Bushland Protection Systems
Specialising in
BUSHFIRE HAZARD
PLANNING & MITIGATION

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BUSHFIRE HAZARD ASSESSMENT AND MITIGATION PLAN

PROPOSED RESIDENTIAL DEVELOPMENT
IN
Precinct 6 ROL2
Yarrabilba

FOR

Lendlease

DATED

2nd May 2024

PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL

Approval no: DEV2023/1448

Date: 7 June 2024

Queensland Government

A Bushfire Mitigation Plan is designed to identify and minimise the potential bushfire risk to a given property and to help property owner/occupiers to minimise bushfire risk to themselves, their property and their neighbours, although it cannot completely eliminate that risk. Ultimately it is a community responsibility to protect the environmental values, life and property in their area.

Bushland Protection Systems
Document Control:

Version	Date	Details	Prepared	Checked
1	26/09/23	Draft BMP	Brett Bain	
2	06/10/23	Finalised BMP	Brett Bain	
3	02/05/24	Amended road and lot layout S24	Brett Bain	

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1. Background

This plan is for the proposed residential development in Precinct 6 ROL 2 of Yarrabilba, as shown in Appendix 1 & 2 of this report.

This plan is based on the following material supplied by Lendlease.

1.1. Precinct 6 – Application Two, Reconfiguration of a Lot Plan, drawn by Lendlease, Drawing No. YAR-P06-ROL2-POD-240423, Sheet 1 of 3, dated 23/4/24 is attached as Appendix 1.

1.2. Bushfire Hazard Assessment and Management Plan, drawn by Lendlease, Drawing No. YAR-PO6-ROL2-BHA-240423, Dated 23/4/24, is attached as Appendix 2.

This plan is produced in accordance with:

- Bushfire hazard assessment in accordance with the Logan Planning Scheme 2015, Section 8.2.3 – Bushfire Hazard Overlay Code and Sc6.2.6 – Planning Scheme Policy 6, based on State Planning Policy 7/17, support document – Bushfire Resilient Communities 2019, under the Planning Act 2016.
- The Context Bushfire Hazard Assessment and Mitigation Plan for Precinct 4 of Yarrabilba produced by Bushland Protections Systems, dated 14/7/17.
- This report also takes into consideration the 'Pre-Development Bushfire Mitigation Concept' Plan prepared by Bushland Protection Systems, dated 30/1/12, and the approved 'Conceptual Bushfire Risk Assessment and Mitigation Plan' (BMP), produced by Bushland Protection Systems, dated 18/7/2012.

2. Site Description and Bushfire Hazard Assessment

Precinct 6 ROL 2 is located in the south of Precinct 6, and consists of residential allotments, which will be cleared for development. The proposed lots will be managed and be assigned a Vegetation Hazard Class (VHC) 42.6, resulting in a 'Not Bushfire Prone Area' hazard rating. To the southeast of Stages 24, 25 & 28 is a future district sports park and future development, to south and southwest is also future development, and to the north is Precinct 6 – ROL 1, all providing a 'Not Bushfire Prone Area' hazard rating.

Lot 2012 and Lot 2007 are to be managed as outlined in Section 5 of this report and will provide a 'Not bushfire prone area' hazard rating.

The bushland exposures for Precinct 6 – ROL 2 is the corridor to the east of Stages 19, 21 & 23 and the corridor to the northwest of Stage 17.

The corridor to the northwest of Stage 17 would be assigned a Vegetation Hazard Class (VHC) of 16.1 with associated fuel loads of up to 16t/Ha, over slopes of up to 2 degrees and a Forest Fire Danger Index (FFDI) of 54, providing for a potential fire line intensity of up to 8,486kW/m equating to a 'Medium' hazard rating. Proposed Lots 690-698 are within 100 metres of the bushland as shown in Appendix 2.

The corridor (Lot 2011) to the east of Stages 19, 21 & 23 would be assigned a Vegetation Hazard Class (VHC) of 16.1 with associated fuel loads of up to 16t/Ha, over slopes of up to 2 degrees and a Forest Fire Danger Index (FFDI) of 54, providing for a potential fire line intensity of up to 8,486kW/m equating to a 'Medium' hazard rating.

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Table 2.1: Potential Bushfire Hazard Rating

POTENTIAL HAZARD CLASS	POTENTIAL FIRELINE INTENSITY
Not Bushfire Prone Area (Low)	<4,000 kw/m
Medium	4,000 to 20,000 kw/m
High	20,000 to 40,000 kw/m
Very High	>40,000 kw/m

The Bushfire Hazard Mapping also incorporates a 100 metre Potential Impact Buffer meaning that any land within 100 metres of a Potential Bushfire Hazard is also assigned the same rating as that bushland and triggers the Bushfire Code if Medium, High or Very High. Whilst having the same distance for all three levels of hazard is not considered a fit for purpose application, it is unfortunately what is legislated at this current time. Therefore, the proposed allotments 690-698, 756-769, 776-786, 796-801, 855-859, 880-885, 945-951, 957-968, 973-977 & 980-984, as shown in Appendix 2, would be assigned a 'Medium' hazard rating, while the remainder of the allotments in Precinct 6 - ROL 2 would be assigned a Low/No hazard rating.

3. Roads, Driveways and Trails

3.1. Roads

The sub-precinct has substantial internal road network with the main access/egress coming in from the north. There are also future connections to the Precincts in the south and to the east.

With the exception of proposed Lots 759-766, there is a perimeter roadway providing separation to the bushland corridors. Lots 759-766 have a pathway and then a managed buffer containing another bike/pedestrian path. Both pathways are to be establish so they are capable of providing emergency vehicle access.

It is considered unlikely that access/egress would be compromised by bushfire.

3.2. Driveways

Being residential allotments, the driveways would be short and direct.

3.3. Trails

The proposed pathway behind Lots 759-766 and the walking/bikeway through Lot 2007 are to be designed so as to double as a fire trail with connections to the roadway at each end.

Fire trails would be low impact preferably with a mowed or slashed surface which would minimise disturbance or erosion, have a maximum grade of 25% and maximum cross slope of 5%. Fire trails are to have a minimum cleared width of 6 metres and minimum formed width of 4 metres. Where fire trails deviate away from lot boundaries the area between the trail and lot boundary must be managed with low fuel levels so as not to compromise the buffer function that fire trails provide in addition to vehicle access. Appendix 5 on fire trails is included in this report as a guide on establishing and maintaining fire access trails.

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4. Appropriate Building Location

The proposed residential allotments are located on relatively level ground to rolling hills, away from steep slopes and ridgelines, in an already disturbed area.

The SPP7/17 bushfire support documents released December 2019, require separation distances between buildings and hazardous bushland that achieve a radiant heat flux rating of 29kW/m^2 or less when assessed in accordance with the methodology outlined in the Bushfire Resilient Communities Technical Reference Guide 10/19. This would require a minimum 15 metres of separation from the 'Medium' rated bushland areas, which has been provided as indicated in Appendix 2. Therefore, a tolerable risk level has been achieved.

5. Appropriate Clearing and Landscaping

The residential allotments are to be maintained with low ground fuel levels at all times and may include domestic gardens, lawns with grass kept under 100mm in height and scattered trees with discontinuous canopy.

As a guide to landscaping and gardening in a bushfire prone area, the document 'Landscaping for Bushfire' produced by the CFA Victoria, is a useful guide on plant selection, garden design and ongoing maintenance. It can be found at https://www.cfa.vic.gov.au/plan-prepare/landscaping.

Lot 2007, is to be managed as an inner Asset Protection Zone (APZ), as outlined in Appendix 3.

Lot 2012, is to be managed so as not to result in an area of future bushfire hazard. This can be achieved by:

- Retention of mature tall canopy trees
- Selective retention of juvenile tall canopy tree species
- Removal of limbs less than 2 metres high on trees over 4 metre tall
- Removal of weed growth.
- Mowing/brush cutting of grass, keeping grass under 300mm high, but allowing for reed/rush type vegetation in the basin to allow for the function of the detention area.
- Minimise mid-storey vegetation (except the juvenile trees in dot point 2) to prevent ladder fuel structure.
- Occasional dis-continuous small clumps of evergreen ground covers would be permissible, such as Lomandra Hystrix, which should be trimmed back prior to the start of fire season (fire season generally starts in July/August).
- Removal of fallen timber.
- Restricting leaf litter build-up to 5t/Ha (approx. 10mm deep), allowing for a total of 8t/ha overall fuel load.
- All plantings should be 'fire wise' as outlined in the 'Landscaping for Bushfire' document referred to above.
- Steepness of batter slopes must allow for management (<1:4).

Non-endemic grass and weed growth is to be controlled in the 'Linear Park Unmanaged' corridors. All slash pine is to be removed.

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All previous or future cleared timber and foliage or accumulated rubbish should be removed from the site or mulched and not simply moved aside as this will result in a concentrated area of fuel loading which will increase the potential bushfire hazard from that direction.

Fibrous bark trees, such as melaleuca, swamp mahogany and stringy bark, have a tendency to increase ember attack during a bushfire, due to the fire running up the tree trunk and burning bark breaking off, creating large quantities of airborne burning embers. Ribbon bark tree species (trees that shed their bark in long strips) are also an issue, significantly increasing the potential for spot fires. For this reason, tree species with these bark types should not be used as revegetation/rehabilitation/regeneration plantings in urban interface areas.

In bushland areas, the areas around the fringes of the bushland and along fire trails have a tendency to have increased ground fuel loading, as a result of increased sunlight penetration producing better growing conditions for grass and weeds (known as 'Edge Effects'), which can have an adverse impact on the local ecosystem and safety issues for fire suppression personnel during unplanned fire events. These non-endemic grasses and weeds penetrate into the edges of the retained bushland, creating conditions for higher intensity fire which damages the edges of the bushland, opening up the canopy which then allows more sunlight in and promotes grass and weed intrusion further into the bushland. This cyclic process has the effect of decreasing the size of quality bushland and increasing grass and weed dominated areas. The most cost-effective way to control grass and weed growth is to create a good closed in canopy cover, which will shade out the undesirable species. The control of fuel loads along the edges by regular mowing, brush cutting or in some cases poisoning may be suitable. Areas with a build-up of volatile fuel levels along the open edges of bushland, where full sunlight is available, can be where the most damage is inflicted on the bushland during a bushfire.

For optimal bushfire safety and best practise, the allotments must be cleared during operational works and maintained by the developer with low ground fuel levels until sold. Once sold the purchaser must maintain the allotment at all times, before, during and after construction of the dwelling.

Where the development is to take place in stages, care should be exercised to ensure the developed stages are not threatened by bushfire from the undeveloped stages. When operational clearing approvals are applied for, the application needs to include cleared buffers of 100 metres into developable areas in adjoining stages and these areas must be managed until developed.

6. Building Construction

The bushfire provisions of the National Construction Code (NCC) are applied to Class 1, 2 & 3 buildings and associated Class 10a buildings, located in designated bushfire prone areas. "Designated bushfire prone area means land which has been designated under a power in legislation as being subject, or likely to be subject, to bushfires" *(NCC Schedule 3 Definitions)*.

The Logan Planning Scheme 2015, Table 5.7.1 – Building Work, Editor's note, states "*Land identified in a bushfire hazard area on Bushfire hazard overlay map-OM-03.00 is a designated bushfire prone area for the Building Code of Australia and the Queensland Development Code.*" OM-03.00 only maps areas of Very High, High or Medium Potential Bushfire Hazard (PBH).

Under the Logan Planning Scheme 2015, Table 5.7.1 – Building Work, Editor's note, a site with a low PBH rating does not require assessment under the National Construction Code in relation to bushfire or under the Australian Standard (AS3959) for *Construction of Buildings in Bushfire Prone Areas* and therefore no specific level of construction would be required in relation to bushfire for those dwellings.

As proposed Lots 690-698, 756-769, 776-786, 796-801, 855-859, 880-885, 945-951, 957-968, 973-977 & 980-984 have a 'Medium' hazard rating, the Logan Planning Scheme 2015, Table 5.7.1, requires the National Construction Code (NCC) and where relevant the Australian Standard for Construction of Buildings in Bushfire-Prone Areas (AS3959) to be addressed.

P2.7.5 of the NCC requires:- A Class 1 building or a Class 10a building or deck associated with a Class 1 building that is constructed in a designated bushfire prone area must, to the degree necessary, be designed and constructed to reduce the risk of ignition from a bushfire, appropriate to the –

(a) Potential for ignition caused by burning embers, radiant heat or flame generated by a bushfire; and
(b) Intensity of the bushfire attack on the building.

Section 3.10.5.0 (Qld variation) of the NCC is the deemed-to-satisfy provision and states:-

(a) Subject to (b), Performance Requirement P.2.7.5 is satisfied for—
(i) a Class 1 building; or
(ii) a Class 10a building or deck associated with a Class 1 building,
located in a designated bushfire prone area if it is constructed in accordance with—
(iii) AS 3959; or
(iv) NASH Standard – Steel Framed Construction in Bushfire Areas.

(b) The requirements of (a) do not apply when, in accordance with AS 3959, the classified vegetation is Group F rainforest (excluding wet sclerophyll forest types), mangrove communities and grasslands under 300 mm high.

Where a Performance Solution is proposed, the relevant Performance Requirements must be determined in accordance with Sections A2.2(3) and A2.4(3) of the NCC as applicable. Section V2.7.2 of the NCC is a means to verify the appropriate risk of ignition from a bushfire in order to meet the requirement of P2.7.5. For further guidance refer to the Buildings in Bushfire Prone Area Verification Method Handbook available from the Australian Building Code Board.

The level of construction for dwellings, if any, should be assigned prior to plan sealing stage when the actual risk would be more readily assessable for individual allotments, allowing for potential alterations during development to terrain and vegetation types.

It is noted that with the implementation of the recommendations of this report, future dwellings are not expected to exceed a BAL-19 bushfire construction rating under AS3959-2018. These levels of construction are reliant on the recommendations of this report being implemented and maintained.

Any mains gas supply is to be installed in accordance with AS2596, the requirements of relevant authorities and metal piping is to be exclusively used.

Electricity supplies within the property are to be protected and not vulnerable to falling tree or bushfire threatening the viability of transmission poles.

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7. Provision of Adequate Water Supplies

The area of the proposed development is to be serviced by reticulated water supplies with the inclusion of fire hydrants for firefighting purposes. These services are to comply with the relevant standards as required by the local authorities, including a minimum pressure and flow of 10 litres a second at 200kPa or that which is able to be supplied by the local reticulated network.

Fire Hydrants are to be installed in accordance with the *Fire Hydrant and Vehicle Access Guidelines for residential, commercial and industrial lots*, Queensland Fire and Emergency Services, 2015, unless otherwise specified by the relevant water authority.

8. Provision of Fire Fighting Infrastructure

Dwellings are to have external taps and hoses that are positioned so water supply is capable of reaching to all parts of the building. All water lines are to be covered by at least 300mm of soil or be of metal above ground. Residents should maintain good access around their homes for fire suppression activities by fire services.

9. Local Fire Brigades

The subject property is in the urban Fire & Rescue district and they would be responded on a 000 emergency call, with back-up from Logan Village and Tamborine Rural Fire Brigades. If further back-up is required, additional units would be engaged by the Beaudesert/Logan Rural Fire Brigade Groups.

10. Improved Community Awareness

Managing ground fuel in small pockets of bushland at the interface between urban development and bushland (Izone) is the easiest way of reducing bushfire hazard, particularly the removal of non-endemic grass and weeds.

It is recommended that a copy of this report be placed on display at any sales office, and a copy of the report be given to the purchasers of lots to provide them with the necessary information required for the building application process.

A copy of this plan should be retained by residents to assist them in minimising the risk of bushfire damage. It is recommended that regular liaison with the local fire brigade takes place as a way of being informed of danger periods.

It is recommended that residents with a 'Medium' bushfire hazard rating prepare a 'Bushfire Survival Plan', a template for which is available from the Rural Fire Service Queensland website at www.qfes.qld.gov.au/bushfires. The 'Bushfire Survival Plan' document provides information on Bushfire Danger Ratings, Community Warning Information, how to prepare

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your property, what to do in the event of a bushfire and what to expect. The Bushfire Survival Plan should be updated annually. Further information is also available through the Prepare•Act•Survive brochure also available on the Rural Fire Service website. For further information contact your local Fire Brigade for assistance or phone 1300 369 003.

The Bushland open space is a very sensitive ecosystem and could be altered drastically if not cared for properly. Residents can assist in maintaining this fragile ecosystem by preventing unwanted fires from encroaching into the parkland, ensure that dumping of rubbish does not degrade the area and that exotic plant species do not invade the bushland. Hot fires on a regular basis will degrade the bushlands biodiversity.

11. Summary of Recommendations

- The proposed pathway behind Lots 759-766 and the walking/bikeway through Lot 2007 are to be designed so as to double as a fire trail with connections to the roadway at each end.

- Fire trails would be low impact preferably with a mowed or slashed surface which would minimise disturbance or erosion, have a maximum grade of 25% and maximum cross slope of 5%. Fire trails are to have a minimum cleared width of 6 metres and minimum formed width of 4 metres. Where fire trails deviate away from lot boundaries the area between the trail and lot boundary must be managed with low fuel levels so as not to compromise the buffer function that fire trails provide in addition to vehicle access.

- The residential allotments are to be maintained with low ground fuel levels at all times and may include domestic gardens, lawns with grass kept under 100mm in height and scattered trees with discontinuous canopy.

- Lot 2007 is to be managed as an inner Asset Protection Zone (APZ), as outlined in Appendix 3.

- Lot 2012, is to be managed so as not to result in an area of future bushfire hazard, as outlined in Section 5 of this report.

- Non-endemic grass and weed growth is to be controlled in the ‘Linear Park Unmanaged’ corridors. All slash pine is to be removed.

- All previous or future cleared timber and foliage or accumulated rubbish should be removed from the site or mulched and not simply moved aside as this will result in a concentrated area of fuel loading which will increase the potential bushfire hazard from that direction.

- Fibrous bark trees, such as melaleuca, swamp mahogany and stringy bark, have a tendency to increase ember attack during a bushfire, due to the fire running up the tree trunk and burning bark breaking off, creating large quantities of airborne burning embers. Ribbon bark tree species (trees that shed their bark in long strips) are also an issue, significantly increasing the potential for spot fires. For this reason, tree species with these bark types should not be used as revegetation/rehabilitation/regeneration plantings in urban interface areas.

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- Edge effects are to be managed.

- For optimal bushfire safety and best practise, the allotments must be cleared during operational works and maintained by the developer with low ground fuel levels until sold. Once sold the purchaser must maintain the allotment at all times, before, during and after construction of the dwelling.

- Where the development is to take place in stages, care should be exercised to ensure the developed stages are not threatened by bushfire from the undeveloped stages. When operational clearing approvals are applied for, the application needs to include cleared buffers of 100 metres into developable areas in adjoining stages and these areas must be managed until developed.

- The level of construction for dwellings (BAL), if any, should be assigned prior to plan sealing stage when the actual risk would be more readily assessable for individual allotments, allowing for potential alterations during development to terrain and vegetation types.

- Any mains gas supply is to be installed in accordance with AS2596, the requirements of relevant authorities and metal piping is to be exclusively used.

- Electricity supplies within the property are to be protected and not vulnerable to falling tree or bushfire threatening the viability of transmission poles.

- The area of the proposed development is to be serviced by reticulated water supplies with the inclusion of fire hydrants for firefighting purposes. These services are to comply with the relevant standards as required by the local authorities, including a minimum pressure and flow of 10 litres a second at 200kPa or that which is able to be supplied by the local reticulated network. Fire Hydrants are to be installed in accordance with the *Fire Hydrant and Vehicle Access Guidelines for residential, commercial and industrial lots*, Queensland Fire and Emergency Services, 2015, unless otherwise specified by the relevant water authority.

- Dwellings are to have external taps and hoses that are positioned so water supply is capable of reaching to all parts of the building. All water lines are to be covered by at least 300mm of soil or be of metal above ground. Residents should maintain good access around their homes for fire suppression activities by fire services.

- It is recommended that a copy of this report be placed on display at any sales office, and a copy of the report be given to the purchasers of lots to provide them with the necessary information required for the building application process.

- A copy of this plan should be retained by residents to assist them in minimising the risk of bushfire damage. It is recommended that regular liaison with the local fire brigade takes place as a way of being informed of danger periods.

- It is recommended that residents with a 'Medium' bushfire hazard rating prepare a 'Bushfire Survival Plan', a template for which is available from the Rural Fire Service Queensland website at www.qfes.qld.gov.au/bushfires.

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12. Conclusion

With the appropriate maintenance of fuel levels around the development, adequate water supply, good access provisions and minimising ground fuels, the risk of bushfire damage can be managed and improve the safety of residents and fire services in attending to a bushfire threat.

The proposed dwellings achieve a tolerable risk level in accordance with Bushfire Resilient Communities Technical Reference Guide 10/19.

This plan remains current for a period of 5 years, until 2028, at which time it should be subject to review to take account of changing land use and vegetation patterns. Any major bushfire event affecting the subject site should also trigger a review to determine effectiveness of protection measures and annual hazard reduction initiatives.

Ultimately, persons living in a bushfire prone area must take the precautions necessary to protect themselves, their families and their homes if Brigades are stretched and are unable to attend immediately.

If you require any further assistance, please do not hesitate to contact this office.



Brett Bain, MDIA, MRFAQ
Lead Bushfire Consultant.

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Legislation

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Building Act 1975 (Qld)
https://www.legislation.qld.gov.au/view/html/inforce/current/act-1975-011

Building Regulation 2006 (Qld)
https://www.legislation.qld.gov.au/view/html/inforce/current/sl-2006-0227

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Planning Act 2016 (Qld)
https://www.legislation.qld.gov.au/view/html/inforce/current/act-2016-025

Vegetation Management Act 1999 (Qld)
https://www.legislation.qld.gov.au/view/html/inforce/current/act-1999-090

Work Health and Safety Regulation 2011 (Qld)
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Other Legislative Materials

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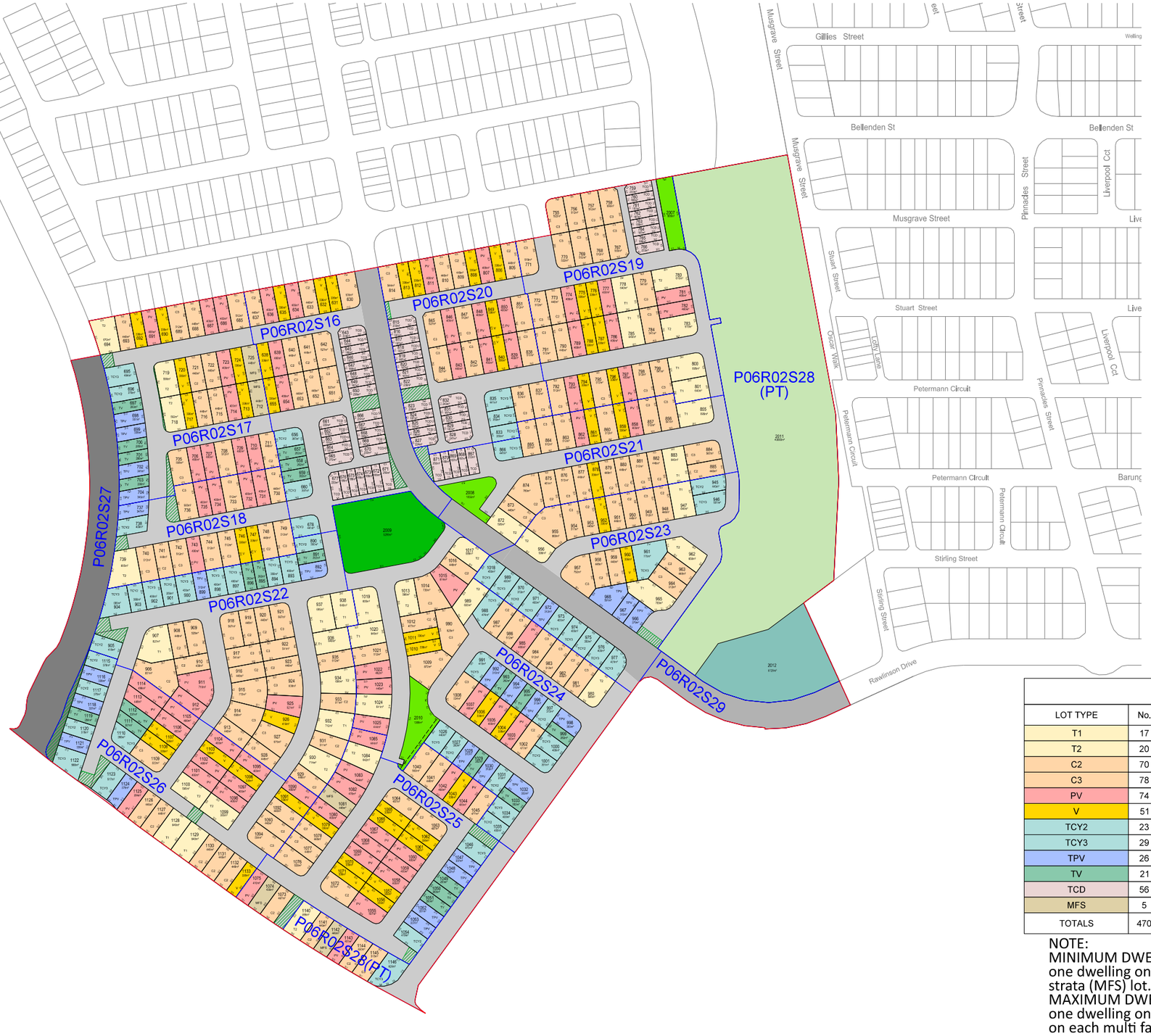
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Council Planning Scheme

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Appendix 1

YARRABILBA



- PRECINCT SIX- APPLICATION TWO BOUNDARY
- STAGE BOUNDARY
- OPEN SPACE - LINEAR AND STORMWATER QUALITY BASIN
- OPEN SPACE - NEIGHBOURHOOD RECREATION PARK
- OPEN SPACE - LOCAL RECREATION PARK
- LOCAL STAGE ROAD
- PATHWAY CONNECTION
- VILLAGE ROAD
- MAJOR ROAD

LAND USE	AREA (ha)
Residential	19.813 ha
Open Space - Local	0.341 ha
Open Space - Neighbourhood	0.529 ha
Open Space - Linear	4.982 ha
Road - Major Road	1.063 ha
Road - Village Road	1.447 ha
Road - Local Road	7.963 ha
TOTAL	36.137 ha

MINIMUM RESIDENTIAL DENSITY - 30.09 ha
470 dw
15.62 dw/ha

MAXIMUM RESIDENTIAL DENSITY - 30.09 ha
480 dw
15.95w/ha

LOT YIELD BY LOT TYPE

LOT TYPE	No.	No.%	AREA	AREA%	MINIMUM	MAXIMUM	AVERAGE
T1	17	3.62%	11487.33m²	5.80%	640.00m²	826.58m²	675.73m²
T2	20	4.26%	12619.87m²	6.37%	586.20m²	804.92m²	630.99m²
C2	70	14.89%	32575.78m²	16.44%	446.22m²	850.59m²	465.37m²
C3	78	16.60%	43011.51m²	21.71%	512.00m²	871.70m²	551.43m²
PV	74	15.74%	30831.85m²	15.56%	393.66m²	709.68m²	416.65m²
V	51	10.85%	17217.82m²	8.69%	336.00m²	417.82m²	337.60m²
TCY2	23	4.89%	8700.70m²	4.39%	350.00m²	439.76m²	378.29m²
TCY3	29	6.17%	13247.63m²	6.69%	398.88m²	769.87m²	456.81m²
TPV	26	5.53%	8978.16m²	4.53%	312.50m²	591.02m²	345.31m²
TV	21	4.47%	5800.96m²	2.93%	262.50m²	336.81m²	276.24m²
TCD	56	11.91%	11421.99m²	5.77%	186.49m²	271.50m²	203.96m²
MFS	5	1.06%	2231.13m²	1.13%	437.93m²	449.20m²	446.23m²
TOTALS	470	100%	198124.71m²	100%	186.49m²	871.70m²	421.54m²

NOTE:
MINIMUM DWELLINGS is based on the development of one dwelling on each single family and multi-family strata (MFS) lot.
MAXIMUM DWELLINGS is based on the development of one dwelling on each single family lot, and three dwellings on each multi family strata (MFS).

DENSITY calculations include the area of residential lots, local roads and credited park. The boundaries, roads and pathways shown hereon are subject to detailed engineering design, final survey and approval of subsequent development applications by the relevant authorities.

PRECINCT 06 - APPLICATION TWO RECONFIRGUATION OF A LOT

NOTE: This plan is indicative only, and specific uses, road alignment, boundaries, setbacks, and building layout shown may vary due to detailed design consideration. ©2024 Lendlease Communities (Australia). All rights reserved. Except as permitted by Lendlease, no part of this publication may be reproduced or distributed in any form or by any means, or stored in a database or retrieval system, without the permission of Lendlease.

0 40 80 120 160 200m

Scale 1:4,000 at A3

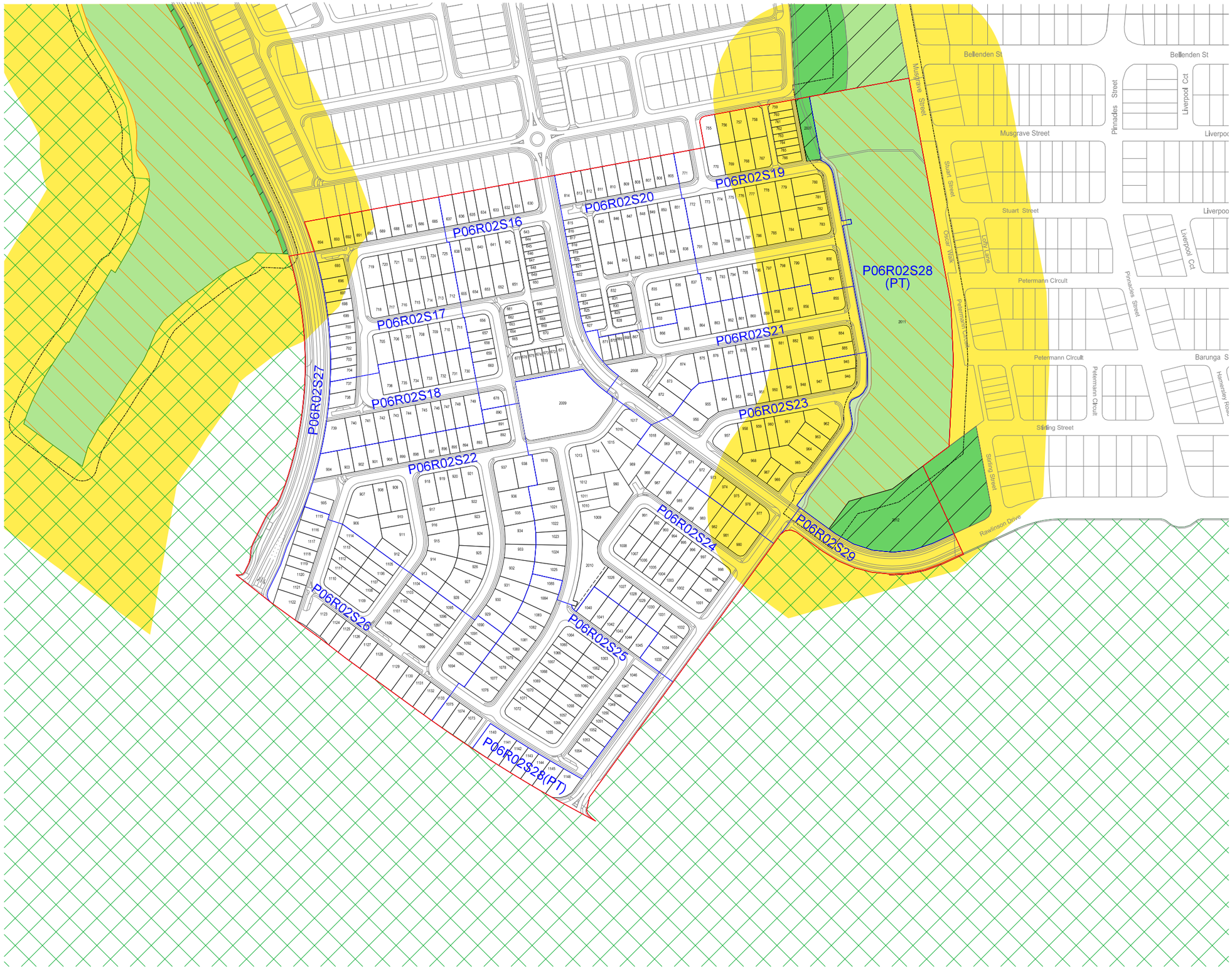
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Appendix 2

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- PRECINCT SIX - APPLICATION TWO BOUNDARY
- STAGE BOUNDARY
- LOW BUSHFIRE HAZARD RATING
- MEDIUM BUSHFIRE HAZARD RATING
- MANAGED BUFFER - LATER APPLICATIONS
- POTENTIAL BUSHFIRE IMPACT ZONE
- LINEAR PARK MANAGED
- LINEAR PARK UNMANAGED
- MINIMUM BUILDING SETBACKS

PREPARED BY LENDLEASE ON BEHALF OF BUSHLAND PROTECTION SYSTEMS

PRECINCT 06 - APPLICATION TWO
BUSHFIRE HAZARD ASSESSMENT AND MANAGEMENT PLAN

NOTE: This plan is indicative only, and specific uses, road alignment, boundaries, setbacks, and building layout shown may vary due to detailed design consideration. ©2024 Lendlease Communities (Australia). All rights reserved. Except as permitted by Lendlease, no part of this publication may be reproduced or distributed in any form or by any means, or stored in a database or retrieval system, without the permission of Lendlease.

0 40 80 120 160 200m

Scale 1:4,000 at A3

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Appendix 3: Asset Protection Zones

This Appendix on Asset Protection Zones (APZs) is included in this report as a guide on how to implement and maintain Asset Protection Zones.

What is an APZ

Generally, buildings or infrastructure located in a bushfire prone area are required to have a minimum separation between the buildings/infrastructure and the unmanaged hazardous bushland (hazardous bushland being bushland assigned a Medium, High or Very High bushfire hazard rating). This separation is known as an Asset Protection Zone (APZ) and is also sometimes referred to as a Radiation Zone or bushfire buffer.

The Asset Protection Zone can include roadways, fire trails, car parking, driveways, active park and managed areas (i.e. lawns and correctly designed landscaping). For example, on rural allotments the APZ would most often be provided by managed areas with a Low hazard rating (lawns and gardens), whilst in an area of small residential allotments adjacent to large areas of bushland the APZ may consist of a roadway or fire trail possibly supplemented by managed areas within the allotments.

An APZ provides an area for bushfire impact mitigation and a defendable space for active fire suppression. An APZ;

- Allows the radiant heat from a bushfire in adjacent bushland to at least partially dissipate before impacting on buildings or infrastructure, thereby mitigating the bushfires impact on the asset,
- Reduces the chance of direct flame contact on buildings,
- Usually includes vehicle access or firefighter pedestrian access,
- Provides an area of defendable space around the asset, allowing firefighters room to work safely and defend structures during direct, indirect and defensive suppression strategies,
- Provides a work area and break for hazard reduction burning activities to be conducted, if desirable.

Dimensions of APZs

Often the APZ will be split into two zones, an ‘inner APZ’ and ‘outer APZ’, particularly where the APZ is a managed vegetation area. As a general rule of thumb, the first ten metres around the building would be an inner APZ while the remainder of the required separation would be an outer APZ, however the exact dimensions are those stipulated in the bushfire mitigation plan, not the generalised examples stated in this appendix, as it may vary depending on individual site conditions. The dimensions may vary depending on site factors, for example with a building on a slope, the APZ may be less on the upslope side of the building than on the downslope side. A change in vegetation type or size of vegetation area that the building is exposed to may also vary the dimensions of the APZ. An extended outer APZ is also sometimes used to extend the outer APZ in consideration of slope. The extended outer APZ is usually managed the same as the outer APZ.

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Slopes in APZs

Generally, APZs require ongoing vegetation management and therefore need to be located where management can be physically possible. APZs on public land should not include slopes with a grade greater than 1:4, on private land APZs should avoid slopes greater than 1:3. For example, where a roadway (including road verge) provides the required separation, the road verge cannot consist of a batter greater than 1:4. Where a retaining wall is located within an APZ, access to all levels need to be provided permitting management of the entire APZ.

Vegetation in APZs

It should be noted that APZs do not necessarily call for complete clearing of all vegetation, as tall canopy tree retention, for example, is a common feature within outer APZs. The management of fuel levels within these zones is designed to reduce the intensity of bushfires before the bushfire impacts on assets such as buildings and property. The correct and continued maintenance of fuel levels within a buildings APZ may result (depending on factors such as terrain, fuel types and climatic conditions) in reduced flame height, a slowing of the rate of spread of the fire and a reduced risk of direct or radiant heat attack on buildings and other property assets.

The following is a guide for vegetation within APZs, however where there is an inconsistency between the main body of the Bushfire Mitigation Plan (BMP) and this Appendix, the requirements of the BMP applies.

<u>The inner APZ</u>;

- Trees have less than 15% canopy cover at maturity and canopy is discontinuous.
- Trees do not touch or overhang buildings.
- Near surface fuels (shrubs, ground covers) are not to be planted underneath tree canopies, are less than 300mm in height and have less than 10% plant cover.
- Lawns/grass is kept to less than 100mm height.
- No accumulated Leaf litter or fallen timber.

An example of 15% canopy – If the tree species being used have a maximum 5 metre diameter canopy at maturity then there could be up to one tree per 166m^2.

<u>The outer APZ</u>;

- Trees have less than 30% canopy cover at maturity.
- Trees do not touch or overhang buildings.
- Near surface fuels (shrubs, ground covers) are not to be planted underneath tree canopies, are less than 300mm in height and have less than 20% plant cover. Gaps between fuel patches are greater than the size of the patches.
- Lawns/grass are kept to less than 300mm height.
- No fallen timber.
- Leaf litter is not allowed to accumulate to more than 5t/Ha (10mm deep).

An example of 30% canopy – If the tree species being used have a maximum 5 metre diameter canopy at maturity then there could be up to one tree per 83m^2.

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General for both zones;

- No mulch, woodchip, bark or leaf litter build-up against structures or flammable fencing.
- Shrubs and ground covers should not be species that accumulate a lot of dead fuel underneath.
- Creepers used as ground cover must not be climbers.
- Creepers should be low broadleaf succulents, such as Myoporum ellipticum.
- Tree selection is not to include fibrous bark trees or ribbon bark trees.
- Tree species have a well-defined trunk with upper canopy, not short bushy trees with foliage from ground to canopy, providing ladder fuels. Trees have branches lower than two metres removed, providing separation between canopy and ground fuels.
- Weed growth is removed.

The above criteria for an outer APZ, would approximately allow up to 8t/Ha overall fuel load in the outer zone.

Plant/Canopy cover is defined as the amount of ground blocked out by that fuel layer if viewed while looking straight down from above. Each plant is considered opaque – any ground within the perimeter of the plant cannot be seen.

Pebbles, gravel or scoria may be useful substitutes for garden mulch. Pathways and gravel areas in addition to lawn can assist in separation of plantings resulting in less continuity of fuels.

How to select the correct plant species for APZs

In selecting the correct plant species to use for landscaping in a bushfire prone area, consideration needs to be given to plant moisture content, branching patterns, texture, foliage density, leaf type, bark type, retention of dead material, and presence of oils, waxes and resins.

As a guide to landscaping and gardening in a bushfire prone area, the document 'Landscaping for Bushfire' produced by the CFA Victoria, is a useful guide on plant selection, garden design and ongoing maintenance. It can be found at https://www.cfa.vic.gov.au/plan-prepare/landscaping. Section 5 of the document provides a good description of the above characteristics and which are good or bad, and Section 7 of the document provides a plant selection key, which is a step by step guide on how to select plants based on those characteristics and should be used when choosing what plants to have in APZs.

There are a number of different terms used to identify suitable plants, some of the more common ones include Fire Resistant, Fire Retardant and Firewise. Not all of these are correct and such plant lists are often confused by some as to their purpose.

'Fire Resistant Plants' is a term that describes plant species that survive being burnt and will regrow after a bushfire. They are resistant to being killed by a bushfire, but not to being burnt. Therefore, they may be highly flammable and inappropriate for bushfire risk areas. You can often find lists of 'Fire Resistant Plants' being used for the wrong purpose due to people not understanding this, so beware, it does not necessarily mean low flammability.

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'Fire Retardant Plants' can be confused by some as being plants that will not burn. All plants will burn under the right conditions, so don't be misled. Plants with low flammability are good, but can still burn, which is why positioning, planting density and ongoing management is also just as important.

'Firewise Plants' is the term used in the 'Landscaping for Bushfire' document to describe suitable lower flammability plants.

Other Features within APZs

Non-flammable features such as tennis courts, in-ground swimming pools, dams, driveways, paved or concreted areas, uncovered patios and non-combustible water tanks may be located within the APZs. (Note: a timber deck around a pool, is not non-flammable and if connected to the building is part of the building.)

Retaining walls and fencing within APZs should preferably be non-flammable.

Piles of timber, firewood and other flammable material should not be stored within the APZ unless shielded from bushfire.

Management of APZs

Management requirements in the APZ include:

- Tree branches below two metres being removed.
- Selective removal of tree saplings.
- Fallen Timber, bark and twigs being removed.
- Leaf Litter being controlled to the appropriate level, which can be achieved by raking or using a blower/vac.
- Removing of weed growth regularly, especially woody weed.
- Regular mowing, slashing or grazing.
- Trimming back of shrubs and ground covers
- Regular watering to keep lawns and vegetation lush and green at all times, particularly during drought, when fires are more likely to happen.
- If poisoning is used, ensure dead material has time to collapse and begin to rot prior to the onset of fire season and not provide standing dead material as fuel for a potential bushfire.

Ongoing management of vegetation in the APZ is just as critical as getting the right type of plants and correct landscape design.

Building construction ratings (or BALs) are calculated with consideration of the amount of separation between the building and hazardous bushland. Not properly maintaining the APZ separation may mean the designated construction of the dwelling is not sufficient and could compromise building survivability in the event of bushfire. This could also lead to issues with insurance claims in the event of building damage or loss.

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Appendix 4: Being Prepared

Knowing how to prepare your property for bush fire, both pre-fire and during a fire, can assist in protecting people and property. It can also alleviate a lot of the stress and panic and the feeling of helplessness that is commonly felt by the inexperienced and by the ill-prepared.

It is generally accepted that South East Queensland does not experience the same degree of extreme fire conditions as the southern states of New South Wales, Victoria and South Australia. Having said this it is also accepted that this State's bushland experiences a relatively regular fire regime. From time to time conditions may occur that will institute a serious and potentially destructive fire. These conditions can be recognised and precautions taken. It must be remembered that during extreme fire conditions the fire services may be stretched to the limit and may not be able to respond immediately to your particular emergency. Fire trucks and fire fighters are a limited resource, so it is important that they are deployed in an appropriate manner to best manage the fire. The Queensland Fire and Rescue Service do not guarantee a fire truck will be available to defend every structure during a large bushfire. So, it would be desirable to be as prepared and self-reliant as possible to protect yourself, your family and your assets. It is not difficult if appropriate preparation is undertaken, and the following information is provided to be of some assistance.

1. Conditions that may lead to a Serious Fire:

1.1. Higher than average air temperatures for prolonged periods.

1.2. Large and very dry fuel loads.

1.3. Prolonged dry spell with little or no rain resulting in low soil moisture content.

1.4. Very low relative humidity, ie. there is very little moisture in the air.

1.5. Strong and gusty winds, usually from the north through to the west contribute to increased fire hazard. The longer these winds continue the drier the conditions become, and the higher the risk of serious fire.

Observation of local weather conditions past and present will give the best indication of the potential intensity of a fire at any given time or place.

Notification of potential bushfire conditions are available from the Queensland Rural Fire Service and Local Brigades, in the form of Fire Danger Ratings often seen on roadside signs, Advice Messages, Watch and Act Messages and Emergency Warnings. More information on these information sources, where to find them and what they mean, is available on the Rural Fire Service Website www.qfes.qld.gov.au/bushfires or through the local Fire Brigade.

2. Basic Fire Behaviour.

Having some idea of what a fire is likely to do in your local area, will help you make the right decisions and give you the confidence to deal with an approaching fire if necessary. Following are some basic fire behaviours.

2.1. Fire will travel faster and hotter uphill. The steeper the slope the faster the rate of spread, in some cases allowing little time to react. The speed of a fire will double for every 10 degrees of upslope.

2.2. Fire will usually travel relatively slower down hill even with reasonably high fuel loads, which will give more time to prepare. The speed of a fire will halve for every 10 degrees of down slope.

2.3. A fire will generally travel faster and at higher intensities with a wind behind it. The stronger the wind, the faster the rate of spread. Likewise, a fire will slow considerably when burning against the wind in some cases it may even go out.

2.4. The fire will usually burn at a higher intensity and spread faster during the hottest times of the day and tend to slow down considerably as the evening approaches and air temperatures drop.

2.5. The greater the supply of dry ground fuel available to the fire, ie. grass, dry leaf litter, hanging bark and twigs, the greater the intensity of the fire. If the ground fuel is minimised the intensity of the fire reduces considerably and so does the personal risk and the potential for damage.

2.6. If ground fuels are kept relatively low the chances of a fire progressing into the treetops (crown fire) would be considerably reduced within the Queensland coastal bushlands. For a fire to progress into the treetops ground fuels and elevated fuels must be present providing a 'ladder' of fuels from ground level to treetop. Control of these fuels is the best way of minimising fire intensity and therefore limiting the destructiveness of a bushfire.

Talk to neighbours that have been present during previous bushfires or consult the local Fire Brigade to develop an understanding of usual fire behaviour for your specific location.

3. Preparing for the bushfire season.

Most cases of damage to property are caused by radiated heat, direct flame contact or most commonly by burning debris or sparks landing in, on, or around buildings and starting small spot fires which if not attended to may destroy the property long after a fire front has passed. There are many steps that should be taken prior to the onset of a fire season to help protect your property.

3.1. Keep ground fuel cleared from around buildings such as long dry grass, branches, dead leaves, bark and thick undergrowth.

3.2. Remove elevated fuels, such as hanging bark and fallen debris hung up on lower branches.

3.3. Ensure fire breaks/trails/buffers are checked and maintained, even a well-watered lawn can be an effective firebreak.

3.4. Flammable material around buildings should be kept well clear, such as firewood piles, rubbish, fuels, hazardous materials, plant pots, boxes, paper, patio and garden furniture.

3.5. Ensure flammable materials are not stored in open areas under the building.

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3.6. Make sure that rainwater gutters are kept clear of leaf litter build-up. Consider a method of blocking off down pipes so gutters can be filled with water during a fire to extinguish sparks landing in gutters. There are commercially made products available or you can create your own.

3.7. Make sure that the roofing is well secured, as winds created during a fire may lift roofing and allow the entry of burning-embers into the roof space. Also clear any leaf litter or debris build-up from roof areas.

3.8. All windows and vents should be screened with fine wire mesh and all roof areas closed in to prevent entry by sparks.

3.9. Ensure gas tanks have their emergency relief valves facing away from the building (this includes barbeque bottles).

3.10. Make sure of reserve water supplies. Power frequently fails during a fire. If petrol or diesel pumps are available, make sure they and associated hoses and fittings are in good working order.

3.11. Ensure your bushfire survival kit is up to date and complete.

The Queensland Fire and Rescue Service provide detailed lists for preparation prior to fire season and what to do during a bushfire event. This information can be found at www.qfes.qld.gov.au/bushfires or obtained from your local fire brigade.

4. Green Fire Breaks

Added protection from bushfire can be achieved by establishing green fire breaks which include green lawns, trees arranged to create a shield to catch sparks or fire brands or the expanding of tropical rainforest species. Excess rainwater or tertiary treated waste water could be stored and used for this purpose during dry periods to maintain the green fire breaks. Trees and shrubs not subject to drought stress will cope better during bushfires. The higher the moisture content in the plant the slower it burns. Therefore, by keeping the surrounding area green and low in dry ground fuel, the intensity of an approaching fire will be reduced, and the risk of spot fires minimised.

5. Personal Protection

5.1. If you plan to evacuate, make sure you do so early, long before the fire front arrives. Evacuating at the very last moment results in the majority of deaths at bushfires. People remaining to fight the fire need to be physically and mentally fit to do so.

5.2. Those staying to protect the property should make sure they protect themselves from radiant heat, flying embers, smoke and most importantly heat stress. Protection measures should include the following:

- Long trousers and long sleeve shirt made of wool, denim or cotton (no synthetics)
- Woollen socks and sturdy work boots for foot protection
- Goggles for eye protection
- A good pair of work gloves to protect hands from burns
- A smoke mask or a damp cloth (non-synthetic), to cover your nose and mouth to protect you from inhaling smoke and embers.

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- Have plenty of drinking water available to protect against dehydration (not refrigerated as this can cause cramping).

5.3. During the fire

When a fire is approaching and given that you have already carried out your pre-fire precautions, established adequate buffers, implemented mitigation measures and established the degree of risk to your property, protection from the actual fire should be relatively straight forward.

5.3.1. Dress in the appropriate clothing and be sure to drink water regularly.

5.3.2. Fill up bathtubs, sinks, buckets, laundry tubs etc. in case of blackouts.

5.3.3. Close doors and windows.

5.3.4. Close gaps under doors and windows with wet towels.

5.3.5. Block up down pipes, wet down roof, walls and gardens, paying particular attention to the side the fire is approaching from.

5.3.6. Have a battery-powered radio on hand to listen for information about the fire's progress from local radio stations.

5.3.7. Patrol your property while the fire is approaching and take shelter inside as the fire front passes. Then continue patrolling the property for many hours after it has passed, to ensure that any spot fires or smouldering debris do not get a chance to develop into a major fire, paying particular attention to the roof cavity of your buildings. Smouldering embers have been known to start fires hours or even days after the initial passing of the bushfire front.

The Queensland Fire and Rescue Service provide detailed lists for preparation prior to the arrival of a bushfire and what to do during a bushfire event. This information can be found at www.qfes.qld.gov.au/bushfires or obtained from your local fire brigade.

6. Further Information?

The local fire brigade is a good source of local district knowledge, they also have pamphlets and literature produced by the Queensland Fire and Rescue Service available. Most brigades will also be happy to advise local residents.

The information provided above is only a basic guide. Further and more details information is available from the Queensland Fire and Rescue Service. It would be recommended that residents in bushfire prone areas prepare a 'Bushfire Survival Plan', which is available from the Queensland Rural Fire Service website at www.qfes.qld.gov.au/bushfires. The 'Bushfire Survival Plan' document provides information on Bushfire Danger Ratings, Community Warning Information, how to prepare your property, what to do in the event of a bushfire and what to expect. The Bushfire Survival Plan should be updated annually. Further information is also available through the Prepare•Act•Survive brochure also available on the Rural Fire Service website. For further information contact your local Fire Brigade for assistance or phone 1300 369 003.

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Appendix 5: Fire Trails

Recommendations for Fire Trails

Fire trails can be a very effective tool in the management of bushland, for weed control, hazard reduction requirements, prescribed burns and fire suppression activities. A good well maintained trail network can effectively enhance and maintain desired ecosystems, while providing added safety for the protection of life and property. The following is some ways in which fire trails can be constructed and maintained to improve their viability.

1. Fire trails should preferably be constructed to a cleared width of 6 metres and a formed width of 4 metres, and be able to be negotiated by light and medium 4 wheel drive fire appliances.

2. They should preferably have a maximum gradient of 25%, a maximum cross slope of 5%, avoid large cut and fill and avoid sharp corners.

3. Fire trails up to 25% can be of compacted earth surface designed with water shedding devices, such as pipes under trail, woa boys or change of gradients, to prevent washouts or gouging of slopes. It would also be advantageous in some cases if grass coverage can be established, which with periodic slashing or mowing will assist in preventing washouts.

4. Fire trails should have access at each end and multiple access/egress points where possible.

5. Fire tails are to have passing and turn around areas at maximum intervals of 400 metres.

6. Periodic management of ground fuel levels along the edges of fire trails should be implemented to at least one metre each side to improve accessibility during a fire event.

7. Trees alongside fire trails should have low branches removed to a height of 2 metres to assist in preventing fire from climbing into treetops. Branches overhanging fire trails should be removed to a minimum height of 4 metres to ensure access by fire vehicles.

8. Fire trails should be inspected each year prior to fire season, to ensure their condition and carry out remedial work if required.

9. Dead or dying trees that are close to fire trails and may pose a risk to fire services should be removed.

10. Fire trails should not be seen as fire breaks. They are an aid in the management of fuel levels and fire suppression activities.

11. Fire trails should be identifiable to land managers and fire services by signage and map records. Where a fire trail network exists, intersections should also be identifiable.

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Bushland Protection Systems
Specialising in
BUSHFIRE HAZARD PLANNING & MITIGATION

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Fire is a part of nature. Its effects can be catastrophic and fire can never be totally eliminated, however there are steps that can be taken to reduce the chances of uncontrolled fires occurring and the risk to life, property and the environment, in the event of uncontrolled fires. This is what we concentrate on, how the threats from bushfire can be minimised. There are many methods to do so, however deciding which method/s is best to use can be a complex decision to make. There are so many factors to consider such as ecological values, biodiversity, fire history, availability of resources, cost effectiveness and public awareness just to name a few. No guarantees can ever be given when dealing with Mother Nature, with ever increasing complexities it has now become a specialist field to be able to create plans to try and minimise the risk from bushfire. Ultimately it is a community responsibility to protect the environmental values, life and property in their area

COMPANY PROFILE

Bushland Protection Systems Pty Ltd (BPS) is a leading Bushfire Management Consultancy firm in Queensland, with many clients, ranging from private landowners to multi-national companies and Government bodies.

BPS consultants began operating as Bushfire Management Consultants with the introduction of the Gold Coast Bushfire Management Strategy in 1998 and spread their operations across the state with the implementation in 2003 of the State Planning Policy for mitigating the adverse impacts of flood, bushfire and landslide.

During that time over 3500 projects have been successfully completed, including large residential estates such as Coomera Waters, Spring Mountain, Pacific Pines, Coomera Springs, Observatory, Highland Reserve, Delfin Woodlands & Yarrabilba as well as commercial or Government project sites such as Paradise Country, Wacol Police Academy, Numinbah Correctional Facility, Silkwood Steiner School, Canon Hill Community Links Project & Griffith University.

With a strong background in bush fire fighting and involvement with numerous industry bodies, Bushland Protection Systems continues to deliver realistic and cost effective advice and solutions to provide higher levels of safety for the community, improve wildfire suppression and mitigation options for emergency services and land managers, while maintaining and improving environmental values for the future.

Our Consultants are registered with the Rural Fire Association of Queensland (RFAQ) as Level 2 Accredited Bushfire Practitioners.