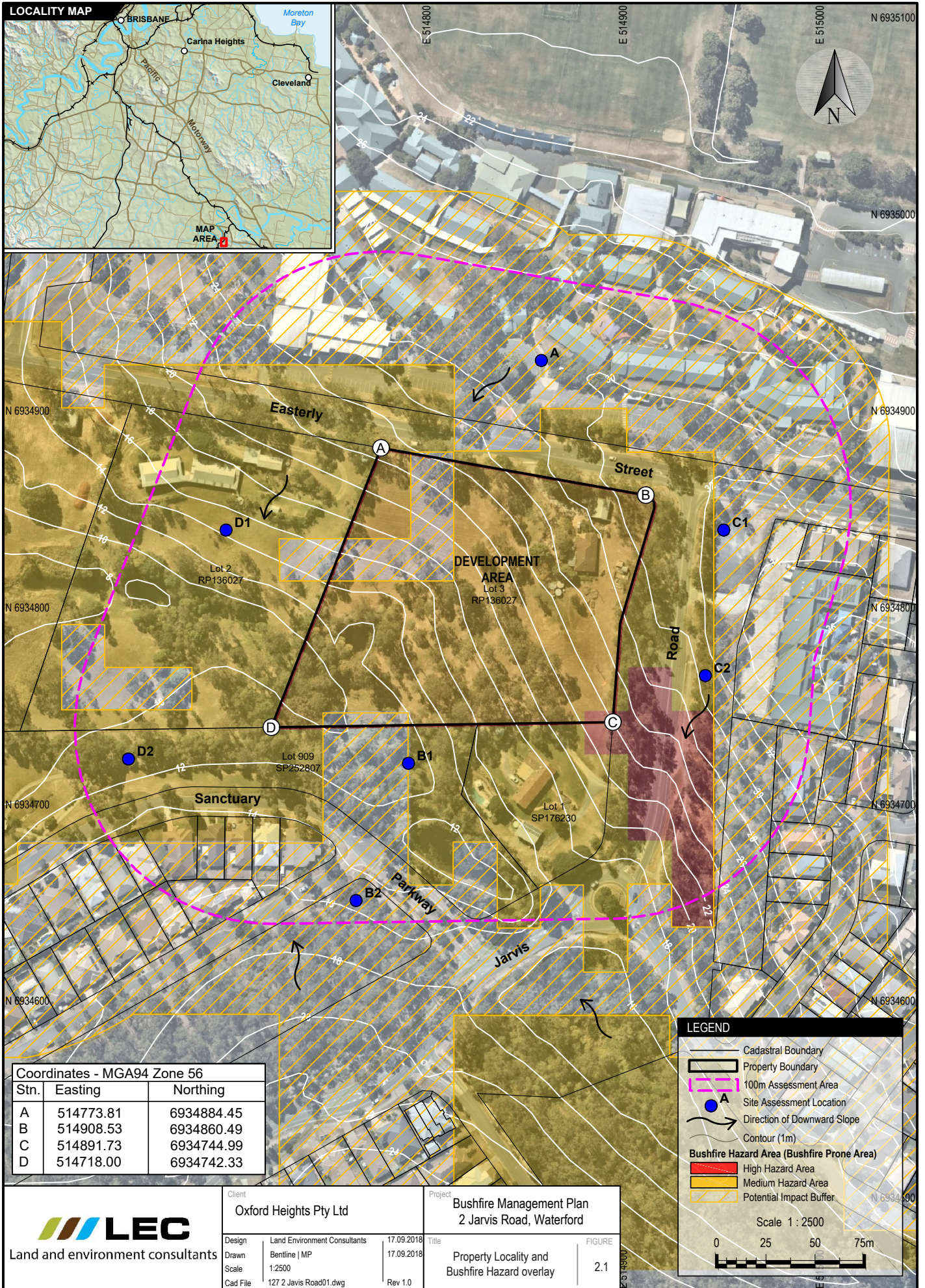
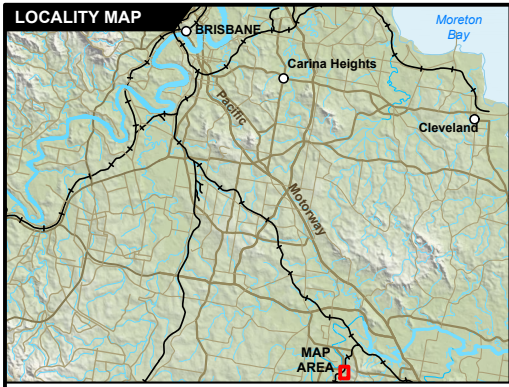
The proposed development will have access/egress via Easterly Street. However, additional future access to the site may be possible subject to future development. Access to lots 9-10 will be from a common property driveway.

The proposed bio-retention basin/drainage reserve adjoining part of the south boundary and waterway corridor will be subject to vegetation restoration typical of a bio-retention basin, ie groundcover species, and will be designed so that it does not exacerbate bushfire hazard on the site.

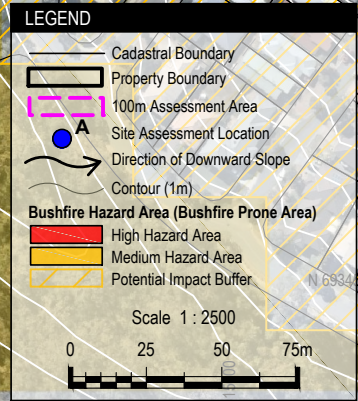
The proposed development will be connected to a reticulated water supply.

2.3 Bushfire hazard overlay

The Bushfire hazard overlay map for the site is presented on Figure 2.1 and shows most of the site is affected by a medium bushfire hazard area.



Coordinates - MGA94 Zone 56		
Stn.	Easting	Northing
A	514773.81	6934884.45
B	514908.53	6934860.49
C	514891.73	6934744.99
D	514718.00	6934742.33



 Land and environment consultants	Client Oxford Heights Pty Ltd			Project Bushfire Management Plan 2 Jarvis Road, Waterford		
	Design	Land Environment Consultants	17.09.2018	Title	FIGURE	
	Drawn	Bentline MP	17.09.2018	Property Locality and Bushfire Hazard overlay	2.1	
	Scale	1:2500				
	Cad File	127 2 Jarvis Road01.dwg	Rev 1.0			

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3 Bushfire assessment

3.1 Site assessment

Prior to the bushfire hazard assessment, VHC mapping was reviewed on redi-portal so that it could be compared with observations from the site assessment.

The site assessment was performed by LEC on 1 September 2018 and focused on land within 100 m of the site. The location of site assessment points is shown on Figure 2.1. Table 3.1 provides a summary of observations from the site assessment which are also shown in Photographs 3.1-3.5.

Table 3.1 Site observations

Assessment Point	Redi-portal VHC	Ground truthed VHC	Notes
A	VHC 41.4 <i>Discontinuous low grass or tree cover</i> (VHC 41.4)	VHC 41.4	Easterly Street road corridor and a school. Vegetation is associated with street scape plantings and landscaping within the school and best correlates with VHC 41.4. VHC 41.4 has a potential fuel load of 3 tonnes/hectare (t/ha) ¹ and is a non-bushfire prone vegetation hazard class.
B1	VHC 16.1 <i>Eucalypt dominated forest on drainage lines and alluvial plains</i> (VHC 16.1)	VHC 16.2 <i>Eucalypt dominated woodland on drainage lines and alluvial plains</i> (VHC 16.2)	50 m wide corridor of unmanaged vegetation on the mapped waterway corridor and north of Sanctuary Parkway. Vegetation has an open canopy and better correlates with a woodland than open forest. Unmanaged vegetation is 2° upslope of the site when measured perpendicular to the south boundary.
B2	VHC 41.4	VHC 10.2 <i>Spotted gum dominated woodland</i> (VHC 10.2)	> 3 ha continuous patch of unmanaged vegetation south of Sanctuary Parkway. The vegetation occurs in corridor which is > 50 m wide and is separated from vegetation at B1 by a 20 m wide road corridor, ie Sanctuary Parkway. Unmanaged vegetation is 2° upslope of the site when measured perpendicular to the south boundary.
C1	VHC 42.6 <i>Nil to very low vegetation cover</i> (VHC 42.6)	VHC 42.6	Jarvis Road and commercial building with carpark. VHC 42.6 has a potential fuel load of 2 t/ha ¹ and is a non-bushfire prone vegetation hazard class.
C2	VHC 41.4	VHC 10.2	< 50 m corridor of unmanaged vegetation on east side of Jarvis Road.
D1	VHC 41.4	VHC 40.4 <i>Continuous low grass or tree cover</i> (VHC 40.4)	Rural residential property with managed vegetation consisting of gardens and lawn with native specimen trees. VHC 40.4 has a potential fuel load of 5 t/ha ¹ and is a non-bushfire prone vegetation hazard class.
D2	VHC 40.4	VHC 40.4	Parkland with low cut grass, walkways and native specimen trees.

Table 3.1 Site observations

Assessment Point	Redi-portal VHC	Ground truthed VHC	Notes
			VHC 40.4 has a potential fuel load of 5 t/ha ¹ and is a non-bushfire prone vegetation hazard class.
Notes	1 potential fuel load taken from the Queensland Fire and Emergency Services guideline <i>Vegetation hazard class descriptions and fuel characteristics – January 2017</i>		



Photograph 3.1 Site assessment area A



Photograph 3.2 Site assessment area B1



Photograph 3.3 Site assessment area B2



Photograph 3.4 Site assessment area C2



Photograph 3.5 Site assessment area D1

3.2 Bushfire hazard assessment

The bushfire hazard assessment in this report is based on the method in Part B of the SPP bushfire hazard assessment manual and the CSIRO patch and corridor filters.

3.2.1 Bushfire hazard area patch and corridor filters

Vegetation at assessment points A, C1, D1 and D2 do not require assessment against the CSIRO patch and corridor filters because the vegetation, ie VHC 40.4, VHC 41.4 and VHC 42.6, has a low potential fuel load and is a non-bushfire prone hazard class.

Vegetation at assessment point B1 is not sufficiently separated from vegetation at B2 to meet the CSIRO patch and corridor filters for *sub-hectare patches*. In combination, assessment points B1 and B2 form a continuous patch > 2 ha and generally > 50 m wide. Therefore, vegetation at assessment points B1 and B2 require further assessment to quantify their level of bushfire hazard, ie potential bushfire intensity calculation.

Vegetation at assessment point C2 occurs in a corridor on the verge of Jarvis Road. Unmanaged vegetation is < 50 m wide and meets the CSIRO patch and corridor filters for *narrow corridors*. Such corridors are removed from further assessment because they are not sufficiently wide/large enough to support a fully developed flame front. As a result, these areas are considered as low hazard in a planning context.

3.2.2 Potential bushfire intensity calculations

The potential bushfire intensity of assessment points B1 and B2 were determined using the QFES *Potential Bushfire Intensity Calculator* (version November 2014) which models the bushfire hazard assessment method in the SPP bushfire hazard assessment manual.

The severe fire weather map on the QFES redi-portal indicates the 5 % annual exceedance probability forest fire danger index (FDI) for the site is 53. Therefore, FDI 53 was used in the potential bushfire intensity calculations.

The results are presented in Table 3.2 and are based on the observations summarised in Table 3.1.

Table 3.2 Potential bushfire intensity

Assessment Point	Ground truthed VHC	Potential fuel load (t/ha)	Slope (°)	Potential fire intensity (kW/m)	Bushfire hazard class
B1	VHC 16.2	11.6	2°	4,989	Medium
B2	VHC 10.2	18	2°	12,222	Medium

3.3 Bushfire hazard areas

The results of the potential fire intensity calculations indicate the unmanaged woodland vegetation in the waterway corridor adjoining the south boundary of the site is a medium bushfire hazard area.

In the event of a fire, land adjacent a medium bushfire hazard area is vulnerable to exposure to radiant heat, ember attack and burning debris. To mitigate these potential impacts, the SPP bushfire hazard assessment manual applies a 100 m wide potential impact buffer to medium bushfire hazard areas. Land affected by a potential impact buffer is defined as a bushfire hazard area for planning purposes.

Although the site will be cleared of vegetation under the proposed development, proposed lots within 100 m of the south boundary will remain vulnerable to bushfire attack. Therefore, it is concluded from the bushfire hazard assessment that the site is affected by a bushfire hazard area and the proposed development is subject to demonstrating compliance with relevant performance outcomes sought under the Bushfire hazard overlay code.

4 Bushfire hazards associated with the site

This chapter identifies bushfire hazards associated with the site.

4.1 Fire danger season

The fire danger season in South-east Queensland starts in August, peaks in September and begins to fall in November, but will remain elevated until consistent summer rainfall occurs. Typically, the worst fire weather conditions will be experienced during the fire danger season when the wind direction is from the north.

Fire Danger Index (FDI) values represent the chance of a fire starting, its rate of spread, its intensity and the difficulty of its suppression, according to various combinations of air temperature, relative humidity, wind speed and both the long and short-term drought effects. The severe fire weather map accessed on the redi-portal indicates the 5% annual exceedance probability FDI for the site is 53.

Fire danger ratings (FDR) are based on the forecast weather conditions, ie FDI, and give advice about the level of bushfire threat on a particular day. An FDI of 53 is commensurate with a very high FDR and will be associated with hot, dry and windy conditions. If a fire starts and takes hold under these conditions, it may be difficult to control in natural areas.

4.2 Fire history

No evidence of recent fire was observed in the assessment area, ie there was no charring on trees, stumps or timber fence posts. This does not mean the site will not be subject to a fire in the future but suggests a broadscale fire incident is unlikely, particularly given the pattern of adjacent urban residential land development.

4.3 Likely direction of bushfire attack

The likely direction of bushfire attack on the proposed development is from the south where medium bushfire hazard areas occur. This bushfire attack scenario is further assessed in Chapter 5.

4.4 Potential bushfire hazard for adjacent land use

The site is surrounded by commercial and residential development and bushland open space which are not land uses considered a bushfire hazard to the proposed development.

5 Proposed development bushfire hazard

This chapter identifies bushfire hazards associated with the proposed development.

5.1 Site activities and usage patterns

The primary use of the proposed development is for a residential purpose which will not increase the risk of bushfire hazard to adjacent properties.

5.2 Hazardous chemical storage

The proposed development will not involve the storage or handling of hazardous chemicals in bulk. Hazardous chemical storage and use is expected to be consistent with typical household patterns.

5.3 Vulnerable use and essential community infrastructure

Vulnerable uses and essential community infrastructure are not included in the proposed development.

5.4 Landscaping

The proposed development includes a 2,384 m² bio-retention basin/drainage reserve and will be subject to vegetation restoration plantings which will be designed so that plantings do not exacerbate bushfire hazard on the site.

Landscaping around buildings on proposed lots will consist of hard and soft areas including driveways, footpaths, lawn and landscaped gardens.

5.5 Access and egress

Efficient access for fire-fighters and the orderly evacuation of occupants will be provided by public roads which provide direct access to Easterly Street. Emergency vehicle manoeuvring will be assisted by the inclusion of an internal ring road.

Additional access/egress to the proposed development is possible in the future as adjacent development occurs south of the site.

Public roads will be designed to comply with relevant 'movement infrastructure' standards and policies in the Logan Planning Scheme 2015 for vertical and horizontal road clearance, road construction, road grades and turning areas.

5.6 Warning and evacuation requirements

Queensland emergency services use a range of methods to warn the community about bushfire, severe weather and other emergencies that require preparation and action at the property level. Future occupants of the proposed development will be subject to advice and warnings by Queensland Fire and Emergency Services via radio, online media, and local community safety announcements.

5.7 Fire-fighter water supply

Hydrants will be in positions that enable fire services to access water safely, effectively and efficiently. They will also be identified so that fire services can locate them at all hours.

The proposed development will be connected to a reticulated water supply scheme. During the detailed design phase of the proposed development, water supply and pressure will be tested (and if required augmented) to ensure that it has sufficient flow and pressure characteristics for fire-fighting purposes at all times.

5.8 Radiant heat exposure

As discussed in Section 4.3, the likely direction of bushfire attack on the site is from the south where unmanaged vegetation occurs along a waterway corridor and a natural area open space reserve. The Fire Protection Association of Australia *BAL calculator version 4.7* was used to model this bushfire attack scenario to determine the 29 kW/m² radiant heat exposure contour within the site. The model inputs and calculations are provided in Appendix 2 and determined that land within 6 m of unmanaged vegetation in the waterway corridor will be exposed to radiant heat > 29 kW/m².

6 Bushfire mitigation plan

This chapter identifies measures that will be implemented for the proposed development to reduce the risk of bushfire hazards to a tolerable level.

It is the total of the actions in this report that will reduce the risk of bushfire hazards to a tolerable level. Failure to implement all actions in their entirety could result in an increased level of exposure to the bushfire hazards.

6.1 Bushfire protection zone

The 29 kW/m² radiant heat exposure contour is shown on Figure 6.1 and is to be established as a bushfire protection zone over proposed lots 18 and 20-21.

The effects of the bushfire protection zone on the developer include:

- *a registered surveyor must survey and peg the bushfire protection zone on each lot;*
- *the bushfire protection zone must be shown on site plans;*
- *fencing and retaining walls exposed to the bushfire protection zone must be constructed with non-flammable materials; and*
- *prospective purchasers of these lots must be notified of the effects of the bushfire protection zone.*

The effects of the bushfire protection zone on prospective purchasers include:

- *Building Code of Australia class 1 and associated class 10 residential buildings are not permitted in the bushfire protection zone;*
- *swimming pools, hardened pathways and lawn locker garden sheds are permitted in the bushfire protection zone;*
- *fencing, retaining walls and lawn locker garden sheds in the bushfire protection zone must be constructed from non-flammable materials;*
- *grass in the bushfire protection zone must be maintained as lawn, ie < 100 mm in height;*
- *gardens will not be planted against buildings adjacent the bushfire protection zone;*
- *gardens in the bushfire protection zone will favour less flammable species with high moisture content, high salt content, and low levels of fine fuel and/or oil content; and*
- *a 1 m wide pedestrian access path from the street to the bushfire protection zone must be maintained for emergency services always.*

6.2 Building design and construction

The site is affected by the Bushfire overlay map and is defined as a 'bushfire prone area' under the Queensland Building Regulation 2006.

Proposed *Building Code of Australia* class 1 and associated class 10 residential buildings will be designed and constructed in accordance with relevant BAL construction specifications in AS 3959-2009.

A BAL assessment will be performed on proposed lots for building approvals when civil works to establish proposed lots are nearing completion.

6.3 Emergency services access

Public roads will be designed to comply with relevant 'movement infrastructure' standards and policies in the Logan Planning Scheme 2015.

Access/egress for emergency vehicles and the evacuation of occupants is via Easterly Road as shown on Figure 6.1. However, there is potential for addition future vehicle access/egress to the site subject to future development.

6.4 Hydrants

Fire-fighter water supply and hydrants will be supplied in accordance with the local water retailer's specifications or the *Australian Standard for Fire Hydrant installations – Part 1: System design, installation and commissioning* (AS 2419.1-2005).

Hydrants will be in positions that enable fire services to access water safely, effectively and efficiently and will be identified with marker posts or blue cats eye markers on the road so that they can be located at all hours.

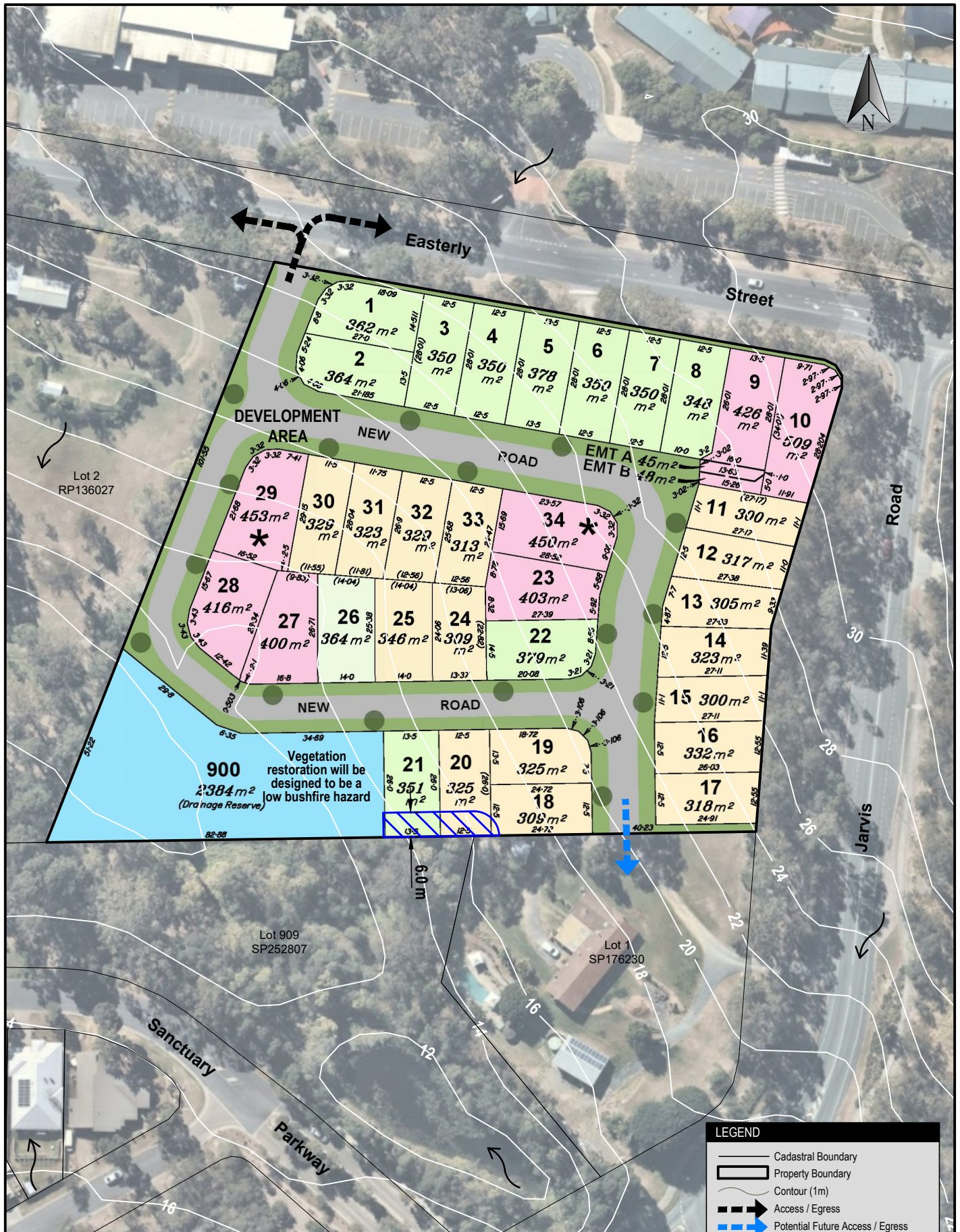
6.5 Vegetation restoration in bio-retention basin/drainage reserve

Vegetation restoration in the bio-retention basin/drainage reserve will be designed so that it does not exacerbate bushfire hazard on the site.

Plantings in the bio-retention basin/drainage reserve will consist of groundcover species only.

Tree planting is permissible in the bio-retention basin/drainage reserve provided trees are planted so that when they reach maturity their canopies are not connected and do not overhang the boundary of proposed lot 21.

Shrub plantings are permissible in the bio-retention basin/drainage reserve provided they are grouped into patches that do not cover > 30 % of the drainage reserve.



7 Conclusion

This bushfire management plan was prepared in general accordance with the Bushfire planning scheme policy.

A bushfire hazard assessment confirmed the proposed development is affected by bushfire hazard and is subject to compliance with the outcomes sought under the Bushfire hazard overlay code.

Mitigation measures for the proposed development include a bushfire protection zone, compliance with AS 3959-2009, design specifications for roads and fire-fighter water supply and design criteria for landscaping in the bio-retention basin/drainage reserve.

With the implementation of the mitigation measures in this report, the proposed development generally complies with the outcomes sought under the Bushfire hazard overlay code as shown at Appendix 3.

References

Australian Building Codes Board (ABCB) 2016, *National Construction Code Series, Building Code of Australia Class 2 to Class 9 Buildings, Volume 1*, Australian Government and States and Territories of Australia, May 2016

Australian Building Codes Board (ABCB) 2016, *National Construction Code Series, Building Code of Australia Class 1 and Class 10 Buildings, Volume 2*, Australian Government and States and Territories of Australia, May 2016

Commonwealth Scientific and Industrial Research Organisation (CSIRO) 2014, *A new methodology for State-wide mapping of bushfire prone areas in Queensland*, CSIRO and State of Queensland 2014

Queensland Department of Infrastructure, Local Government and Planning (DILGP) 2016, *State Planning Policy Natural Hazards, Risk and Resilience Technical Manual – A 'fit-for-purpose' approach in undertaking natural hazard studies and risk assessments*, April 2016

Standards Australia Limited (Standards Australia) 2005, *Australian Standard 3959-2009 Construction of buildings in bushfire prone areas*, Incorporating amendments 1, 2 and 3, 10 March 2009

Standards Australia Limited (Standards Australia) 2009, *Australian Standard for Fire Hydrant installations – Part 1: System design, installation and commissioning*, reissued incorporating amendment No. 1, June 2007

Appendix 1 Plan of development

Development Summary

Site Area:

2.026 ha

Existing Lots:

1 Lot

Proposed Additional Lots:

34 Lots

Drainage Reserve:

2384 m²

Total Lots:

35 Lots

Area of New Road:

4768 m²

Easements A & B for access and services in favour of Lots 9 & 10.

RP Description:

Lot 3 on RP136027

Local Authority:

Logan City Council

Notes

Design, areas and dimensions are conceptual and for discussion purposes only and subject to detailed investigations, survey, design and relevant authority approvals.

Allotments intended for residential dwellings.

For building setbacks, refer to Drawing S-9904-003-A.

Legend

Subject Boundary

Lot sizes 300 m² - 349 m²

Lot sizes 350 m² - 399 m²

Lot sizes 400 m² - 600 m²

Drainage Reserve

*

Possible Auxiliary Unit Lot



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Drawing Ref: S-9904-001-E
Date: 6 February 2020
Scale: 1:600 @ A3
0 6 12 18m
1 : 600@A3 (Before Reduction)

"Oxford Woods" Estate
2 Jarvis Road, Waterford
for Ritz Group & Oxford Heights Pty Ltd

Appendix 2 Radiant heat exposure calculations

South

- Forest fire danger index - 53
- Vegetation – VHC 16.2 *Eucalypt dominated woodland on drainage lines and alluvial plains*
- Overall fuel load – 11.6 t/ha
- Surface fuel load – 11.1 t/ha
- Slope – 2° up slope
- Site slope – flat
- Flame width – 28 m (based on short-run fire flame width calculation and run length of 150 m)

Short-run fire flame width calculations

The shape and growth of a fire run can be determined mathematically and presented as an ellipse as shown in Figure 1.

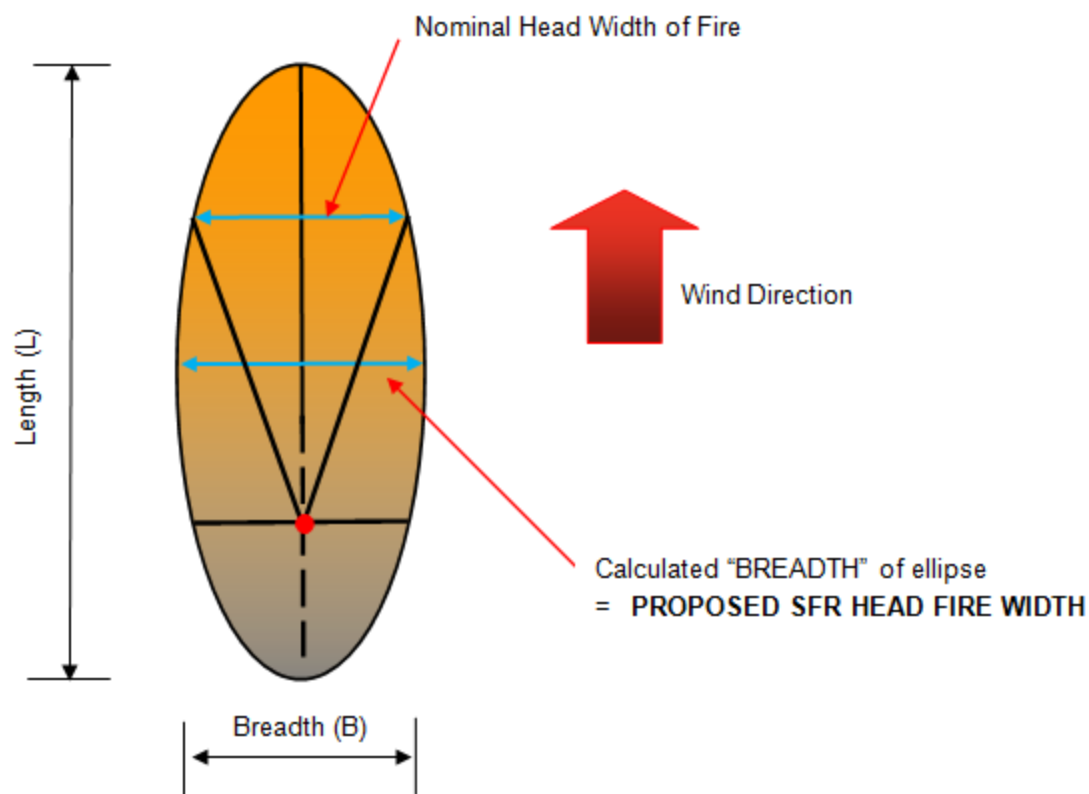


Figure 1 Schematic diagram of a simple elliptical fire growth model

The two basic dimensions of an elliptical fire outline are its length and breadth. The shape factor identified is more commonly referred to as the length-to-breadth ratio or L/B. The L/B ratio is determined by dividing the total fire length by the maximum fire width or breadth

L/B ratio

The short-run fire head width represents the horizontal dimension of the view factor used in the BAL model. To calculate the short-run fire head width we need to determine the L/B ratio using the following equation:

$$\text{L/B ratio} = 1.0 + 0.0012V^{2.154}$$

where

V = wind speed kilometres (km)/hour (hr) (AS 3959-2009 standard is 45 km/hr)

$$L/B \text{ ratio} = 1.0 + (0.0012 \times 45)^{2.154}$$

$$L/B \text{ ratio} = 5.4$$

Flame width

The breadth or short-run fire head width is determined by rearranging the L/B ratio equation.

If

$$L/B \text{ ratio} = 5.4$$

Then

$$B = L/5.4$$

Bushfire attack from the west – potential maximum fire run of 100 m, ie width of the existing lot (about 135 m) minus the width of proposed lots plus road widening (about 35 m)

$$B = 150/5.4$$

$$B = 28 \text{ m}$$



Calculated September 16, 2018, 12:41 pm (MDC v.4.8)

2 Jarvis Rd (S)

Minimum Distance Calculator - AS3959-2009 (Method 2)			
Inputs		Outputs	
Fire Danger Index	53	Rate of spread	0.61 km/h
Vegetation classification	Woodland	Flame length	5.38 m
Surface fuel load	11.1 t/ha	Flame angle	54 °, 63 °, 70 °, 74 °, 75 ° & 82 °
Overall fuel load	11.6 t/ha	Elevation of receiver	2.17 m, 2.4 m, 2.53 m, 2.59 m, 2.6 m & 2.66 m
Vegetation height	n/a	Fire intensity	3,685 kW/m
Effective slope	-2 °	Transmissivity	0.891, 0.883, 0.871, 0.858, 0.85 & 0.8
Site slope	0 °	Viewfactor	0.5829, 0.4266, 0.2849, 0.1905, 0.1536 & 0.0409
Flame width	28 m	Minimum distance to < 40 kW/m²	4.6 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	6.2 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	8.9 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	12.3 m
		Minimum distance to < 10 kW/m²	14.4 m

Appendix 3 Bushfire hazard overlay code

Performance outcomes	Acceptable outcomes	Comments
For accepted development (subject to requirements) and assessable development		
Location, design and siting of development		
<p>PO1</p> <p>Development is designed to:</p> <ul style="list-style-type: none"> (a) minimise risk of bushfire hazard; (b) provide safe premises; (c) create efficient emergency access for fire-fighting and other emergency vehicles. <p>Note—Planning scheme policy 6—Management of bushfire hazard provides guidelines on how to achieve this outcome.</p>	<p>AO1</p> <p>Development:</p> <ul style="list-style-type: none"> (a) does not increase the number of persons living in, or lots in, the Bushfire hazard area identified on Bushfire hazard overlay map—OM—03.00; or (b) is on a site that a bushfire hazard assessment prepared in accordance with the methodology in planning scheme policy 6—Management of bushfire hazard determines is of low bushfire hazard. 	<p>✓</p> <p>This bushfire management plan meets the requirements of the planning scheme policy 6-Management of bushfire hazard and provides mitigation measures that will reduce the risk of bushfire hazard to a tolerable level.</p>
<p>PO2</p> <p>Development is sited and constructed to minimise the bushfire hazard and maximise the protection of life and property from bushfire.</p> <p>Editor's note – Planning scheme policy 6- Management of bushfire hazard contains guidance on the preparation of bushfire management plans.</p>	<p>AO2</p> <p>Development is located and constructed:</p> <ul style="list-style-type: none"> (a) where there is no bushfire management plan approved by an existing development approval: <ul style="list-style-type: none"> (i) such that the bushfire attack level is less than or equal to BAL-29; (ii) away from the most likely direction of a fire front; (iii) so that elements of the development least susceptible to fire are sited closest to the bushfire hazard; (iv) such that asset protection zones are sited on land with a slope less than 18 degrees; (v) such that asset protection zones are entirely within the boundaries of the private property of the development site; or (b) where an approved bushfire management plan directs development to be located. <p>Note—BAL = Bushfire attack level is the radiant heat flux a building will experience during a bushfire and is a measure of heat energy impacting on a surface expressed as kW/m². BAL</p>	<p>✓</p> <p>A bushfire protection zone will be established on proposed lots 18 and 20-21. Requirements of the bushfire protection zone will ensure buildings are not exposed to radiant heat flux > 29 kW/m².</p> <p>A BAL assessment will be performed on proposed lots for building approvals when civil works to establish proposed lots are nearing completion.</p>

Performance outcomes	Acceptable outcomes	Comments
	<p>is calculated from the following factors; vegetation type, fuel loads, distance to vegetation, Forest Fire danger Index (FDI), flame length, fire behaviour/intensity and slope. BAL is used to determine the required construction level of a building and the size of asset protection zones (inner and outer radiation zones). Further information on calculating the BAL can be obtained from AS3959–2009.</p> <p>Editor's note—Asset protection zones are not located on slopes greater than 18 degrees to ensure maintenance is practical, soil stability is not compromised and the potential for crown/canopy fires is reduced.</p>	
<p>PO3</p> <p>Reconfiguring a lot ensures that lots are designed to minimise bushfire hazard and provide safe sites for people, property and buildings.</p>	<p>AO3</p> <p>Lots:</p> <p>(a) are suitable for people, property and buildings by:</p> <p>(i) having a bushfire attack level less than or equal to BAL–29; or</p> <p>(ii) containing a development envelope area that has a bushfire attack level less than or equal to BAL–29;</p> <p>(b) provide asset protection zones that:</p> <p>(i) are located on land with a slope less than 18 degrees;</p> <p>(ii) are located on the same lot.</p>	<p>✓</p> <p>See response to PO2</p>
Vehicular access and fire maintenance trails		
<p>PO4</p> <p>Access for fire management and evacuation is provided by access that:</p> <p>(a) separates premises from adjoining vegetation;</p> <p>(b) is safely accessible by fire fighting vehicles;</p> <p>(c) has regular vehicular access points for bushfire management, response and evacuation;</p> <p>(d) has regular vehicle passing and turning areas for bushfire management, response and evacuation;</p>	<p>AO4</p> <p>Access for fire management and evacuation is provided by vehicular access in the form of a perimeter road:</p> <p>(a) with a minimum reserve width of 20 metres;</p> <p>(b) located between the premises and adjoining vegetation;</p> <p>(c) with a maximum gradient of 12.5 percent;</p> <p>(d) constructed to otherwise comply with section 3.4–Movement infrastructure standards of planning scheme policy 5–Infrastructure;</p>	<p>✓</p> <p>Access/egress to the proposed development for fire management and evacuations is from Easterly Street.</p> <p>Public roads will comply with relevant 'movement infrastructure' standards and policies in the Logan Planning Scheme 2015.</p>

Performance outcomes	Acceptable outcomes	Comments
<p>(e) allows access at all times for fire fighting vehicles;</p> <p>(f) allows for maintenance, burning off and bushfire response;</p> <p>(g) has vehicular links to an alternative through road;</p> <p>(h) is readily maintained.</p> <p>Editor's note—Planning scheme policy 6— Management of bushfire hazard provides details on alternative solutions for providing fire management access and evacuation</p>	<p>(e) that has a layout that does not include a cul-de-sac.</p>	
Water supply		
<p>PO5</p> <p>Development has access to adequate water supply for fire fighting purposes.</p>	<p>AO5</p> <p>Development:</p> <p>(a) is connected to a reticulated water supply scheme that has sufficient flow and pressure characteristics for fire fighting purposes at all times with a minimum pressure and flow of 10 litres per second at 200kPa; or</p> <p>(b) has an on-site water storage in accordance with Table 8.2.3.3.2, dedicated or retained for fire fighting purposes that is made of fire resistant materials and is:</p> <p>(i) a separate tank; or</p> <p>(ii) a reserve section in the bottom part of the main water supply tank.</p> <p>Editor's note—The requirement in AO5 is:</p> <ul style="list-style-type: none"> – in addition to the requirement for potable water supply/storage in AO2 in Table 9.4.3.3.2—Infrastructure code: self-assessable and assessable development.; – reflected in AO5 in Table 9.4.3.3.2—Infrastructure code: self-assessable and assessable development. 	<p>✓</p> <p>The proposed development will be connected to reticulated water supply.</p> <p>Fire-fighter water supply and hydrants will be supplied in accordance with the local water retailer's specifications or the <i>Australian Standard for Fire Hydrant installations – Part 1: System design, installation and commissioning</i> (AS 2419.1-2005).</p>

Performance outcomes	Acceptable outcomes	Comments
For assessable development		
Community infrastructure		
<p>PO6</p> <p>Community infrastructure is not located in a bushfire hazard area or is able to function effectively during and immediately after a bushfire event.</p>	<p>AO6</p> <p>Community infrastructure is:</p> <ul style="list-style-type: none"> (a) not located in a Bushfire hazard area identified on Bushfire hazard overlay map—OM—03.00; or (b) located to ensure that: <ul style="list-style-type: none"> (i) the core services provided by the community infrastructure is able to function effectively during bushfire events; (ii) access to the community infrastructure is not compromised by bushfire events; (iii) the safe storage of valuable records, public records and items of cultural or historic significance is able to be maintained during a bushfire event. 	<p>Not applicable</p> <p>The proposed development is not community infrastructure.</p>
Hazardous materials		
<p>PO7</p> <p>Public safety and the environment are not adversely affected by the adverse impacts of bushfire on hazardous materials including fuels, explosives and flammable chemicals manufactured or stored in bulk on premises.</p>	<p>AO7</p> <p>Hazardous materials:</p> <ul style="list-style-type: none"> (a) storage is in compliance with AS1940—The storage and handling of flammable and combustible liquids; (b) manufacturing does not occur in a Bushfire hazard area on Bushfire hazard overlay map—OM—03.00. 	<p>Not applicable</p> <p>The proposed development does not involve the storage or handling of hazardous materials in bulk.</p>