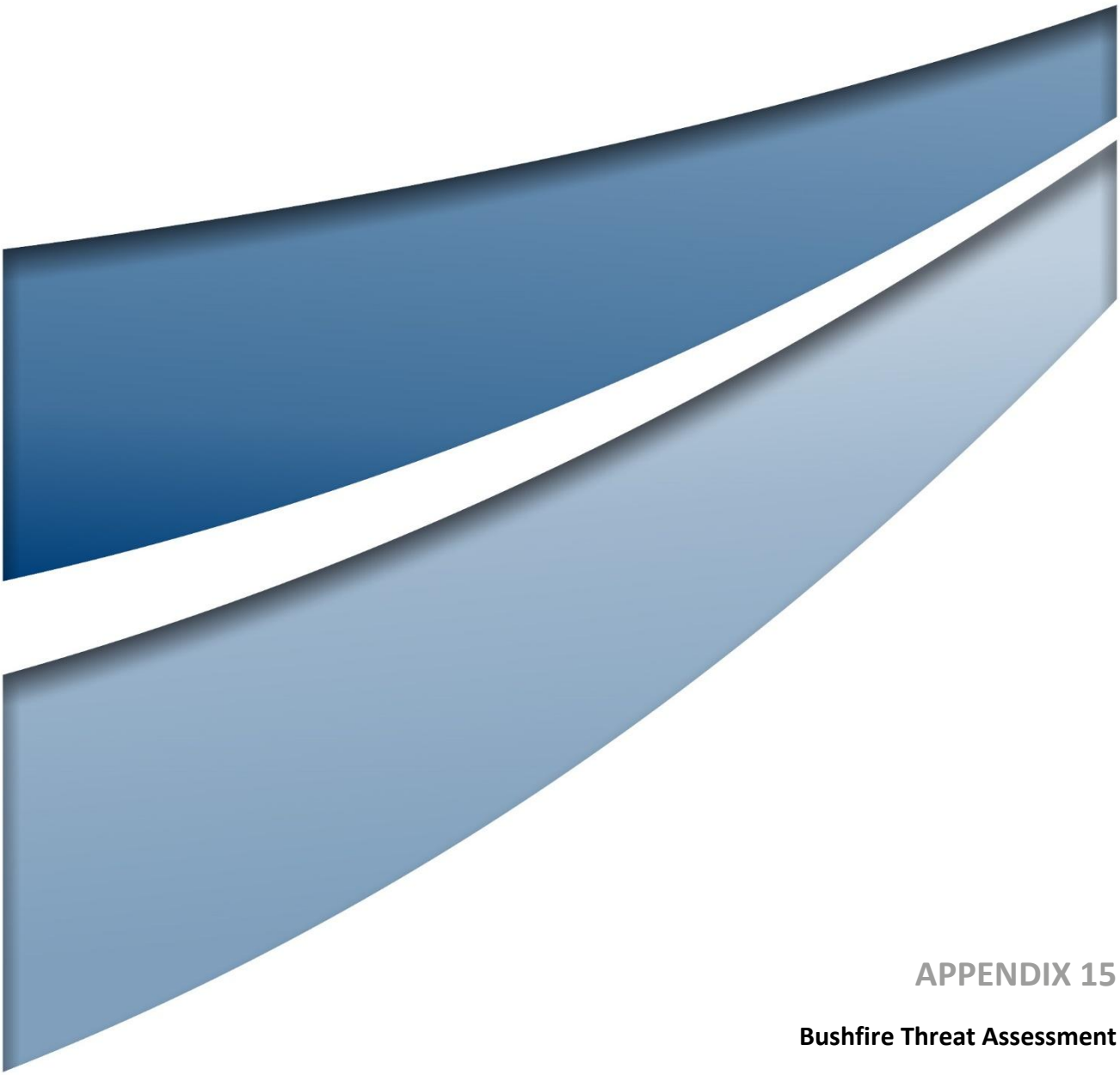

APPENDIX 15

Bushfire Threat Assessment

BLACKASH
BUSHFIRE CONSULTING

Comet Park Battery Energy Storage System

Bushfire Risk Assessment

Prepared for

Umwelt (Australia) Pty Ltd

Version 1.4

2 June 2026

Project Name:	Comet Park BESS (J3780)
Client Details:	Samsung C&T Renewable Energy Australia Pty Ltd C/- Umwelt (Australia) Pty Ltd
Project Address	44 River Road, Yanco NSW 2703

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Version	Primary Author(s)	Description	Date Completed
1.2	David Lemcke & Lew Short	Final Draft for client review	15 May 2025
1.4		Final	2 June 2026

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Contents

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 weather conditions at site as expressed by the Forest Fire Danger Index (FFDI).
BESS	Battery Energy Storage System
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 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.

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.
Forest Fire Danger Index	A numerical rating to express how dangerous a fire is likely to be if started. It essentially summarises fire weather conditions using temperature, relative humidity, wind speed and drought factor. The higher the rating the more dangerous the fire weather conditions. This is used to set the design fire used in *Planning for Bushfire Protection 2019* for various local government areas.
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 minimising 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.

1. Introduction

Blackash Bushfire Consulting has been engaged by Umwelt (Australia) Pty Ltd on behalf of Samsung C&T Renewable Energy Australia Pty Ltd (SREA), a leading renewable energy Project developer, to provide a bushfire threat assessment (BTA) associated with the construction, operation and decommissioning of the Comet Park Battery Energy Storage System (BESS) (the Project) approximately 6km south of Leeton within the Riverina Murray region of NSW.

The Project is a utility scale energy development proposed to have a capacity of 150 megawatts (MW) and a storage capacity of 600 megawatt hours (MWh. The Project Area is located at 44 River Road, Yanco NSW on part of Lot 763 DP 257321 (49ha) in the Leeton Local Government Area (LGA). The Project Footprint for the BESS (excluding transmission options) is 4.8 ha. The Project Area is in single ownership. The site is bounded by River Road to the south; Hulme Road to the west; Houghton Road, Yanco Substation and a sewer treatment plant to the north; and agricultural and retained woodland to the east. The site is transversed by existing high voltage power lines (north-south) connecting to the Yanco Substation see Figures 1-3.

The Project is a state significant development (SSD) pursuant to schedule 1 of the *State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP)*. Approval for the Project is required under Part 4, Division 4.7 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). The Project Footprint is not located on designated Bushfire Prone Land (BPL), however there is designated BPL approximately 940m to the southwest and remnant woodland and grassland in the area that is capable of supporting bushfire. As SSD, Section 4.41 (f) of the EP&A Act precludes the requirement for a Bushfire Safety Authority to be obtained from the NSW Rural Fire Service (RFS).

Whilst the bushfire risk is assessed as Low Risk, there is a possibility of bushfire occurring at the site over year asset life of up to 30 years. The risk to life and Project infrastructure can be mitigated relatively simply through good Project planning requirements including a 10m wide Asset Protection Zone, and good ongoing emergency management planning for the sites.

This report demonstrates compliance with RFS document *Planning for Bush Fire Protection 2019* (PBP). This assessment has been prepared by David Lemcke, Senior Planner & Bushfire Specialist (FPAA BPAD Level 3 Certified Practitioner No. BPD-L3-68670) and Lew Short, Principal Bushfire & Resilience (FPAA BPAD Level 3 Certified Practitioner No. BPD-L3-34603) who are recognised by the NSW RFS as qualified in bushfire risk assessment and have been accredited by the Fire Protection Association of Australia as a suitably qualified consultant to undertake alternative solution proposals. David and Lew's curriculum vitae are presented in Appendix 2.

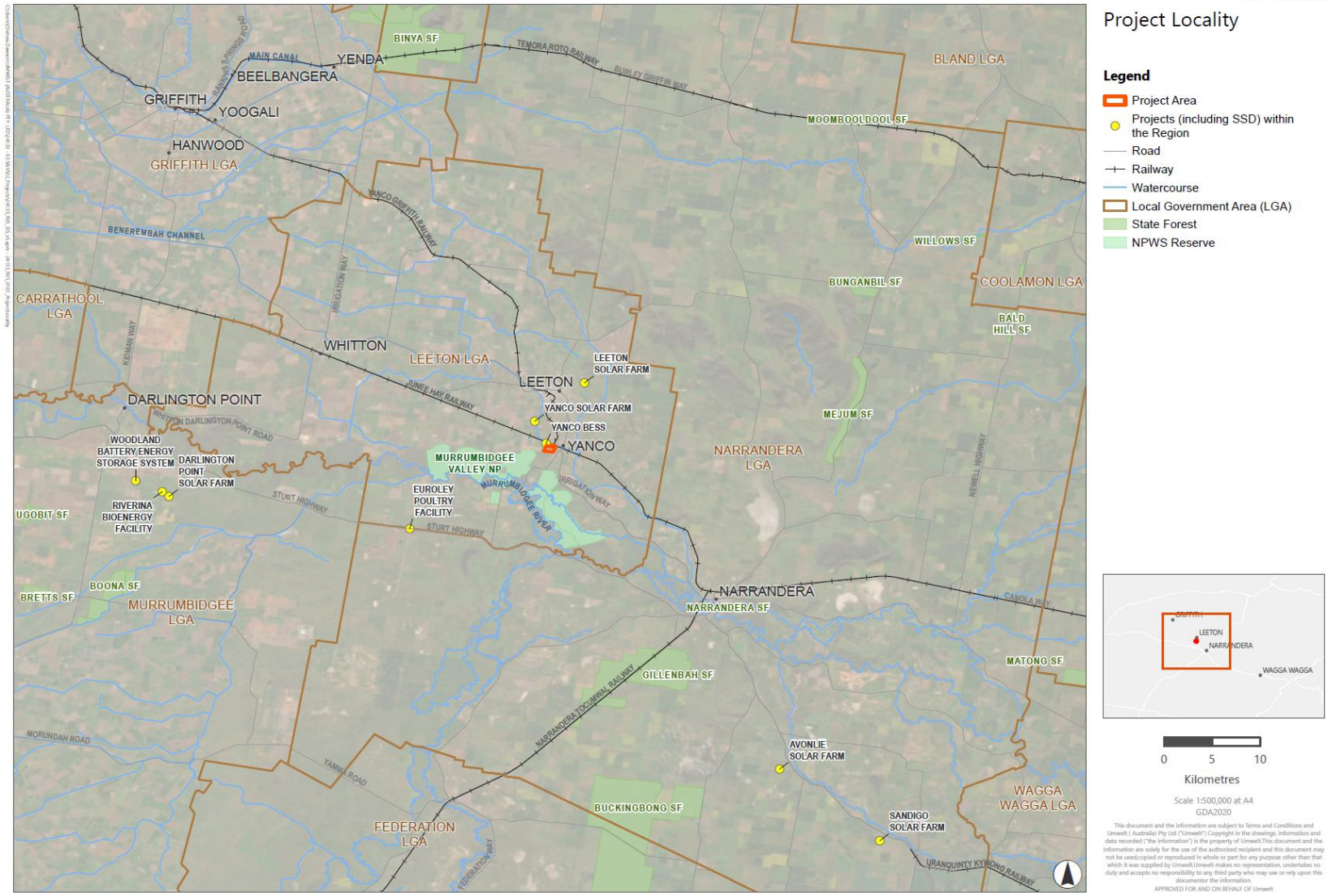

Image Source: ESRI Basemap (2024) | **Data Source:** NSW DFSI (2024)

Figure 1: Site in local context

Figure 2: Project Area location and zoning

Image Source: ESRI Basemap (2025) | **Data Source:** NSW DFSI (2025)

Figure 3: Project Footprint and relationship to Yanco Substation on adjoining land (Umwelt)

1.1. Purpose of this report

This bushfire risk assessment report forms part of the environmental impact statement (EIS) for the Project and has been prepared in accordance with the Secretary's environmental assessment requirements (SEARs) (application number: SSD-76008209) issued for the Project on 14 October 2024 by the NSW Department of Planning, Housing and Infrastructure (DPHI) including:

> *Bushfire* – a bush fire hazard assessment completed by a suitably qualified consultant and identify potential hazards and risks associated with bushfires / use of bushfire prone land including the risks that a BESS would cause a bush fire and demonstrate compliance with *Planning for Bush Fire Protection 2019*;

Correspondence received by the RFS dated 15 February 2024 for the proposed development, emphasises the need for a comprehensive bushfire hazard assessment. The RFS advises that this assessment be undertaken by a suitably qualified consultant and address the aims and objectives outlined in PBP. Furthermore, the assessment must specifically consider the provisions detailed in Section 8.3.5 of PBP – Wind and Solar Farms, ensuring that potential bushfire risks associated with the development are effectively identified and mitigated.

1.2. Aims of this assessment

This report seeks to provide bushfire risk assessment advice relating to the implications of the Project including the BESS and connection to the nearby substation. The aim of this report is to:

- assess the potential bushfire risks to the development mitigation measures to improve the feasibility of the Project;
- Provide measures that meet the SEARs and PBP requirements through bushfire hazard identification and assessment, including a bushfire hazard site and landscape assessment;
- Provide recommendations for the protection of human life and to minimise impacts on property from the threat of bushfire;
- Reduce the occurrence and consequences of bushfires through risk-based design; and
- Enable safe and effective emergency response through the provision of;
    - safe access in and around the Project Footprint including firefighting infrastructure such as water supply,
    - management of vegetation,
    - implementation and maintenance of building construction standards,
    - prevention of fire ignition on site and prevention of fire spread between site infrastructure.
    - operational procedures to address the impact on aerial fighting of bushfires.

2. Legislative Framework

The following sections identify the statutory and regulatory requirements relevant to the assessment of bushfire risk for the Project.

2.1. Environmental Planning and Assessment Act 1979

The Project has been declared SSD under Part 4, section 4.12(8) of the *Environmental Planning and Assessment Act, 1979* (*EP&A Act)*.

As the Project is not located on 'bushfire prone land' for the purposes of Section 10.3 of the EP&A Act, it does not require the application of the specifications and requirements of PBP. The Project provides this assessment to satisfy the Secretary's Environmental Assessment Requirements (SEARs) requirements. Project infrastructure should be designed and housed in such a way as to minimise the impact of bushfires on the capabilities of the infrastructure during bushfire emergencies. It should also be designed and maintained so that it will not serve as a bushfire risk to surrounding bush.

The DPHI has a renewable energy framework, including standard SEARs that include consideration of bushfire risk across the construction, operation, and decommissioning stages of the Project.

2.2. Planning for Bush Fire Protection 2019

All SSD applications must first demonstrate the proposal complies with the overall Aim and Objectives of 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.

The current planning and building systems are primarily based around the protection of assets/buildings through a combination of bushfire protection measures (BPM) to achieve an acceptable risk mitigation outcome, remembering it is rarely possible to reduce risk entirely in the Australian landscape.

Combinations of BPM are used to achieve acceptable outcomes for different types of development at different sites and provide some flexibility to satisfying the aim and objectives of PBP which is the key NSW document managing bushfire risk mitigation in new development. The BPM are shown in Figure 4. Appropriate combinations depend upon geographic location and site circumstances.

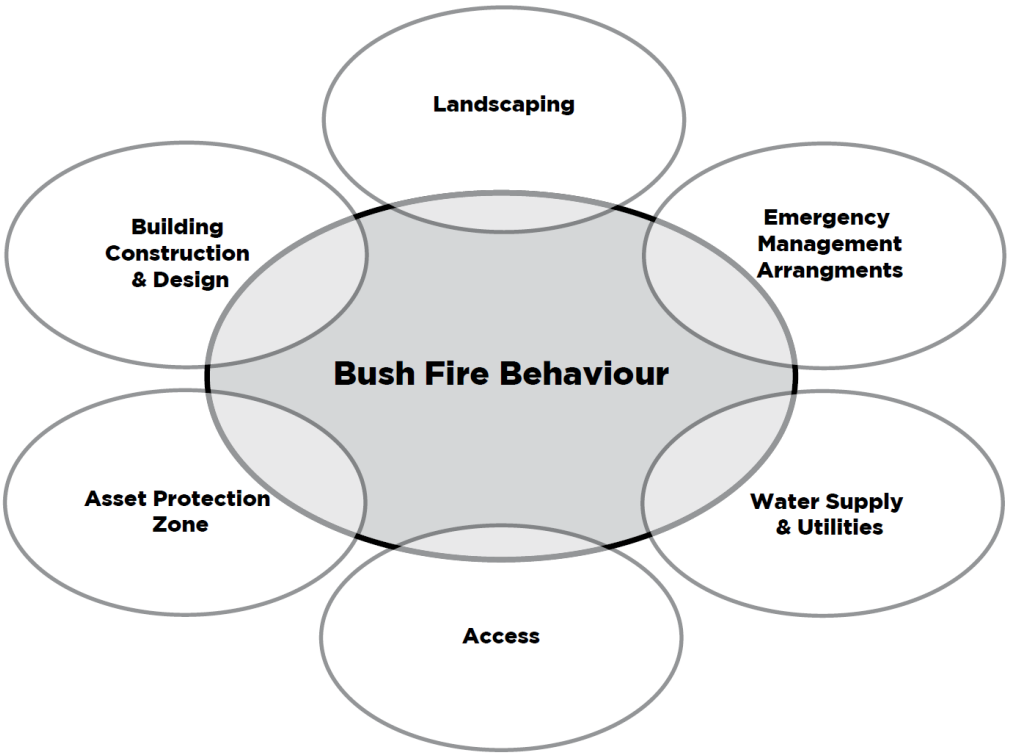

Figure 4: Bushfire Protection Measures in combination (PBP p. 26)

PBP addresses the specific considerations and requirements for wind and solar farms in Section 8.3.5 (p. 77) and as BESS are often associated with these generation facilities and have some similar characteristics, compliance with these requirements is considered one suitable method of demonstrating performance compliance with the aim and objectives of PBP particularly with respect to provision of Aset Protection Zones (APZ):

> *Wind and solar farms require special consideration and should be provided with **adequate clearances** to combustible vegetation as well as firefighting access and water. The following should be provided for wind and solar farms:*
>
> - *A minimum **10m APZ** for the structures and associated buildings/infrastructure; and*
> - *The APZ must be maintained to the standard of an IPA for the life of the development.*
>
> *Infrastructure for the purposes of requiring APZ excludes:*
>
> - *road access to the site; and*
> - *power or other services to the site and associated fencing.*
>
> *Essential equipment should be designed and housed in such a way as to **minimise the impact of bushfires** on the capabilities of the infrastructure during bushfire emergencies. It should also be designed and maintained so that it will not serve as a bushfire risk to surrounding bush.*
>
> *A Bush Fire Emergency Management and Operations Plan (BEMOP) should be prepared for the development that identifies all relevant risks and mitigation measures associated with the construction, operation and decommissioning of the solar farm. This should include:*
>
> - *Detailed measures to prevent or mitigate fires igniting;*
> - *Work that should not be carried out during total fire bans;*
> - *Availability of fire-suppression equipment, access and water;*
> - *Storage and maintenance of fuels and other flammable materials;*
> - *Notification of the local NSW RFS Fire Control Centre for any works that have the potential to ignite surrounding vegetation, proposed to be carried out during a bush-fire fire danger period to ensure weather conditions are appropriate; and*
> - *Appropriate bushfire emergency management planning.*
>
> *It is important to be aware of operations that may be carried out on days of Total Fire Ban and any prohibited activities or exemptions that are notified by the Commissioner of the NSW RFS under the RF Act s.99.*

These matters will be discussed in more detail below, however the only numerical standard applicable to these analogous developments is the 10 metre APZ. Consideration of the vulnerability of the BESS asset to fire, and the potential for a BESS ignition causing a wider fire, has been considered through the Project design process. The 10m APZ as prescribed by PBP for wind and solar generation assets is a general requirement and does not factor in the criticality of infrastructure and the associated tolerable risk of radiant heat at those assets. BESS are also not specifically referred to in PBP.

The tolerable level of radiant heat exposure to the critical infrastructure and assets will need to be further considered by SREA during the detailed design phase. Larger APZ have been implemented in this BTA along with other mitigation strategies, depending on the determined vulnerability, to address the heightened criticality of the asset, and to allay any community concerns that a BESS fire could spread to vegetation and cause a bushfire.

The specific mapping of the APZ and rationale underpinning the outcome is shown in Section 4 of this report, however after consideration of design and site opportunities the 29kW/m2 standard preferably applied to BESS projects is calculated as 10m. The BESS will be provided with a minimum **10m APZ** and the high voltage connection to the Yanco substation will be maintained to current required standards for transmission easements. The methodology used is consistent with PBP and *Australian Standard AS 3959:2018 Construction of buildings in bushfire-prone areas* (AS3959) and is detailed below. This will prevent flame contact to the BESS which may cause damage and disruption to service.

Section 8.3.9 of PBP (p. 79) recognises specific consideration of hazardous industry is needed under the NSW planning system. BESS have typically been included within this overall categorisation, with NSW Fire & Rescue requiring a Fire Safety Study (FSS) as a standard SSD consent condition for most renewable energy and storage systems. Section 8.3.9 – Hazardous Industry:

> *Some developments are considered by their very nature to be hazardous, as much for their ability to start bush fires as their susceptibility to bush fire impacts. New developments of this nature should be avoided on BFPL. However, where hazardous industries are proposed, prior consultation with the NSW RFS and preparation of a performance based solution, potentially including a BFDB, will be required.*
>
> *In preparation of a performance based solution or BFDB, the Fire Safety Study prepared under the DPIE Hazardous Industry Planning and Assessment Papers (HIPAPs) should be considered. This study provides details of all credible fire hazards and the associated fire prevention and mitigation measures for the development. The BFDB must address the appropriate protection measures to be provided commensurate with the bush fire hazards and associated risks. Care should also be taken to ensure that such facilities do not impact on existing developments.*

Hazardous industries include but are not limited to:

- *power generating works;*
- *sawmills;*
- *junk yards;*
- *liquid fuel depots;*
- *hazardous industries/storage;*
- *chemical industries/storage;*
- *service stations;*
- *ammunition storage/manufacture; and*
- *fireworks manufacture/storage.*

2.3. Relevant standards for renewable energy and BESS facilities

The renewable energy and BESS industry is a rapidly changing development space. In some respects, the regulatory environment is running behind the pace of industry development. There is no consistent Australian position or suitable standard at this point in time that manages some elements of the development of large generation and energy storage facilities. It appears this is common across the western world and at this stage there are a number of different approaches to determining what is the most effective standard bushfire management treatments.

It is not appropriate to rely on documentation developed in other states in the NSW context, however information developed by fire agencies from across the country and by key industry participants can be used to inform the development of the most appropriate solutions. This is further discussed in section 4 of this report. It is expected that as the industry matures in future years there will be a more comprehensive range of standards developed.

3. Bushfire Landscape Scale Risk Assessment

A bushfire landscape assessment considers the likelihood of a bushfire approaching the site, its potential severity and intensity and the resultant impact on life and property in the context of the broader surrounding landscape.

3.1. Bushfire Prone Land

The Project Area is not identified as being within 'bushfire prone land' (BPL) for the purposes of Section 10.3 of the EP&A Act and the legislative requirements for development on BPL are not applicable through this development trigger pathway.

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 council and certified by the Commissioner of the NSW RFS.

BPLM show vegetation hazards and provides a suitable buffer distance from that vegetation. They are an indication of potential bushfire attack only and are not a risk assessment of land.

The BPLM shows the Project Area is not identified as BPL as per Figure 5 and supports the characterisation of the site as **Low Risk**.

Figure 5 Bushfire Prone Land Map

3.2. Murrumbidgee Irrigation Area Bush Fire Risk Management Plan

The site and local area are identified within the Murrumbidgee Irrigation Area (MIA) Bush Fire Risk Management Plan 2024 (BRMP). As shown in Figure 6 the site sits within the area to the south of Leeton identified as having Lowest to Moderate Risk to Economic Assets.

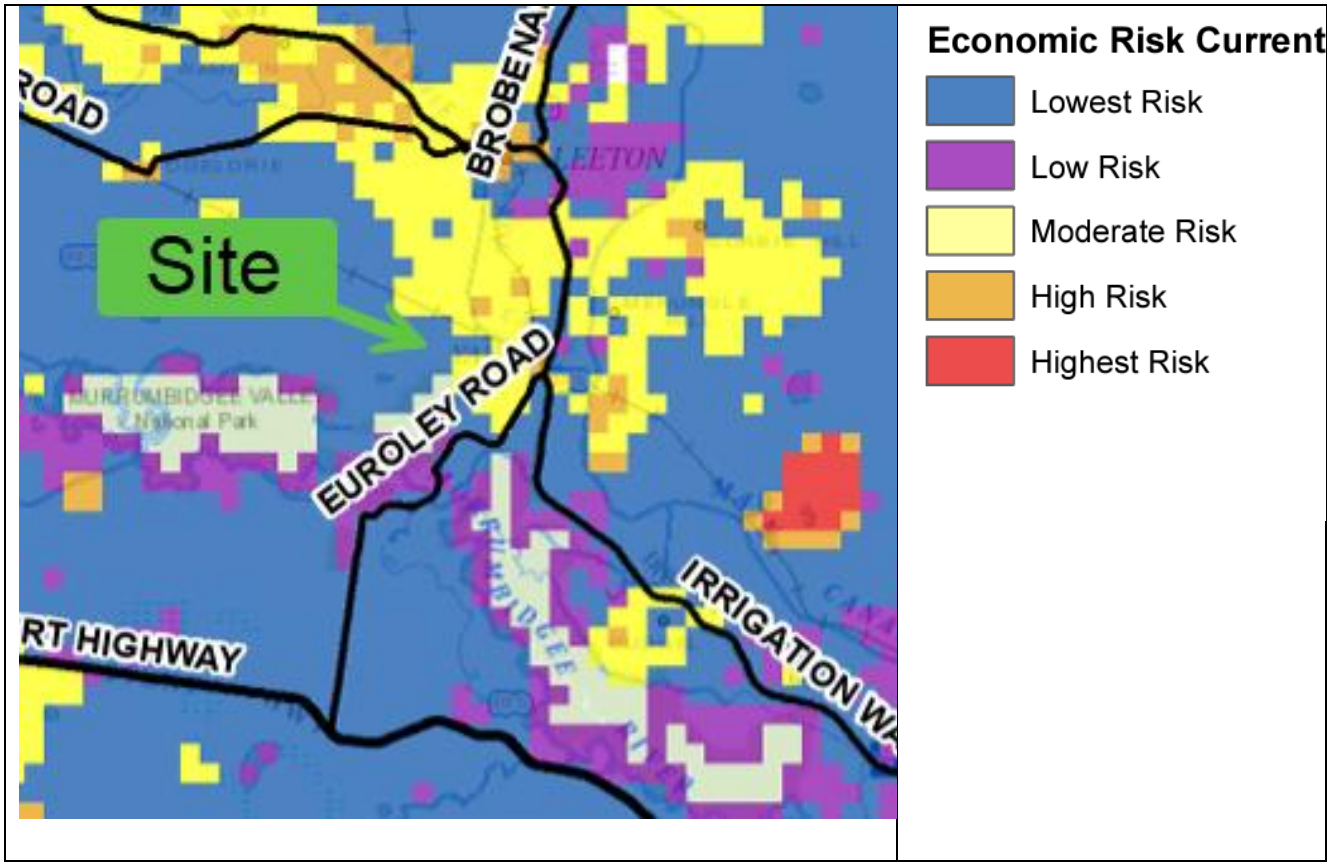

Figure 6: Extract from MIA BRMP - site shown as within Lowest to Moderate Risk area

3.3. Fire History

As shown in Figure 7 there is little mapped history of bushfires in the wider area. Figure 7 is extracted from the NSW Fire History dataset. This is the most comprehensive dataset of fire history available and is established under Australian Fire & Emergency Service Council (AFAC) protocols. The date and accuracy of records vary across the state, however, typically reach back four decades. Figure 7 shows very limited bushfire impact with an indicative 20km radius from the site. Figure 8 shows the mapped fire history at a closer scale and is taken from the same data set that is managed by the NSW National Parks and Wildlife Service.

The fire history mapping supports the site being considered as **Low Risk**.

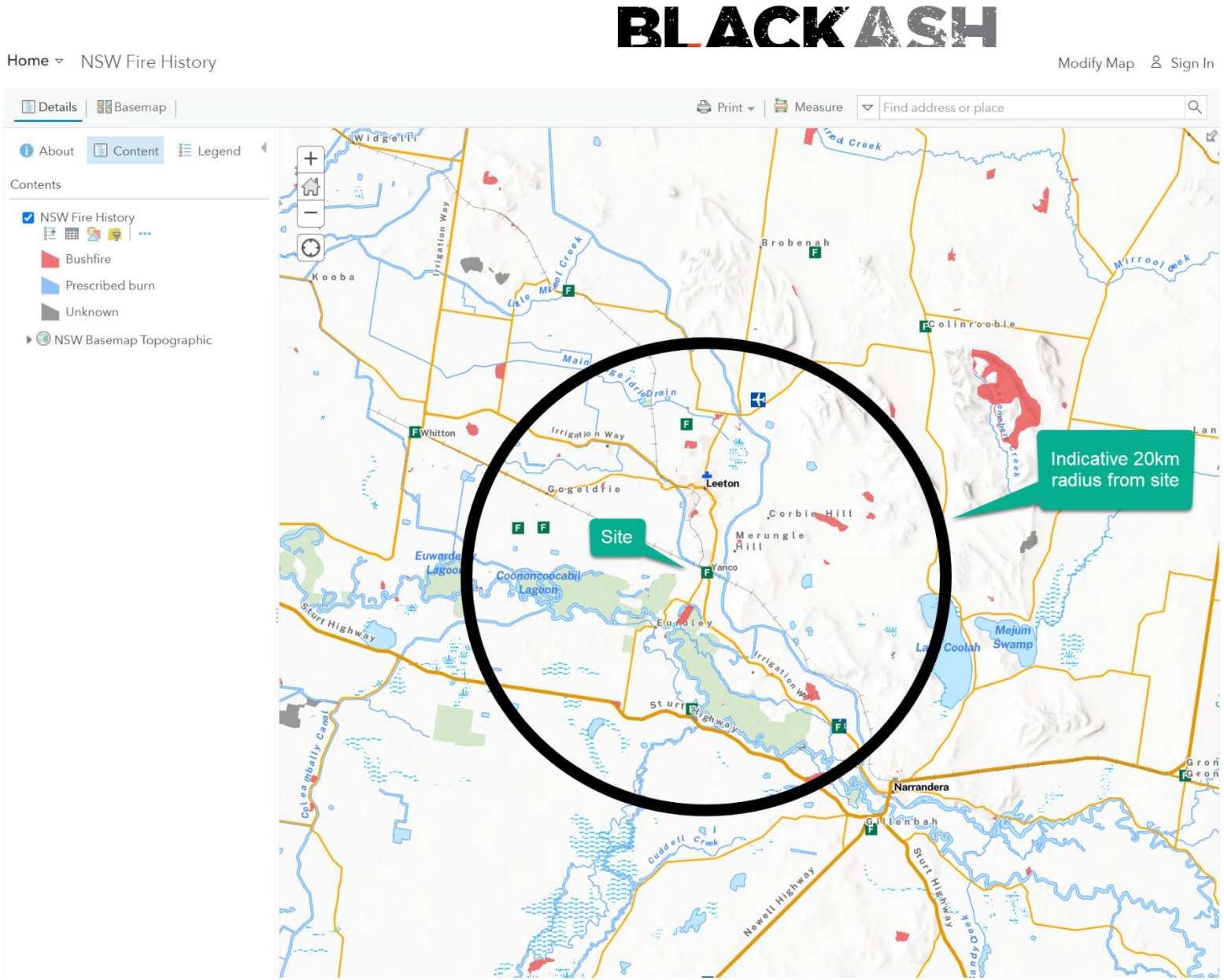

Figure 7: Wider area fire history (extract from NSW Fire History map)

Figure 8: Local fire history

3.4. Blackash Landscape Scale Assessment Tool

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 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. 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.

Scale of hazard vegetation and topography are key in terms of assessing the bushfire hazard and can be separated generally into one of two categories:

- landscape scale hazard – where large expanses of vegetation over tens to thousands 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 less than 20 hectares in size

The Blackash Landscape Scale Assessment Tool (LSAT) combines quantitative and qualitative techniques, which are scaffolded by the *Planning Permit Applications Bushfire Management Overlay Technical Guide* (Victorian Department of Environment, Land, Water and Planning, 2017) and associated documentation. The LSAT is shown in Table 2 and uses elements of the Bayesian decision making model and Expert Judgment techniques (NSW *Land & Environment Court Uniform Civil Procedure Rules*, Part 31, 2005) 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.

Key considerations in our assessment have included:

- extent and continuity of vegetation
- topography
- prevailing winds
- potential fire run and area that is likely to be impacted by the fire
- impact on evacuation routes to safer places considering road networks, distances, and landscape factors

- location and exposure of the development to bushfire
- ability to seek bushfire shelter on site or at alternative locations
- extent of neighbourhood-scale damage the bushfire may produce.

The Project Area is predominantly surrounded by irrigated cropping areas and the rail line to the north, with urban development to the northeast. Small, fragmented areas of woodland are to the east and west approximately 500m away, and significantly larger areas of woodlands, wetlands and forested wetlands approximately 900m to the southwest that form part of the Murrumbidgee Valley National Park.

The landscape in the wider area is predominantly flat and characteristic of the MIA and the focus on irrigated agriculture. Potential fire runs are limited by urban and agricultural development including farm access and management trails, roads and the rail line, all of which assist in fragmenting natural or farmed vegetation, and which also assist firefighting containment strategies.

There is no potential for a landscape scale fire to affect the site. The LSAT is heavily weighted to life safety and places significant emphasis on the ability for the future workers on site (during the construction, operational or decommissioning phases) to be able to shelter in place or evacuate safely, whilst emergency services can access the site at the same time.

When the individual factors are scored, after consideration of the landscape context, the site design complying with PBP, the overall Landscape Scale Threat for the site is assessed as **Low Risk**. The summary and weighted scores are presented in Table 1 below. However, there are different risks during the construction and operational phase of the Project. Mitigation measures can be put to mitigate bushfire risk. The reduction of bushfire risk in the Project due to effective mitigation measures involves systematically identifying, addressing, and minimising potential fire hazards to protect life, property, and the environment. When well-executed, these measures significantly decrease the impact and consequence of fire on Project infrastructure, reduce the likelihood of ignition and limit potential fire spread, and enhance the Project's resilience to bushfire impacts.

The total prevention of bushfires is not possible, and neither is the protection of all assets. What is common when considering risk management for relevant scenarios are the overarching common goals to prevent bushfire ignitions, design and prepare assets to facilitate effective bushfire suppression, and where possible, to incorporate protection of valuable assets and business continuity into Project planning. This also relates to the likelihood of a BESS ignition spreading from the site and causing a bushfire to start.

The bushfire risk for the Project site is considered overall to be **Low Risk**.

Table 1 Landscape Scale Assessment for the Project

Landscape Scale Assessment Tool					
Parameter	Low landscape scale threat	Moderate landscape scale threat	High landscape scale threat	Extreme landscape scape threat	Rating
1. Surrounding Vegetation	Bushfire cannot directly approach the site as it is surrounded by urban development and non-mapped vegetation or managed land.	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 width or less.	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 grasslands.	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.	Access is readily available to a place that provides shelter from bushfire. This will often be the surrounding developed area.	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.	Moderate
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**	110
	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				

4. Project Area Bushfire Hazard Assessment

A range of elements are required to be considered as part of the bushfire hazard assessment for a Project, and these are outlined within this section.

4.1. Bushfire Hazard Assessment Methodology

An assessment of the BPL is necessary to determine the application of Bush Fire Protection measures such as APZ locations and future building construction levels.

PBP provides a methodology to determine the bushfire threat and commensurate size of any 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.

The following assessment is prepared in accordance with PBP. This assessment is based on the following resources:

- Planning for Bush Fire Protection (NSW RFS, 2019);
- Council Bushfire Prone Land Map;
- Aerial mapping; and
- Detailed GIS and Site analysis.

The following methodology is from PBP (p. 80) which has been used to determine the BAL at the Site. The process to determine BAL is outlined below:

To determine Bushfire Attack Level (BAL):

- Step 1: Determine vegetation formation in all directions around the building to 140 metres
- Step 2: Determine the effective slope of the land from the building for 100 metres
- Step 3: Determine the relevant Forest Fire Danger Index (FFDI) for the council area where development is to be undertaken
- Step 4: Determine the separation distance by measuring from the edge of the unmanaged vegetation to the closest external wall of an asset
- Step 5: Match the relevant FFDI, appropriate vegetation, distance, and effective slope to determine the appropriate BAL using the relevant tables in PBP.

The FFDI, vegetation formations (bushfire fuels) and the topography (effective slope) combine to create the bushfire threat that may affect bushfire behaviour at the Site, and which determine the planning and building response of PBP. A detailed assessment has been undertaken to determine the bushfire hazard and likely radiant heat at the Site

4.2. Fire Weather

The fire weather is dictated by PBP and RFS *NSW Local Government Areas FDI* (2017) and assumes a credible worst-case scenario and an absence of any other mitigating factors relating to aspect or prevailing winds. The Leeton LGA is within the Northern Riverina Fire Weather District and has an FFDI of 80.

4.3. Vegetation Assessment

PBP requires a classification of the vegetation on and surrounding the property (out to 140 metres from the boundaries of the property).

Predominant vegetation is classified by structure or formation using the system adopted by Keith (2004) and by the general description using PBP. Vegetation types give rise to radiant heat and fire behavior characteristics. There are seven vegetation formations (with sub-formations) identified in PBP. Where a mix of vegetation types exist, the type providing the greater hazard is said to predominate. The vegetation formations in the wider local area are shown in Figure 9 and the vegetation directly impacting the site (Grassland) is shown in Figure 10. It is further noted that the area to the west of the BESS site is already maintained to the standards required for high voltage

4.4. Topography and Slope Influencing Bushfire Behaviour

PBP requires an assessment of the slope of the land on and surrounding the property (out to 100 metres from the boundaries of the property or from the proposed development footprint).

The effective slope' influencing fire behaviour approaching the sites has been assessed in accordance with the methodology specified within PBP. The effective slope is the slope of the ground under the hazard (vegetation). It is not the slope between the vegetation and the building (slope located between the asset and vegetation is the site slope).

The effective slope for the site is shown in Figure 10. The site and surrounding area is characterised by relatively flat country with gentle topography, characterized by minimal changes in elevation across the landscape. The terrain may consist of expansive plains intersected by meandering water channels or perennial creeks. The relatively flat landscape results in minimal influence of slope on fire behaviour and spread.

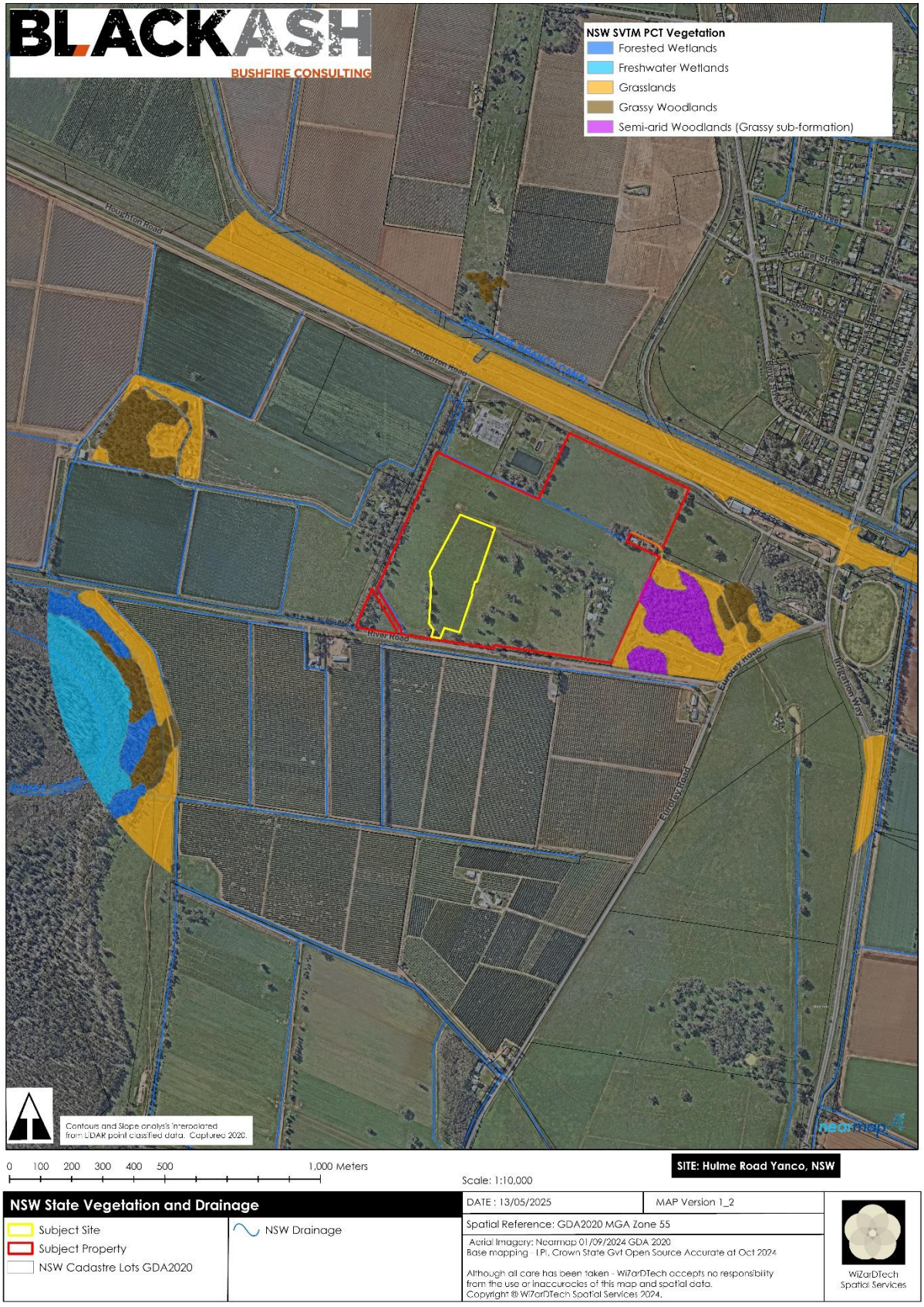

Figure 9: Vegetation in wider local area

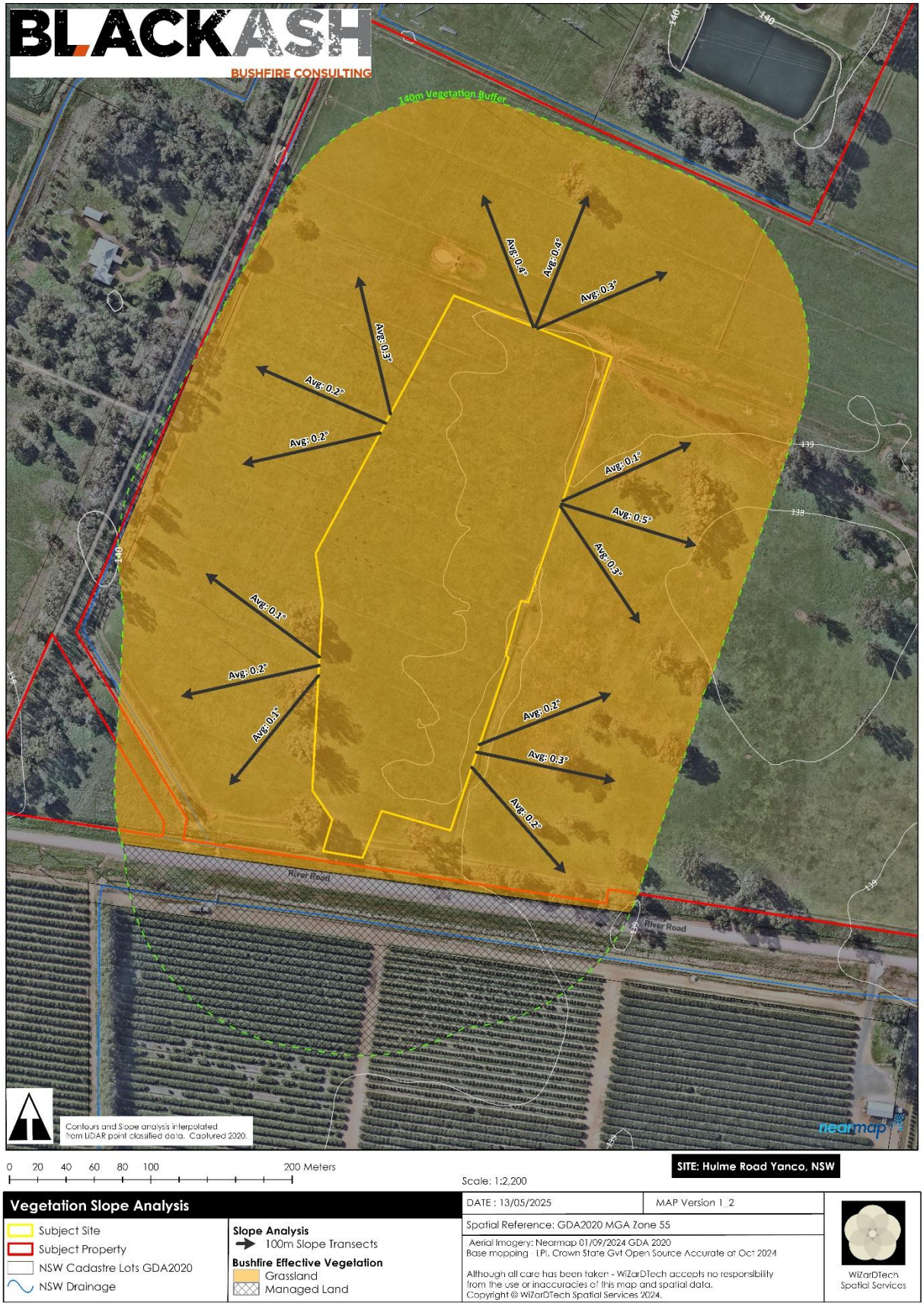

Figure 10: Vegetation and slope mapping at Project site

4.5. Bushfire Attack Assessment – rationale and approach

An APZ is a fuel-reduced area surrounding a built asset or structure which provides a buffer zone between a bushfire hazard (fuel) and an asset. The APZ includes a defendable space within which firefighting operations can be carried out. An APZ is land that has vegetation removed or maintained to a level that limits the spread and impact of bushfire. The RFS APZ management requirements are at Appendix 3.

Infrastructure associated with the Project should be designed in such a way so as to minimise the impact of bushfire on the infrastructure and ensure that the infrastructure does not cause a bushfire, and that minimises the risk that capabilities of the infrastructure are compromised during bushfire emergencies. Bushfire Protection Measures should be commensurate with the bushfire risk and criticality of the infrastructure.

A BESS is considered as 'other development' in PBP. 'Other development' includes industrial, commercial and infrastructure development. Whilst PBP does not have specific requirements for BESS, the methodology and standards used by PBP for building construction can be used in combination with power industry standards to provide a methodology to demonstrate compliance with the aim and objectives, and to consider appropriate levels of protection for the BESS. It is noted there are currently no minimum or maximum numerical standards for radiant heat flux impacting a BESS applied in any planning or other standards in Australia.

In the absence of standards and benchmarks that apply to bushfire risk reduction on 'other development' such as BESS, there is a need to consider a variety of guidelines, standards and references that have relevance. Figures 11-14, as described below, include various elements that can be applied to BESS developments. The focus is on demonstrating compliance with the intent of PBP Section 8.3.5 Wind and Solar Farms:

> *Wind and solar farms require special consideration and should be provided with adequate clearances to combustible vegetation as well as firefighting access and water.*

Figures 11 & 12 are taken from standard references long used in state planning and building frameworks in NSW and Victoria and referenced in Australian Standard *AS 3959:2018 Construction of buildings in bushfire-prone areas* (AS3959). These have been annotated and highlighted to emphasise the standards permissible for residential bushfire construction. This in turn relates to well established evidence regarding the impacts of radiant heat flux, which can also be applied to critical infrastructure. BAL-29 is the minimum standard for the creation of new residential lots in NSW, focusing on managing costs to a tolerable level for residential

homebuilders, related to the impact of that level of radiant heat flux on a range of building materials and components.

BAL-29 is a well-understood and practical standard, that has the advantage of having RFS "acceptable solution" modelling readily available in PBP. This also allows use of images and tables scaffolded by AS3959 and adopted by industry to simplify shared understanding between proponents and regulators about what impacts of radiant heat are being managed.

The BAL-29 standard aligns well to the industry standards that follow in Figures 13 and 14, with respect to components that are analogous to BESS components, and to the substation design for the site.

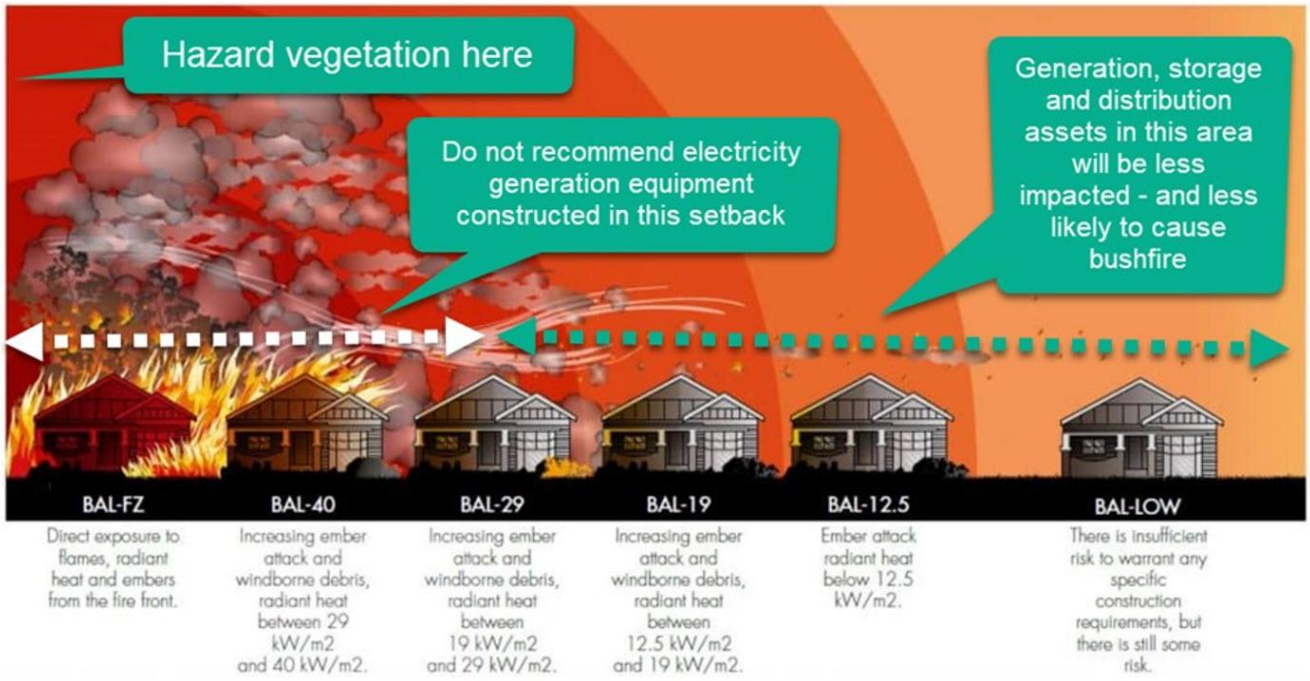

Figure 11: Bushfire attack mechanisms and relationship to radiant heat flux and building standards (CFA 2012; AS3959 2018)

Radiant heat flux kW/m²	Observed effect
1	Maximum for indefinite skin exposure
3	Hazardous conditions, firefighters expected to operate for a short period (10 minutes)
4.7	Extreme conditions, firefighters in protective clothing will feel pain after 60 seconds of exposure
6.4	Pain after 8 seconds of skin exposure
7	Likely to be fatal to unprotected person after exposure for several minutes
10	Critical conditions, firefighters not expected to operate in these conditions although they may be encountered. Considered to be life threatening in less than 60 seconds in protective equipment. Fabrics inside a building could ignite spontaneously with long exposure.
12.5 (BAL-12.5)	Volatiles from wood may be ignited by pilot after prolonged exposure. Standard float glass could fail during the passage of a bushfire.
16	Blistering of skin after 5 seconds
19 (BAL-19)	Screened float glass could fail during the passage of a bushfire.
29 (BAL-29)	Ignition of most timbers without piloted ignition (3 minutes of exposure) during the passage of a bushfire. Toughened glass could fail.
40+	Flame zone – exposure to direct flame contact from fire front

Figure 12: Observed effects of radiant heat flux (RFS, 2006; CFA, 2012)

Figure 13 is a highlighted extract from the Ausgrid Network Standard NS 187 Passive Fire Mitigation Design of Major Substations (amendment 2, 2020). This depicts the standards used in the development of major substations for this NSW network provider as it relates to bushfires. Each renewable energy generation facility or BESS is linked into the grid via a substation, and there are components and industry risk management approaches for substations that can be considered as a framework for a suitable standard for BESS until specific standards are developed.

The BAL-29 or <29kW/m^2 standard aligns with recognised protection of most key components of substations in this document.

A typical radiant heat / temperature duration curve applicable to bushfires would be as follows:

- Peak values are reached after 1 minute;
- Values remain at peak for up to 4 minutes; and
- Values recede to ambient linearly over a further 5 minutes.

Refer to Table 3 for limiting radiant heat flux levels for determining minimum safe separation distances. For bushfires, the NSW RFS PBP is the key reference document in establishing the maximum bushfire intensity at a given location. A flame front length equal to the approach boundary length is to be assumed and a flame height based on the PBP shall be used in calculations.

Table 3 – Radiant Heat Exposure Limits for Bushfires

Item	Maximum allowable radiant heat flux (kW/m^2)	Comment
Cable	12.5 20	PVC Cables begin to distort and may ignite. Ignition of XLPE cables between 85 and 550 seconds.
Steel support structure	35	To 60% of yield strength after a maximum duration of 5 minutes. Applies where elastic deflections due to elevated temperatures are not critical.
Porcelain bushing/Insulators	>30	Damage may occur requiring replacement or in extreme case resulting in catastrophic failure. See Note 2.
Polymeric bushing/insulators	>30	Damage may occur requiring replacement or in extreme case resulting in catastrophic failure. See Note 2.
Aluminium busbar	20	Based on 250°C after a maximum duration of 5 minutes. Comparable to withstand temperature under fault conditions.
Copper busbar	25	Busbars may undergo significant distortion and impose significant stresses on rigid insulators.
Transformer tank	>35 (see Note 1)	Refer to above regarding bushings and cables.
Combustibles	12.5	Piloted ignition may occur on timber.

Note 1. Transformers always have some more vulnerable components such as bushings and cables etc. Refer to Clause 7.2.

Note 2. Detailed information on radiant heat exposure limits is not available. However in-service applications exposed to bushfire indicate a high radiant heat limit and a low risk of damage or failure.

The radiant heat limits provided in Table 3 are applicable to identified critical substation structures and HV components. Critical elements are those deemed to be essential for return to service following a bushfire event.

The location of critical substation elements, their sensitivity to radiant heat and their ease of replacement will all impact upon the potential Asset Protection Zone (APZ) required at a given substation.

APZ widths may potentially reduce where critical exposed elements nearest the boundary are able to be locally protected and/or rapidly replaced following a bushfire event.

Substation design should aim for a high level of bushfire protection for critical assets and a rapid return to service following a bushfire event.

Figure 13: Extract from Ausgrid Network Standard 187 Passive Fire Mitigation Design of Major Substations

Figure 14 is taken from a similar Institute of Electrical & Electronics Engineers (IEEE) paper (*IEEE Guide for Substation Protection 2012 p.49*) which is in common usage in multiple countries including the United States where it was developed. This standard is currently under review; however, this is the current guideline. The BAL-29 or <29kW/m^2 standard aligns with recognised protection of most key components of substations in this document.

This industry standard specifically addresses major electricity Project infrastructure, and this may reasonably be related to a BESS. In particular, the damage to unprotected metal occurring at 30kw/m^2 is likely analogous to a BESS, and another indication that the BAL-29 standard is suitable.

Impact of radiant heat flux	Heat flux (kW/m^2)
Sufficient to cause damage to process equipment	37.5
Equipment failure	35
Damage to unprotected metal	30
Spontaneous ignition of wood	25
Cable insulation degrades	20
Pilot ignition of wood	12.5
Plastic melts	12.5
Pain threshold reached after 8 s Second-degree burns after 20 s	9.5
Possible failure of ceramic bushings	5
Skin burns	5

Reproduced from IEEE Std 979-2012: IEEE Guide for Substation Fire Protection

Figure 14: Extract from IEEE Guide for Substation Fire Protection (2012)

Figure 15 is an extract from Appendix 1 of *Hazardous Industry Planning Advisory Paper No. 4 – Risk Criteria for Land Use Safety Planning* (Department of Planning 2011, p. 21) that also considers the consequences of radiant heat flux. The Table suggests that at 23kW/m2 there is a chance of structural failure in unprotected steel. This provides another indication that the BAL-29 standard is suitable when considering the appropriate standard to protect BESS components from a bushfire.

Table 6: Consequences of Heat Radiation

Heat Radiation (kW/m^2)	Effect
1 .2	Received from the sun at noon in summer
2.1	Minimum to cause pain after 1 minute
4.7	Will cause pain in 1 5-20 seconds and injury after 30 seconds' exposure (at least second degree burns will occur)
12.6	• Significant chance of fatality for extended exposure. High chance of injury • Causes the temperature of wood to rise to a point where it can be ignited by a naked flame after long exposure • Thin steel with insulation on the side away from the fire may reach a thermal stress level high enough to cause structural failure
23	• Likely fatality for extended exposure and chance of fatality for instantaneous exposure • Spontaneous ignition of wood after long exposure • Unprotected steel will reach thermal stress temperatures which can cause failure • Pressure vessel needs to be relieved or failure would occur
35	• Cellulosic material will pilot ignite within one minute's exposure • Significant chance of fatality for people exposed instantaneously

Figure 15: Appendix 1, Table 6 HIPAP No. 4 (NSW Department of Planning)

In summary, consideration of relevant analogous industry documents has been undertaken to work towards determining a suitable standard for radiant heat protection from a bushfire for typical BESS components. Review of these materials suggests that the BAL-29 or <29kW/m2 standard is likely to provide suitable risk mitigation. Such APZ distances associated with meeting the standard will also provide significant risk reduction of a BESS unit fire igniting vegetation that ultimately leads to a bushfire.

Section 4.6 below considers the application of the specific site characteristics to achieve a BAL-29 standard and further considers the safety implications for firefighters operating to manage a bushfire that is impacting on the Project.

4.6. Bushfire Attack Assessment – APZ and Bushfire Attack Levels

As discussed in detail above, achieving the radiant heat flux standard of BAL-29 or <29 kW/m^2 is likely to provide a suitable risk management standard for the BESS components. The combination of fire weather (FFDI 80), slope and vegetation factors are used within the PBP methodology to analyse what APZ is required to provide the acceptable BAL-29 standard. As shown in Figure 16 this is **10m**, which is also the minimum APZ required by PBP (p. 77) for "*structures and associated buildings/infrastructure*" for wind and solar farms.

Table A1.12.3

Minimum distances for APZs – residential development, FFDI 80 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	9	12	15	20	25
Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	20	25	31	39	48
Grassy and Semi-Arid Woodland (including Mallee)	11	13	17	21	27
Forested Wetland (excluding Coastal Swamp Forest)	8	10	13	17	22
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	11	12	14	16

Figure 16: Extract from PBP showing minimum APZ for new residential development

A key factor in analysing the best method of protecting a BESS from bushfire impact is that firefighters must have sufficient safe areas to undertake firefighting. In the case of the Comet Park BESS, the site is in single ownership; there is an existing easement to the west of the BESS, and there is a road to the south of the BESS (roads and road reserves may be used as part of an APZ). This can reasonably be compared with the standards required for protection with the SFPP type of development which also relies on safe operating areas for firefighters.

As seen in Figure 17 the provision of an APZ of **10m** is considered to provide a practical outcome that does not require any significant land management changes and:

- meets and exceeds PBP requirements for wind and solar farm infrastructure,
- significantly reduces the risk of a bushfire impacting the BESS,
- significantly reduces the chance of the BESS igniting a bushfire, and
- provides space for safe active firefighting.

Figure 17: Asset Protection Zone Map showing recommended 10m wide APZ from BESS

The Project is required to mitigate multiple environmental impacts resulting from the development and one of these is to minimise acoustic impacts to surrounding properties. This will be achieved in part through the erection of acoustic walls of up to 6m height. SREA advises the walls will meet the relevant AS/NZS standards for bushfire resistance and provide an additional fire separation measure.

Australian Standard 1530.8.1:2018 *Methods for fire tests on building materials, components and structures, Part 8.1: Tests on elements of construction for buildings exposed to simulated bushfire attack - Radiant heat and small flaming sources* and Australian Standard 1530.8.2 *Methods for fire tests on building materials, components and structures, Part 8.2: Tests on elements of construction for buildings exposed to simulated bushfire attack - Large flaming sources* are the relevant standards for building materials and building systems.

Acoustic walls constructed to the appropriate standard will partially shield the BESS from the flame contact and radiant heat impacts of bushfire. This further reduces any chance of a battery unit fire spreading to vegetation. The acoustic walls may be located anywhere within the APZ (subject to compliance with relevant section of AS 1530.8.1 or AS 1530.8.2 as applicable and the BAL map at Figure 12) as long as maintenance of the entire APZ can be practically managed ongoing.

Any APZ on the outside of the acoustic wall will consist of a permanent service trail around the site and mown grass. There will be a complete absence of vegetation from much of the site, and the remainder of the Project Area will be established and maintained to APZ standards as shown for a typical site in Figure 18.

Appendix 5 considers the guidance provided by *NFPA 855 Standard for the Installation of Stationary Energy Storage Systems 2023* and reproduces material from four recent publicly available Fire Safety Studies (FSS). Appendix 5 demonstrates that it is unlikely a BESS module fire will ignite a bushfire through radiant heat flux. In the event of a BESS module self-igniting due to damage or malfunction, the radiant heat generated by a burning module will produce radiant heat levels at 10m setback of typically 1-4kW/m^2, which is unlikely to ignite vegetation.

The provision of an APZ to the BESS infrastructure to reduce radiant heat level from a bushfire at the assets to <29kW/m^2. The generation of radiant heat by a battery unit fire of typically 1-4kW/m^2, combined with a minimum APZ of 10m will not be likely to ignite nearby vegetation.

Figure 18: Landscaping management at typical Zone Substation demonstrating BESS footprint treatment

4.7. Access and Egress

The nature of the Project involves construction of internal road and trail upgrades and upgraded connection to the public road system. These will be required to be built and maintained to heavy vehicle standard for Project operation (e.g. cranes, floats, concrete mixers, heavy vehicles). There are no specific standards detailed in PBP for access requirements for a BESS. Instead, the access standards in PBP that facilitate fire tanker operation will be sufficient to allow evacuation from the site to occur whilst firefighters are attending and firefighting are considered sufficient and relevant.

Access can be conditioned to comply with the aim and objectives of PBP.

4.8. Water supplies

The nature of the Project involves road building works, earthworks and concrete mixing all of which require water supplies. At detailed design stage the likely FSS to be required by NSW Fire & Rescue will include details such as water quantity, locations and access. Standard Storz fittings will be required and this and other such details can be conditioned at FSS stage. The site is large and in single ownership, the details of firefighting water supplies can be determined at future Project stages.

Water supplies can be conditioned to comply with the aim and objectives of PBP.

4.9. Landscaping

As discussed above the site is in single ownership which simplifies overall APZ and landscaping management ongoing. The four large trees to the western side of the BESS footprint will be retained as they will not prevent maintenance of the area to APZ standards. Should there be a requirement for landscaping to manage site aesthetics or views, these can be established in accordance with APZ standards and/or at sufficient distance from the BESS to maintain the 10m APZ.

Landscaping can be conditioned to comply with the aim and objectives of PBP

4.10. Emergency management arrangements

Effective emergency planning provides for the safety of site personnel, emergency responders and the community.

An emergency management and planning process, informed by the RFS *Guide to Developing a Bushfire Emergency Management Plan* and AS 3745-2010: *Planning for emergencies in facilities*, and the NSW Hazardous Industry Planning Advisory Papers will be undertaken.

These documents provide the framework for the development of a Bushfire Emergency Management & Operations Plan (BEMOP) and a Bushfire Emergency Response Plan (BERP). These should be developed in consultation with the local Bush Fire Management Committee (BFMC) and include detailed information regarding ongoing maintenance of bushfire protection measures, relevant staff training, location and signage indicating firefighting infrastructure onsite, and a Pre Incident Plan (PIP) developed with local emergency services.

A BESS BEMOP and BERP must include:

- Emergency procedures for fires within, and in the vicinity of, the BESS site.
- Details of any triggers or circumstances for modifying or ceasing BESS operation, such as approach of bushfire/grassfire to the facility.

Emergency management arrangements can be conditioned to comply with the aim and objectives of PBP

Figure 19 is an extract from the NSW Planning Portal and shows there are a minimum of 20 RFS brigades within approximately 30 minutes response time of the Project Site. The Yanco-Wamoon RFS brigade is located approximately 1.1km from the site, with an additional four brigades located within 10km. NSW Fire and Rescue has a station at Leeton approximately 7km from the site. This indicates there are both significant nearby first attack firefighting resources in addition to any onsite capability, and there is the ability for a significant weight of attack response to be provided to any fire occurring on or impacting the site.

The nature of BESS is they are equipped with early warning and fire suppression systems linked to local emergency services and this will be considered during the FSS.

Suitable emergency management arrangements can be developed during final design stages and prior to construction.

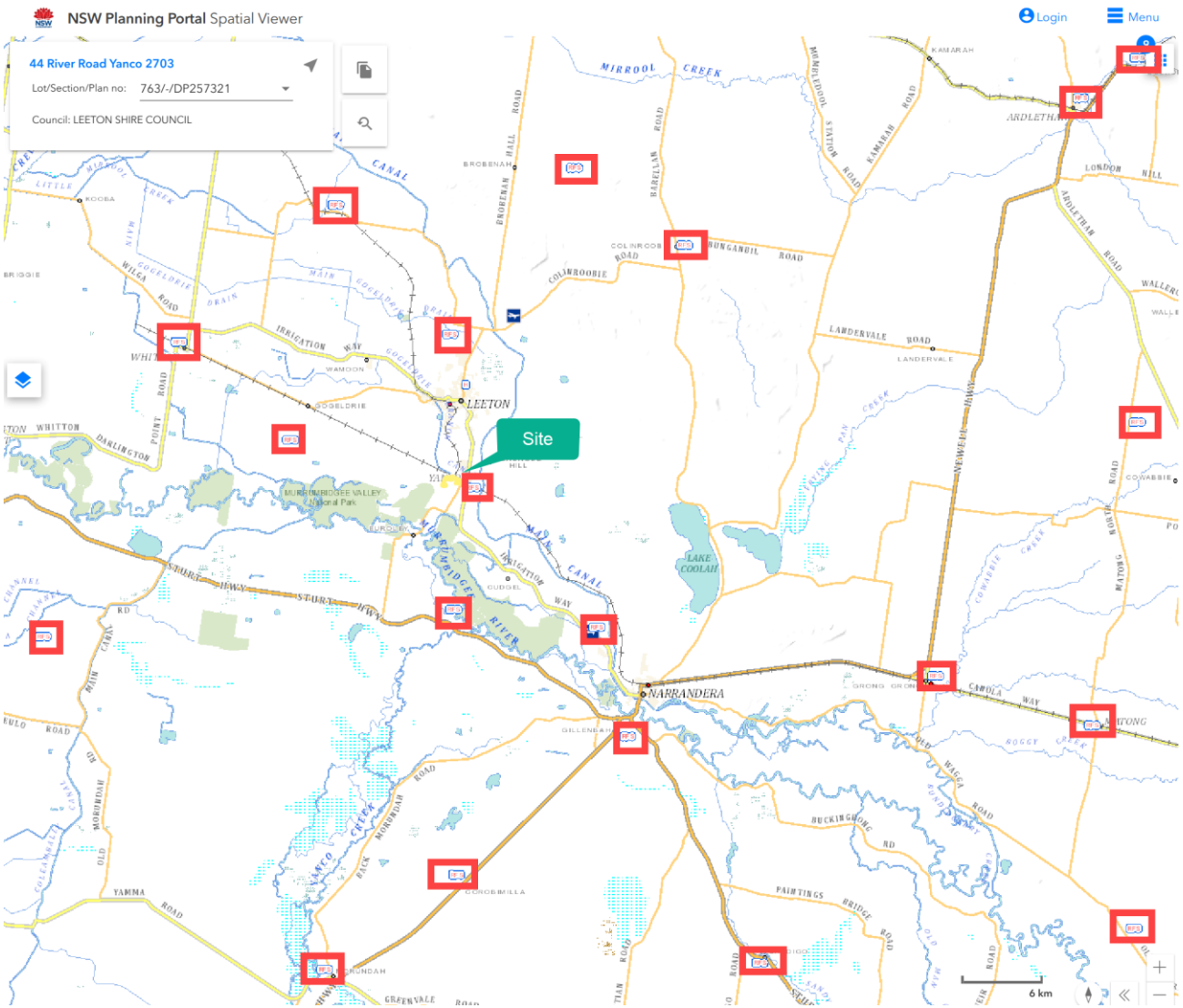

Figure 19: Extract from NSW Planning Portal showing location of nearby RFS brigades

5. Bushfire risk created by the Project

Fire risks have been identified and must be effectively managed during the construction, operation, and decommissioning of the Project.

5.1. Assessment of bushfire risk during construction and decommissioning

The potential sources of ignition of bushfires resulting from the construction of the Project and during decommissioning include:

- Construction equipment including bulldozers, excavators and vegetation removal machinery using slashers and mulching machines. These activities can produce sparks when steel blades encounter rock, with the potential to ignite surrounding vegetation.
- Motor vehicle exhaust systems and diesel-powered trucks with pollution control devices have the potential to emit burning diesel particles and ignite grassland and woodland ground fuels.
- Hot works such as welding and grinding can produce sparks resulting in an extreme level of risk of ignition for cured vegetation.
- Electrical equipment faults create a high level of risk of ignition of vegetation.
- Inappropriate storage of chemicals has the potential to cause a chemical fire or explosion. Failure to clean up a spill can also lead to fire; and
- Arson.

In general, the risk of bushfire impact during construction is dependent on factors such as fuel loads, weather and the scale (size) of fires which may occur. There is a very limited threat to construction personnel or firefighters from fast moving bushfire events which may impact the Project Area. Staff training, provision of firefighting water supplies and the availability of first attack firefighting equipment can be conditioned at the later stages of the Project.

5.2. Assessment of bushfire risk during operation

As seen above in Section 3 of this report the site is considered to be of Low Risk of impact by bushfire, and similarly the risk of the BESS igniting a bushfire is also low given the vegetation and topography.

Using the mitigation strategies recommended in this report, the risk of the BESS operation igniting a bushfire is an unlikely possibility due to the flat land and very limited vegetation. The forthcoming FSS will manage fire risk associated with BESS operation, with any fire spread to surrounding vegetation being managed via staff training, provision of firefighting water supplies and the availability of first attack firefighting equipment.

There is substantial area on the site to provide for necessary infrastructure, and these details can be finalised and conditioned through the BEMOP during later stages of the Project.

6. PBP Compliance Summary

Table 2 provides an overall compliance summary incorporating relevant and comparable elements of PBP, specifically the Aim and Objectives, Section 8.3.5 Wind and solar farms, and Section 8.3.9 Hazardous Industry.

Table 2: Summary of compliance with PBP

PBP requirements	Comment	Complies?
Comply with PBP Aim & Objectives (p.10)	Project has been developed to incorporate a suite of bushfire risk mitigation measures that are designed into the layout and include consideration for ongoing maintenance of all bushfire protection measures and incorporation into local bushfire planning.	**Yes**
Section 8.3.5 - Wind and solar farms (p. 77)	APZ that meet the standard are provided; suitable access will be available; essential equipment is designed and housed to both minimise the impact of a bushfire, and to minimise risk to surrounding vegetation; and a Bushfire Emergency Management & Operations Plan (BEMOP) and sub plans will be developed.	**Yes**
A minimum 10m APZ for the structures and associated buildings / infrastructure;	The Project is provided with a **10m** APZ, with the remainder of the site maintained to typical rural standards through slashing and grazing.	**Yes**
The APZ must be maintained to the standard of an Inner Protection Area (IPA) for the life of the development	The Project site will be continually maintained to IPA standard as part of normal operations (refer to Appendix 3). This can be conditioned and will be part of the Bushfire Emergency Management & Operations Plan (BEMOP).	**Yes**

PBP requirements	Comment	Complies?
Essential equipment designed and housed to minimise impact of bushfires, and to not serve as a bushfire risk.	All infrastructure designed and sited to reduce impact of bushfires, and to prevent bushfire risk. Larger than required APZ, hardstand areas around critical components, numerous access roads internally, initial attack firefighting capability and water supplies will be provided on site.	**Yes**
Detailed BEMOP to be produced	This will be developed as part of next stage following Fire Safety Study (FSS) and will be key part of ongoing operations. A Bushfire Emergency Response Plan (BERP) will be a sub-plan of the BEMOP.	**Yes**
Comply with Total Fire Ban Day (TOBAN) requirements under RF Act s.99	All construction and operations will be conditioned to comply with TOBAN requirements.	**Yes**
Section 8.3.9 – Hazardous industry (p. 79)	All construction, operations and decommissioning and operations will be conditioned to be consistent with the relevant Hazardous Industry Planning and Assessment Papers (HIPAPs).	
Development should be avoided on bushfire prone land	The Project site is not designated as bushfire land, and the site is of Low Risk of bushfire impact.	**YES**
A Fire Safety Study should be prepared under the DPHI HIPAPs	A Fire Safety Study is typically required by NSW Fire and Rescue to be developed following initial development consent. This can be conditioned.	**YES**

7. Recommendations

The following recommendations have been made within this report to ensure the proposed development is compliant with *Planning for Bush Fire Protection 2019*:

Recommendation 1: A 10m Asset Protection Zone (APZ) is to be established and maintained in accordance with Figure 18. Prior to construction certificate stage a suitably worded instrument is to be created pursuant to section 88B of the *Conveyancing Act 1919* must be placed on Lot 763 DP 257321 which requires the provision of the APZ identified in Figure 17. The name of the authority empowered to release, vary, or modify the instrument shall be Leeton Shire Council.

Recommendation 2: This Bushfire Assessment Report should be used to inform the forthcoming Fire Safety Study.

Recommendation 3: Prior to construction certificate stage a Bushfire Emergency Management and Operations Plan and a Bushfire Emergency Response Plan (including a Pre Incident Plan) are to be developed for the Project in consultation with emergency services. These plans should be reviewed at least every 5 years and after any significant fire event in the immediate area. Copies of these plans are to be provided to local emergency services.

8. Conclusion

This Bushfire Risk Assessment has examined the proposed development of the Comet Park Battery Energy Storage System.

Whilst the bushfire risk is assessed as Low Risk, there is a possibility of bushfire occurring at the site over year asset life of up to 30 years. The risk to life and Project infrastructure can be mitigated relatively simply through good Project planning requirements including a 10m wide Asset Protection Zone, and good ongoing emergency management planning for the sites. Mitigation measures have been recommended to provide passive protection and the forthcoming Fire Safety Study will put in place measures to limit the potential for uncontrolled fire starting on the site and spreading from the site.

The Project complies with *Planning for Bush Fire Protection 2019*, and the location of the BESS is considered acceptable and practical provided appropriate bushfire protection measures are employed that allow for suitable and effective Asset Protection Zone setbacks, construction within tolerable radiant heat levels, water supplies, road and trail access arrangements and emergency management planning.

A range of mitigation options, including detection are available that can be employed to identify and respond to bushfire ignitions early, thus reducing the chance of out of control fires impacting assets.

There is the potential for significant public benefits arising from the proposal and the Project overall provides a long-term contribution to the energy transition.

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Appendix 1 References

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Appendix 2 Curriculum Vitae

BLACKASH
BUSHFIRE CONSULTING

Curriculum Vitae

Lew Short
Director BlackAsh Bushfire Consulting
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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 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

- Landuse planning & consequence management
- Legal strategy, Land & Environment Court and Expert Witness
- Bushfire planning, design & construction requirements in accordance with National Standards
- Insurance threat, vulnerability and constraints assessments
- 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

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Curriculum Vitae

David Lemcke
Senior Planner & Bushfire Specialist
BlackAsh Bushfire Consulting
T: 0439 220 464 E: david.lemcke@blackash.com.au

Summary

David is an experienced bushfire, planning and land management professional with over 20 years in local government and 4 years as a private sector bushfire consultant. He has undertaken a wide range of development assessments and strategic planning projects in both regulatory and proponent roles. He was Central Coast Council's bushfire subject matter expert for over 15 years, including representation in the Land & Environment Court and numerous working groups. He has a deep understanding of contemporary, practical bushfire management from a range of perspectives due to decades of experience as a public land manager and a Rural Fire Service (RFS) volunteer, and now applies this expertise with a range of clients across the private and public sectors.

David has served as Council's staff representative on the Wyong and Central Coast Bushfire Management Committees since 2007 and was instrumental in developing and contributing to emergency management planning including preparation of Bush Fire Risk Management Plans, Fire Access & Fire Trail Plan, developing local policy and pre-incident planning, and delivering community engagement.

From 2010 he was the program manager for the Wyong Shire Council and then Central Coast Council (CCC) bushfire program. These programs won several awards, sponsored research and were renowned for innovation and improvement of local government bushfire management. The CCC program included management of over 220 fire trails, management of 275 mechanical Asset Protection Zones, Hazard Reduction burning, access management, environmental protection and community engagement using both contractors and internal staff teams.

David has been active in policy development at State level, being the Local Government NSW representative on numerous RFS policy committees including the Review of the Bushfire Environmental Assessment Code and delivering numerous conference presentations.

David is an active senior RFS volunteer, with over 21 years in the service, having been a field officer for 15 years.

Areas of Expertise

- Rezoning and strategic bushfire studies
- Residential, commercial and industrial development assessment
- Infrastructure vulnerability and consequence management
- Bushfire planning, design & construction requirements in accordance with National Standards
- Bushfire Management Plans for large and small scale holdings
- Evacuation planning and implementation
- Technical and strategic advice
- Innovative policy development

Qualifications

Graduate Diploma of Bushfire Protection
Western Sydney University, 2024.

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

Diploma of Management
Management Consultancy International, 2012

Master of Environmental Planning
Macquarie University, 2005

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

Certificate 2 Bush Regeneration
Blue Mountains TAFE, 2000

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

Rural Fire Service
Various foundational, technical, specialist and incident management qualifications
2002 - current

Appendix 3 Asset Protection Zone Requirements

(source Planning for Bushfire Protection 2019 p. 107)

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.