



BUSHFIRE HAZARD ASSESSMENT

PROPERTY

238 Gardner Road
Rosedale Brisbane City
Lot 8 on RP 84459

- + Bushfire assessments
- + Property vegetation assessments
- + Site planning for bushfire
- + Property management for bushfire
- + Bushfire management plans

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EXECUTIVE SUMMARY

Proposed Development

Lot 8 on RP 84459 located at 238 Gardner Road, Rochedale, is proposed for a reconfiguration of lot from 1 into 15 lots and a Drainage Reserve, for residential purposes. The site is located at Rochedale in Brisbane City.

Site Description

Lot 8 has an area of 12 010 square metres and is located within an emerging community zone of Brisbane City.

Bushfire Attack Level

The remnant vegetation on Lot 3 RP 76179 adjoining to the south of Lot 8 will impact the proposed lots.

Construction of buildings on lots 7 to 15 captured by the impact of assessed heat flux will comply with the construction standards of the AS 3959 – 2009 – Bushfire Attack Level (BAL). In the event that Lot 3 RP76179 is developed for low density residential purposes, the assessed Impacts on Lot 8 would be removed.

The BAL rating expressed in kW/m² (Heat Flux) as a function of fire line intensity and the distance of a building from the hazardous vegetation, is contained within Appendix 1.

This report has been prepared in accordance with the Brisbane City Plan 2014 V 14.00 and the requirements of the Australian Standard - construction in bushfire prone areas – AS3959 – 2009.

This report has been prepared in accordance with the methodology in the CSIRO report: A new methodology for state-wide mapping of bushfire prone areas in Queensland by J. Leonard, G. Newnham, K. Opie, R. Blanchi. 2014, CSIRO, Australia.



INTRODUCTION

Queensland Bushfire Planning has been engaged on behalf of CFMG to conduct a site-based bushfire hazard assessment in relation to a reconfiguration of a lot for the purpose of urban residential development at 238 Gardner Road Rochedale. A report has been prepared in accordance with the Brisbane City plan 2014 Version 14.00 – Schedule 6 Planning Scheme Policies SC 6.4. Bushfire Planning Scheme policies.

SITE DETAILS

Site Address	238 Gardner Road. Rochedale
Local Government	Brisbane City
Real Property Description	Lot 8 on RP 84459
Zoning	Emerging Community
Area of Site	12 010 m ²
Tenure	Freehold
Applicant	CFMG
Current Land Use	Detached Dwelling
Proposed Land Use	Reconfiguration of a lot 1 into 15

LOCATION AND LEGAL DESCRIPTION

The site is located at 238 Gardner Road, Rochedale and is described as Lot 8 on RP 84459 in Brisbane City. (Figure 1)



Figure 1

Scope of Bushfire Hazard Assessment

A reconfiguration of a lot has been proposed at 238 Gardner Road Rochedale, Lot 8 on RP 84459. The site is captured by the Brisbane City– Bushfire Hazard Overlay map and in accordance with the provisions of the Planning Scheme Policy Version 14.00, a detailed Bushfire Hazard Assessment has been prepared.

Bushfire Hazard

The combination of vegetation, topography and climate makes Australia one of the most bushfire prone areas of the world. A bushfire hazard exists where there is vegetation - grass, scrub, bushes and trees. The hazard is not restricted to rural areas but also exists in the rural-urban interface where the areas included bushland.

Modes of Bushfire Attack

There are four modes of bushfire attack:

- Burning debris;
- Radiant heat;
- Flame contact;
- Wind. (Figure 2)

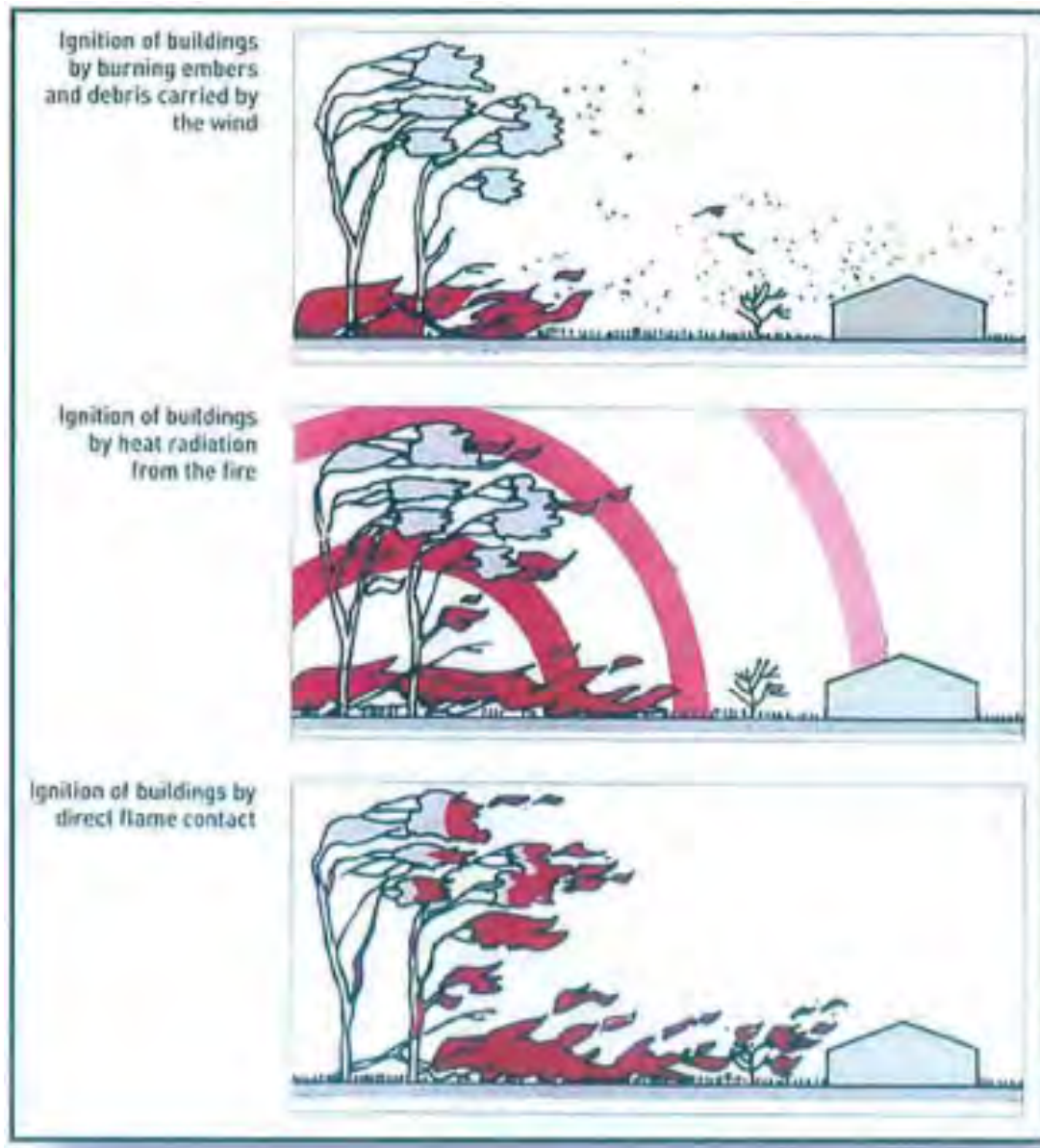


Figure 2



Burning Debris

All bushfires will produce burning debris (embers) that is carried before the fire front by prevailing winds and convective forces. Ember attack occurs before and after the passage of the active fire front.

Radiant Heat

Radiant heat will assist with ignition by preheating fuels and structures. Radiant heat is a measure of the heat energy released from the fire front that impacts on the surrounding environment. Radiant heat impact reduces as a square of distance.

Flame contact

Direct flame contact is a function of fuel load and the proximity of the fuel to structures. The risk is increased when in combination with high winds.

Wind

Strong winds can intensify a fire, convey burning embers and debris and compromise the integrity of structures.

Other factors

Vegetation structure and density is also an important factor and when allied with topography can have a significant effect on fire intensity and behaviour.

Landscape and Localised Fire Hazard

There are two risk types to be considered when evaluating bushfire hazard within a specific locality:

- Landscape hazard – large areas of vegetation close to and encroaching on residential areas;
- Localised hazard – fragmented and linear areas of vegetation that may be included within developments.

The two types of hazard present very different wildfire scenarios, specifically in regard to fire behaviour, fire intensity and rate of spread.

Landscape fires generally have the following dynamics:

- Higher fuel loads;
- Steeper topography;
- Difficult access;
- Continuity of fuel; and
- Induced fire weather conditions.

Localised bushfire risk generally consists of fragmented and disturbed areas of vegetation including green corridors and retained green space. Fires that originate in the area would be constrained by the physical size of the vegetation, lighter fuel loads and opportunities for suppression.

Proposed Development

Lot 8 on RP84459 is proposed for a reconfiguration of lot for residential purposes. The site is located in Rochedale, Brisbane City, an area of large rural residential lots. The proposal will establish fifteen rural residential Lots. (Figure 3)

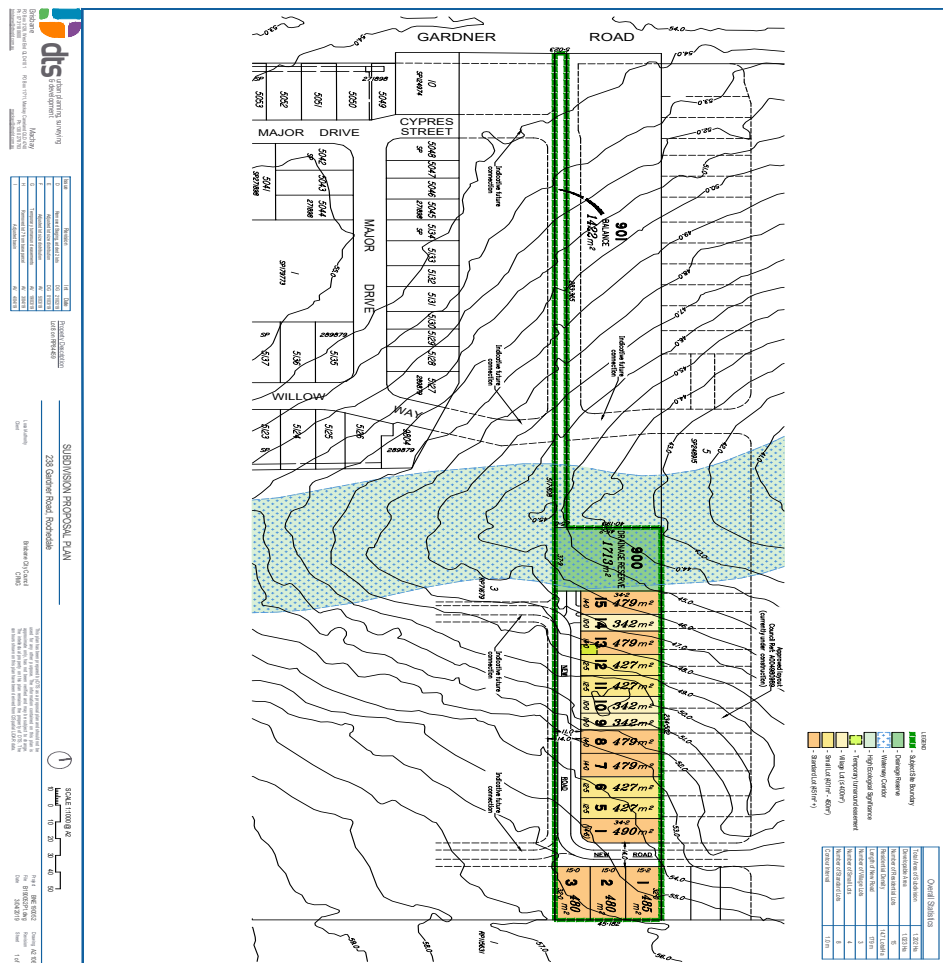


Figure 3

- + Bushfire assessments
- + Property vegetation assessments
- + Site planning for bushfire
- + Property management for bushfire
- + Bushfire management plans



Site Location and Description

Location and Legal Description

Lot 8 RP 84459, 238 Gardner Road, Rochedale. (Figure 4)



Figure 4

Site Description

Lot 8 has a total area of 12 010 square metres and is aligned east - west and has a westerly aspect with a natural slope of 3 degrees.

The site is within zoned Emerging Community and an area that is undergoing a transition to smaller rural residential lots. (Figure 5)











-  OS Open space
-  OS1 Open space (Local)
-  OS2 Open space (District)
-  OS3 Open space (Metropolitan)
-  EM Environmental management
-  CN Conservation
-  CN1 Conservation (Local)
-  CN2 Conservation (District)
-  CN3 Conservation (Metropolitan)
-  EC Emerging community

Figure 5

Bushfire Hazard Assessment

The State Government Single State Planning Policy (SPP) released in 2013, includes mapping that is an outcome of the new bushfire hazard mapping methodology, developed by the CSIRO and the Queensland Government. The new Bushfire Prone Area mapping was found to have an average reliability of 85%. The new methodology provides a major improvement in bushfire hazard mapping.

The new modified approach calculates potential fire line intensity using total fuel loads, landscape slope and fire weather severity. A default 100-metre buffer was determined from analysis of heat and radiation decay curves and research that indicates 80% of housing loss and 80% of life loss occurred within 100 metres of bushland.

The subject site is identified on the State Planning Policy State-wide mapping and the Brisbane City Bushfire Hazard overlay as being within the potential impact buffer zone, requiring the bushfire hazard impacts be addressed. (Figure 6)

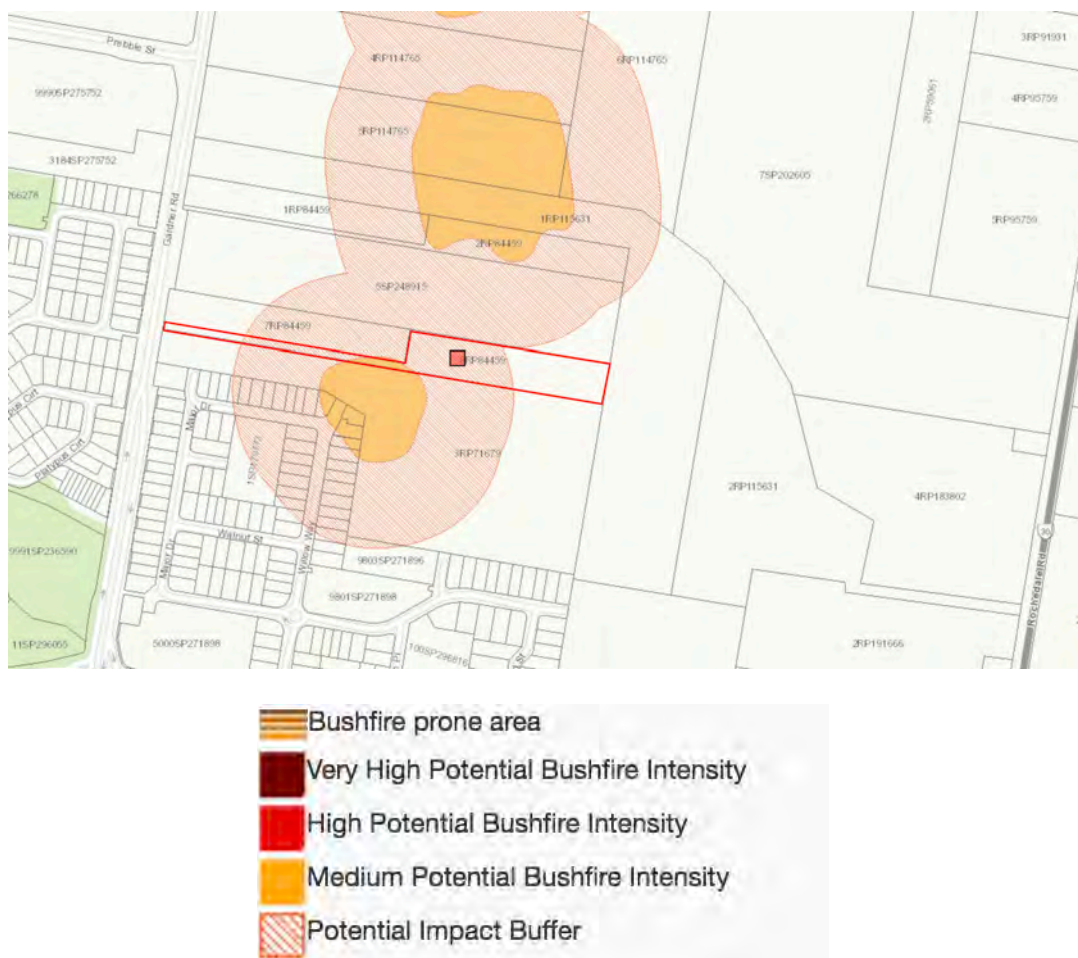


Figure 6



Local Government Provisions

The Brisbane City Plan V14.00 and incorporated Bushfire Overlay Mapping, Overlay Code and Bushfire Hazard Planning Scheme Policy was adopted by Council on 30 June 2014 (Version 14.00/2019). A Bushfire Hazard Assessment has been conducted as per the Brisbane City Plan Policy Version 14.00 and the requirements of the Australian Standard - construction in bushfire prone areas – AS3959 – 2009.

Site Assessment

Vegetation

An onsite inspection and assessment were conducted at 238 Gardner Road, Rochedale on April 3, 2019 to observe and record the relevant information to determine the bushfire hazard in accordance with the requirements of the Brisbane City Plan 2014. The vegetation on the Lot 8 will be managed as part of the proposed development.

Lot 5 SP248915 has been developed for low density residential use. (BCC Ref A004980989) (Photo 1)



Photo 1

An area of remnant vegetation remains on Lot 3 RP76179 immediately adjoining to the south. The vegetation consists of:

- (a) Regional Ecosystem (RE) 12.5.3a moist to dry eucalypt woodland on coastal lowlands and ranges – VHC) 9.2
- (b) Regional Ecosystem (RE) 12.3.5 Melaleuca open forests on seasonally inundated lowland coastal swamps – Vegetation Hazard Class (VHC) 22.1

The classified hazardous (bushfire) vegetation on Lot 3 RP adjoining to the south will impact on the proposed development on Lot 8. (Figure 7)



Figure 7

The predominant vegetation lot 7 is identified as Regional Ecosystem (RE) 12.5.3a *Corymbia intermedia*, *Eucalyptus seeana* ± *E. racemosa*, *Angophora leiocarpa* open woodland on remnant Tertiary surfaces occurring mainly to the south of Brisbane. (Photo 2)



Photo 2

The Public Safety Business Bureau (PSBA) New methodology for state – wide mapping of bushfire prone areas in Queensland identifies the original vegetation on and about this site as Regional Ecosystem (RE) 12.5.3a.

Risk Analysis

The potential for an unplanned vegetation fire to occur within retained vegetation is a function of the level of hazard and the opportunity for ignition and fire development. The risk can be quantified in two parts:

Internal: No hazardous vegetation will remain on Lot 8

External: Lot 3 RP76179 adjoining to the south is an area of remnant moist to dry eucalypt woodland on coastal lowlands and ranges. (Refer to Figure 7)

Classified Vegetation

The Australian Standard: Construction of Buildings in Bushfire Prone Areas (AS 3959–2009) requires that any classified vegetation within 100 metres of the proposed works must be assessed. The Rochedale area is not exposed to bushfire events that are associated with significant landscape areas of contiguous forest types that impact urban areas. Discrete, isolated areas of remnant and regrowth woodlands present the risk in this location. A fire event about Lot 3 RP 76179 would be the result of localised ignition. The disturbed state of the vegetation and the limited extent would reduce the intensity.

Assessment of Bushfire Hazard

The Australian Standard: Construction of Buildings in Bushfire Prone Areas (AS 3959–2009) requires that any classified vegetation within 100 metres of the proposed works must be assessed. Figure 8 shows the extent of the 100-metre separation zone (BAL Impact Zone).



Figure 8— indicative only

Bushfire Attack Level

The remnant vegetation on Lot 3 RP 76179 adjoining to the south will impact the proposal.

Calculations using the Australian Standard in accordance with Appendix B of AS 3959-2009 and Detailed Method for Determining the Bushfire Attack Level (BAL) – Method 2 (Normative) determine the following impacts (Appendix 1).

Bushfire Attack Level impacts as a function of distance from classified vegetation. **Table 1** shows the Heat Flux Exposure ratings, as calculated using Method 2 of the Australian Standard AS 3959 – 2009.

Minimum Distance to < 40 kW/m ²	4.4 m
Minimum Distance to < 29 kW/m ²	6.0 m
Minimum Distance to < 19 kW/m ²	9.0 m
Minimum Distance to < 12.5 kW/m ²	13.0m

Table 1

The impact zone will capture the proposed Lots 6 to 15 (Inc)

Any construction outside the identified BAL >12.5 zone will be required to meet the Australian standard Bushfire Attack Level (BAL) rating of 12.5 (Figure 9)



Figure 9



Bushfire Management and Mitigation

A range of strategies can be applied to mitigate the potential impacts of bushfire:

- Vegetation management
- Access and egress
- Fencing
- Water supply
- Awareness and education
- Building construction

Vegetation Management

On site vegetation and landscape management are important to maintaining low hazard conditions by:

- limiting fuel accumulation;
- reducing connectivity of fuels;
- establishing and maintaining defendable space;
- appropriate landscaping; and
- the proposed lot size of the development will constrain the development of any additional bushfire hazard.

Clearing

The vegetation on site will be managed to reduce the impacts on proposed buildings.

Landscaping

The establishment of rural residential lots will result in the establishment of typical managed and manicured landscapes.

Access and Egress

The proposed roading will provide access and egress via Frangipani Street to Gardner Road for residents and emergency services. The designed egress is away from the hazard and provides alternate exit strategies for residents and ready access for emergency services.

Fencing

Fencing materials have the capacity to contribute to fire spread and intensity. For properties subject to BAL impacts, it is recommended that where fencing is installed, non-combustible fencing materials should be used.

Water Supply

Reticulated water will be supplied to the development meeting the required statutory standards.



Bushfire Preparedness

The affected residents will be provided with a bushfire information kit containing all the necessary information on bushfire risks and their roles and responsibilities for prevention, preparedness and response to any fire event. As a function of the location and design of this reconfiguration and the anticipated low fire line intensity of a fire event on Lot 3 the option for residents to remain within their homes would be a considered alternative. This option would avoid putting residents at risk as a result of smoke, traffic congestion and the movements of emergency vehicles and firefighters. The warning systems now implemented by Emergency Services and Local Authorities provide timely information and advice to residents.

https://ruralfire.qld.gov.au/Fire_Safety_and_You/Bushfire_Survival_Plan/



Bushfire Overlay Code (8.2.3.)

Performance Outcomes	Acceptable Outcomes	Compliance
PO1	AO1	Compliant
Development addresses the bushfire hazard determined by a site-specific bushfire hazard assessment.	Development is designed and sited in compliance with: <ul style="list-style-type: none"> (a) a current approved bushfire management plan relevant to the full nature of the uses, which identifies the level of bushfire hazard and the location of hazardous vegetation affecting the development. 	
PO2	AO2.2	Compliant
Development is sited, designed and maintained taking account of all relevant factors affecting the bushfire hazard on the site, including site topography, aspect, location and type and structure of vegetation to: <ul style="list-style-type: none"> (a) minimise the number of buildings and people working, living or visiting a site exposed to bushfire risk; (b) protect life during bushfire; (c) increase the survival of buildings and structures during a bushfire; (d) minimise bushfire risk from build-up of fuels around buildings and structures. 	Development other than an extension to an existing building is sited within a building protection zone extending a minimum of 20m from the outermost projection of the main building or any habitable structure or to the maximum extent possible on sites less than 2500m ² where a building protection zone would extend into neighbouring properties; <ul style="list-style-type: none"> (a) clusters buildings and structures in the building protection zone; (b) designs the inner 10m of the building protection zone to maintain a very low fuel state in the first 10m, and a fuel-reduced state to the extent of the building protection zone. 	

**PO3**

Development utilises fencing that:

- (a) does not contribute to the spread of bushfire;
- (b) in an urban area or in proximity to accommodation uses, contributes to reducing bushfire hazard to a building;
- (c) facilitates the safe movement of fauna

AO3.1

Development for a fence within 20m of any building used for accommodation comprises non-combustible or fire-retardant materials.

Compliant**AO3.2**

Development for a fence:

- (a) incorporates gaps and spacing to allow the safe movement of fauna; or
- (b) is designed to enable fauna to climb the fence.

PO4

Development ensures that the location, siting, and design of development and associated driveways and access routes:

- (a) avoid potential for entrapment during a bushfire;
- (b) facilitate safe and efficient emergency services to access and egress the site during a bushfire;
- (c) enables safe evacuation of the site during a bushfire

AO4

Development ensures that:

- (a) the length of driveways or access routes does not exceed 70m between the most distant part of any occupied building and the nearest part of the public road.

Compliant



PO5	AO5	Compliant
Development has adequate road access to the site for emergency vehicles and safe evacuation in a bushfire.	Development has frontage to a constructed, all-weather public road capable of carrying emergency service vehicles.	
PO6	AO6	Compliant
Development makes adequate provision for firefighting requirements, including water supply.	<p>Development ensures that:</p> <p>(a) a reliable reticulated water supply and water pressure is available for firefighting requirements with water supply and pressure, which complies with the standards specified by the relevant utilities' provider.</p>	
PO7	AO7	N/A
Development ensures that the water supply provided for firefighting is safely located and freely accessible for firefighting purposes at all times.		



APPENDIX 1



Appendix 1

Method for Determination of BAL

BAL was determined in accordance with Appendix B of AS 3959-2009, Detailed Method for Determining the Bushfire Attack Level (BAL) – Method 2 (Normative).

Step 1: Determine the relevant FDI.

Step 2: Determine the vegetation classification, fuel loads.

Step 3: Determine the effective slope in degrees under the classified vegetation.

Step 4: Determine the slope in degrees of the land between the site and the classified vegetation.

Step 5: Determine the distance of the site from classified vegetation.

Step 6: Calculations.

Determination of Bushfire Attack Level

Step 1. Relevant Fire Danger Index

The Public Safety Business Agency State-wide Bushfire Hazard (bush fire prone area) mapping identifies the FDI for this area as 50.

Step 2. Vegetation Classification - Fuel Loads

The vegetation type was classified as Woodland.

Available fuel weights were derived from; *A new methodology for state-wide mapping of bushfire prone areas in Queensland* by J. Leonard, G. Newnham, K. Opie, R. Blanchi. 2014, CSIRO, Australia

Fuel weights were determined as:

- a. 8.0 tonne/hectare surface fuels
- b. 3.6 tonne/hectare near surface fuels
- c. 4.8 tonne/hectare elevated fuels
- d. 1.0 Tonne/hectare bark fuels
- e. Total fuel weight = 17.4 Tonne/hectare.

Step 3. Determine the effective slope in degrees under the classified vegetation

The average slope under the vegetation to the west was calculated using a Nikon Forestry Pro Range Finder and Inclinator at <2 degrees downslope.



Step 4. Determine the slope in degrees of the land between the site and classified vegetation

The slope between the site and the classified vegetation was calculated using a Nikon Forestry Pro Range Finder and Inclinator at < 2 degrees downslope.

Step 5. Determine the distance of the site from classified vegetation

Distance is calculated from the closest edge of the classified vegetation. Where the hazard is on an adjoining property the distance is measured to the boundary of that lot-classified vegetation under AS 3959-2009 does not include low threat vegetation.

Indicative separation for Bushfire Attack Level (BAL) expressed as kW/m²

Minimum Distance to < 40 kW/m ²	4.4 m
Minimum Distance to < 29 kW/m ²	6.0 m
Minimum Distance to < 19 kW/m ²	9.0m
Minimum Distance to < 12.5 kW/m ²	13.0 m



Addendum 1.

Brisbane City Council: RFI July 25, 2019

Application Reference: A005179558

238 Gardner Road Rochedale

Bushfire Assessment:

"The resubmitted bushfire assessment by Queensland Bushfire Planning is not considered to adequately address the bushfire hazard in relation to the development from the revegetated waterway corridor, which adjoins proposed lot 15.

Assessment has concluded Lot 15 as being exposed to significant risk of bushfire hazard. This lot would be exposed to an unacceptable level of radiant heat loading if bushfire was to occur on the western edge of the waterway corridor on a day characterised by bad fire weather.

Compliance with the bushfire overlay code can be achieved with the inclusion of a 6m wide bushfire management buffer zone between the vegetated waterway corridor/stormwater quality offset area and lot 15, or at least between the waterway and any buildable area within lot 15.

This solution would require a modification to the subdivision proposal plan as lot 15 is currently proposed at 12.5m wide. The required 6m wide buffer strip would require mown grass in order to limit bushfire fuel and would not be permitted to intrude into the mapped waterway corridor area and stormwater quality offset area, which is required to be vegetated."

- a) *Provide amended plans including a 6m wide bushfire management zone between the waterway corridor area and the development taking into consideration the possible requirement for lot 15 to be removed or consolidated with proposed lot 14 in order to accommodate the 6m wide area.*



Response:

The attached drawing (Figure 10) shows Lot 900 Drainage Reserve (PA1) and Lot 902 (PA2), including the Water quality offset

The PA2 area including the Water Quality Offset area will be planted with understorey *Lomandra sp.* only.

This provision will provide 10 metres of low hazard separation from the revegetated area (PA1) and Lot 15.

Bushfire hazard

The establishment of a 10 metre (PA2) Low hazard area immediately adjoining Lot 15 would provide acceptable Bushfire Attack Level (BAL) rating in accordance with Appendix B of AS 3959-2009, Detailed Method for Determining the Bushfire Attack Level (BAL) – Method 2 (Normative).

Refer Appendix 1

Available fuel weights were derived from; *A new methodology for state-wide mapping of bushfire prone areas in Queensland* by J. Leonard, G. Newnham, K. Opie, R. Blanchi. 2014, CSIRO, Australia

Fuel weights were determined as:

- a. 8.0 tonne/hectare surface fuels
- b. 3.6 tonne/hectare near surface fuels
- c. 4.8 tonne/hectare elevated fuels
- d. 1.0 Tonne/hectare bark fuels
- e. Total fuel weight = 17.4 Tonne/hectare.



Fire Danger Index	50
Vegetation classification	Woodland
Surface fuel load	8 t/ha
Overall fuel load	17.4 t/ha
Effective slope	2°
Site slope	2°
Distance to vegetation	10 metres
Flame width	100 metres
Heat of combustion	18 600 kJ/kg
Flame temperature	1 090 K
Fire intensity	4 953 kW/m
Radiant Heat Flux	18.46 kW/m ²
Bushfire Attack Level	BAL



The BAL impact can be reduced to 12.5 utilising a 2-metre-high non - combustible boundary fence on Lot 15.

Effective barrier height	2 Metres
Fire Intensity	4 953 kW/m
Radiant heat flux	18.46 kW/m ²
Adjusted view factor	0.1852
Adjusted Radiant Heat Flux	12.2 kW/m ²
Bushfire Attack Level	BAL 12.5

