BLACKASH
BUSHFIRE CONSULTING

Bushfire Risk Assessment

SSD-10422 Proposed Brickworks Plant (Plant 2)

416 and 524 Berrima Road, Moss Vale

Prepared for

Brickworks Land & Development

BPAD Bushfire Planning & Design Accredited Practitioner Level 3

Version 1.0

17 March 2020

Project Name:	**SSD-10422 Proposed Brickworks Plant (Plant 2)**
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Contents

1. Summary

Table 1 is a summary of compliance with relevant documents and approaches to limit bushfire attack and meet the requirements of the NSW planning framework for new development in Bushfire Prone Areas.

Table 1 Summary

Planning for Bushfire Protection 2019 Classification	EIS in support of a Development Application "Other" commercial/ industrial
Location	416 and 524 Berrima Road, Moss Vale Lot 1 DP785111 and Lot 1 DP414246
Local Government Area	Wingecarribee Shire Council
Can this proposal comply with AS3959, 2009	AS3959, 2009 does not apply as a DTS Provision
Does this development comply with the requirements of *Planning for Bushfire Protection 2019*?	YES
Does this development comply with the Aims and objectives of *Planning for Bushfire Protection 2019*?	YES
Is referral to the NSW RFS required?	NO

2. Introduction

Brickworks Land & Development (Brickworks) through Willow Tree Planning has engaged Blackash Bushfire Consulting to complete a Bushfire Assessment Report for a new brick making facility. The Development Application for the proposed development, to be submitted to the Department of Planning, Infrastructure and Environment (DPIE) is to determine under Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act).

This application seeks consent for the construction and use of a 50 million brick per annum brickworks plant with 24/seven operations and a Capital Investment Value of $80 million. The proposed development would take place at 416 and 524 Berrrima Road, Moss Vale (the site) which is legally known as Lot 1 DP785111 and Lot 1DP414246 (Figure 1) within the Wingecarribee Local Government Area. The location of the proposed building and associated works are shown in Figure 2.

The primary objective of the proposed development is to provide a new, state of the art Brickworks facility to supersede the operations of the currently outdated Bowral brickworks plant, allowing Brickworks Land and Development to continue to supply its premium "Bowral Blues" masonry product.

The DPIE issued a Secretary's Environmental Assessment Requirements (**SEAR**) on 11th February 2020 for the State Significant Development (SSD) which identified the bushfire as a matter that needed to be addressed. SEAR number SSD-10422 requires that Bushfire and Incident Management is addressed including:

- *assess the level of hazard posed to future development on adjacent land and how the hazards may change as a result of development*
- *address the requirements of Planning for Bush Fire Protection 2006 (RFS), in particular the provision of access (including perimeter roads) and water supply for firefighting* purposes.

This report has been completed having regard to the SEAR and RFS requirements through Planning for Bushfire Protection. A new version of Planning for Bushfire Protection has been released which is due to be legislated in March 2020. To ensure best practice, this assessment has been completed against PBP 2006 to ensure compliance with the SEARS and also PBP 2019 to ensure best practice is reflected in ensuring people and assets are protected from the effects of bushfire.

Figure 1 Site Location

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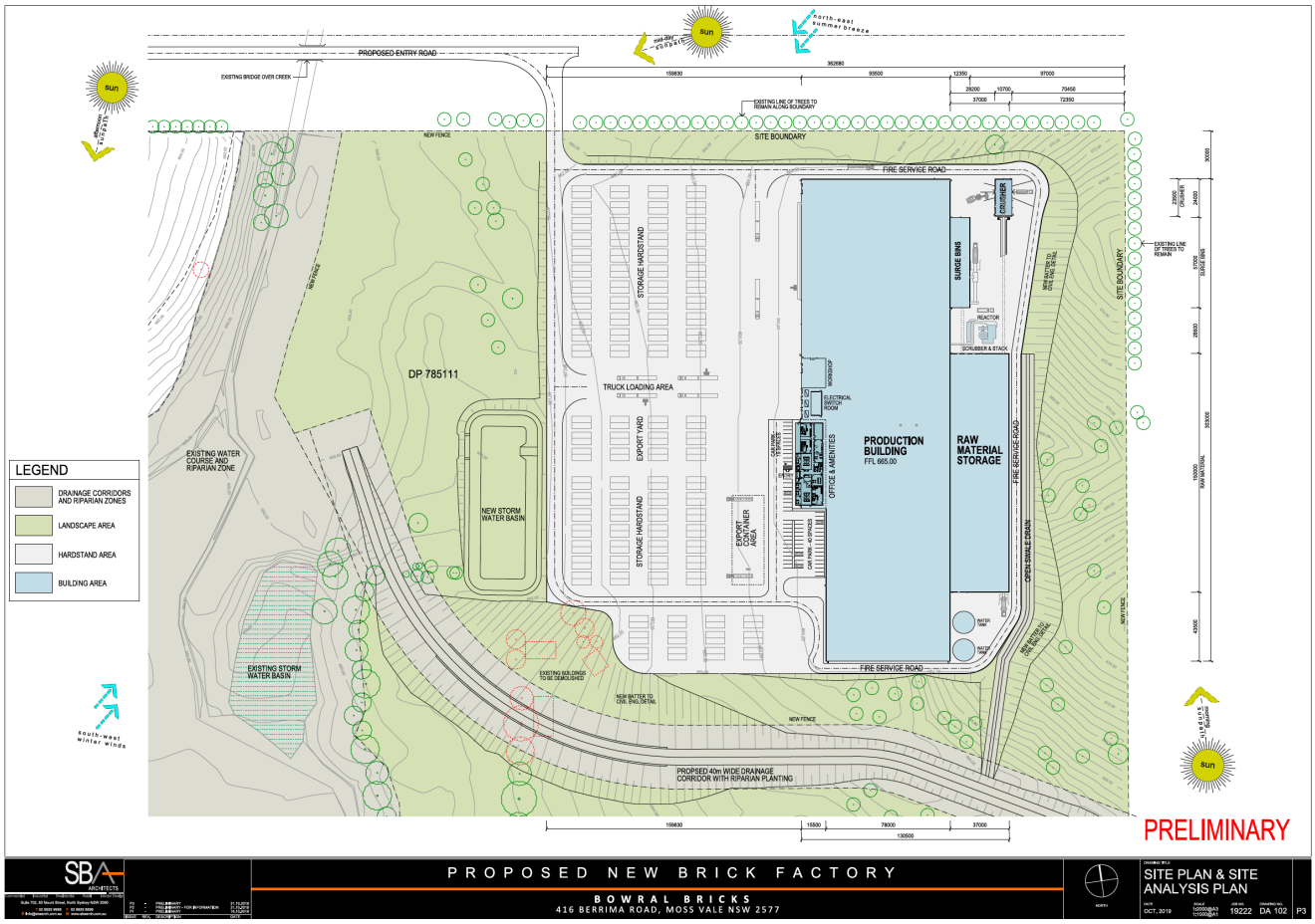
Figure 2 Site Plan



3. Site Context

The site lies within the suburb of Moss Vale in the Wingecarribee LGA. It is around 6.8km south-west of Bowral and around 50.8km west of Wollongong.

The site is located at 416 and 524 Berrima Road, Moss Vale. It lies to the east of Berrima Road, Moss Vale, and comprises the eastern-most portion of Lot 1 DP785111 and part of the existing access handle of Lot 1 DP414246 which will be used for heavy vehicle access and egress to the brickworks plant as well as for raw materials transport from the Mandurama quarry via a conveyor.

Lot 1 DP785111 has been most recently used for agricultural and rural residential purposes, supporting the Chesley Park Pastoral Land homestead. It comprises an area of 51.68ha and currently contains paddocks and derived grasslands, scattered and landscaped mature trees, a storage dam, tributaries of Stony Creek, an internal access road and minor agricultural structures supporting the dominant use of cattle farming. There is an existing above ground water main traversing Lot 1 DP785111 from the north-west and travelling in a curvature to the north-east. Topographically, Lot 1 DP785111 is relatively flat.

4. Legislative Framework

The proposed brickmaking plant is industrial development. Industrial development is designated as "other" development by the PBP 2006 and PBP 2019.

The RFS has reviewed PBP 2006. The new document is known as *Planning for Bushfire Protection 2019* (**PBP 2019**) and the RFS has requested that all new proposals are assessed against PBP 2019. This assessment has been completed having regard to PBP 2019.

The site is identified as 'bushfire prone land' (see Figure 3) for the purposes of Section 10.3 of the *Environmental Planning and Assessment Act, 1979* (**EPA Act**) and the legislative requirements for development on bushfire prone lands are applicable. All development on bushfire prone land must consider and comply with PBP 2019. However, industrial development has considerable flexibility and the nature of the development often results in the structures providing a higher degree of bushfire resistance than required by the RFS.

Industrial and commercial subdivisions that permit a residential house (caretaker's residence) to be constructed are considered as residential development by PBP and require a Bushfire Safety Authority. A Bushfire Safety Authority is an approval required for subdivision from the Rural Fire Service (RFS) Commissioner as identified in Section 100B of the Rural Fires Act 1997 (RF Act). Where no residential provision is intended, these requirements do not apply. No residential component is proposed as part of the upgrade works.

As "other" development, the proposed industrial development and future development is addressed through demonstrating compliance with the aim and objectives of PBP. As an existing asset, the upgrade works are considered as infill development by PBP 2019.

This assessment includes an analysis of the hazard, threat and subsequent risk to the proposal and provides recommendations that satisfy the Aims and Objectives of PBP.

Future management of the site will be covered by a separate Bushfire Management Program that will be submitted prior to development of the site. This will identify asset protection zones and the management regimen for ongoing management.

5. The Proposal

The primary objective of the proposed development is to provide a new, state of the art Brickworks facility to supersede the operations of the currently outdated Bowral brickworks plant, allowing Brickworks Land and Development to continue to supply its premium "Bowral Blues" masonry product. The proposed development would involve the construction and operation of a 50 million brick per annum plant with 24/seven operations. The plant will provide a range of facilities and brick making assets.

The proposed factory building would comprise a floorspace of around 36,800m2 (230m x 160m). It would be constructed using standard industrial construction techniques. Details on the equipment foundations would be provided by the kiln manufacturer and installed by a contractor. A standard slab would be laid over the site foundations.

The factory amenities would be constructed to be suitable for around 12 members of staff at any one time. It is proposed to have staff work two separate shifts over the 24 hour period. The factory would therefore also include amenities suitable to cater for 12 member of staff at any one time, including a lunchroom, factory manager's office and a control room.

Once bricks are formed, dried and fired in the factory, they would be removed from kilns and strapped, ready for storage.

A yard storage area of around 40,000m2 would be provided in the east of the site with provision for pallets to be stored six high. A hardstand export container area would also be provided for.

An office would be constructed, suitable for around 10 staff members, including four administrative staff, four sales representatives and two plant managers.

6. Designated Development

In September 2011, Part 3A of the EP&A Act was repealed, leading to the creation of two new major project development categories: state significant infrastructure (**SSI**) and state significant development (**SSD**).

Because of their size, complexity, importance and/or potential impact, the DoP is predominantly responsible for assessing development applications relating to these project types. The Minister for Planning is the consent authority for SSI and SSD applications.

Applications designated as state significant projects are exempt from requiring a bushfire safety authority (**BFSA**). Given their scale however, the requirements of PBP should still be applied, and consultation with the NSW RFS is encouraged. Even where comments are sought at the strategic planning stage, further development applications may need to be referred to the NSW RFS.

7. Mining (underground and open cut) production

PBP 2019 identifies specific considerations for mining development. Where mining and associated activities are carried out on BFPL, consideration should be given to any hazards and risks associated with bushfire. It may be necessary to implement measures to control and manage any identified hazards and risks.

8. Bushfire Prone Land

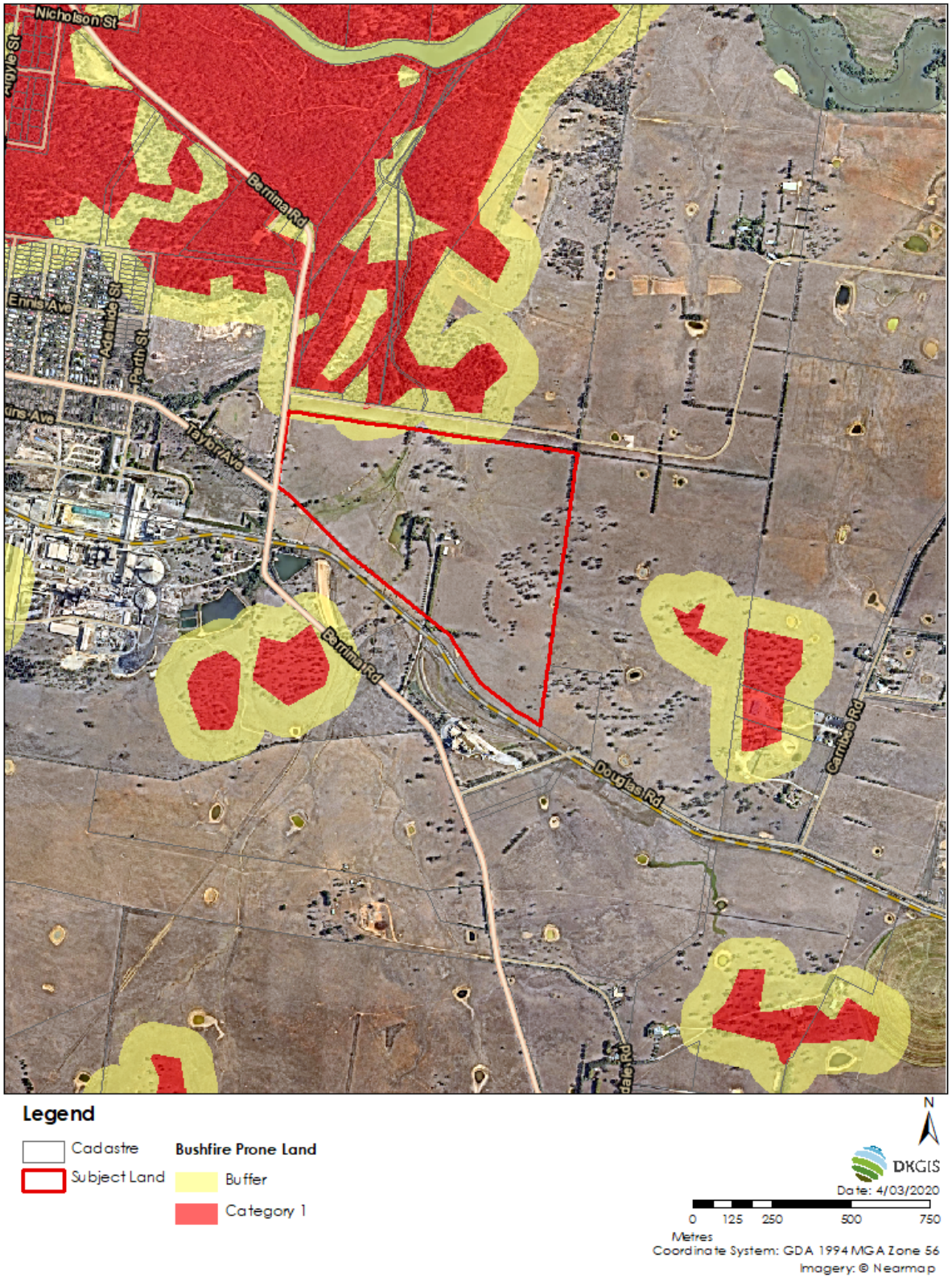
Bushfire prone land maps provide a trigger for the development assessment provisions and consideration of sites that are bushfire prone.

Bushfire prone land (**BFPL**) is land that has been identified by council, which can support a bushfire or is subject to bushfire attack. Bushfire prone land maps are prepared by local council and certified by the Commissioner of the NSW RFS.

Figure 3 shows the Bushfire Prone Land Map for the site. The extract from the Bushfire Prone Map shows that the land is partially affected by adjoining bushfire prone land buffer to the north of the site. Surrounding land has a mix of Category 1 and associated buffers and land that is considered managed (i.e. not bushfire prone).

A small number of remnant trees and associated vegetation is within the site.

Figure 3 Bushfire Prone Land



9. Site Assessment Methodology

The Bushfire Assessment Report is based on a desktop assessment of the site utilising the following resources:

- *Planning for Bushfire Protection* (NSW RFS, 2019);
- Aerial mapping
- Detailed GIS analysis.

This assessment is based on mapping of vegetation formations and slope assessment in accordance with PBP 2019.

Bushfire risk as influenced by fire history and future mitigation strategies (e.g. hazard reduction burning) has no bearing on the determination of bushfire protection strategies for future development at the sites. This is due to the fact that PBP assesses bushfire protection based purely on vegetation and slope (i.e. hazard and not risk), making the assumption that a fire may occur at a near worst-case scenario.

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

9.1. Bushfire Hazard

An assessment of the bushfire hazard is necessary to determine the application of bushfire protection measures such as Asset Protection Zone (**APZ**) locations and dimensions and future building levels.

The 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 2019.

9.2. Vegetation

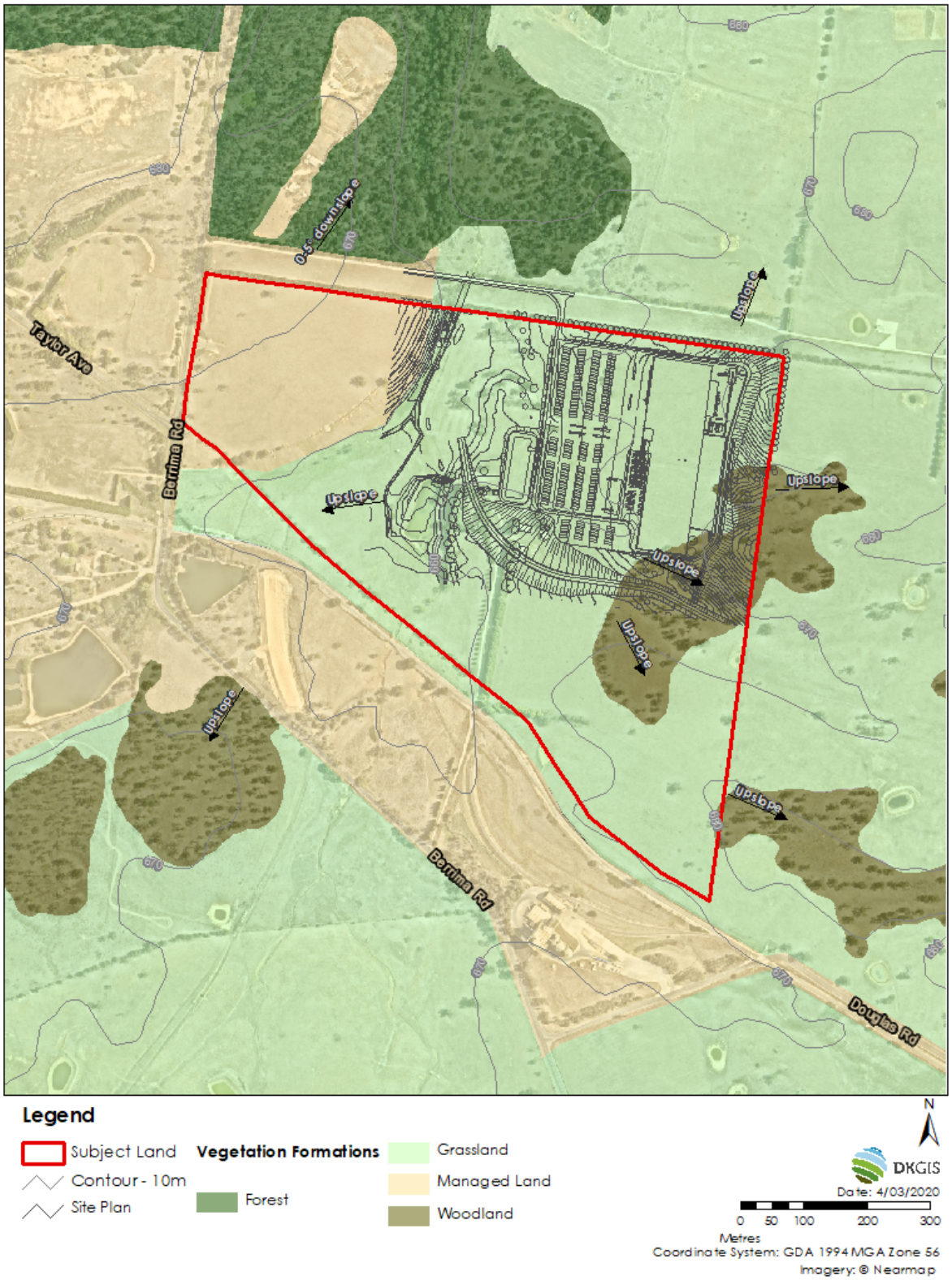
Predominant Vegetation is classified by structure or formation using the system adopted by Keith (2004) and by the general description using PBP 2019. Vegetation types give rise to radiant heat and fire behaviour characteristics.

The predominant vegetation is determined over a distance of at least 140 metres in all directions from the proposed site boundary or building footprint on the development site. Where a mix of vegetation types exist, the type providing the greater hazard is said to predominate.

The land around the site is identified as bushfire prone land (see Figure 4) and is made up of woodland vegetation communities (see Figure 4), grassland and managed land. Small patches of remnant woodland exist within and surrounding the site with the remainder of the area being managed/ non hazard areas.

The vegetation within site and surrounds is fragmented and highly modified.

Figure 4 Vegetation and Slope



9.3. Slopes Influencing Bushfire Behavior

The 'effective slope' influencing fire behaviour approaching the sites has been assessed in accordance with the methodology specified within PBP 2019. This is conducted by measuring the worst-case scenario slope where the vegetation occurs over a 100 m transect measured outwards from the development boundary or the existing/ proposed buildings.

The slope within the site are generally upslope from the proposed plant (see Figure 4).

9.4. Fire Weather

The fire weather is dictated by PBP and assumes a credible worst-case scenario and an absence of any other mitigating factors relating to aspect or prevailing winds. The sites have a Fire Danger Index (**FDI**) of 100 as per PBP 2019.

9.5. Bushfire Attack Levels

The Bushfire Attack Level (**BAL**) is a means of measuring the severity of a building's or sites potential exposure to ember attack, radiant heat and direct flame contact. In the Building Code of Australia, the BAL is used as the basis for establishing the requirements for residential construction to improve protection of building elements.

The Bushfire Attack Levels to the site from the woodland vegetation is shown Table 2.

As "Other" development, the development must comply with objective 3 of PBP 2019 which requires that the development:

> *3. provide appropriate separation between a hazard and buildings which, in combination with other measures, minimises material ignition*

Asset Protection Zones (see section10) will be provided around the development that will include perimeter roads and hardstand areas. The buildings will be non-combustible and have APZs provided meet Objective 3. No specific construction level is proposed for the proposed buildings given the heavy industrial nature of the development.

Table 2 Bushfire Attack Levels (source PBP 2019 Table A1.12.5

	KEITH VEGETATION FORMATION	BUSH FIRE ATTACK LEVEL (BAL)				
		BAL-FZ	BAL-40	BAL-29	BAL-19	BAL-12.5
		Distance (m) asset to predominant vegetation class				
ALL UPSLOPE AND FLAT LAND	Rainforest	< 8	8 -< 11	11 -< 16	16 -< 23	23 -< 100
	Forest (Shrubby and Grassy) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	< 18	18 -< 24	24 -< 33	33 -< 45	45 -< 100
	Woodland (grassy and woody)	< 9	9 -< 12	12 -< 18	18 -< 26	26 -< 100
	Forested Wetland	< 7	7 -< 10	10 -< 14	14 -< 21	21 -< 100
	Tall Heath	< 11	11 -< 15	15 -< 21	21 -< 30	30 -< 100
	Short Heath	< 7	7 -< 10	10 -< 15	15 -< 21	21 -< 100
	Arid-Shrublands (acacia and chenopod)	< 5	5 -< 7	7 -< 10	10 -< 15	15 -< 100
	Freshwater Wetlands	< 5	5 -< 6	6 -< 9	9 -< 13	13 -< 100
	Alpine Complex	< 5	5 -< 7	7 -< 10	10 -< 14	14 -< 100
	Grassland	< 8		NOT APPLICABLE		8 -< 50
0 > 5 DEGREES – DOWNSLOPE	Rainforest	< 11	11 -< 14	14 -< 21	21 -< 29	29 -< 100
	Forest (Shrubby and Grassy) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	< 22	22 -< 29	29 -< 40	40 -< 54	54 -< 100
	Woodland (grassy and woody)	< 12	12 -< 16	16 -< 23	23 -< 32	32 -< 100
	Forested Wetland	< 9	9 -< 12	12 -< 18	18 -< 26	26 -< 100
	Tall Heath	< 12	12 -< 16	16 -< 24	24 -< 33	33 -< 100
	Short Heath	< 8	8 -< 11	11 -< 16	16 -< 24	24 -< 100
	Arid-Shrublands (acacia and chenopod)	< 6	6 -< 8	8 -< 11	11 -< 17	17 -< 100
	Freshwater Wetlands	< 5	5 -< 7	7 -< 10	10 -< 15	15 -< 100
	Alpine Complex	< 6	6 -< 8	8 -< 11	11 -< 16	16 -< 100
	Grassland	< 9		NOT APPLICABLE		9 -< 50

10. Asset Protection Zones

An APZ is a buffer zone between a bush fire hazard and buildings. The APZ is managed progressively to minimise fuel loads and reduce potential radiant heat levels, flame, smoke and ember attack. The appropriate APZ distance is based on vegetation type, slope and the nature of the development. The APZ can include roads or properties managed to be consistent with APZ standards set out in RFS document *Standards for Asset Protection Zones*.

The APZ provides a fuel-reduced, physical separation between buildings and bush fire hazards is a key element in the suite of bush fire measures and dictates the type of construction necessary to mitigate bushfire attack. APZs are shown in Figure 5 and meet the requirements of PBP 2006 and Figure 6 for PBP 2019 to provide a defendable space and minimises material ignition.

The proposed 40m wide drainage area to the south of the site will be replanted and managed as a riparian corridor. The APZ can be established from the riparian planting and will incorporate the landscaped area that will be managed as an APZ.

APZs will be managed and maintained to prevent the spread of a fire towards the building and to prevent the spread of fire onto or from the site in accordance with section 63 of the Rural Fires Act, 1997 (RF Act). The areas around the buildings is cleared and maintained to mineral earth and is not a fire hazard.

Figure 5 Asset Protection Zones – PBP 2006

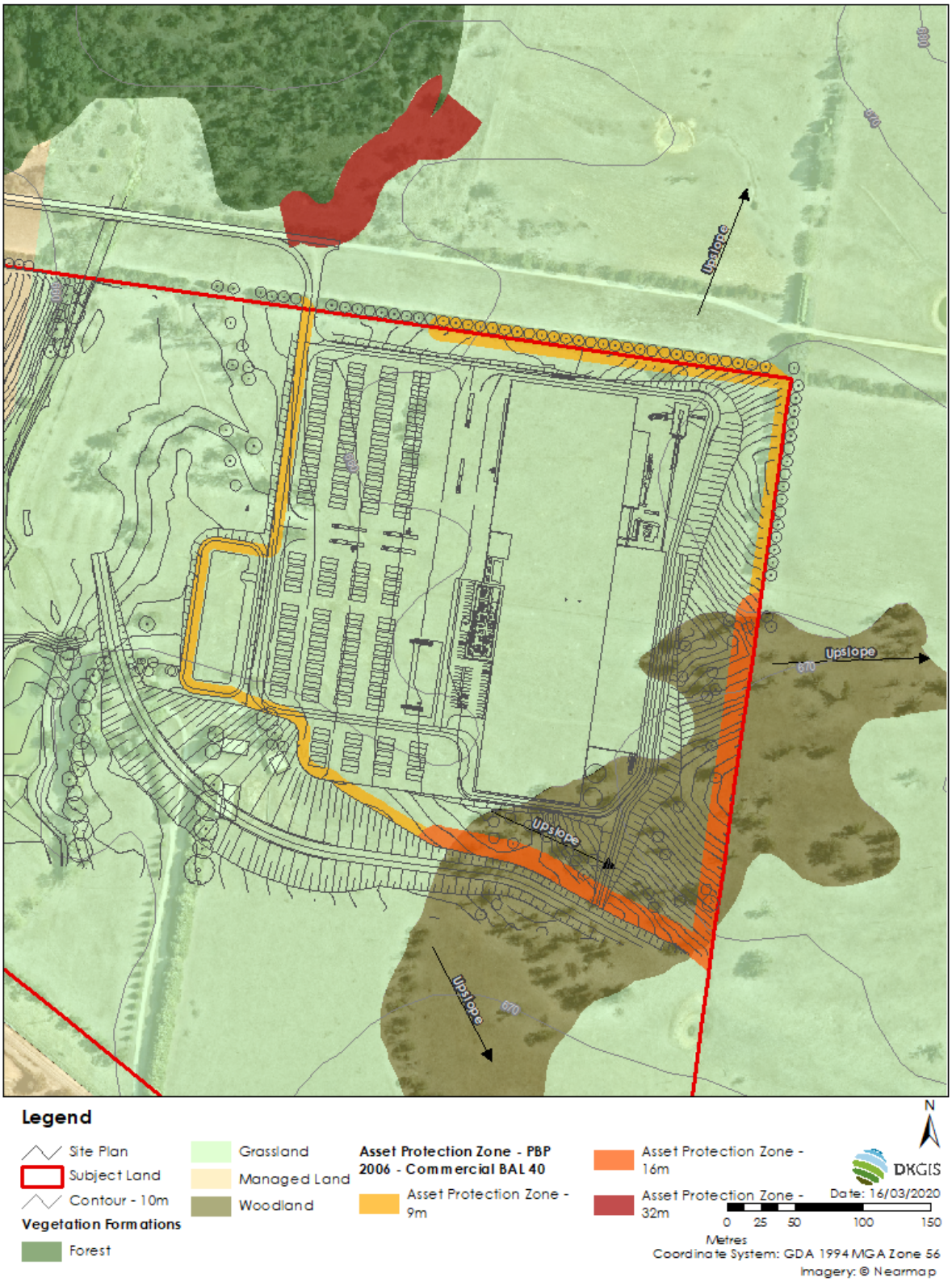
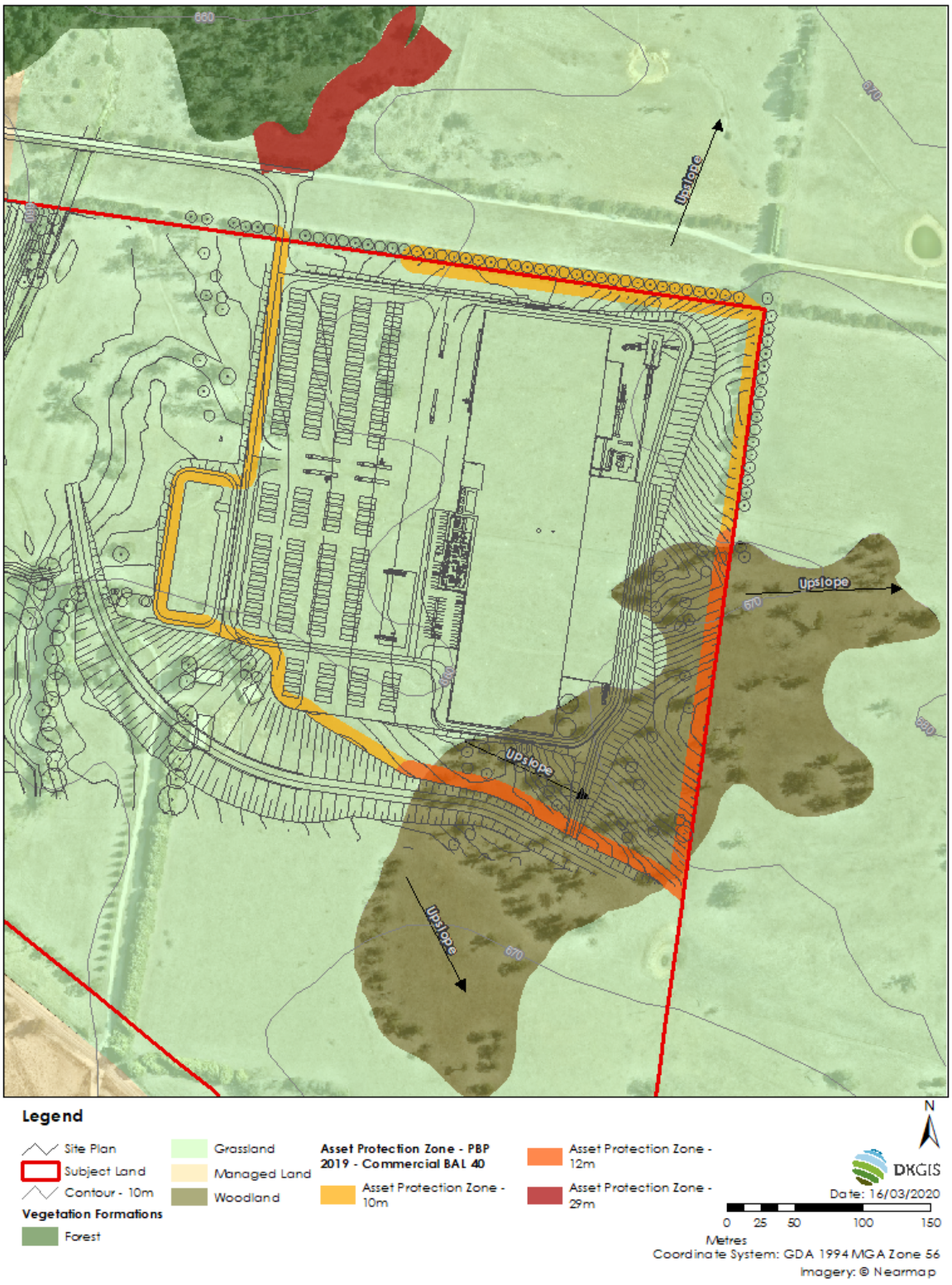


Figure 6 APZ - PBP 2019



11. Access

PBP 2019 requires that the design of access roads enables safe access and egress for people attempting to leave the area at the same time that emergency service personnel are arriving to undertake firefighting operations.

Figure 2 shows the Site Plan including the proposed access within the site for articulated vehicles. All facilities have perimeter roads around them including designated the "Fire Road" as shown on the Site Plan (Figure 2). Due to the use of heavy machinery on site, the road widths will be more than sufficient (minimum 6m wide) to provide access for fire fighting vehicles.

12. Water Supply and Utilities

PBP 2019 (p. 47) requires that adequate services of water for the protection of buildings during and after the passage of a bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building.

Suitable water supply arrangements shall be provided for firefighting that meet the NSW RFS requirements. It is essential to ensure that any water sources are maintained at the appropriate capacity. Tanks will located around the site that will be available for fire fighting purposes. The capacity of the tanks will be determined by the fire engineer.

Fire hydrants will be provided in accordance with BCA E1.3, AS2419.1:2005, including the ring main requirements for large isolated buildings and where internal hydrants are required, FRNSW progressive coverage required (50m / 25m) to be incorporated. Fire hose reels will be provided in accordance with AS2441:2005.

Fire and smoke detection will be provided for the production building in accordance with AS1670.1:2015 for activation of smoke exhaust system and an industrial fit for purpose thermal detection system will be provided throughout both buildings to interface with occupant warning systems.

13. Assessment Against the Aim and Objective of PBP

All development in Bushfire Prone Areas needs to comply with the aim and objectives of PBP. Table 3 shows the compliance with PBP.

The aim of PBP 2019 is to *provide for the protection of human life and minimise impacts on property from the threat of bush fire, while having due regard to development potential, site characteristics and protection of the environment.*

The objectives are to:

1. *afford buildings and their occupants protection from exposure to a bush fire*
2. *provide for a defendable space to be located around buildings*
3. *provide appropriate separation between a hazard and buildings which, in combination with other measures, minimises material ignition*
4. *ensure that appropriate operational access and egress for emergency service personnel and residents is available*
5. *provide for ongoing management and maintenance of BPMs*
6. *ensure that utility services are adequate to meet the needs of firefighters.*

Table 3 shows compliance with these elements.

Table 3 Compliance with Aim & Objectives of PBP

Aim	Meets Criteria	Comment
The aim of PBP is to use the NSW development assessment system to provide for the protection of human life (including fire fighters) and to minimise impacts on property from the threat of bushfire, while having due regard to development potential, onsite amenity and the protection of the environment.	Yes	Landscaping, defendable space, access and egress, emergency risk management and construction standards are in accordance with the requirements of PBP and the aims of PBP have been achieved.
Objectives	**Meets Criteria**	**Comment**
Afford occupants of any building adequate protection from exposure to a bushfire.	Yes	The development provides opportunity for all occupants to be shielded from any external bushfire. Heavy plant and machinery will be present at the site that can be used in fire fighting operations within the site (spot fires and grass fire) that provides on site response to limit the development and spread of spot fires. Construction material will be non-combustible to ensure durability that

		will exceed AS3959 requirements.
Provide for defendable space to be located around buildings.	Yes	Defendable space is provided on all sides of the proposed development.
Provide appropriate separation between a hazard and buildings, which, in combination with other measures, prevent direct flame contact and material ignition.	Yes	The structures are separated from the narrow remnant areas of vegetation and provide APZs to BAL 40. The structures are non-combustible.
Ensure that safe operational access and egress for emergency service personnel and occupants is available.	Yes	The site has direct access to public roads, and access and egress for emergency vehicles and evacuation is adequate. A perimeter road is provided around the buildings. The development provides for the movement of heavy articulated trucks about the site with passing areas provided for fire trucks if needed.
Provide for ongoing management and maintenance of bushfire protection measures, including fuel loads, in the asset protection zone.	Yes	The site will be managed as an APZ and will be extensively cleared to mineral earth.
Ensure that utility services are adequate to meet the needs of firefighters (and others assisting in bushfire fighting).	Yes	Utility services are adequate to meet the needs of firefighters (and others assisting in bushfire fighting).

14. Recommendations

The following recommendations are made for the proposed new brick making plant at 416 and 524 Berrrima Road, Moss Vale:

1. **Asset Protection Zones**: At the commencement of building works and in perpetuity, an Asset Protection Zone shall be established and maintained as per Figure 6. The APZ shall be established and maintained as an inner protection area as outlined within *Planning for Bushfire Protection 2019* and the NSW RFS document '*Standards for Asset Protection Zones'*.
2. **Fire hydrants** to be provided in accordance with Building Code of Australia E1.3, AS2419.1:2005, including the ring main requirements for large isolated buildings.
3. A **static water supply** firefighting purposes that includes a connection for firefighting purposes that provides a 65mm Storz outlet with a ball valve is fitted to the outlet.

15. Conclusion

Blackash Bushfire Consulting have completed a Bushfire Assessment Report a new brick making facility. The Development Application for the proposed development, to be submitted to the Department of Planning, Infrastructure and Environment is to be determined under Part 4 of the Environmental Planning and Assessment Act 1979.

The application seeks consent for the construction and use of a 50 million brick per annum brickworks plant with 24/seven operations and a Capital Investment Value of $80 million. The proposed development would take place at 416 and 524 Berrrima Road, Moss Vale.

The Department of Planning and Environment Secretary's Environmental Assessment Requirements have been assessed and the proposed works do not pose a future hazard to adjoining lands or development.

The site could be impacted by embers from adjoining lands and from spot fires within the site. The report demonstrates that the proposed development satisfies the requirements of *Planning for Bush Fire Protection 2019*, in particular the provision of asset protection zones, access (including perimeter roads) and water supply for firefighting purposes.

The proposed development is designated development and considered as "other" development in *Planning for Bushfire Protection 2019* and complies with the aim and objectives of that document.

The Building Code of Australia does not provide for any bushfire specific performance requirements for the proposed development and as such AS3959, 2009 does not apply as a deemed to satisfy provision.

This Report is a Bush Fire Hazard Assessment that provides the required information to assist the Department of Planning in determining compliance in accordance with the aims and objectives of Planning for Bushfire Protection 2019.

Appendix 1 References

Australian Building Codes Board Building Code of Australia Volumes 1&2
Councils of Standards Australia AS3959 (2009) – Australian Standard Construction of buildings in bushfire-prone areas

Keith, David (2004) – Ocean Shores to Desert Dunes – The Native Vegetation of New South Wales and the ACT. The Department of Environment and Climate Change

NSW Rural Fire Service (2015) Guide for Bushfire Prone Land Mapping

NSW Rural Fire Service (RFS). 2006. Planning for Bushfire Protection: A Guide for Councils, Planners, Fire Authorities, Developers and Home Owners. Australian Government Publishing Service, Canberra

NSW Rural Fire Service (RFS). 2019. Planning for Bushfire Protection: A Guide for Councils, Planners, Fire Authorities, Developers and Home Owners.

NSW Government (1979) Environmental Planning and Assessment Act 1979. NSW Government Printer

Appendix 2 APZ Maintenance

An APZ is a buffer between a bushfire hazard and buildings which is managed to minimise fuel loads to reduce the spread of fire thereby reducing radiant heat, ember and flame attack. The RFS have produced *Standards for Asset Protection Zones* that provides the required standard to be achieved in establishing and maintaining APZs.

The Standards for APZs require extensive modification of vegetation such that an area will not support a bushfire. Requirements include (p. 6):

- Raking or manual removal of fine fuels. Ground fuels such as fallen leaves, twigs (less than 6 mm in diameter) and bark should be removed on a regular basis.
- Mowing or grazing of grass. Grass needs to be kept short and, where possible, green.
- Removal or pruning of trees, shrubs and understorey. The control of existing vegetation involves both selective fuel reduction (removal, thinning and pruning) and the retention of vegetation. Prune or remove trees so that you do not have a continuous tree canopy leading from the hazard to the asset. Separate tree crowns by two to five metres. A canopy should not overhang within two to five metres of a dwelling. Native trees and shrubs should be retained as clumps or islands and should maintain a covering of no more than 20% of the area.

The APZs and future landscaping of the subject land will achieve the following principles:

- The presence of a few shrubs or trees in the APZ is acceptable provided that they:
    - are well spread out and do not form a continuous canopy;
    - are not species that retain dead material or deposit excessive quantities of ground fuel in a short period or in a danger period; and
    - are located far enough away from future buildings so that they will not ignite the buildings by direct flame contact or radiant heat emission.
- Any landscaping or plantings should preferably be local endemic mesic species or other low flammability species; and
- A minimal ground fuel is to be maintained to include less than 4 tonnes per hectare of fine fuel (fine fuel means ANY dead or living vegetation of <6 mm in diameter e.g. twigs less than a pencil in thickness. 4 t/ha is equivalent to a 1 cm thick layer of leaf litter).