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BUSHFIRE CONSULTING

Strategic Bushfire Study

Planning Proposal for Community Title Residential Development

1020 Melia Court, Castle Hill NSW 2154

Prepared for

Castle Hill Glen Pty Ltd

BPAD Bushfire Planning & Design Accredited Practitioner Level 3

Version 1.0

21 November 2023

Project Name:	Planning Proposal – Community Title Residential Castle Hill (J3318)
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Project site	Lot 2 DP576773 – 1020 Melia Court, Castle Hill NSW 2154

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Version	Primary Author(s)	Description	Date Completed
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1.0	Lew Short	Final	21 November 2023

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Disclaimer

Contents

1. Glossary

This section defines those core terms and concepts which are adopted throughout the body of this report.

Term	Definition
Asset Protection Zone (APZ)	A fuel-reduced area surrounding a built asset or structure which provides a buffer zone between a bushfire hazard and an asset. The APZ includes a defendable space within which firefighting operations can be carried out. The size of the required APZ varies with slope, vegetation and FFDI.
Bushfire	A general term used to describe fire in vegetation, includes grass fire.
Bushfire attack mechanisms	The various ways in which a bushfire can impact upon people and property and cause loss or damage. These mechanisms include flame contact, radiant heat exposure, ember attack, fire wind and smoke.
Bushfire Attack Level (BAL)	A means of measuring the severity of a building's potential exposure to ember attack, radiant heat, and direct flame contact. The BAL is used as the basis for establishing the requirements for construction to improve protection of building elements and to articulate bushfire risk.
Bushfire Design Requirements	A separate design document to assist the master planning with requirements and specifications to provide compliance with PBP 2019.
Bushfire prone land (BPL)	An area of land that can support a bushfire or is likely to be subject to bushfire attack, as designated on a bushfire prone land map.
Bushfire Hazard	Any vegetation that has the potential to threaten lives, property, or the environment.

Strategic Bushfire Study (SBS)	Provides the opportunity to assess whether proposed new development is appropriate in the bushfire hazard context.
Bushfire Threat	Potential bushfire exposure of an asset due to the proximity and type of a hazard and the slope on which the hazard is situated.
Hazard	A hazard is any source of potential harm or a situation with a potential to cause loss. A hazard is therefore the source of risk.
Likelihood	The chance of an event occurring. Likelihood may be represented as a statistical probability (such as an annual exceedance probability), or whether this is not possible, it can be represented qualitatively using measures such as 'likely', 'possible' and 'rare'.
Managed land	Land that has vegetation removed or maintained to a level that limits the spread and impact of bushfire. This may include developed land (residential, commercial, or industrial), roads, golf course fairways, playgrounds, sports fields, vineyards, orchards, cultivated ornamental gardens and commercial nurseries. Most common will be gardens and lawns within curtilage of buildings. These areas are managed to meet the requirements of an APZ.
Mitigation	The lessening or minimizing of the adverse impacts of a bushfire event. The adverse impacts of bushfire cannot be prevented fully, but their scale or severity can be substantially lessened by various strategies and actions. Mitigation measures include engineering techniques, retrofitting and hazard-resistant construction as well as on ground works to manage fuel and separate assets from bushland.
Planning for Bushfire Protection 2019 (PBP)	NSW Rural Fire Service publication effective from 1 March 2020 which is applicable to all new development on bushfire prone land in NSW.

Resilience	The ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management. UNDRR 2017
Risk	The degree of risk presented by that interaction will depend on the likelihood and consequence of the bushfire occurring. Risk may be defined as the chance of something happening, in a specified period of time that will have an impact on objectives. It is measured in terms of consequences and likelihood.
Risk assessment	A systematic process of evaluating the potential risks that may be involved in a projected activity or undertaking, having regard to factors of likelihood, consequence, vulnerability, and tolerability.
Risk-based land use planning	The strategic consideration of natural hazard risk and mitigation in informing strategic land use planning activities.

2. Melia Court, Castle Hill - Planning Proposal

3. Overview

Blackash Bushfire Consulting has been engaged by Castle Hill Glen Pty Ltd, to provide a Strategic Bushfire Study (SBS) to support the Planning Proposal (PP) for a proposed community title subdivision and multistorey residential development at 1020 Melia Court, Castle Hill NSW (the site). The study area has a total size of ~4.5 ha and is legally known as Lots 1020 & 1021 DP876671 & Lot 2 DP576773.

The subject site is located on the southern side of Castle Hill Road, approximately 1km to the east of the main Castle Hill shopping area, and less than 100m south from the Anglicare Mowll Village complex. There is legal access via Melia Court and Glen Road, and practical vehicle access is via Glen Road. The site is not designated as being Bushfire Prone Land. As such the provisions of the Environmental Planning and Assessment Act 1979, (EPA ACT) and Planning for Bushfire Protection 2019 (PBP) are not triggered, and assessment of bushfire risk is not legislatively required. However, a conservative approach has been taken to provide assurance to Council that bushfire has been considered and is reflected in the Planning Proposal.

An existing subdivision approval on the site 1089/2006/ZA (confirmed by The Hills Shire Council) was issued on 15 November 2007, and the physical commencement was confirmed 11 March 2016.

The proposed project ultimately involves the re-development of the site for a mix of low and medium density residential buildings (185 dwellings), a new public park, a series of open spaces, and public domain upgrades.

The project includes:

- A Publicly Accessible Park "Rogan Hill Park" that is designed to provide a natural play area and outdoor fitness opportunities.
- Six (6) residential flat buildings, with heights ranging from three to six storeys, containing 147 apartment units.
- 38 terraces, each spanning between two and three stories.
- A series of connected biodiversity corridors connecting the existing Blue Gum High Forest and WSUD infrastructure that provide new opportunities for habitat for local flora and fauna.
- A central loop road to enhance accessibility and circulation to each public and communal space.

The subject site is currently zoned as C4 Environmental Living under *The Hills Local Environmental Plan 2019*. The rezoning is proposed to facilitate:

- an area to be zoned R3 'Medium Density Residential'; and
- an area to be zoned as C2 Environmental Conservation and to be held as a 'Stewardship' site under the NSW Biodiversity Conservation Act.

Approximately 4ha of Blue Gum High Forest will be retained on the site and the adjacent Sydney Water Reservoir site. The highly degraded bushland on the site will be significantly rehabilitated and will include bushfire Asset Protection Zones (APZ) near the proposed buildings and approximately 1.125ha of the site to the south will be retained solely for bushland biodiversity and rehabilitated to improve its condition.

The Planning Proposal has been designed to meet the bushfire requirements within the *Environmental Planning and Assessment Act, 1979* (EPA Act), specifically Direction under section 9.1 of the Act, and Direction 4.3 *Planning for Bush Fire Protection* which applies to Planning Proposals that affect, or are in close proximity to, land mapped as BPL. This report demonstrates compliance with the NSW Rural Fire Service (RFS) document *Planning for Bushfire Protection 2019* (PBP).

The site location and context are shown in Figures 1 & 2.

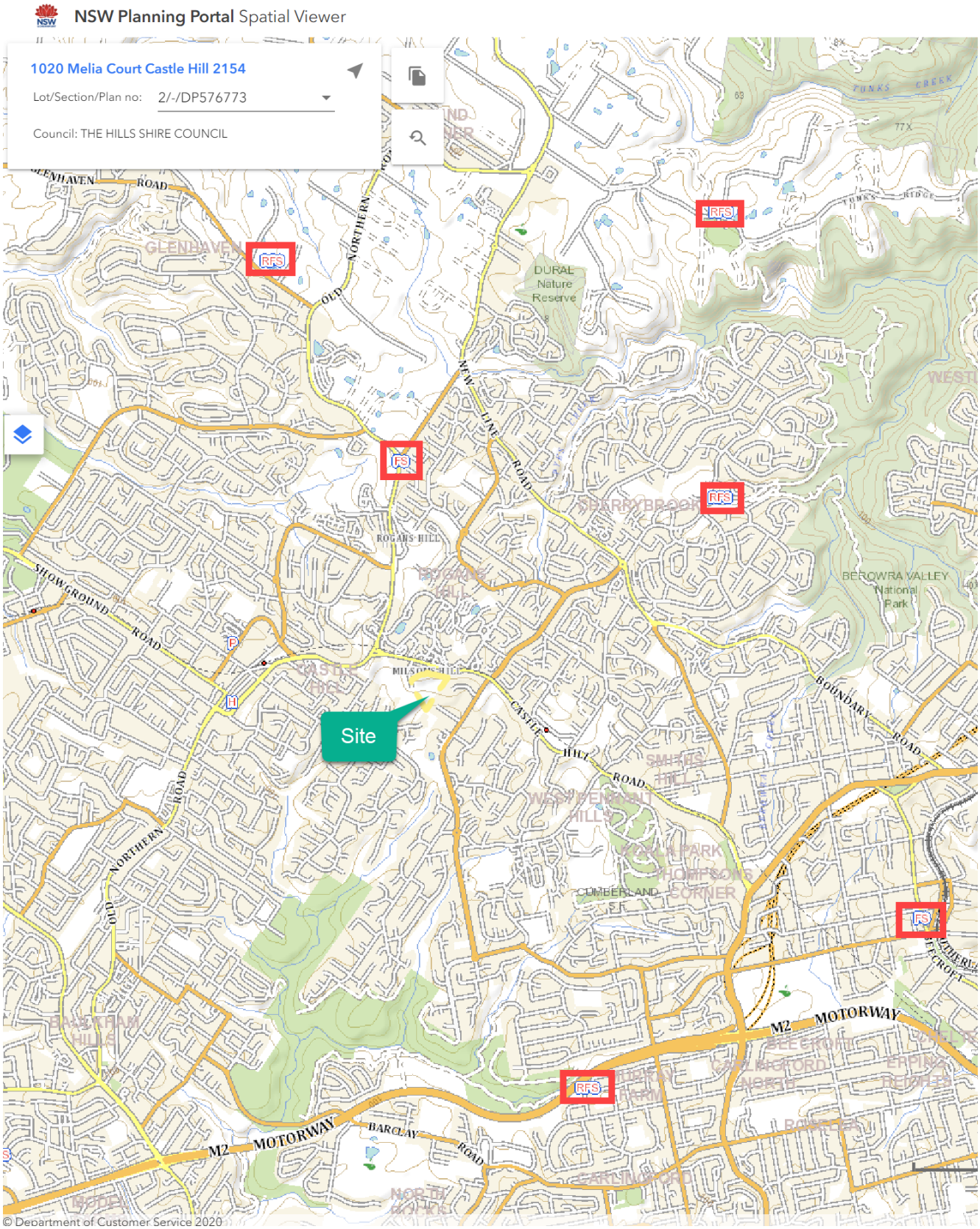

Figure 1: Site locality and location of nearby fire stations (NSW Planning Portal)

Figure 2: Location and current zoning (NSW Planning Portal)

4. Site Description

The land to which this PP relates to is a generally wedge shaped block located towards the top of the slope that Castle Hill Road runs along, with expansive views of Sydney to the south. The site is heavily environmentally degraded having been significantly cleared for agriculture in previous decades across the moderately sloped area of the site proposed for development.

To the north of this cleared flatter area, there is a very steep embankment up to the road (25+ degrees) and existing dwellings on Melia Court, and this consists of poor quality vegetation with approximately 85% being weed species. This vegetation is unconnected to offsite vegetation. No vehicle access is proposed here, however future landscape planning may include a pedestrian link in this location.

To the south of the cleared flatter area, there is steep sloping land to the south (10-14 degrees) that is mapped as remnant Blue Gum High Forest (BGHF). This vegetation is in extremely poor quality and whilst retaining some tree species of the BGHF the shrub and ground cover layers are approximately 85% weed species. This vegetation is connected to retained BGHF to the southwest on the adjoining Sydney Water site, that is again in very poor condition. There is a small highly modified 1st Order stream running along the western boundary towards the southern end of the site.

To the east of the site is managed land consisting of large developed residential lots containing some canopy trees but little or no other vegetation layers.

To the west of the site is Glen Road and the access to the site. There is also an area of managed land on the northern part of the Sydney Water Reservoir site associated with access and site infrastructure. West of Glen Road is moderately sloped managed land. This is land that has been maintained as cleared land for decades, related to a number of existing development consents for subdivision associated with it.

See Figures 3-9 for context.

Figure 10 shows the proposed layout.

The site was inspected by David Lemcke in the company of the design team 28 September 2023.

Figure 3: Site in context with aerial photo (Mecone Mosaic)

Figure 4: Site context - slope and vegetation

Figure 5: Looking south into the managed Sydney Water land west of the site

Figure 6: Looking west into No. 7 Glen Road from Glen Rd cul-de-sac

Figure 7: Looking north along Glen Road with site to right side of photo and managed land to the left

Figure 8: Looking south along eastern boundary – managed land to left of photo and to the right the existing vegetation. The shrub and ground layer is almost entirely weed species to be removed as part of Vegetation Management Plan.

Figure 9: Looking northeast across central cleared area of site towards weedy perimeter of land on northern embankment

Figure 10: Site layout and proposed landscaping (development area of site)

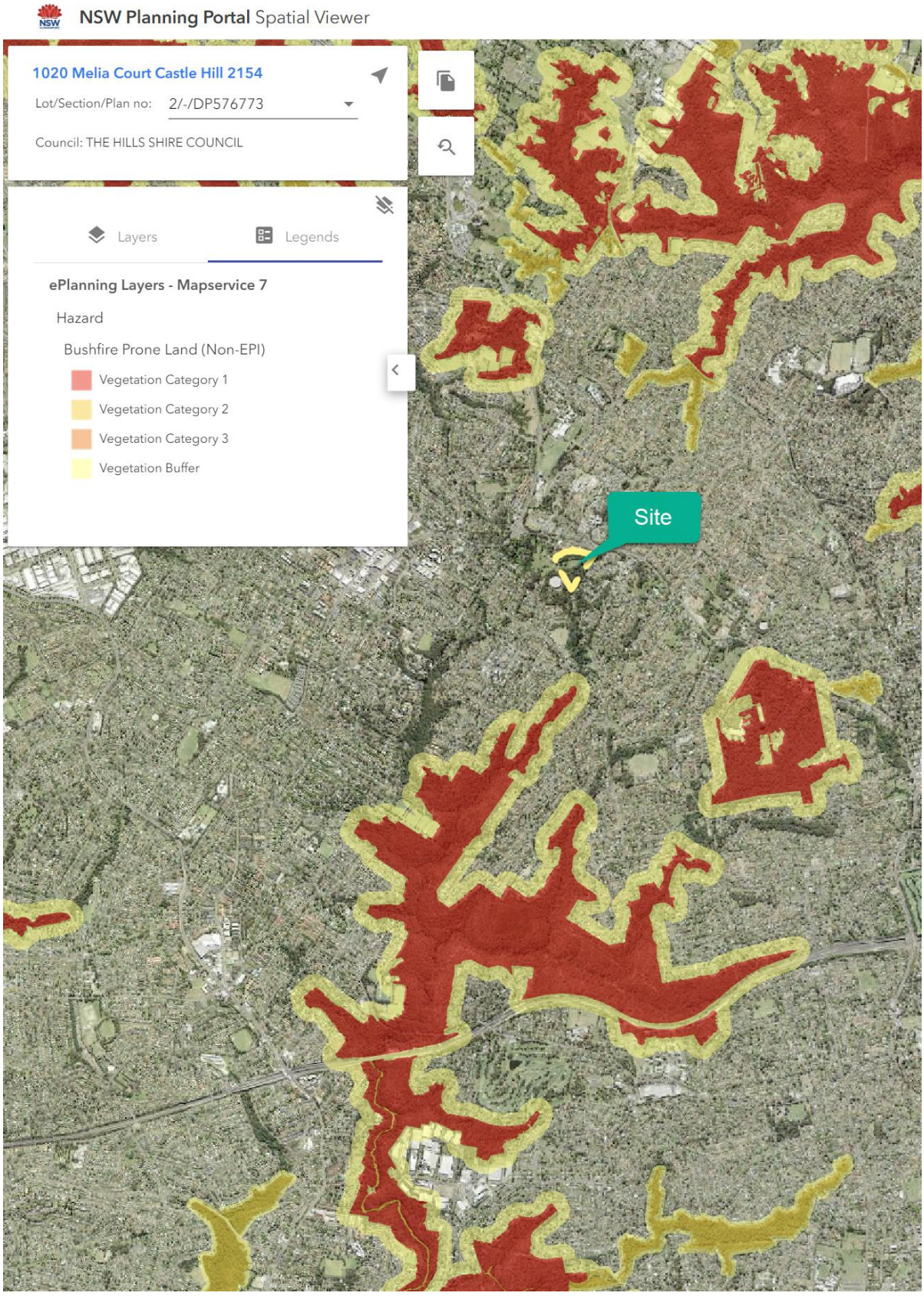

Figure 11: Bushfire Prone Land mapping (NSW Planning Portal)

5. The site in bushfire risk management context

As shown in Figure 11, the site is on land that is not designated as Bushfire Prone Land (BPL). Under section 10.3 of the EPA Act the Bushfire Prone Land Maps (BPLM) provide a trigger for the development assessment provisions and consideration of sites that are bushfire prone. BPL is land that has been identified by council, which can support a bushfire or is subject to bushfire attack. The BPLM are prepared by local councils and certified by the Commissioner of the NSW RFS.

BPLM map vegetation hazards and provide a suitable buffer (50m or 100m) distance from that vegetation. They are an indication of the ability of land to carry a bushfire or to be subject to potential bushfire attack and are not a risk assessment of land. Whilst the map may trigger the requirement for a bushfire assessment, it is not accurate to a scale to be used for other purposes. The BPLM remains a simple trigger to indicate hazard to be considered during stages of the development process.

The requirement to map Bushfire Prone Land was introduced in August 2002 into the EPA Act. In preparing a Bushfire Prone Land Map, Council and the Rural Fire Service are required to follow the RFS Guidelines for Bushfire Prone Land Mapping. Since the inception of the legislation on 1 August 2002, we have not found a record that the site has been designated as being Bushfire Prone Land by either the RFS or Council.

It is noted that the map at Figure 11 shows varying degrees of accuracy and attention to scale changes when mapping vegetation. As per the RFS document "*Guide for bushfire prone land mapping*" (2015) areas of bushland over 1 hectare should be mapped as such.

7.1.2 Exclusions

Vegetation excluded from being mapped as bush fire prone includes:

- Single areas of vegetation less than 1 hectare in area and greater than 100 metres separation from other areas of Category 1, 2 or 3 vegetation;
- Multiple areas of vegetation less than 0.25 hectares in area and not within 30 metres of each other;
- Strips of vegetation less than 20 metres in width, regardless of length and not within 20 metres of other areas of Category 1, 2 or 3 vegetation;
- Areas of "managed grassland" including grassland on, but not limited to, recreational areas, commercial/industrial land, residential land, airports/airstrips, maintained public reserves and parklands, commercial nurseries and the like;

Figure 12: Extract from RFS "*Guide for bushfire prone land mapping 2015*" (p. 11)

A conservative approach is being taken with regard to this PP and a bushfire assessment is being undertaken for the site. This recognises:

- the potential inconsistencies in bushfire mapping;
- the size of the bushland parcel to the south of the site (approximately 4ha); and
- the instruction accompanying Local Planning Direction 4.3 *Planning for Bush Fire Protection* to apply to Planning Proposals that affect, or are in close proximity to, land mapped as BPL.

As outlined in the introduction and site description and shown in Figures 1-11, the site is surrounded by existing urban development of various types and densities, major roads and various infrastructure. The site is characterised as being situated within an established urban area and within the NSW regulatory framework, the bushfire risk is limited to a relatively small area of highly degraded remnant bushland. The steepness of the site adds somewhat to the bushfire risk potential. The key to assessing a practical bushfire outcome for this PP is the scale and context of the risk.

The site is within NSW Rural Fire Service (RFS) The Hills District. The District is a mixture of urban development areas, some rural residential/agricultural areas and fingers of bushland linked to the Council reserve system and the larger National Parks reserves including Marramarra National Park that runs all the way north to the Hawkesbury River. The Hills RFS team includes full time staff and 18 rural fire brigades. As shown on Figure 1 there are 4 RFS brigades and 2 full-time permanent NSW Fire & Rescue stations within a 5km radius of the site, and dozens of additional firefighting resources within the Greater Sydney Area Command.

6. Credentials

This assessment has been prepared by David Lemcke and Lew Short from Blackash Bushfire Consulting. Current Curriculum Vitae are at Appendix 2.

David Lemcke is a Senior Planner & Bushfire Specialist who is an active senior RFS volunteer, with over 20 years in the service, having been a field officer for 13 years. Dave is an experienced planner with over 20 years' experience in local government holding numerous qualifications including a Master of Environmental Planning and Advanced Diploma of Public Safety (Emergency Management).

Lew Short is the Principal at Blackash Bushfire Consulting (FPAA BPAD-A Certified Practitioner No. BPD-PA-16373) who is recognised by the RFS as qualified in bushfire risk assessment and has been accredited by the Fire Protection Association of Australia as a Level 3 BPAD qualified consultant.

Lew established and led the Community Resilience Group for the RFS. His areas of responsibility included land use planning and environmental management. He was responsible for the establishment, management and leadership of the development assessment function for the RFS at a State level. Lew holds several qualifications including undergraduate and post graduate level in environmental management and specialising in bushfire management. Lew is an active Crew Leader with Ku-ring-gai Rural Fire Brigade and has significant operational experience.

Both Lew and David are experts in the bushfire field and can interpret and apply legislation, policy and bushfire requirements while drawing on extensive professional expertise and operational experience.

7. Approach to the Bushfire Strategic Study

The Planning Proposal and design of the site meets the deemed to satisfy requirements of PBP. No alternative solutions or performance-based assessment are required for any part of this assessment.

The strategic planning process provides the opportunity to determine if the site complies with the legislative requirements pertaining to safety and potential risk to life and the capability of the site to comply with various bushfire objectives. This report uses a conservative approach that demonstrates the proposal can meet the legislative and planning requirements. The fundamental issue being tested in this rezoning application, is the determination of the suitability of the site for rezoning, considering bushfire safety and for the ability of future development to comply with PBP.

Pending rezoning approval, detailed information building on this PP will be provided in subsequent development applications. This PP provides opportunity for the plan-making authority and referral agencies to flag areas of concern and to determine the suitability of the proposal for rezoning.

In a bushfire context, strategic land use planning must ensure that future land uses are in appropriate locations to minimise the risk to life and property from bushfire attack. The broad principles which apply to the analysis, and which are demonstrated in this report are[1]:

- ensuring land is suitable for development in the context of bushfire risk and broader environmental impacts
- ensuring new development on BPL will comply with the minimum requirements of PBP
- minimising reliance on performance-based solutions
- providing adequate infrastructure associated with emergency evacuation and firefighting operations
- facilitating appropriate ongoing land management practices.

This report will demonstrate that the Planning Proposal affords utilisation of the site for the proposed residential development and is able to meet the Aim and Objectives of PBP.

[1] Planning for Bushfire Protection 2019 p. 34

8. Strategic Planning for Bushfires

Land use planning is widely recognised as an important measure for limiting future vulnerabilities and losses in areas of new development and a critical element for building disaster resilient communities.

The physical design and layout of communities and settlements are central to the many functions that sustain the social, economic and environmental support systems for the community. Land use planning provides the opportunity to manage new growth and residual risk resulting from new development by complying with legislation and standards, limiting or modifying the location of new development and influencing its layout. This can limit both the impacts of new development on natural systems, ecosystem services and hazards and the flow on impacts on the existing community, as well as limiting the impacts that natural hazards can have on new development and its users.

The strategic planning system is particularly important in contributing to the creation of resilient, safe and sustainable communities that are in keeping with the policy and intent of government.

The *National Strategy for Disaster Resilience* (2011)[2] recognises that strategic planning is essential in creating safer and sustainable communities. In keeping with the policy and intent of government at all levels. Priority outcomes of Section 3.6 include:

- *All levels of decision making in land use planning and building control systems take into account information on risks to the social, built, economic and natural environments.*

This SBS has been completed having regard to the following Commonwealth documents:

- *National Strategy for Disaster Resilience* (2011)
- *Land Use Planning for Disaster Resilient Communities* (2020)
- *National Disaster Risk Reduction Framework* (2018)

Comprehensive consideration of bushfires and risks in the NSW planning system needs sound understanding of the landscape context and risks, as well as clarity on risk management principles and on the approach to strategic planning and development controls that will adequately mitigate

[2] NSDR https://www.homeaffairs.gov.au/emergency/files/national-strategy-disaster-resilience.pdf

identified risks. Where there are competing policy objectives, such as biodiversity conservation and fuel reduction, an agreed methodology or guidance is critical. As such, planning decisions must be based on the best available evidence and rigorous merits-based assessment to ensure that new development - people, homes and businesses are not exposed to unacceptable risk from bushfire. The framework provided within PBP provides the minimum requirements for new development within bushfire prone areas.

The importance of sound land use planning has been recognised in most significant bushfire inquiries, including Natural Disasters in Australia which noted that land use planning that considers natural hazard risks is the single most important mitigation measure in preventing future disaster losses in areas of new development, and that planning, and development controls must be effective, to ensure that inappropriate developments do not occur[3]. The application of legislation, policy, and guidelines provides one of the most effective means of bushfire planning to ensure future developments are resilient and capable of protecting life.

This report focuses on disaster resilience which means planners, hazard leaders, emergency managers and other built environment professionals can contribute to:

- understanding and anticipating bushfire risks before they happen and developing more resilient land use and built form tailored to address bushfire risks
- minimising the increase in risks to people and disruptions to social and economic functions when a disaster strikes by ensuring compliance with state requirements for new development in Bushfire Prone Areas.

This report uses the balanced approach provided within NSW for new development in Bushfire Prone Areas (BPA) that recognises the need to protect human life and provide safe operating environments for fire and emergency services, while having due regard to the environmental impacts, development potential of land and the need to cater for growing populations.

[3] Ellis, S et al (2004) National Inquiry on Bushfire Mitigation and Management (p.92)

9. Legislative Framework

The landuse planning framework as it relates to landuse planning and bushfire in NSW is embedded in the EPA Act, the *Rural Fires Act 1997* (RF Act), *Rural Fires Regulation* 2013 (RFR) which is articulated through PBP. As the site is not designated as being Bushfire Prone Land, there is no legislative mechanism to require the consideration of bushfire risk.

10. Strategic Planning Phase

The EPA Act sets out the laws under which planning in NSW takes place. The main parts of the EPA Act that relate to development assessment and approval are Part 3 (Planning Instruments) and Part 4 (Development Assessment).

EPA Act Section 9.1 provides for the Planning Minister to direct councils to apply certain standards (detailed in the Direction) when preparing Planning Proposals for consideration. These Directions cover a range of practice areas and carry legislative weight.

Planning Direction 4.3 *Planning for Bush Fire Protection* (Appendix 3) states that:

> *This direction applies to all local government areas when a relevant planning authority prepares a planning proposal that will affect, or is in proximity to, land mapped as bushfire prone land.*

As the site is not mapped as being Bushfire Prone Land, Planning Direction 4.3 is not applicable. However, we have taken a conservative position in having regard to the Planning Direction 4.3 requirements. These require Council to consult with the Commissioner of the NSW Rural Fire Service when preparing a Planning Proposal and consider any comments made. Importantly, a Planning Proposal must:

(a) have regard to Planning for Bush Fire Protection 2019
(b) introduce controls that avoid placing inappropriate developments in hazardous areas, and
(c) ensure that bushfire hazard reduction is not prohibited within the APZ.

Again, there is no legislative mechanism for the consideration of Chapter 4 of PBP controls Strategic Planning, and details what must be included in an SBS. Again, the applicant has sought a conservative position to ensure that bushfire has been adequately considered and planned for where necessary. The SBS must be considered by the Gateway authority (when triggered), before any Planning Proposal to

amend an LEP can be submitted to the Department of Planning and Environment (DPE). The SBS may be considered by DPE as part of the Gateway Determination. This determines whether the Planning Proposal should proceed further, or not, towards becoming an Environmental Planning Instrument (EPI).

EPIs are statutory plans made under Part 3 of the EP&A Act that guide development and land use. These plans include State Environmental Planning Policies (SEPPs) and Local Environmental Plans (LEPs). LEPs zone land and provide controls for a suitable range of permissible uses to be considered in more detail at the development assessment stage.

11. Development Assessment

Bushfire Prone Land (BPL) is designated in accordance with s.10.3 of the EP&A Act. BPL is land which can support a bushfire or is subject to bushfire attack, that has been identified and mapped by the local council and certified by the Commissioner of the RFS. The site is not designated Bushfire Prone Land.

Integrated development, under Division 4.8 of the EP&A Act, is development requiring consent and one or more additional approvals. Section 4.46 of the EP&A Act requires a Bushfire Safety Authority (BSA) from the RFS under Section 100B of the RFA for residential and rural residential subdivision, or development of land for a Special Fire Protection Purpose (SFPP) on BPL. The site is not designated Bushfire Prone Land and as such, is not Integrated development. The applicant has sought a conservative position to ensure that bushfire has been adequately considered and planned for where necessary. An application for a BFSA must address the extent to which the development complies with PBP.

A BFSA authorises development to the extent that it complies with PBP including requirements for Asset Protection Zones (APZ), construction standards, landscaping, provision of water supply & utilities, access, and emergency management arrangements in combination considered by the Commissioner necessary to protect persons, property or the environment from danger that may arise from a bushfire.

On designated Bushfire Prone Land, new residential or rural residential subdivision development needs to justify that the Planning Proposal results in development that can meet the requirements of PBP on a risk-based approach.

Future building work on BPL must comply with the requirements of the *National Construction Code* (NCC). Under the Deemed to Satisfy provisions of the NCC, building work on BPL must comply with

Australian Standard 3959-2018 *Construction of buildings in bushfire-prone areas* (*AS 3959*) or the National Association of Steel Framed Housing (2014) *Steel Framed Construction in Bushfire Areas* (NASH Standard).

12. General Obligations

All owners and land managers (both public and private) have a duty to prevent the occurrence and spread of bushfires on or from their land. This duty is legislated under Section 63 of the *RFA*.

Local risk mitigation is coordinated through Bushfire Risk Management Plans (BRMP). These guide programs to implement specific treatments. Treatments may include such things as hazard reduction burning, establishing and maintaining APZ, grazing, preparing pre-incident plans, establishing and maintaining fire trails and community engagement. These may be applied to public and private landowners and as notified steps carry the legislative weight of Section 63.

13. Planning for Bush Fire Protection 2019

The application is inherently conservative as the site is not designated Bushfire Prone Land. As such, the consideration of Bushfire Prone Land from a legislative context is hypothetical in nature.

The specific objective of this SBS is to assess the proposed development with the strategic assessment considerations in Chapter 4 of PBP. The SBS provides the opportunity to assess whether new development is appropriate in the bushfire hazard context at a strategic or landscape scale. It also provides the ability to assess the strategic implications of future development for bushfire mitigation and management. The SBS must first demonstrate the proposal complies with the overall Aim and Objectives of the document.

All new development on bushfire prone land must comply with PBP.

The **aim** of PBP (p. 10) is:

- *to provide for the protection of human life and minimise impacts on property from the threat of bushfire, while having due regard to development potential, site characteristics and protection of the environment.*

The **objectives** (PBP p. 10) are to:

- *Afford buildings and their occupants protection from exposure to a bushfire*
- *Provide for a defendable space to be located around buildings*
- *Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings*
- *Ensure that appropriate operational access and egress for emergency service personnel and occupants is available*
- *Provide for ongoing management and maintenance of Bushfire Protection Measures; and*
- *Ensure that utility services are adequate to meet the* needs of firefighters

Chapter 4 of PBP articulates the regulatory framework for Planning Proposals in NSW, along with a series of assessment considerations that are required before a determination can be made regarding a Planning Proposal.

PBP Section 4.2 (in part, p. 34):

> *A Strategic Bush Fire Study must include, as a minimum, the components in Table 4.2.1.*

> *Once these strategic issues have been addressed, an assessment of whether the proposal can comply with this document should be carried out. If the strategic issues cannot be resolved, then the proposal cannot comply with PBP and will not be supported by the NSW RFS.*

Strategic planning will need to take account of the next level of detail required at Development Application (DA), but without needing to provide complete final project plans, or full assessments for each lot or development proposed. This is designed to provide flexibility for later project stages while progressing the rezoning to permit the new uses.

Commercial, industrial, and "other" development do not have specific minimum standards defined in PBP that apply to residential or rural residential subdivision or SFPP development. These subdivision types must however demonstrate that practical development can be achieved outside the Flame Zone, and how the PP can meet the aim and objectives of PBP and the relevant requirements of Chapter 4. This can be demonstrated through a variety of methods including mapping analysis demonstrating that development can be located to achieve BAL-40 construction standards.

14. Strategic Planning Compliance

PBP requires that Planning Proposals in bushfire prone areas require the preparation of a SBS. While not legislatively required, this SBS has been completed using the deemed to satisfy provisions within PBP. For strategic level assessment, this requirement relies on the application demonstrating it is possible to provide complying asset protection zones (APZ) for the proposed development, and that roads and services (water, electricity and gas) will be able to be developed to meet PBP.

The SBS is a strategic level assessment, requiring a balance between providing sufficient information to determine the suitability of the site, without overly burdening proponents with detail to be managed / finalised at subsequent DA stage. PBP (p. 19) notes that:

> *The most important objective for strategic planning is to identify whether new development is appropriate subject to the identified bushfire risk on a landscape scale. An assessment of proposed land uses and potential for development to impact on existing infrastructure is also a key element of the strategic planning process in bushfire prone areas. Land use planning policies can be introduced to limit the number of people exposed to unacceptable risk.*
>
> *Once development has been assessed as being appropriate in its bush fire prone context, it will need to be capable of complying with PBP. The ability of proposed land uses and associated*

future developments to comply with PBP will be assessed at the strategic planning stage. The expectation will be that the development will be able to comply with PBP at the DA stage.

The design team has considered and responded to the bushfire requirements within PBP. In a bushfire context, the design team has provided a PP that ensures future residential development is in appropriate locations to minimise the risk to life and property from bushfire attack. Future development will be able to comply with PBP at the DA stage.

The design team has incorporated the broad principles PBP (p. 34) for strategic planning into the Planning Proposal which apply to the risk assessment of an area which includes:

- *ensuring land is suitable for development in the context of bushfire risk*
- *ensuring new development on BPL will comply with PBP*
- *minimising reliance on performance-based solutions*
- *providing adequate infrastructure associated with emergency evacuation and firefighting operations*
- *facilitating appropriate ongoing land management practices.*

PBP also outlines exclusion of inappropriate development in bushfire prone areas which includes:

- *the development area is exposed to a high bushfire risk and should be avoided*
- *the development is likely to be difficult to evacuate during a bushfire due to its siting in the landscape, access limitations, fire history and/or size and scale*
- *the development will adversely effect other bushfire protection strategies or place existing development at increased risk*
- *the development is within an area of high bushfire risk where density of existing development may cause evacuation issues for both existing and new occupants*
- *the development has environmental constraints to the area which cannot be overcome.*

PBP requires that the SBS must include, as a minimum, the components identified in Table 4.2.1 of PBP – Bushfire Strategic Study (p.35) as shown in Figure 13.

ISSUE	DETAIL	ASSESSMENT CONSIDERATIONS

Bush fire landscape assessment	A bush fire landscape assessment considers the likelihood of a bush fire, its potential severity and intensity and the potential impact on life and property in the context of the broader surrounding landscape.	› The bush fire hazard in the surrounding area, including:
		  › Vegetation
		  › Topography
		  › Weather
		› The potential fire behaviour that might be generated based on the above;
		› Any history of bush fire in the area;
		› Potential fire runs into the site and the intensity of such fire runs; and
		› The difficulty in accessing and suppressing a fire, the continuity of bush fire hazards or the fragmentation of landscape fuels and the complexity of the associated terrain.

Land use assessment	The land use assessment will identify the most appropriate locations within the masterplan area or site layout for the proposed land uses.	› The risk profile of different areas of the development layout based on the above landscape study; › The proposed land use zones and permitted uses; › The most appropriate siting of different land uses based on risk profiles within the site (i.e. not locating development on ridge tops, SFPP development to be located in lower risk areas of the site); and › The impact of the siting of these uses on APZ provision.
Access and egress	A study of the existing and proposed road networks both within and external to the masterplan area or site layout.	› The capacity for the proposed road network to deal with evacuating residents and responding emergency services, based on the existing and proposed community profile; › The location of key access routes and direction of travel; and › The potential for development to be isolated in the event of a bush fire.
Emergency services	An assessment of the future impact of new development on emergency services.	› Consideration of the increase in demand for emergency services responding to a bush fire emergency including the need for new stations/ brigades; and › Impact on the ability of emergency services to carry out fire suppression in a bush fire emergency.
Infrastructure	An assessment of the issues associated with infrastructure and utilities.	› The ability of the reticulated water system to deal with a major bush fire event in terms of pressures, flows, and spacing of hydrants; and › Life safety issues associated with fire and proximity to high voltage power lines, natural gas supply lines etc.
Adjoining land	The impact of new development on adjoining landowners and their ability to undertake bush fire management.	› Consideration of the implications of a change in land use on adjoining land including increased pressure on BPMs through the implementation of Bush Fire Management Plans.

Figure 13: Requirements of a Bush Fire Strategic Study (PBP p. 35)

15. Bushfire Landscape Assessment - Context

16. Landscape Assessment – Scale Context

The bushfire landscape assessment considers the likelihood of a bushfire, its potential severity and intensity and the potential impact on life and property in the context of the broader surrounding landscape. The broader landscape and the potential size or scale of a bushfire has been a key design response by the project team throughout the preparation of the Planning Proposal.

The likelihood of a bushfire, its severity and intensity, and the potential impact on life and property varies depending on where a site is located in the landscape. Two types of considerations are relevant in terms of assessing the bushfire hazard including:

- landscape scale hazard – where large expanses of vegetation over tens to hundreds of hectares are located in immediate proximity to, and may traverse, urban periphery suburbs/townships
- localised hazard – which is most commonly presented by fragmented areas of vegetation larger than 1 hectare in size

These two types of hazard present different types of fire behaviour, fire intensity and potential rate of spread characteristics. The site is subject to a range of environmental and historical influences features which provide the current urban form of the area, including bushfire, vegetation corridors, existing land uses, drainage and ecology/biodiversity values.

This site is located within a highly developed and managed landscape, with only relatively small, fragmented areas of vegetation, often linked to riparian zones or isolated ridgelines. This means only local scale fires are possible at the PP site – landscape scale fires are not possible here based upon localised terrain, fuel, fragmentation, and overall small bushland patch size.

The significant fire threats in The Hills are discussed further below, however the vegetation pattern means that in this landscape setting only fires started locally by arson, misadventure or ember attack are able to impact the site. Whilst ember attack is possible, such ignition of the downslope vegetation could only occur in specific, rare circumstances of very bad fire weather and large fires locally.

Whilst bushfires may be present from any direction from the site, these bad weather days are typically hot days with dry north westerly winds. The nearest substantial area of bushland likely to develop a large scale fire from the northwest is the Council reserve system associated with Glenhaven and Annangrove approximately 5km to the northwest. This cannot directly impact the site. This has to assume a substantial bushfire is already going in this area.

The other associated bad fire weather is a south or southwest change that impacts a going bushfire at the end of a hot dry day, turning the flank into a new front. This has to assume a significant bushfire is already going to the south of the site. The only location where this could occur is the North Rocks/Baulkham Hills reserve system associated with Excelsior Creek and Darling Mills Creek to the south approximately 1-3km to the south.

Both scenarios are possible (if unlikely) under strong winds, however containment and control of these fires is assisted by fragmentation of vegetation by roads and urban development. In both situations, the community and the emergency services would already be on high alert locally. The fire combat agencies now have in place Operational Readiness arrangements of relatively high sophistication including measures such as standing up crews and strike teams in key locations; having pre-determined dispatch aircraft ready to go; additional patrols of known risk areas; additional staff and Incident Management Teams in place.

The site is exposed to only **Low** landscape scale risk due to the extensive modification of the landscape and the primary focus remains on localised hazard and risk.

17. Assessment against adopted Bush Fire Risk Management Plan

The Hills Bush Fire Management Committee (BFMC) is made up of local representatives of emergency services, land managers and the Council. They are appointed to the BFMC as they are considered the most expert bushfire management practitioners in their agencies in their respective local areas (note some individuals may be members of more than one BFMC). Their role is to combine both expert knowledge of bushfire and emergency management, and local knowledge to develop plans and priorities for bushfire risk management actions for their respective local areas.

The BFMC is responsible for producing *The Hills Bush Fire Risk Management Plan 2019*. [4] The Bush Fire Risk Management Plan (BRMP) is legislatively required under the *Rural Fires Act 1997* (RFA) and is a strategic document that identifies community assets at risk, rates the relative risks and set out a five-year program of coordinated multi-agency treatments to reduce the risk of bush fire to the assets. Treatments may include such things as mechanical hazard reduction (e.g., slashing, mowing), hazard reduction burning, grazing, community education and fire trail maintenance. The BRMP uses a state-wide methodology to risk assess all assets across the state consistently.

18. The Hills Bush Fire Risk Management Plan Assessment

The BFMC area includes The Hills Shire LGA and covers approximately 38,630 hectares. Land tenure and land use are critical for context, with most of the area (~81.4%) being privately owned with only 1.6% of the area is noted as National Park or State Forest. Crown lands and council lands make up 16%.

The BFRMP (p.8-9) provides the following relevant information for context:

Climate and bush fire season

The typical/average climate in The Hills BFMC area is warm summers and cool winters with the most rainfall received during summer and autumn (December to May) and a drier winter and spring (June to November). The start of the normal bush fire season coincides with northwest winds, which often prevail during late spring (Sep/Oct). The majority of serious bushfires occur from this period until the onset of autumn.

[4] https://www.rfs.nsw.gov.au/__data/assets/pdf_file/0005/2399/The-Hills-BFRMP-2019.pdf

Population and demographic information

The Hills BFMC area is predominantly residential and rural. The rural areas in the northern part of the Shire boast significant amounts of agriculture, national parks, as well as semirural and rural-residential living. The southern parts of the Shire feature well-established residential and commercial areas as well as large areas of recent residential and employment development. The population of The Hills BFMC area is approximately 172,473 people with the major population centres being the more established Baulkham Hills, Castle Hill and West Pennant Hills. Areas of growth now and into the future however include the precincts of Kellyville, North Kellyville, Rouse Hill and Box Hill with some increase in the more rural areas of Kenthurst, Glenorie, Maroota and South Maroota due to Rural Cluster Subdivisions.

History of bushfire frequency and ignition cause

The Hills BFMC area has on average 153 bush fires per year, of which approximately 4 on average can be considered to be major fires. Major bush fires that have occurred in The Hills Shire were in 1939, 1975, 1991, 1994, 2002, 2006. The most notable were in 1991 and 2002. In 1991 a 1630Ha fire burnt through Kenthurst under a NW wind and resulted in the loss of two lives and the destruction of 7 homes. In 2002 over 45,000Ha were burnt after 3 fires joined together. The fire destroyed 31 homes and 47 other structures and damaged many more. Most commonly today the main sources of ignition in The Hills BFMC area are:

- Escaped private hazard reductions burns;
- Lightning; and
- Arson.

BFRMP references to the Planning Proposal site

The Planning Proposal site and the local area are identified as at risk Assets, with most human settlement assets in the area generally rated not rated as having a bushfire risk, other than those directly adjoining relatively large areas of bushland. This is shown on Figure 14 which is a reproduction of Map 4 – North Rocks of The Hills BRMP.

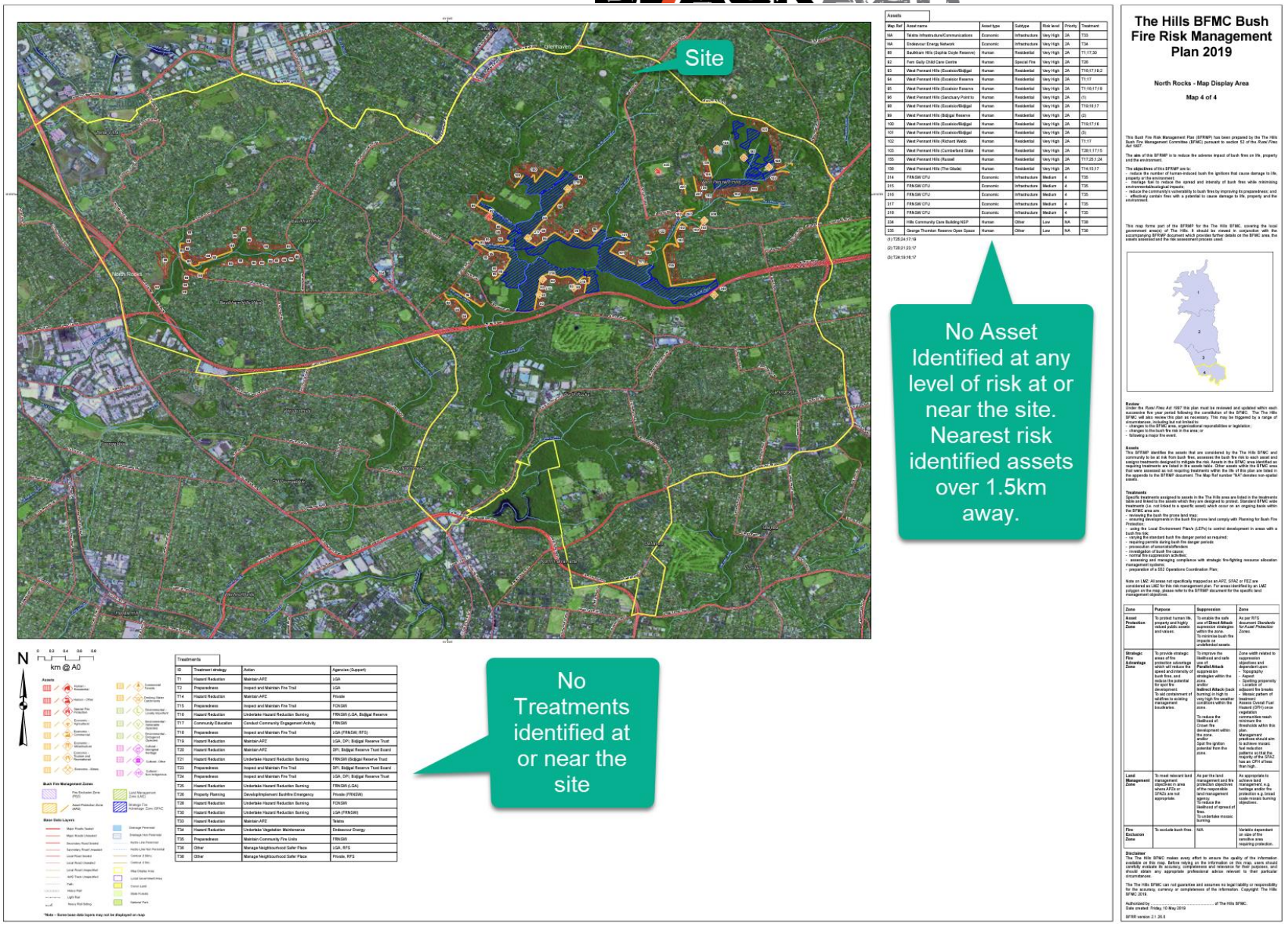

Figure 14: BRMP Assets and Treatments Map 4 (p. 45).

For contrast, the map also shows the residential housing adjacent to the 45 ha Cumberland State Forest (approx. 1.5km to the east of the site) and that associated with the 200+ha Bidjigal/Excelsior/Darling Mills Reserve (approx. 1-3km to the south of the site). These are rated as Very High and have specific Treatments assigned. The BRMP demonstrates a clear relationship between the level of risk and the size of the bushland patch, linked to the possibility of a significant bushfire starting and developing. Detail from Map 4 is shown as Figure 16.

The Risk Treatments table from Map 4 of the BRMP is reproduced below as Figure 15 and shows the types of risk mitigation treatments applied. These are consistent with the Bushfire Protection Measures (BPM) outlined in PBP and are drilled down to a more local scale application where necessary.

Treatments

ID	Treatment strategy	Action	Agencies (Support)
T1	Hazard Reduction	Maintain APZ	LGA
T2	Preparedness	Inspect and Maintain Fire Trail	LGA
T14	Hazard Reduction	Maintain APZ	Private
T15	Preparedness	Inspect and Maintain Fire Trail	FCNSW
T16	Hazard Reduction	Undertake Hazard Reduction Burning	FRNSW (LGA, Bidjigal Reserve
T17	Community Education	Conduct Community Engagement Activity	FRNSW
T18	Preparedness	Inspect and Maintain Fire Trail	LGA (FRNSW, RFS)
T19	Hazard Reduction	Maintain APZ	LGA, DPI, Bidjigal Reserve Trust
T20	Hazard Reduction	Maintain APZ	DPI, Bidjigal Reserve Trust Board
T21	Hazard Reduction	Undertake Hazard Reduction Burning	FRNSW (Bidjigal Reserve Trust
T23	Preparedness	Inspect and Maintain Fire Trail	DPI, Bidjigal Reserve Trust Board
T24	Preparedness	Inspect and Maintain Fire Trail	LGA, DPI, Bidjigal Reserve Trust
T25	Hazard Reduction	Undertake Hazard Reduction Burning	FRNSW (LGA)
T26	Property Planning	Develop/Implement Bushfire Emergency	Private (FRNSW)
T28	Hazard Reduction	Undertake Hazard Reduction Burning	FCNSW
T30	Hazard Reduction	Undertake Hazard Reduction Burning	LGA (FRNSW)
T33	Hazard Reduction	Maintain APZ	Telstra
T34	Hazard Reduction	Undertake Vegetation Maintenance	Endeavour Energy
T35	Preparedness	Maintain Community Fire Units	FRNSW
T36	Other	Manage Neighbourhood Safer Place	LGA, RFS
T38	Other	Manage Neighbourhood Safer Place	Private, RFS

Figure 15: Detail from Treatment Table Map 4 The Hills BRMP (p.45)

It can be concluded that The Hills BFMC does not consider there to be an elevated Risk associated with the site. It also appears clear that similar existing rural residential assets in The Hills are not considered likely to be at elevated risk of bushfire impact.

Analysis of The Hills BRMP shows the BFMC considers the site to be **Low Risk** overall.

Figure 16: Detail from Map 4 of The Hills BRMP (p.45)

19. Landscape Scale Assessment Tool (LSAT)

The *Victorian Planning Permit Applications Bushfire Management Overlay – Landscape Scale Threat Assessment* has been used as the framework to assess the broader landscape scale potential of bushfire affecting the site. This document is the only Australian contemporary Landscape Scale methodology with legislative weight. Blackash has expanded and modified the criteria to emphasise the priority of life safety, and the criticality of bushfire Emergency Management and Evacuation Planning as part of the risk assessment process.

The Blackash Landscape Scale Assessment Tool (LSAT) combines quantitative and qualitative techniques which are scaffolded by the *Landscape Scale Threat Assessment* and associated documentation. The approach is shown in Table 1 and uses elements of the Bayesian decision making model and Expert Judgment techniques backed by data. Bayesian decision making has been used where there is both objective and subjective data to analyse, and decisions need to be made on the probability of successful outcomes where there are high levels of uncertainty. Expert Judgement has been used in the assessment and determination of the landscape scale risk.

Blackash Expert Judgement (as outlined in Appendix 2) is applied consistent with the criteria used in the *National Construction Code* (NCC)[5] Assessment Methods and NSW Land & Environment Court practice that calls up *Schedule 7 – Expert Witness Code of Conduct* in the *Uniform Civil Procedure Rules 2005*.[6]

The LSAT provides information on the bushfire hazard more than 150 metres away from the site at a landscape scale. The broader landscape and the potential size or scale of a bushfire has been an important design response in the development of the PP. The likelihood of a bushfire, its severity and intensity, and the potential impact on life and property varies depending on where a site is in the broader landscape. Landscape scale fires will place greater pressure on emergency response capability and will have a wider impact on roads and the length of time roads cannot be safely used. This will affect the likelihood of successful evacuations taking place across larger areas and may affect the ability of firefighting resources to be deployed. Multiple factors have been considered for the landscape scale assessment. Key considerations in our assessment have included:

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5 https://www.abcb.gov.au/sites/default/files/resources/2021/UTNCC_Using_assessment_methods%20%281%29.pdf

6 https://legislation.nsw.gov.au/view/html/inforce/current/sl-2005-0418#sch.7

- extent and continuity of vegetation
- topography
- prevailing winds
- the potential fire run and area that is likely to be impacted by the fire
- the impact on evacuation routes to safer places considering road networks, distances, and landscape factors
- the location and exposure of the development to bushfire
- the ability to seek bushfire shelter on site or at alternative locations
- the extent of neighbourhood-scale damage the bushfire may produce.

PBP refers to The Hills LGA being in the Greater Sydney Fire Weather District, and the appropriate maximum Forest Fire Danger Index (FFDI) to be applied in the LGA is FFDI 100.

Landscape scale fires are those that can span many kilometres or tens of kilometres, and that burn for days or weeks at a time. Typically, these fires can be many thousands of hectares in size with fire fronts many kilometres in length. On the east coast of Australia this scale of fire is only possible where there are very large areas of forested vegetation, typically National Parks and State Forests that also adjoin substantial areas of private bushland.

The PP site is within a landscape setting that has a long history of vegetation modification for agriculture and urban development. The significant areas of forested bushland in the local area are those local reserves discussed above in Section 9.3; the large complex of bushland reserves in the Glenhaven, Kellyville, and Annangrove starting from approx. 1.5km north of the site; and the very large Berowra Valley Regional Park and associated smaller reserves approx. 1.5km to the northeast. These extensive reserve systems are complicated and have extensive urban development along their edges. These systems carry a landscape scale risk, however due to the extensive separation from the site there is only a local scale fire risk applicable.

The local scale bushfire threat at the site is not able to develop the size and intensity of a landscape scale fire that is likely to cause neighbourhood scale destruction. The local scale fires may still be significant and can cause local damage, as wherever vegetation is retained there will always be some residual risk to manage, however they will not result in widespread property destruction. Local scale fires in such a managed landscape also tend to be noticed quickly by the public and called in to emergency services soon after ignition.

Due to the application of PBP requirements throughout the development process there will be good access for firefighting at the interface, suitable construction standards keeping radiant heat levels at buildings below 29kW/m^2 (BAL-29), suitable firefighting water supplies, and preparation of a suitable Bushfire Emergency Management & Evacuation Plan (BEM&EP) for the site. The small scale of the fire

possible at the site with a maximum of approx. 4ha available to burn and fire runs of less than 200m combined with PBP standard development is then considered with relation to firefighting resources.

As seen in Figure 1 there are 4 RFS brigades and several Fire & Rescue NSW stations within approximately 10 minutes response time and therefore a very high likelihood that a significant 'weight of attack' will be provided by firefighting services. Weight of attack refers to the number of firefighting resources that are likely to be immediately available to respond to a bushfire and a proxy for this can be used by considering the number of fire stations (Fire & Rescue and RFS) that are within a 20-30 minute response. Modern firefighting arrangements are also better coordinated than in previous decades, and have the use of more resources including bulk water tankers, heavy plant (e.g. bulldozers and graders), helicopters and Large Air Tankers (LATS) that are much more readily available, and these enable a major addition to firefighting capabilities, especially on bad fire weather days. As previously discussed substantial improvements to Operational Readiness systems on bad fire weather days means any fire at the site will have an efficient and effective response.

All these characteristics mean that when such fires are ignited there is a relatively quick and effective response meaning that the fire is unlikely to grow to a significant scale. This is not to say that very difficult fire weather days or resources being used elsewhere don't have an impact, simply that there is a low likelihood of any significant fire impacting the study area, and such local fires are likely to be managed with local resources as part of normal emergency operations.

Overall Landscape Scale Assessment

The LSAT is heavily weighted to life safety and places significant emphasis on the ability for the future community to be able to shelter in place or evacuate safely, whilst emergency services can access the site at the same time. The safest methods of protection are not to be in a bushfire hazard area during a day of bad fire risk; have a clear evacuation to an urban area more than 100m from hazard vegetation; and to have a shelter in place strategy in a well prepared property with the dwelling built to contemporary standards. A combination of these methods is likely to maximise life safety whilst still allowing for normal life to continue during the bushfire season.

The site has access to Glen Road which is well integrated into the local road network. The existing traffic network is likely to be impacted by heavy traffic during days where bushfires are occurring in the local area, however road closures due to bushfire impacting on the roads that then affects access and egress to the site are not likely. The primary method of life safety on the site is likely to involve a shelter in place strategy due to the small scale local fire possible, the relatively large number of residents and the high standard of buildings that will meet all PBP standards whilst also meeting NCC requirements for building fire safety for the relevant Class of building.

Whilst the site retains some vegetated areas on the south and southwest sides, this vegetation remains fragmented against landscape scale fire runs. Similarly, the areas west of the site are largely managed, cross slope and separated from the site by Glen Rd.

These fragmented areas of bushland will not be able to develop or maintain landscape scale fires, and therefore the ultimate built form will be more than 100 metres from areas of extreme bushfire threat, as opposed to local scale bushfire threat. Once developed the development will have been assessed against PBP and have a suitable combination of Bushfire Protection Measures (BPM) including significant water supplies, access, and emergency planning appropriate for the types of uses proposed. As the site will be managed through Community Title arrangements there is a very strong administrative framework to ensure the BEM&EP and all the related APZ and landscaping maintenance will be continually managed to standard by the Community Association.

Development will be subject to bushfire assessment and specific building standards as required by PBP and AS 3959:2018 (or contemporary documents as time passes) and will therefore offer suitable shelter from bushfire for individual buildings ultimately approved within the PP site. This shelter in place approach, combined with quick and intuitive self-evacuation away from bushland to within the site and suitable buildings will provide options for immediate life safety for occupants and will reduce the need or desire for evacuations from the site.

When the individual factors are scored, after consideration of the landscape context, the site design complying with PBP, and the large urban area, the overall Landscape Scale Threat for the site is assessed as **Low Risk**. The summary and weighted scores are presented in Table 1 below.

Table 1 Blackash Landscape Scale Assessment Tool – 1020 Melia Court, Castle Hill

Landscape scale bushfire risk factors					
Parameter	**Low landscape scale threat**	**Moderate landscape scale threat**	**High landscape scale threat**	**Extreme landscape scape threat**	
1. Surrounding Vegetation	Landscape scale bushfire cannot directly approach the site as it is surrounded by urban development and non-mapped vegetation or managed land.	Landscape scale bushfire can only approach from one aspect and the site is within a suburban, township or urban area considered managed land. Typically an island of bushfire vegetation within a wider urban development area or interface site impacted only by linear vegetation corridors of 100m	Bushfire can approach from more than one aspect and site is on the bushland-urban interface with the developed area considered as managed land. Typically contigous bushfire vegetation with a typical fire run in any direction of 0.1-2.0 km distance.	Bushfire can approach from more than one aspect and/or fires have many hours or days to grow and develop before impacting and/or site is surrounded by significant unmanaged vegetation. Typically large areas of contigous bushland with fire runs of more than 2 km possible.	**Low**
2. Bushfire Behaviour	Extreme bushfire behaviour at the site is not possible given the broader landscape.	Extreme bushfire behaviour at the site is unlikely in this broader landscape due to combination of factors of vegetation type, vegetation fragmentation, aspect and topography.	Extreme bushfire behaviour at the site is likely in this broader landscape due to combination of factors of vegetation type, vegetation fragmentation, aspect and topography.	Extreme bushfire behaviour is very likely in this broader landscape due to combination of factors of vegetation type, vegetation fragmentation, aspect and topography.	**Low**
3. Impact of severe fire behaviour (FFDI 80 or 100 as relevant) coming onto site from wider fire catchment	There is little vegetation beyond 150 metres of the site (except grasslands and low-threat vegetation) and will not result in neighbourhood scale destruction of the site.	The type and extent of vegetation beyond 150m from the site may result in neighbourhood-scale destruction as it interacts with the bushfire hazard on and close to the site.	The type and extent of vegetation beyond 150m is likely to result in neighbourhood-scale destruction as it interacts with the bushfire hazard on and close to the site.	The type and extent of vegetation beyond 150m will result in neighbourhood-scale destruction as it interacts with the bushfire hazard on and close to the site.	**Low**
4. Vegetation Corridors	Vegetation within the site cannot enable fire to enter and move through the site by a continuous fire path from the primary fire source.	Vegetation within the site is unlikely to enable fire to enter and move through the site by a continuous fire path from the primary fire source.	Vegetation within the site may enable fire to enter and move through the site by a continuous fire path from the primary fire source.	Vegetation corridors on site provide for passage of fire to enter and move through the site from the primary fire source.	**Low**
5. Separation	Hazard separation between extreme bushfire hazard and buildings of greater than 100m. Extreme bushfire hazard does not include vegetated corridors of less than 100m width or	Hazard separation between extreme bushfire hazard and buildings of 50-100m. Extreme bushfire hazard does not include vegetated corridors of less than 100m width or grasslands.	Hazard separation between extreme bushfire hazard and buildings of 20-50m. Extreme bushfire hazard does not include vegetated corridors of less than 100m width or grasslands.	Hazard separation between extreme bushfire hazard and buildings of <20m. Extreme bushfire hazard does not include vegetated corridors of less than 100m width or grasslands.	**Low**
6. Shelter	Immediate access is available to a place that provides shelter from bushfire. This includes existing or proposed buildings on site constructed in accordance with PBP and urban areas more than 100m from bushland hazard.	Access is readily available to a place that provides shelter from bushfire. This will often be the surrounding developed area. In the case of an eco-tourist facility it will be the designated bushfire refuge built in accordance with PBP requirements.	Access to a place that provides shelter from bushfire is not certain during a wildfire and existing buildings are not built to PBP standards.	Access to a place that provides shelter from bushfire is not possible during a wildfire.	**Low**
7. Evacuation	Multiple evacuation routes are available and unlikely to be impacted by fire.	Evacuation to alternate location that provides life safety refuge is <1km and can be completed by foot or vehicle.	Evacuation to alternate location that provides life safety refuge is 1km-10km.	Evacuation to alternate location that provides life safety refuge is > 10km.	**Moderate**
8. Isolation and emergency services	Seamless integration with existing settlement - no impact on evacuation or access for emergency services.	Short bushland pinch points that may carry fire across roads and restrict access briefly during passage of fire. Unlikely impact on evacuation or access for emergency services.	Short bushland pinch points that are likely to carry fire across roads and restrict access temporarily. Likely impact on evacuation or access for emergency services.	Large areas of bushland or multiple pinch points that are likely to carry fire across roads in forest areas and will block evacuation or emergency service access routes for extended time.	**Low**
9. Firefighting water supplies	Site is within urban area and has access to reticulated water supply OR site has dedicated firefighting water supply in accordance with PBP requirements.	Site is on the periphery of urban area and has access to reticulated water supply that may be more susceptible to interuption.	Site is outside urban area and relies on an on site water supply not in accordance with PBP.	Site is in an isolated area and relies on an on site water supply not in accordance with PBP.	**Low**
		Overall Threat Rating	**Low Risk**	**Total**	100

Assessed at Forest Fire Danger Index of 100 as the design fire, using Method 1 in accordance with PBP 2019

The scoring system uses a multiplier for each Threat level based on a conservative life safety approach.

The scaled scores for each Threat assessment are totalled and final scores are placed within a range to produce the final Risk Rating

Conclusion regarding compliance with PBP 4.1 Strategic Principles:

Consideration of the strategic bushfire context including an assessment of the local landscape characteristics and likely bushfire behaviour demonstrates the Melia Court site is suitable for development in accordance with PBP.

Consideration of the location of the site in the wider landscape and the possibility of the site being impacted by either or both Landscape Scale bushfire threat and Local bushfire threat is that the site can be impacted by **Local Bushfire Threat** only.

The Hills BRMP does not raise significant bushfire risk issues for the study area and identifies the existing local rural properties and townships as **Low Risk** only.

The Blackash Landscape Scale Assessment Tool (LSAT) rates the Planning Proposal as **Low Risk**.

As a new development, the ultimate residential proposal can be conditioned to meet the acceptable solutions within PBP and presents a low risk of high consequence bushfire impacting the site. Every future building provides for radiant heat levels no greater than 29 kW/m^2 within an APZ that can be established and reasonably maintained.

The Planning Proposal has been analysed using multiple methods and geographic scales. The land is suitable for rural residential use with respect to bushfire protection. The landscape scale risk for the site overall is **Low**.

This Planning Proposal therefore demonstrates it is consistent with Section 2.3 Strategic Planning (p. 19):

> *Strategic bush fire planning and studies are needed to avoid high risk areas, ensure that zoning is appropriate to allow for adequate emergency access, egress, and water supplies, and to ensure that future compliance with this document is achievable.*

The Planning Proposal is next assessed against the Aim and Objectives of PBP and will address in detail below the requirements of Chapter 4 – Strategic Planning and will consider relevant sections within Chapters 5-8 of PBP.

The following sections address the requirements of Chapter 4 Strategic Planning Table 4.2.1 of PBP (p. 35) as shown in Figure 13.

20. Bushfire Hazard Assessment

PBP provides a methodology to determine the bushfire threat and commensurate size of any Asset Protection Zone (APZ) that may be required to offset possible bushfire attack. These elements include the potential hazardous landscape that may affect the site and the effective slope within that hazardous vegetation. For new residential development, APZ requirements are based on providing practical building envelopes on lots that keep radiant heat levels at future buildings below 29kW/m^2.

The following assessment is prepared in accordance with Section 100B of the RFA, Section 44 of the *Rural Fires Regulation 2013* (RFR) and PBP. This assessment is based on the following resources:

- Planning for Bush Fire Protection (RFS, 2019);
- The Hills Shire Council Bush Fire Prone Land Maps;
- Aerial mapping;
- Detailed GIS and site analysis, and
- Site inspection.

The methodology used in this assessment is in accordance with PBP (p.80) and is outlined in the following sections.

21. Fire Danger Weather District

PBP requires a credible worst case bushfire weather scenario at a 1:50 year bushfire weather event. PBP refers to The Hills Shire LGA being in the Greater Sydney Fire Weather District, and the appropriate maximum Forest Fire Danger Index (FFDI) to be applied is FFDI 100.

22. Vegetation Assessment

Vegetation is the fundamental physical component of determining the bushfire behaviour. Vegetation, in broad terms provides the available fuel to be consumed by a bushfire. Fuel load and arrangement represents a considerable component in dictating to a large degree the behaviour of fire in terms of intensity, rate of spread and flame height, and typically relates to dead plant material less than 6mm thick, and live plant material thinner than 3mm.

Vegetation type, density and arrangement can further influence fire behaviour and intensity. Vertical and horizontal continuity is also a significant element. Thus, vegetation forms a key consideration within this report. The vegetation provides a basis for the determination for bushfire intensity mapping.

The vegetation assessment has been completed in accordance with PBP. The predominant Vegetation is classified by structure or formation using the system adopted by David Keith (2004) and by the general description using PBP.

Vegetation types give rise to radiant heat and fire behaviour characteristics. The predominant vegetation has been determined for the site over a distance of at least 140 metres in all directions from the proposed site boundary or key assets on the development site. Where a mix of vegetation types exist, the type providing the greater hazard is said to predominate.

The vegetation is shown in Figure 17. It is understood that vegetation modification will be undertaken to accommodate the final proposal.

23. Slopes Influencing Bushfire Behaviour

PBP requires assessment of slope. The slope of the land under the classified vegetation has a direct influence on the rate of fire spread, the intensity of the fire and the ultimate level of radiant heat flux. The effective slope is the slope of the ground under the hazard (vegetation). In identifying the effective slope, it may be found that there are a variety of slopes covering different distances within the vegetation. The effective slope is considered to be the slope under the vegetation which will most significantly influence the bushfire behaviour for each transect. This is usually the steepest slope.

The site is generally classified in three sections. The most northerly section is a thin area of very steep upslope embankment of +25 degrees. The middle section where the development will occur is generally 2-3 downslope. The southern section which contains the remnant Blue Gum High Forest is assessed as being within the 10-15 degrees downslope range.

The effective slope of these areas is considered in relation to the slope ranges in PBP Table A1.12.5 (p. 91) which provides the determination of minimum APZ distances for a range of BALs that can be used for all types of development. Figure 17 shows an analysis of the slopes across the PP site.

Figure 17: Vegetation and slope map – current vegetation

24. The potential fire behaviour that might be generated based on vegetation and slope

The maximum potential fire behaviour is limited by the location, topography and vegetation surrounding the PP site. This has been discussed at length above, and the evidence supports the view that the potential of the most severe fire weather is from the north through to the southwest, with a potential influence from a south or south-westerly change.

The likely worst case scenario is that a bushfire is ignited in the southern part of the site on a day of bad fire weather including a southerly wind. The bushfire hazard vegetation is limited to approximately 4ha only and the maximum fire runs is approximately 240m from the southern part of the Sydney Water reservoir site.

The standard APZ output Table A1.12.2 (PBP p. 90) reproduced as Figure 18 uses the most conservative interpretation of vegetation fuel loads and broad slope classes to provide a standard set of APZ distance solutions to achieve BAL-29. Given the size of the overall development site there is ample room to provide the maximum APZ shown here.

Table A1.12.2

Minimum distances for APZs – residential development, FFDI 100 areas (≤29kW/m², 1090K)

KEITH VEGETATION FORMATION	EFFECTIVE SLOPE				
	Up slopes and flat	>0°-5°	>5°-10°	>10°-15°	>15°-20°
	Distance (m) from the asset to the predominant vegetation formation				
Rainforest	11	14	18	23	30
Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	24	29	36	45	56
Grassy and Semi-Arid Woodland (including Mallee)	12	16	20	25	32
Forested Wetland (excluding Coastal Swamp Forest)	10	12	16	20	26
Tall Heath	16	18	20	22	25
Short Heath	9	10	12	13	15
Arid-Shrublands (acacia and chenopod)	6	7	8	9	10
Freshwater Wetlands	5	6	6	7	8
Grassland	10	12	13	15	17

Figure 18: Highlighted PBP Table A1.12.2

A calculator accepted by the RFS (Delany, 2019) is used to undertake an assessment of potential worst case fire behaviour at the site (Figure 10). This models a wildfire in the southern area of the PP site in the retained conservation area consisting of a 14.0 degree downslope (topography), FFDI of 100 (weather), and North Coast Wet Sclerophyll Forest (vegetation). This confirms the calculated impact of this fire using the standard APZ widths provides for a measured radiant heat flux of below the required standard of 29 kW/m^2.

It is also noted that given the small area of bushland available to a bushfire (~4ha) any bushfire will be relatively short lived and the direct impact on the development will be similarly short. Such a fire will be over in hours and no early evacuation is likely.

Forest/Woodland - FDF & SFR Calculation page:

Fire run specifics	1020 Melia Court, Castle Hill NSW

Common and bushfire behaviour contributor inputs:

Predominant vegetation	North Coast Wet Sclerophyll Forests - 22 & 35.98 - Medium - > 0.9m - < 1.4m				
Surface & Elevated Fuel Load	22	tph	Overall fuel load	35.98	tph
Average Canopy Height	20	Metres	Fire weather district	100	FDI
Average elevated fuel height	1.4	Metres	Flame temperature	1090	Kelvin
Distance to vegetation	45	Metres	Target elevation of receiver	4	Metres
Effective slope	14	Degrees	Ambient temperature	308	Kelvin
Site slope	3	Degrees	SFR fire run length	240	Metres
FDF nominal head width	100	Metres			

Outputs - Fully Developed Fire (FDF)			Outputs - Developing Fire Run (DFR)		
Wind Speed	45	kph	Wind speed	30	kph
Default elevation of receiver	24.702	Metres	Default elevation of receiver	14.151	Metres
FDF Flame Angle	47	Degrees	SFR Flame Angle	67	Degrees
FDF Flame Length	49.40	Metres	SFR Flame Height	28.302	Metres
FDF Intensity	128945	kW/m	SFR Intensity	78843	kW/m
FDF FROS	6.9364	kph	SFR FROS	6.9364	kph
FDF Flame transmissivity	0.8092	kW/m	SFR Flame transmissivity	0.7852	kW/m
FDF View Factor	0.4229		SFR View Factor	0.2499	
			Calculated SFR Head Width	87.849	Metres
			SFR fire run length	240	Metres
			Approx. SFR travel time	10:36	min/sec
FDF Radiant Heat	26.02	kW/m^2	SFR Radiant Heat	14.92	kW/m^2

Input cells

Locked output cells

Figure 19: Detailed calculations of typical worst-case fire at site using Delany 2019 calculator

The proposed development is considered suitable within the context of the potential worst case fire behaviour onsite.

An additional factor to consider when considering potential fire behaviour is that any ignition of a wildfire will be seen and reported to firefighting authorities within a very short time as the area has a significant human presence due to the high density of urban development and the presence of multiple major roads with passing traffic. The short timeframe for detection will result in early response by emergency services which in many cases will assist in preventing a small early stage fire from developing into a fully developed fire, and will assist in providing adequate resources in a timely fashion.

25. Any history of bushfire in the area

The Hills BRMP 2019 provides no fire history mapping, however given the area is rated as no risk this suggests there is no history of significant bushfires.

The Fire Extent & Severity Mapping (FESM) data available via the SEED Portal shows no history of fire for the period of 2016-17 to 2021-22 (Figure 20).

Regardless of the limited fire history affecting the site, bushfires can occur at any time of the year. The Australasian Fire and Emergency Services Council (AFAC) Bushfires and Community Safety Position Paper (p. 3) outlines nationally agreed positions for the fire services which states that:

> *Bushfire loss can be reduced or avoided in some cases but cannot be entirely prevented. A balance needs to be struck between measures taken to reduce or avoid harm and loss due to bushfire, and the protection of other values.*

The position paper (p. 3) recognises that

> *Bushfire is a normal part of Australia's natural environment, particularly in eucalypt forests and grasslands. However, the frequency and intensity of bushfires varies throughout the landscape and the seasons. Bushfires are a common occurrence during the drier periods of the year in most places.*

And that

> *Bushfires of low or moderate intensity often pose little threat to life, property and community assets, but the potential for changes in wind direction can be a significant hazard. However, bushfires that burn in heavy fuels, steep terrain or on hot, dry and windy days often spread rapidly, crown in forests, produce powerful convection columns and create extensive spot*

fires ahead of the fire front, often making their control impossible until weather conditions moderate.

As the Fire Danger Rating reaches 'Extreme', bushfires are often described as 'firestorms' and become impossible to control. When the Fire Danger Rating approaches 'Catastrophic', the risk of serious injury or death to people in the path of a bushfire increases significantly, and many properties and other community infrastructure can become difficult or impossible to defend.

The NSW planning framework accepts this fundamental premise and PBP is based on credible worst-case fires (1:50 year event) affecting the site. These response to potential fires affecting the site are determined by the Bushfire Protection Measures contained within PBP. PBP does not seek to stop fires, rather, it recognises the fundamental risk of bushfire affecting new development and puts in place minimum requirements to provide a tolerable approach to risk management. The approach within PBP does not consider fire history and assumes a credible worst case fire weather event and maximum vegetation regardless of management intervention. As such, the provision of meeting the acceptable and performance-based criteria within PBP reflects a tolerable level of risk by the State.

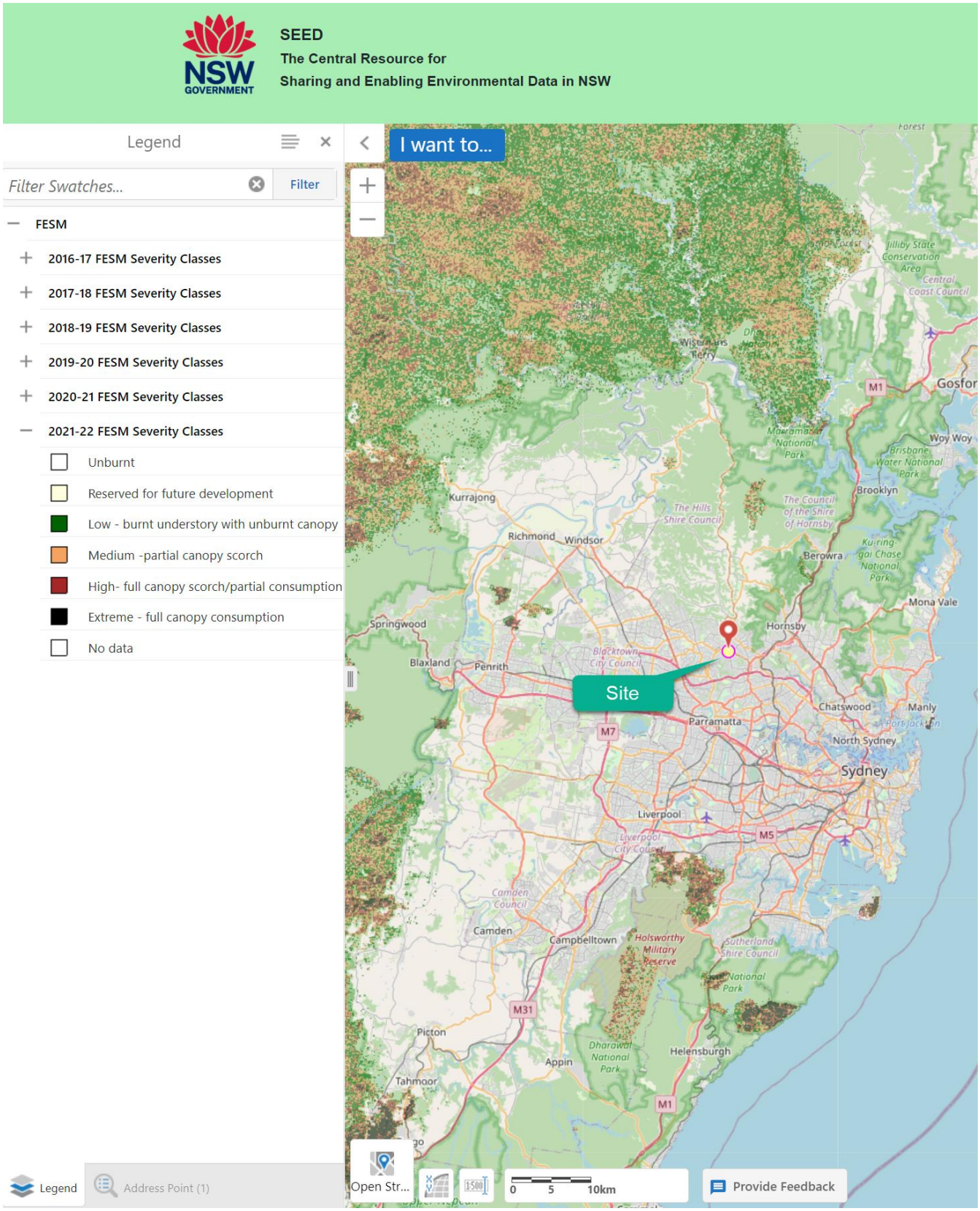

Figure 20: Fire Extent & Severity Mapping 2016/17 - 2021/22 via SEED Portal

26. Potential fire runs into the site and the intensity of such fire runs

Apart from the worst-case fire scenario detailed above, there are other potential fire runs to consider.

From the east there is no viable fire run due to managed land.

From the west there is managed land, however even if this is considered as Grassland (due to a lack of maintenance) there is a very much reduced threat. The standard BAL-29 APZ Table A1.12.2 shown in Figure 18 would require only a 12m APZ which is provided by Glen Road and the front boundary setback.

From the north there is strip of very highly degraded vegetation approximately 285m wide and only 45m deep at the widest point north-south. This is on a very steep (+25 degrees) upslope embankment. Figure 21 provides a calculation using the adopted by RFS Delany, 2019 calculator. At this location there is only 9m available as a separation between the building and vegetation. To be very conservative the Blue Gum High Forest has been used as the vegetation, although this is not representative of the highly modified vegetation which is +85% weed species.

This shows the maximum radiant heat flux generated from this very short fire run, using very conservative assumptions, would be less than 4 kW/m^2 and therefore can reasonably be managed though building construction standards. It must also be noted that significant vegetation rehabilitation would be undertaken in this area, and this is likely to reduce overall fuel loads.

As this application is for PP stage only it is considered no further detailed modelling of BAL requirements is necessary at this stage.

Forest/Woodland - FDF & SFR Calculation page:

Fire run specifics	1020 Melia Court, Castle Hill NSW - upslope

Common and bushfire behaviour contributor inputs:

Predominant vegetation	North Coast Wet Sclerophyll Forests - 22 & 35.98 - Medium - > 0.9m - < 1.4m				
Surface & Elevated Fuel Load	22	tph	Overall fuel load	35.98	tph
Average Canopy Height	20	Metres	Fire weather district	100	FDI
Average elevated fuel height	1.4	Metres	Flame temperature	1090	Kelvin
Distance to vegetation	9	Metres	Target elevation of receiver	10	Metres
Effective slope	-26	Degrees	Ambient temperature	308	Kelvin
Site slope	3	Degrees	SFR fire run length	45	Metres
DF nominal head width	100	Metres			

Outputs - Fully Developed Fire (FDF)			Outputs - Developing Fire Run (DFR)		
Wind Speed	45	kph	Wind speed	30	kph
Default elevation of receiver	3.586	Metres	Default elevation of receiver	1.924	Metres
FDF Flame Angle	90	Degrees	SFR Flame Angle	90	Degrees
FDF Flame Length	7.17	Metres	SFR Flame Height	3.848	Metres
FDF Intensity	8161	kW/m	SFR Intensity	4990	kW/m
FDF FROS	0.4390	kph	SFR FROS	0.4390	kph
FDF Flame transmissivity	0.8677	kW/m	SFR Flame transmissivity	0.8677	kW/m
FDF View Factor	0.2061		SFR View Factor	0.0555	
			Calculated SFR Head Width	16.472	Metres
			SFR fire run length	45	Metres
			Approx. SFR travel time	6:30	min/sec
FDF Radiant Heat	13.60	kW/m^2	SFR Radiant Heat	3.66	kW/m^2

Input cells

Locked output cells

Figure 21: Detailed calculations of typical worst-case fire upslope to north using Delany 2019 calculator

27. The difficulty in accessing and suppressing a fire, the continuity of bushfire hazards or the fragmentation of landscape fuels and the complexity of associated terrain

As discussed above and shown on the project plans, the site has a single vehicular access from Glen Road. This access will be a minimum of 12.5m wide and in addition there will be a separate 4m wide fire trail entry/exit at this location. This will provide adequate access for vehicles to enter and leave concurrently and meets relevant PBP access standards.

There is a circular internal road system that meets the PBP standards for non-perimeter roads. This also links to a fire trail on the southern side of the site which also has a separate street entry. There is also a network of pedestrian paths through the site including a 9m wide minimum defendable space running along the northern part of the site below the embankment. There will be hydrants within the internal road system, and the buildings requiring additional fire safety measures under the NCC will all be built and equipped to the relevant standards. Firefighting access is in keeping with PBP standards.

As noted previously the landscape outside the site is largely urban development. The land to the southwest in the Sydney Water area is significantly managed and this fragments this bushland as well. This Sydney Water internal road to service the reservoir also provides another firefighting access point.

The terrain is not complex, essentially consisting of one run from the south of the property along a steep but relatively consistent slope. The vegetation type is largely consistent and results in bushfire behaviour that is well understood by local crews.

28. Land use assessment

29. The risk profile of different areas of the development layout

The risk profile of the development area essentially reduces the further north the development extends. The primary threat is on the south side of the development footprint and this is taken up with smaller buildings of 2-3 storeys, with the lower storey being an underground car park. These buildings are less complicated and have lower exposure to convective heat.

At development application stage it will be appropriate to undertake further detailed modelling to determine the potential impact of bushfire on the taller buildings towards the rear of the site. Given that BAL-29 compliant APZ are proposed on the development site it may be that Building 06 (which is the closest multistorey building to the hazard) could be constructed to BAL-40 to provide greater bushfire resistance. As detailed fire engineering will be required for the Class 2 buildings it will be most appropriate to undertake these investigations at that later development stage.

The combination of suitable access, APZ, onsite water supplies and compliance with contemporary building standards will significantly reduce the need for late-stage evacuations. Compliance with PBP will result in suitable areas on the site that are of greater safety and the BEM&EP to be developed during the development application stage will reflect this.

Appropriately designed lots (in accordance with PBP), and buildings constructed (in accordance with AS3959) and prepared properties will offer people options for sheltering during most bushfires, reducing the likelihood of bushfire-related injury and death. The nationally agreed position is that the safest option is to leave a bushfire prone area early on days with a Fire Danger Rating of Extreme or higher.

Asset Protection Zones

For proposed new subdivision development, PBP requires that a minimum separation is provided in the form of APZ. The APZ is a fuel-reduced, physical separation between buildings and bushfire hazards. For residential developments, APZ requirements are based on keeping radiant heat levels at buildings below 29kW/m^2 as the maximum exposure on all sides of the building. For any SFPP developments, APZs have been based on 10kW of radiant heat.

A conservative approach has been taken and the site has sufficient room to provide compliant APZ for the entire site shown as Figures 22 & 23. As the land to the north has been shown to have relatively modest fire behaviour, vegetation thinning will be undertaken, and there is a minimum defendable space of 9m no APZ is provided on the northern side.

Figure 22: BAL-29 compliant APZ from building line showing Inner and Outer Protection Areas

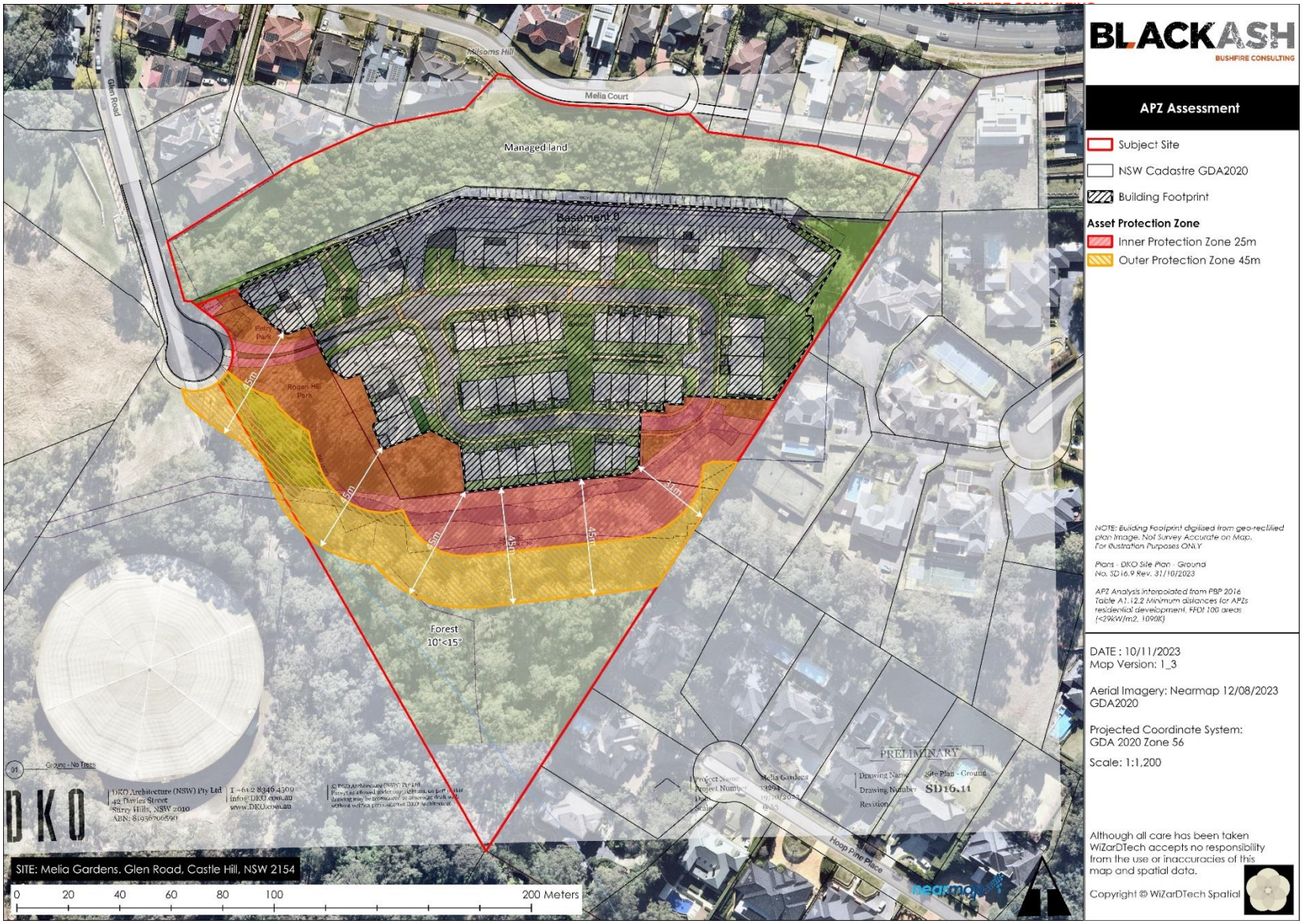

Figure 23: BAL-29 compliant APZ from building line (with development overlay) showing Inner and Outer Protection Areas

Figures 22 & 23 show the APZ divided into two sections – a 25m wide Inner Protection Area (IPA) and a 20m wide Outer Protection Area (OPA). The OPA is located between the IPA and the unmanaged hazard vegetation. It is an area where there is maintenance of the understorey and some separation of the canopy, to a lesser extent than is required by the IPA. The details of the APZ requirements are detailed in PBP Appendix 4 (p. 106-108) which is attached as Appendix for of this report. The split between the makeup of the IPA and OPA is per PBP Table A1.12.4 (p.90) reproduced as Figure 24.

Table A1.12.4

Allowable Outer Protection Area distances (m), within an APZ for forest vegetation

VEGETATION	UPSLOPE/FLAT	>0°-5°	>5°-10°	>10°-15°	>15°-20°
Forests FFDI 100 - subdivision	10	10	15	20	25
Forests FFDI 80 - subdivision	10	10	15	15	20
Forests SFPP	20	25	25	25	15

Figure 24: PBP Table A1.12.4 with relevant sections highlighted

Bushfire Attack Levels

The Bushfire Attack Level (BAL) is a means of measuring the ability of a building to withstand attack from bushfire. The form of bushfire attack and the severity will vary according to the conditions (FFDI, vegetation, slope and setback) on the site.

The BAL assesses the severity of a building's potential exposure to ember attack, radiant heat and direct flame contact, using increments of radiant heat expressed in kilowatts per square metre. This forms the basis for establishing the requirements for construction to improve protection of a building from potential attack by a bushfire, as defined in *Australian Standard AS 3959-2018 Construction of buildings in bushfire-prone areas*. The BAL ratings are used as the basis for establishing the requirements for construction for future buildings to improve protection from bushfire attack.

The BAL ratings across the site are shown as Figure 25. These are provided to demonstrate all the applicable standards can be met, however detailed modelling will be required at development application stage. This demonstrates how buildings to the north of the site are much less impacted by radiant heat, and in fact Buildings 03, 04 and 05 are more than 100m away from the fire front and likely to provide safe refuge for residents during the short lived bushfire that will impact the site.

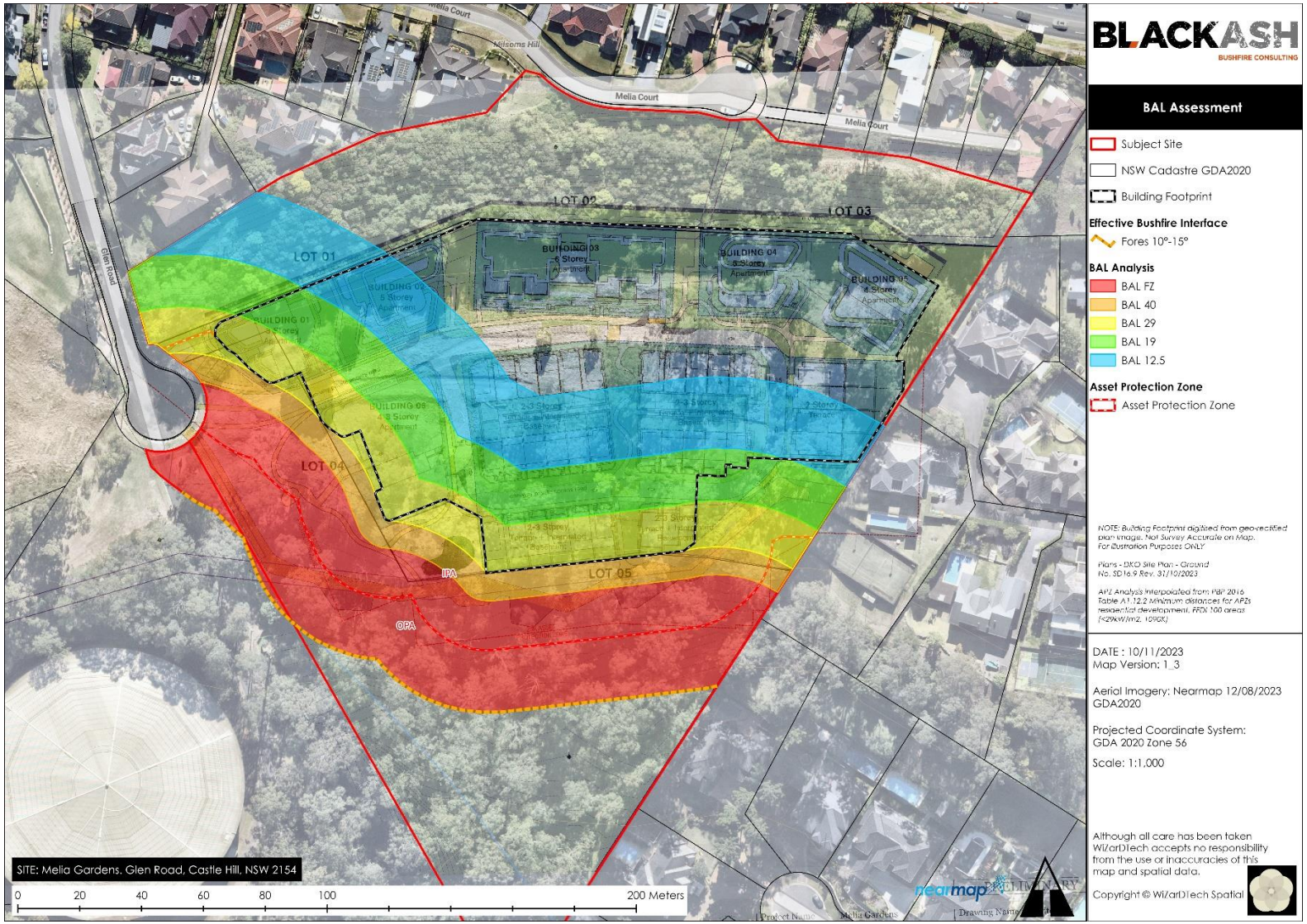

Figure 25: Bushfire Attack Levels modelled across the site

30. The proposed land use zones and permitted uses

The planning proposal responds to the site and considers bushfire constraints in relation to the proposed likely uses for permanent conservation land and residential development.

This complies with PBP.

31. The most appropriate siting of different land uses based on risk profiles within the site

It has been demonstrated that the proposed lots are capable of meeting PBP requirements, and that the taller buildings are located further away from the hazard vegetation. Detailed modelling at development application stage will determine if Building 06 may need to be built to BAL-40 construction standard. Buildings 03, 04 and 05 are more than 100m away from the fire front and likely to provide safe refuge for residents during the short lived bushfire that will impact the site.

This complies with PBP.

32. The impact of the siting of these uses on APZ provision.

The planning proposal responds to the site and considers bushfire constraints in relation to the proposed likely uses for permanent conservation land and residential development. This complies with PBP. No APZs will be located within environmental conservation areas.

Greater detail is provided during later stages of the process, and detailed consideration of specific arrangements at specific areas of the site will occur at development application stage.

This complies with PBP.

33. Access and egress

34. The capacity for the proposed road network to deal with evacuating residents and responding emergency services, based on the existing and proposed community profile

The development is exposed to a low bushfire risk. Compliance with PBP and NCC standards, and Community Title arrangements will allow for a shelter in place strategy to be the primary method for protection of life safety. Buildings 03, 04 and 05 are more than 100m away from the fire front and able to provide safe refuge for residents during the short lived bushfire that will impact the site. All resident car parking on the site will be in underground car parking constructed to fire safety standards under the NCC.

The proposed community profile will have all residents living with the regulatory framework of a Community Association. This includes common ownership of all areas other than the buildings and provides a single body responsible for maintenance arrangements including those of the buildings built to specific BAL construction standards, the fire trail, and the APZ. This ownership structure also provides the opportunity for provision of a coordinated BEM&EP that will assist residents to understand emergency procedures and may provide for an annual bushfire safety awareness event and induction for new residents. Part of this plan will be the development of a Pre-Incident Plan with the local fire agencies. At development application stage these requirements can be further explored and conditioned.

A single access road is provided as there is no alternative or secondary access points and given the low bushfire risk, there is no need for a secondary access. The site has direct access to Glen Road which is a sealed two lane road, providing access to the key arterial Castle Hill Road approximately 200m to the north of the site. As discussed above the primary access will be 12.5m wide with defined entry and exit lanes. The internal fire trail has an additional entry point to the cul de sac.

This combination of physical and administrative controls will limit the need for late-stage evacuations and provide suitable access for responding firefighters. Should late-stage evacuation be required the adjoining urban area immediately north of the site is well away from any possible bushfire due to the lack of hazard vegetation and is immediately accessible by pedestrians.

Suitable consent conditions at development stage can manage the details of the BEM&EP, suitable landscaping, roll top kerbs, hydrant locations etc. The internal road network will be able to be conditioned to meet all PBP standards.

This complies with PBP.

35. The location of key access routes and direction of travel

The national position of fire agencies is that *the safest action to protect life is for people to be away from the bushfire or threat of bushfire*[7]. This is underpinned by comprehensive emergency management arrangements and operational fire management systems that focus on the provision of information, advice, and warnings to assist communities to make informed decisions prior to the impact of bushfire and if necessary be out of Bushfire Prone Areas well before the impact of fire.

Within the NSW Bushfire planning system and PBP, there is a hierarchy of controls in place, from planning schemes to design and construction etc, to mitigate bushfire risk to communities. The BPM work in unison to enhance resilience by the provision of minimum standards for new development while reducing the vulnerability of negative impacts on occupants (including fire fighters) of these areas.

The design team recognises that a bushfire can be a difficult situation with smoke obscuring vision, stressed people more likely to make mistakes, and the likely influx of firefighting vehicles adding to traffic loads whilst people leave. As discussed above, due to the short space of time between ignition and impact of any bushfire, the development of the BEM&EP, and the ability of the site to make available safe refuge areas more than 100m from the interface, a shelter-in-place is the likely primary response for residents.

Given the low risk nature of the site overall, and the provision of compliant APZ, BAL construction standards and water supplies a shelter-in-place approach is likely to be the primary method of responding to local scale fires that start quickly.

As discussed above, there are significant firefighting resources located within 10km of the site, and there are multiple ways to access this location from Castle Hill Road, so it is unlikely that travel routes will be isolated in any but the most extreme circumstances.

Should late-stage evacuation be required the adjoining urban area immediately north of the site is well away from any possible bushfire due to the lack of hazard vegetation and is immediately accessible by pedestrians.

This complies with PBP.

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[7] Australasian Fire and Emergency Services Authorities Council. (2019) *Bushfires and Community Safety Position* (AFAC Publication No. 2028)

36. The potential for development to be isolated in the event of a bushfire

The site is not isolated development as defined by PBP (p111):

> *Development which is located predominantly in native bushland or is considered to be within a remote area. Access and evacuation may be challenging due to distances that are required to be travelled through bush fire prone areas.*

The development is not in a remote area as discussed above, and the wider area is suitable for development in compliance with PBP.

There are multiple routes for firefighting resources to access the site and all routes are unlikely to be impassable by firefighting vehicles at once except in the most extreme circumstances.

This complies with PBP.

37. Emergency services

38. Consideration of the increase in demand for emergency services responding to a bush fire emergency including the need for new stations/brigades

As discussed above, there are substantial existing firefighting resources including multiple RFS brigades and Fire & Rescue stations within close proximity to the PP area. The scale of development on its own will not require additional emergency services.

The PP complies with the requirements of PBP.

39. Impact on the ability of emergency services to carry out fire suppression in a bush fire emergency

Bushfires have occurred in Australia for thousands of years and will continue to occur. Climate change modelling predicts increasing frequency and severity of fire events correlating with altered rainfall and drought patterns and increasing numbers of severe and intense heat events. As the dryness of more areas increases beyond levels historically considered 'normal', the footprint of areas with a propensity to burn are likely to increase, which increases the importance of new

development complying with the minimum bushfire safety standards set out by the NSW Government and RFS in PBP.

Not all bushfires lead to loss of life or assets. Bushfires of low to moderate intensity often pose little threat to life, property and community assets. Fire agencies are very successful at extinguishing low to moderate intensity fires before they lead to injury or death.

The risk is greatest when fire occurs on hot, dry windy days, and where ignition occurs in heavy fuels, and in steep terrain. These conditions present fire that can spread rapidly, crown in forests, produce powerful convection columns and create extensive spot fires ahead of the fire front. This often makes their control impossible until weather conditions moderate. PBP is predicated on a probable worst case fire scenario of FFDI 100 in Castle Hill. Similarly, the NCC and AS3959/NASH provide deemed to satisfy solutions for fires up to and including FFDI 100. Fires above FFDI 100 are possible in this Fire Weather District and fire services have significant notice periods (at least 4 days) from the Bureau of Metrology (BoM) of these catastrophic conditions.

However, the national and NSW framework provides a robust policy setting for new development in Bushfire Prone Areas. The AFAC Community Safety Position Paper[8] notes that:

> *Prevention measures are the most cost-effective and efficacious means of reducing bushfire risk to life and property. Land-use planning as a prevention intervention can significantly impact risk, by directing settlement growth and development to areas of lowest bushfire risk and avoiding settlement and development in areas of highest bushfire risk.*
>
> *Planning policy frameworks can strengthen the resilience of settlements and communities and prioritise the protection of human life by putting in place requirements for Planning Proposals and decision making.*
>
> *Land-use planning underpins and sets preconditions for all other emergency management interventions in future developments.*

Firefighting will be facilitated by the PBP compliant APZ, additional water supplies and improved site access. All future development within the site will be built in accordance with PBP, the National

[8] P. 4 Australasian Fire and Emergency Services Authorities Council. (2019) *Bushfires and Community Safety Position* (AFAC Publication No. 2028)

Construction Code (NCC) and AS3959/NASH which increase the resilience of buildings to the impacts of bushfires. Onsite water and underground services will further assist firefighting.

The PP will have no negative impact on emergency services to undertake fire suppression and is likely to assist through additional access, water supplies and vegetation fragmentation. The PP will also provide a significant improvement in bushfire safety for the adjoining properties on top of the ridge, which have been approved and constructed prior to 2002 and the development of any bushfire protection standards consistent with contemporary practice.

40. Infrastructure

41. The ability of the reticulated water system to deal with a major bush fire event in terms of pressures, flows, and spacing of hydrants

The subsequent development application will detail provisions for services. There is no reason to suggest the reticulated system will not be able to service the proposed development. Should there be any concerns raised over the capability of the reticulated system negotiations for upgrades or alternate solutions should be determined at that stage of the process.

This complies with PBP.

42. Life safety issues associated with fire and proximity to high voltage power lines, natural gas supply lines etc.

There are no issues identified with high voltage power lines and gas supply mains. Specific details will be managed during subdivision development stage, however it is expected that all local services will be provided underground. Electricity supply for the new development will comply with PBP. Any gas services are to be installed and maintained in accordance with *Australian Standard AS/NZS 1596 'The storage and handling of LP Gas'* (Standards Australia 2008). This complies with PBP.

This complies with PBP.

43. Adjoining land

44. Consideration of the implications of a change in land use on adjoining land including increased pressure on BPMs through the implementation of Bush Fire Management Plans

The future development will have no implications for the management of the retained vegetation on the adjoining Sydney Water land. Whilst the initial APZ and BAL mapping shows very slight incursions of the required APZ into the Sydney Water estate, this land is clearly already managed to meet the APZ standards required. The remainder of the APZ is on the subject site.

As noted above the development will substantially improve bushfire protection for the adjoining properties, particularly those on the ridge to the north of the site.

All new development within the site will be designed to meet the minimum standards of PBP which achieve an appropriate level of bushfire resilience. The PP does not seek or rely on the provision of off-site APZs or other off-site BPM. The future development will not burden or change the existing obligations or management actions of neighbours.

This complies with PBP.

45. Summary

This Section evaluates the Planning Proposal against the bushfire strategic planning requirements of PBP and is shown in Table 2.

Table 2 Strategic bushfire study - compliance with PBP Table 4.2.1

Issue	Detail	Assessment considerations	Evidence	Suitable site
Bush fire landscape assessment	A bushfire landscape assessment considers the likelihood of a bush fire, its potential severity and intensity and the potential impact on life and property in the context of the broader surrounding landscape.	The bushfire hazard in the surrounding area including: Vegetation Topography Weather	Landscape Scale Assessment Tool, Bush Fire Risk Management Plan review, Asset Protection Zone modelling and consideration of BPMs.	**YES**
		The potential fire behaviour that might be generated based on the above	Potential is limited to local scale fires only and access and water supplies will improve, future development will build to NCC, PBP standards and AS359-2018.	**YES**
		Any history of bush fire in the area.	Available history suggest site is suitable and fires managed locally.	**YES**

Issue	Detail	Assessment considerations	Evidence	Suitable site
		Potential fire runs into the site and the intensity of such fire runs; and	Potential is limited to local scale fires which can be managed on site.	YES
		The difficulty in accessing and suppressing a fire, the continuity of bush fire hazards or the fragmentation of landscape fuels and the complexity of the associated terrain.	No identified difficulties for accessing and suppressing the type of fires that may occur here. Acceptable terrain and consistent vegetation generally, good local road network, non-complex terrain.	YES
Land use assessment	The land use assessment will identify the most appropriate locations within the masterplan area or site layout for the proposed land uses.	The risk profile of different areas of the development layout based on the above landscape study	The risk profile of the whole site is simple and the scale of the site provides ample opportunity to provide a suitable suite of BPM. The distance to tall buildings to the rear (north) of the site reduces risk and provides for safe refuge areas onsite.	YES

Issue	Detail	Assessment considerations	Evidence	Suitable site
		The proposed land use zones and permitted uses	Medium density residential development is a suitable and practical use of the land.	YES
		The most appropriate siting of different land uses based on risk profiles within the site (i.e. not locating development on ridge tops, SFPP development to be located in lower risk areas of the site); and the impact of siting on APZ provision.	The risk profile of the whole site is simple and the scale of the site provides ample opportunity to provide a suitable suite of BPM. The distance to tall buildings to the rear (north) of the site reduces risk and provides for safe refuge areas onsite.	YES
Access and egress	A study of the existing and proposed road networks both within and external to the masterplan area or site layout.	The capacity for the proposed road network to deal with evacuating residents and responding emergency services, based on the existing and proposed community profile;	A shelter in place strategy will be the primary method of managing life safety for the site. This will be supported by the layout, parking arrangements and the development of a BEM&EP and the Community Title arrangements.	YES

Issue	Detail	Assessment considerations	Evidence	Suitable site
		The location of key access routes and direction of travel; and	The layout provides for a 12.5m wide separated entry/exit access point to Glen Road, and an additional entry point for the fire trail access. The access is protected from bushfire through managed lands and APZ.	YES
		The potential for development to be isolated in the event of a bush fire.	There is little chance of isolation due to arterial road connection of Castle Hill Road, and the type and scale of fires in the area.	YES
Emergency services	An assessment of the future impact of new development on emergency services.	Consideration of the increase in demand for emergency services responding to a bush fire emergency including the need for new stations/brigades; and	Not likely that new emergency services generated by this development alone.	YES

Issue	Detail	Assessment considerations	Evidence	Suitable site
		Impact on the ability of emergency services to carry out fire suppression in a bush fire emergency.	Insignificant negative impact. Will have positive impact with more local population, water supplies, and active land management adjacent to existing housing not built to contemporary bushfire standards.	YES
Infrastructure	An assessment of the issues associated with infrastructure and utilities.	The ability of the reticulated water system to deal with a major bush fire event in terms of pressures, flows, and spacing of hydrants; and	To be considered at DA stage – water supplies will be conditioned as suitable for uses and locations on site.	YES
		Life safety issues associated with fire and proximity to high voltage power lines, natural gas supply lines etc.	No life safety issues identified.	YES

Issue	Detail	Assessment considerations	Evidence	Suitable site
Adjoining land	The impact of new development on adjoining landowners and their ability to undertake bush fire management.	Consideration of the implications of a change in land use on adjoining land including increased pressure on BPMs through the implementation of Bush Fire Management Plans.	No negative impact identified, Sydney Water site will not require any change to current management practices.. Potential positive impact related to additional people, active land management and investment locally.	**YES**

46. Suitability of the Planning Proposal

While not legislatively required, this SBS has demonstrated that the Planning Proposal has considered and responded to the requirements of PBP. In a bushfire context, PBP (p. 34) requires that *strategic planning must ensure that future land uses are in appropriate locations to minimise the risk to life and property from bush fire attack. Services and infrastructure that facilitate effective suppression of bushfires also need to be provided for at the earliest stages of planning*.

The bushfire risk has been considered at the macro-scale, looking at fire runs, slopes, fire behaviour, bushfire attack into the site and it has addressed the access and evacuation requirements of PBP.

This section assesses the broad principles outlined within PBP (p. 34) which are at Table 3 and the consideration of exclusion of development as required within PBP (p. 34) at Table 4.

Table 3 Strategic Principles

Principle within PBP	Comment	Compliance
Ensuring land is suitable for development in the context of bushfire risk	The Planning Proposal demonstrates compliance with the deemed to satisfy requirements of PBP in all BPM, with detail for some BPM to be provided at development application stage. The bushfire risk has been considered at FFDI 100 as required by PBP and the risk to future occupants and emergency services can be managed by meeting the requirements of PBP.	**Yes**
Ensuring new development on BPL will comply with PBP	The Planning Proposal meets all deemed to satisfy requirements of PBP. Future development is able to meet the standard of <29kW/m2 radiant heat at building exposures. Roads and APZs can comply with relevant sections of PBP.	**Yes**
Minimising reliance on performance-based solutions	No performance-based solutions have been proposed or used in this assessment. All BPM will be	**Yes**

Principle within PBP	Comment	Compliance
	able to be met using acceptable solutions provisions within PBP.	
Providing adequate infrastructure associated with emergency evacuation and firefighting operations	The internal road and fire trail network meets or exceeds the relevant minimum requirements of PBP. The development footprint, APZ and additional water supplies will be of significant benefit to existing adjoining housing not built to bushfire protection standards. All services can be provided in accordance with Table 5.3c of PBP. Multiple short distance evacuation routes are available to within the site and more than 100m from hazard vegetation.	**Yes**
Facilitating appropriate ongoing land management practices	The future development will not burden or change the existing obligations or management actions of neighbours. The Community Title arrangements will simplify ongoing maintenance of bushfire protection measures and this will be detailed in a future BEM&EP to be established at development application stage.	**Yes**

Table 4 Exclusion of Development

Principle within PBP	Comment	Compliance
The development area is exposed to a high bush fire risk and should be avoided	The landscape bushfire risk is Low (Table 1) as it is adequately separated from landscape scale bushfires. The new development can be designed to comply with the minimum requirements of PBP, and the risk has been managed to the appropriate level required by PBP.	**Yes**

Principle within PBP	Comment	Compliance
The development is likely to be difficult to evacuate during a bush fire due to its siting in the landscape, access limitations, fire history and/or size and scale	The planning proposal site is in a relatively low risk area and the scale of development will allow for shelter in place strategy.	**Yes**
The development will adversely effect other bush fire protection strategies or place existing development at increased risk	All new development within the site will be designed to meet the minimum standards of PBP which achieve an appropriate level of bushfire resilience. The Planning Proposal does not seek or rely on the provision of off-site APZs or other BPM. The development will not burden or change the existing obligations or management actions of neighbours. The development will provide a positive impact to adjoining neighbours by permanently removing a bushfire hazard and provide ongoing active management.	**Yes**
The development is within an area of high bushfire risk where density of existing development may cause evacuation issues for both existing and new occupants	The landscape bushfire risk is Low (Table 1) overall as it is adequately separated from landscape scale bushfire and will only be exposed to local scale fires due to the limited vegetation and fragmented bushland patterns. The proposal will allow for PBP compliant APZ on site, a shelter in place strategy will be adopted and supported through a BEM&EP and adequate access is provided for firefighting.	**Yes**
The development has environmental constraints to the area which cannot be overcome	The environmental constraints have been considered and assessed separately. The Planning Proposal layout reflects the environmental constraints.	**Yes**

47. Conclusion

While not legislatively required, this Strategic Bushfire Study considers the suitability of the Planning Proposal with respect to bushfire risk within and affecting the site. A conservative position has been taken with regard to the SBS. The referral agencies and consent authority should be sufficiently engaged that they do not prejudice the application where there is no legal standing regarding bushfire legislative requirements. Further, there is an approval for subdivision including APZ on the site with existing physical commencement that should be honoured as part of this application to seek a better outcome on the site.

The Planning Proposal provides a highly suitable application that can respond to the low bushfire risk affecting the site and which will satisfy the Aim, Objectives and requirements within PBP to provide for the protection of life and the minimisation of impact on property while having due regard to the development potential, site characteristics and protection of the environment.

While not legislatively required, this SBS has provided a conservative assessment of bushfire risk and followed the Aim and Objectives of *PBP*, Section 2.3 Strategic Planning, and specifically addressed the requirements of Chapter 4 – Strategic Planning. The suitability of the Planning Proposal has considered the broad land scape scale risk and the site-specific requirements of PBP.

The proposed residential zoning has been assessed against PBP to satisfy Section 4.4.1 regarding indicative development layout. The proposed development can satisfy the detailed criteria to be assessed at the next stage of the process. All future development will be supported by APZ to meet the minimum standard of <29kW/m^2 at building exposures and will be further assessed at development application stage. While not required, the Planning Proposal meets the requirements of PBP and should be supported with respect to bushfire risk management.

In the authors professional opinion, the Planning Proposal is a suitable use of the land, and the bushfire protection measures demonstrated in this report comply with the Aim and Objectives of Planning for Bush Fire Protection 2019, the Ministerial Direction 4.3 Planning for Bush Fire Protection, and allow for the issue of a Gateway Determination with respect to bushfire matters.

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Blackash Bushfire Consulting
B.A., Grad. Dip. Urban & Regional Planning; Master of Environmental Planning;
Adv. Dip. Of Public Safety (Emergency Management); Dip. Management

Lew Short | Principal

Blackash Bushfire Consulting

B.A., Grad. Dip. (Design for Bushfires); Grad. Cert. of Management (Macq); Grad. Cert. (Applied Management); Fire Protection Association of Australia BPAD Level 3 BPD-PA 16373

48. Appendix 1 References

Australasian Fire and Emergency Service Authorities Council (2012) *Bushfires and Community Safety*

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Standards Australia (2014) The storage and handling of LP Gas, AS/NZS 1596:2014. SAI Global, Sydney.

49. Appendix 2 Curriculum Vitae

BLACKASH
BUSHFIRE CONSULTING

Curriculum Vitae

Lew Short
Director BlackAsh Bushfire Consulting
T: 0419 203 853 E: lew.short@blackash.com.au

Summary
Lew is an experienced leader in the government and emergency sector. He has an intimate knowledge of the workings of government and how emergency service organisations operate. He is not only a technical expert but a practitioner who has deep industry knowledge.

Lew has extensive experience providing national leadership in building community resilience representing AFAC and the FPAA. Lew's technical expertise is in bushfire consequence management, risk assessment and mitigation, specifically the planning and design of new developments in high bushfire risk areas to comply with legislative and planning requirements.

Lew has worked with some of Australia's leading organisations including NSW Rural Fire Service, Country Fire Authority, Emergency Management Victoria, Lend Lease, Mirvac, Victorian State and Local Governments, Sydney Water Corporation, Great Lakes and Warringah Councils. Lew has completed numerous industrial development assessments and assessments of new development in rural areas NSW.

Lew has a deep operational understanding of how fire works in the Australian landscape. He has multifaceted insight into how governments respond to this threat. Lew provides unique strategies to comply with regulatory requirements and safety outcomes.

Lew established and led the Community Resilience Group for the New South Wales Rural Fire Service (RFS). His areas of responsibility included land use planning, community engagement, education, vulnerable communities, bunkers, Neighbourhood Safer Places, business systems and projects, social media, integrated risk management and environmental management. He was responsible for the establishment, management and leadership of the development assessment function for the RFS at a State level where he was responsible for the assessment of over 80,000 development applications in Bush Fire Prone Areas.

Areas of Expertise

- Rezoning and strategic studies
- Industrial development assessment
- Landuse planning & consequence management
- Legal strategy, Land & Environment Court and Expert Witness
- Bushfire planning, design & construction requirements in accordance with National Standards
- Bushfire Prone Mapping, hazard mapping and risk assessments
- Australian Standard AS3959 Construction of Buildings in Bushfire Prone Areas
- Bushfire Management Plans
- Alternative & performance based solutions
- Evacuation planning and implementation
- Technical and Strategic advice

Qualifications / Accreditation

BPAD Level 3 Accredited Practitioner
Fire Protection Association of Australia

Graduate Diploma of Bush Fire Design
University of Western Sydney, 2006

Graduate Certificate of Applied Management
Australian Institute of Police Management, 2005

Graduate Certificate of Management Macquarie
Graduate School of Management Macquarie University, 2001

Bachelor of Arts, Resource and Environmental Management
Macquarie University, 1994

DAVID LEMCKE

Senior Planner & Bushfire Specialist

BLACKASH
BUSHFIRE CONSULTING

SKILLS

- Risk Management Planning
- Budgeting, grants & finance
- Project management – Fire Trails, APZ & HR burning
- Incident management
- Community engagement
- Policy development
- Legislation interpretation
- High level collaboration and negotiation skills
- Presentation skills
- Strategic planning
- Confidence & an open mind

RURAL FIRE SERVICE

Senior Deputy Captain
Peninsula Rural Fire Brigade
2016-2021

Deputy Captain
Peninsula Rural Fire Brigade
2008-2016

Bush fire fighter
Peninsula RFB
Lake Munmorah RFB
Katoomba HQ RFB
2002-2008

EDUCATION

Advanced Diploma of Public Safety (Emergency Management)
Australian Emergency Management Institute
Mt Macedon 2015

Diploma of Management
Management Consultancy International
Sydney 2012

PROFESSIONAL PROFILE

I am a highly motivated bush fire, planning and land management professional with 20+ years in local government and now working as a private sector Bushfire Consultant.

Served as Council's staff representative on the Wyong BFMC since 2007, including preparation of Bush Fire Risk Management Plans, Fire Access & Fire Trail Plan & delivery of updated Bush Fire Prone Land Maps.

Served as NCC Representative on Lake Macquarie BFMC from 2007 to 2011.

From 2010 I have been the program manager for the Wyong Shire Council (WSC) bush fire program and program manager for the Central Coast Council (CCC) since the merger in 2016. In 2012 the WSC Natural Areas Bush Fire Program won the NSW Local Government Resilient Australia Award and was a national finalist.

The CCC program includes management of over 220 fire trails, management of 264 mechanical Asset Protection Zones, Hazard Reduction burning, access management and community engagement. I have grown the budget for the program to over $4 million per annum funding in FY 19/20, delivered using both contractors and internal staff teams.

I have been active in policy development at State level, being the Local Government NSW representative on numerous committees including the Review of the Bush Fire Environmental Assessment Code.

I am an active senior RFS volunteer, with 19 years in the service, having been a field officer for 12 years, with incident management experience at local level and have held multiple brigade Executive roles.

WORK EXPERIENCE

Senior Planner & Bushfire Specialist
Blackash Bushfire Consulting, 2021 – current

- Bushfire consultant for a wide range of private and public sector clients.
- Work includes bushfire management planning, development control and rezoning, critical infrastructure protection, evacuation management plans etc.

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DAVID LEMCKE

Senior Planner & Bushfire Specialist

BLACKASH
BUSHFIRE CONSULTING

EDUCATION (CONTINUED)

Master of Environmental Planning
Macquarie University
Sydney, 2005

Graduate Diploma Urban & Regional Planning
University of New England
Armidale 2000

Certificate II Bush Regeneration
Blue Mountains TAFE
Katoomba 2000

Bachelor of Arts (Geography)
University of New England
Armidale 1998

TECHNICAL SKILLS

- Incident controller at local incidents and sector leader at a wide range of larger incidents
- Highly proficient in RFS Grants, finance systems & procurement
- Highly proficient in preparation of Hazard Reduction Certificates and Part 5 Review of Environmental Factors
- Proficient in use of RFS BPED tool
- Worked as team member in Building Impact Assessment
- Prepared Level 1 & 2 HR burn plans in collaboration

WORK EXPERIENCE (CONTINUED)

Senior Planner, Emergency Protection & Natural Assets
Central Coast Council, 2016 – 2021

- Council's representative on the BFMC and program manager of the bush fire risk mitigation program. Have increased and delivered the budget from approximately $1.5 million in 2016 to $4 million in FY 19/20.
- On-ground coordination of Council response and recovery from 19/20 bush fires and flood clean up works following January 2020 storms, including dam catchments.

Senior Planner, Environment and Planning Unit
Wyong Shire Council, 2003-2016

- Founding member of the Local Government Bush Fire Mangers Network and part of team hosting multiple events and field days from 2007 to date.
- Project sponsor for applied research project on methods to improve preparation of private property including detailed costings and community engagement.
- Council's subject matter expert for bush fire providing detailed advice on development proposals, including successfully representing Council in the Land & Environment Court.
- Numerous partnerships with Crown Lands, National Parks & Wildlife Service and Darkinjung Local Aboriginal Land Council to deliver jointly funded HR projects.
- Preparation of environmental assessments for mechanical Hazard Reduction, Fire Trails and prescribed burns.
- Delivered increased Hazard Reduction burning on Council land. Increased the number and effectiveness of burns through collaboration with local RFS staff & volunteers.
- Worked with internal units to protect critical infrastructure including telecommunications towers, pump stations and community buildings.
- Delivering community engagement programs.
- Numerous conference presentations and submissions to inquiries including 2014 Productivity Commission report on Natural Disaster Funding.

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50. Appendix 3 EP&A Act 1979 – Section 9.1 Ministerial Direction

4.3 Planning for Bushfire Protection

Objectives

The objectives of this direction are to:

(a) protect life, property and the environment from bush fire hazards, by discouraging the establishment of incompatible land uses in bush fire prone areas, and

(b) encourage sound management of bush fire prone areas.

Application

This direction applies to all local government areas when a relevant planning authority prepares a planning proposal that will affect, or is in proximity to, land mapped as bushfire prone land.

This applies where the relevant planning authority is required to prepare a bush fire prone land map under section 10.3 of the EP&A Act, or, until such a map has been certified by the Commissioner of the NSW Rural Fire Service, a map referred to in Schedule 6 of that Act.

Direction 4.3

(1) In the preparation of a planning proposal the relevant planning authority must consult with the Commissioner of the NSW Rural Fire Service following receipt of a gateway determination under section 3.34 of the Act, and prior to undertaking community consultation in satisfaction of clause 4, Schedule 1 to the EP&A Act, and take into account any comments so made.

(2) A planning proposal must:

(a) have regard to *Planning for Bushfire Protection 2019*,

(b) introduce controls that avoid placing inappropriate developments in hazardous areas, and

(c) ensure that bushfire hazard reduction is not prohibited within the Asset Protection Zone (APZ).

(3) A planning proposal must, where development is proposed, comply with the following provisions, as appropriate:

(a) provide an Asset Protection Zone (APZ) incorporating at a minimum:

i. an Inner Protection Area bounded by a perimeter road or reserve which circumscribes the hazard side of the land intended for development and has a building line consistent with the incorporation of an APZ, within the property, and

ii. an Outer Protection Area managed for hazard reduction and located on the bushland side of the perimeter road,

(b) for infill development (that is development within an already subdivided area), where an appropriate APZ cannot be achieved, provide for an appropriate performance standard, in consultation with the NSW Rural Fire Service. If the provisions of the planning proposal permit Special Fire Protection Purposes (as defined under section 100B of the *Rural Fires Act 1997*), the APZ provisions must be complied with,

(c) contain provisions for two-way access roads which links to perimeter roads and/or to fire trail networks,

(d) contain provisions for adequate water supply for firefighting purposes,

(e) minimise the perimeter of the area of land interfacing the hazard which may be developed,

(f) introduce controls on the placement of combustible materials in the Inner Protection Area.

Consistency

A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary) that the council has obtained written advice from the Commissioner of the NSW Rural Fire Service to the effect that, notwithstanding the non- compliance, the NSW Rural Fire Service does not object to the progression of the planning proposal.

Issued to commence 1 March 2022 (replaces previous Direction 4.4)

51. Appendix 4 Asset Protection Zone Standards – PBP (p. 106-108) with highlights

APPENDIX 4

ASSET PROTECTION ZONE REQUIREMENTS

In combination with other BPMs, a bush fire hazard can be reduced by implementing simple steps to reduce vegetation levels. This can be done by designing and managing landscaping to implement an APZ around the property.

Careful attention should be paid to species selection, their location relative to their flammability, minimising continuity of vegetation (horizontally and vertically), and ongoing maintenance to remove flammable fuels (leaf litter, twigs and debris).

This Appendix sets the standards which need to be met within an APZ.

A4.1 Asset Protection Zones

An APZ is a fuel-reduced area surrounding a building or structure. It is located between the building or structure and the bush fire hazard.

For a complete guide to APZs and landscaping, download the NSW RFS document *Standards for Asset Protection Zones* at the NSW RFS Website www.rfs.nsw.gov.au.

An APZ provides:

- a buffer zone between a bush fire hazard and an asset;
- an area of reduced bush fire fuel that allows for suppression of fire;
- an area from which backburning or hazard reduction can be conducted; and
- an area which allows emergency services access and provides a relatively safe area for firefighters and home owners to defend their property.

Bush fire fuels should be minimised within an APZ. This is so that the vegetation within the zone does not provide a path for the spread of fire to the building, either from the ground level or through the tree canopy.

An APZ, if designed correctly and maintained regularly, will reduce the risk of:

- direct flame contact on the building;
- damage to the building asset from intense radiant heat; and
- ember attack.

The methodology for calculating the required APZ distance is contained within Appendix 1. The width of the APZ required will depend upon the development type and bush fire threat. APZs for new development are set out within Chapters 5, 6 and 7 of this document.

In forest vegetation, the APZ can be made up of an Inner Protection Area (IPA) and an Outer Protection Area (OPA).

A4.1.1 Inner Protection Areas (IPAs)

The IPA is the area closest to the building and creates a fuel-managed area which can minimise the impact of direct flame contact and radiant heat on the development and act as a defendable space. Vegetation within the IPA should be kept to a minimum level. Litter fuels within the IPA should be kept below 1cm in height and be discontinuous.

In practical terms the IPA is typically the curtilage around the building, consisting of a mown lawn and well maintained gardens.

When establishing and maintaining an IPA the following requirements apply:

Trees

- tree canopy cover should be less than 15% at maturity;
- trees at maturity should not touch or overhang the building;
- lower limbs should be removed up to a height of 2m above the ground;
- tree canopies should be separated by 2 to 5m; and
- preference should be given to smooth barked and evergreen trees.

Shrubs

- create large discontinuities or gaps in the vegetation to slow down or break the progress of fire towards buildings should be provided;
- shrubs should not be located under trees;
- shrubs should not form more than 10% ground cover; and
- clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of the vegetation.

Grass

- grass should be kept mown (as a guide grass should be kept to no more than 100mm in height); and
- leaves and vegetation debris should be removed.

A4.1.2 Outer Protection Areas (OPAs)

An OPA is located between the IPA and the unmanaged vegetation. It is an area where there is maintenance of the understorey and some separation in the canopy. The reduction of fuel in this area aims to decrease the intensity of an approaching fire and restricts the potential for fire spread from crowns; reducing the level of direct flame, radiant heat and ember attack on the IPA.

Because of the nature of an OPA, they are only applicable in forest vegetation.

When establishing and maintaining an OPA the following requirements apply:

Trees

- tree canopy cover should be less than 30%; and
- canopies should be separated by 2 to 5m.

Shrubs

- shrubs should not form a continuous canopy; and
- shrubs should form no more than 20% of ground cover.

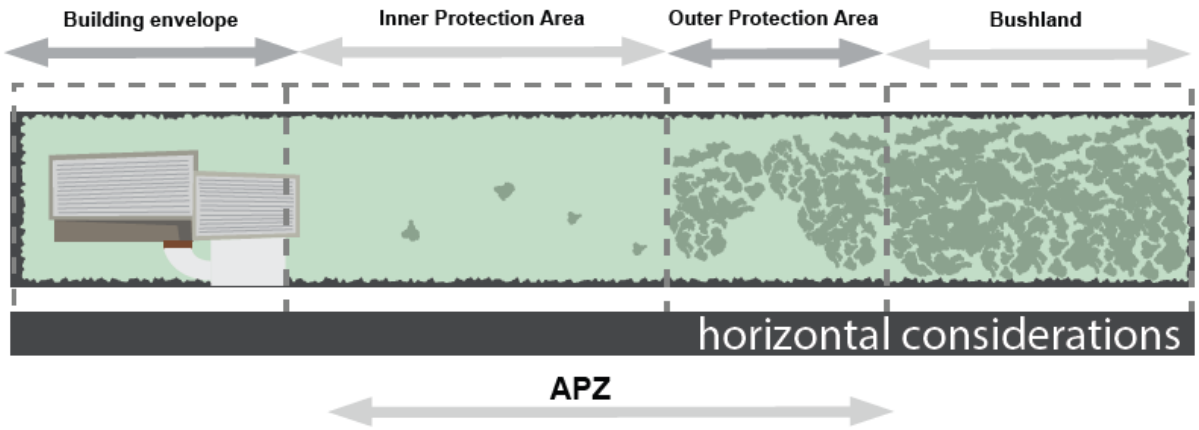
Grass

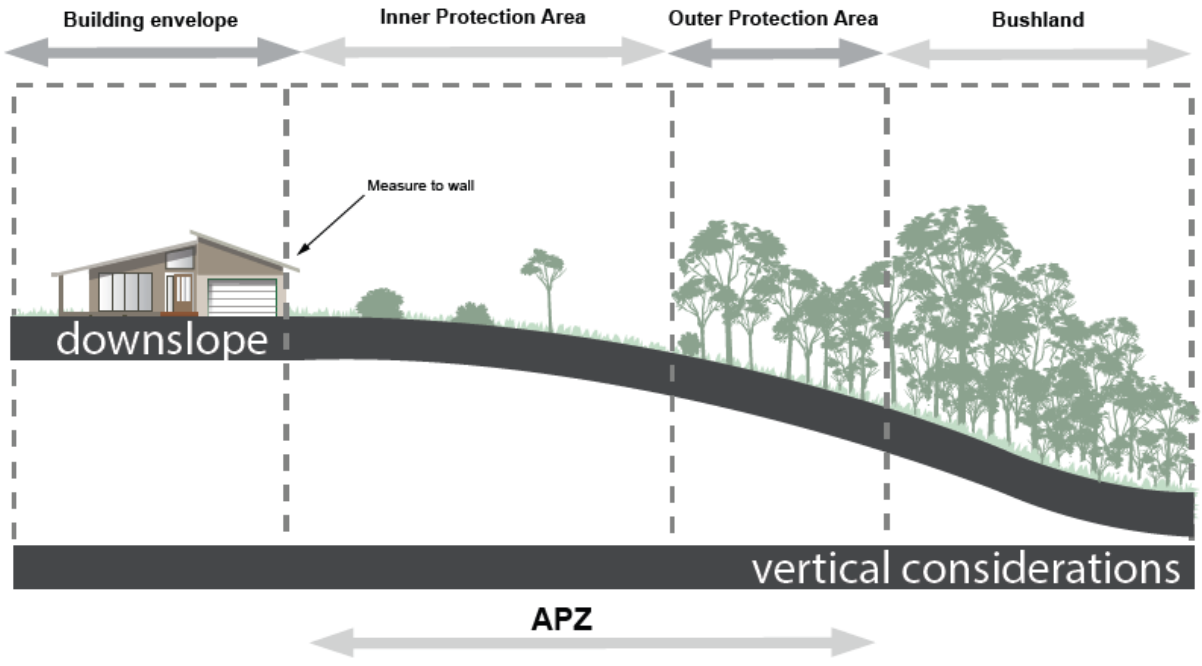
- grass should be kept mown to a height of less than 100mm; and
- leaf and other debris should be removed.

An APZ should be maintained in perpetuity to ensure ongoing protection from the impact of bush fires. Maintenance of the IPA and OPA as described above should be undertaken regularly, particularly in advance of the bush fire season.

Figure A4.1

Typical Inner and Outer Protection Areas.





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