BLACKASH
BUSHFIRE CONSULTING

Bushfire Risk Assessment

Brickworks Plant 2 Upgrade

780 Wallgrove Road, Horsley Park

Prepared for

Brickworks Land & Development

BPAD Bushfire Planning & Design Accredited Practitioner Level 3

Version 1.0

16 April 2019

Project Name:	Brickworks Plant 2 Upgrade
Prepared by	Lew Short
Client Details:	Ms. Megan Kublins Executive General Manager Property & Development Brickworks Land & Development c/o Mr. Andrew Cowan Director Willow Tree Planning
BlackAsh Contact Details	
Lew Short	Principal
0419 203 853	lew.short@blackash.com.au

Version	Primary Author(s)	Description	Date Completed
0.1	Lew Short	Draft for issue	28 March 2018
1.0	Lew Short	Final	16 April 2019

Lew Short | Principal
BlackAsh Bushfire Consulting
B.A., Grad. Dip. (Design for Bushfires), Grad. Cert. of Management (Macq), Grad. Cert. (Applied Management)
Fire Protection Association of Australia BPAD Level 3 BPD-PA 16373

BPAD Bushfire Planning & Design Accredited Practitioner Level 3

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 2018 Classification	EIS in support of a Development Application "Other" commercial/ industrial
Location	780 Wallgrove Road, Horsley Park
Local Government Area	Fairfield Local Government Area
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 2018*?	YES
Does this development comply with the Aims and objectives of *Planning for Bushfire Protection 2018*?	YES
Is referral to the NSW RFS required?	NO

2. Introduction

Brickworks Land & Development (Brickworks) has engaged Blackash Bushfire Consulting to complete a Bushfire Assessment Report for a for upgrade works to the existing Brickworks Plant 2 brick manufacturing facility (the site) at 780 Wallgrove Road, Horsley Park (see Figure 1) in the Fairfield Local Government Area. The upgrade works are outlined in section 3.

The Department of Planning and Environment issued a Secretary's Environmental Assessment Requirements (**SEAR**) on 16th November 2018 for the State Significant Development which identified the bushfire as a matter that needed to be addressed.

SEAR number 9601 requires that Bushfire and Incident Management is addressed including:

- *an assessment of 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.*

The NSW Rural Fire Service (**RFS**) letter of 7th November 2018 advised:

> *that a bushfire assessment report shall be prepared which identifies the extent to which the proposed development conforms with or deviates from the relevant provisions of Planning for Bushfire Protection 2006 and/ or subsequent edition.*

This report has been completed having regard to the SEAR and RFS requirements.

Industrial development is designated as "other" development by the RFS *Planning for Bush Fire Protection 2006* (**PBP 2006**). The RFS has reviewed PBP 2006. The new document is known as *Planning for Bushfire Protection 2018* (**PBP 2018**) and the RFS has requested that all new proposals are assessed against PBP 2018. This assessment has been completed having regard to PBP 2018.

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 2018. 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 2018.

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.

3. The Proposal

The upgrade works (see Figure 2 and Figure 3) to existing Brickworks Plant 2 brick manufacturing facility include:

- a new kiln to replace existing 2 kilns;
- kiln car storage extension and relocated dehacker with an area of 3,500m^2;
- a 1,600 m2 building for consolidated additives area and regularisation of building;
- new footings for relocated clay bins and conveyor system;
- extending existing clay storage building by 1,000m2 for additional undercover stockpile area;
- Re-roofing of the New Production and Existing Kiln building;
- Civil works to improve access around the buildings for production activities;
- A new sealed fire access road.

Figure 1 Site Location

Figure 2 Site Plan

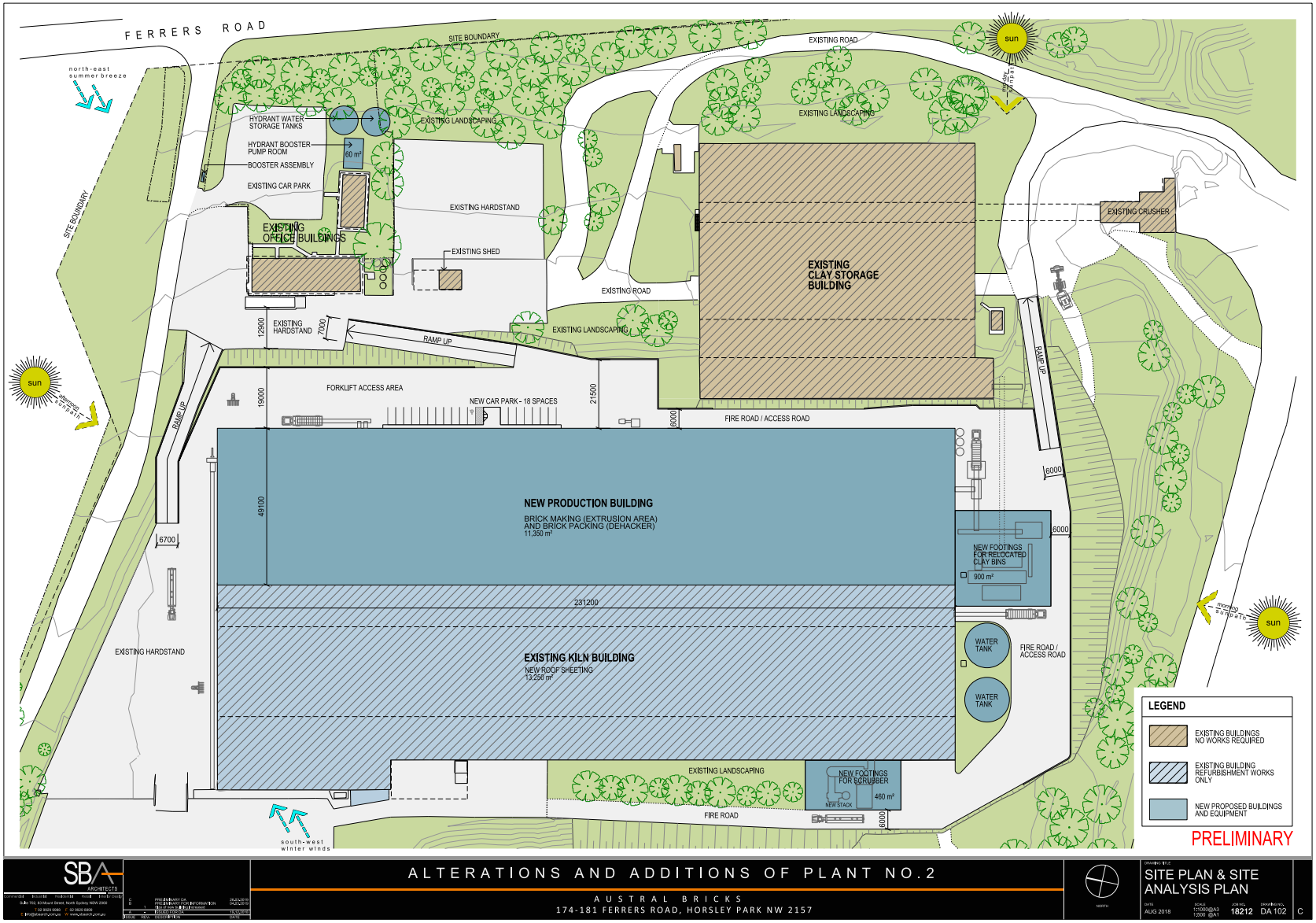


Figure 3 Upgrade Locations

4. 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.

5. Revision of Planning for Bushfire Protection 2006

The RFS has reviewed PBP 2006. The new document is known as *Planning for Bushfire Protection 2018* and the RFS has requested that all new proposals are assessed against PBP 2018.

6. SEAR Requirement

SEAR number 9601 requires that Bushfire and Incident Management is addressed including:

- *an assessment of 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 will address these requirements.

7. Mining (underground and open cut) production

PBP 2018 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

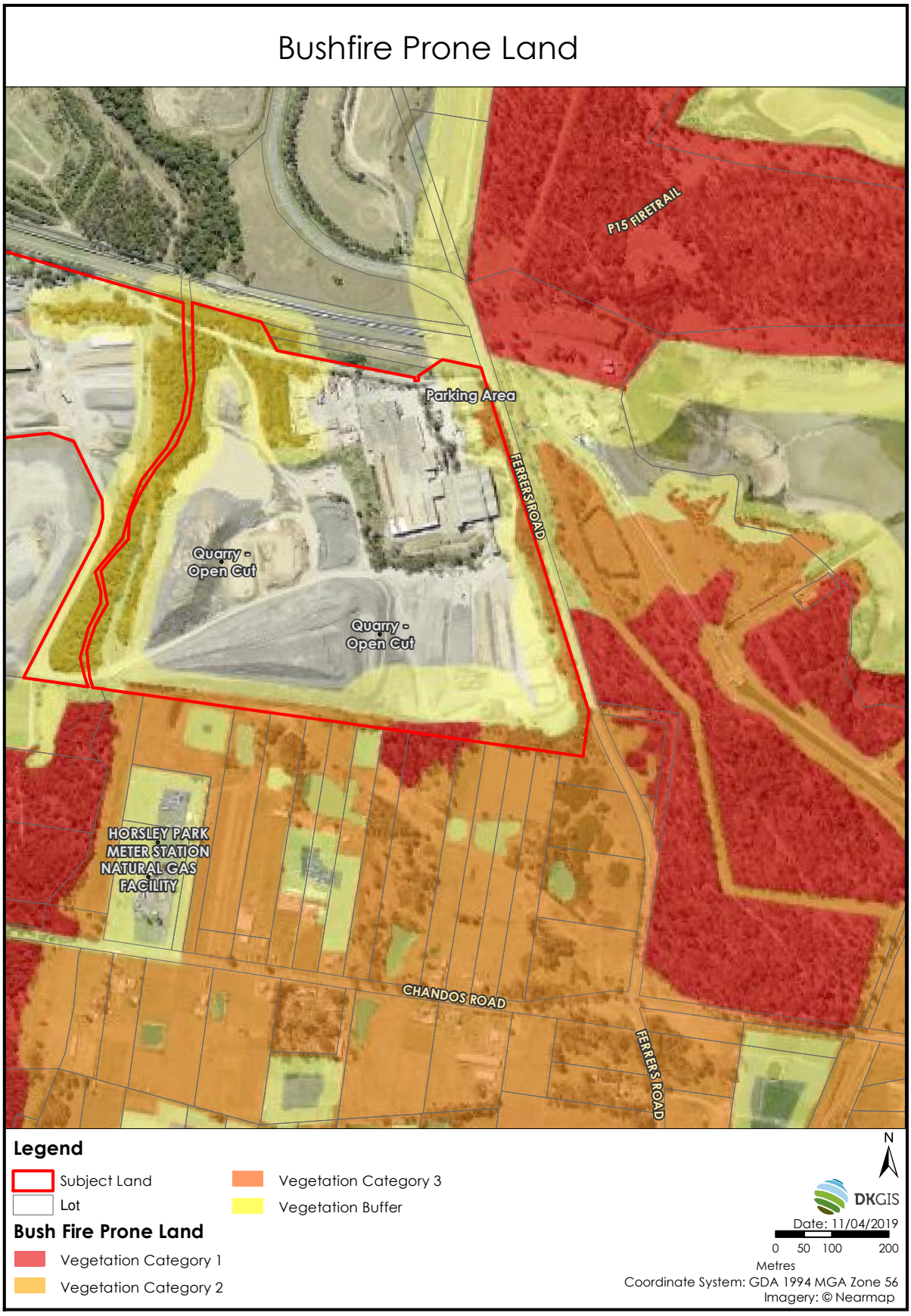
Bushfire prone land maps provide a trigger for the development assessment provisions and consideration of sites that are bushfire prone.

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 4 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 site. Surrounding land is has a mix of Category 1 and Category 2 and associated buffers. The majority of the site is used for the quarry associated with the Brickworks and is mineral earth that does not present a hazard.

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

Figure 4 Bushfire Prone Land



9. Fire Engineering Determination

Core Engineering have provided a Fire Engineering Strategy (dated 9 April 2019) for the upgrading development. The report notes that:

- The building will form single fire compartments -Large Isolated Buildings (LIB)
- A fire strategy will provide BCA C2.4 (b) perimeter vehicular access only without fire sprinklers, due specifically to the low fire hazard contents and activities within the Production Building.
- The building is purpose built for the production of clay bricks. As such the levels of combustible materials will be significantly less than could be expected in an equivalently sized Class 8 manufacturing building. On that basis, fire growth and size is controlled by the minimal fuels, in lieu of the provision of fire sprinklers.
- Fire brigade will be provided with perimeter access around the building, and an external fire hydrant system (which is not currently provided) to allow effective fire fighting operations.

10. 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, 2018);
- Aerial mapping
- Detailed GIS analysis.

This assessment is based on mapping of vegetation formations and slope assessment in accordance with PBP 2018.

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.

10.1. 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 2018.

10.2. Vegetation

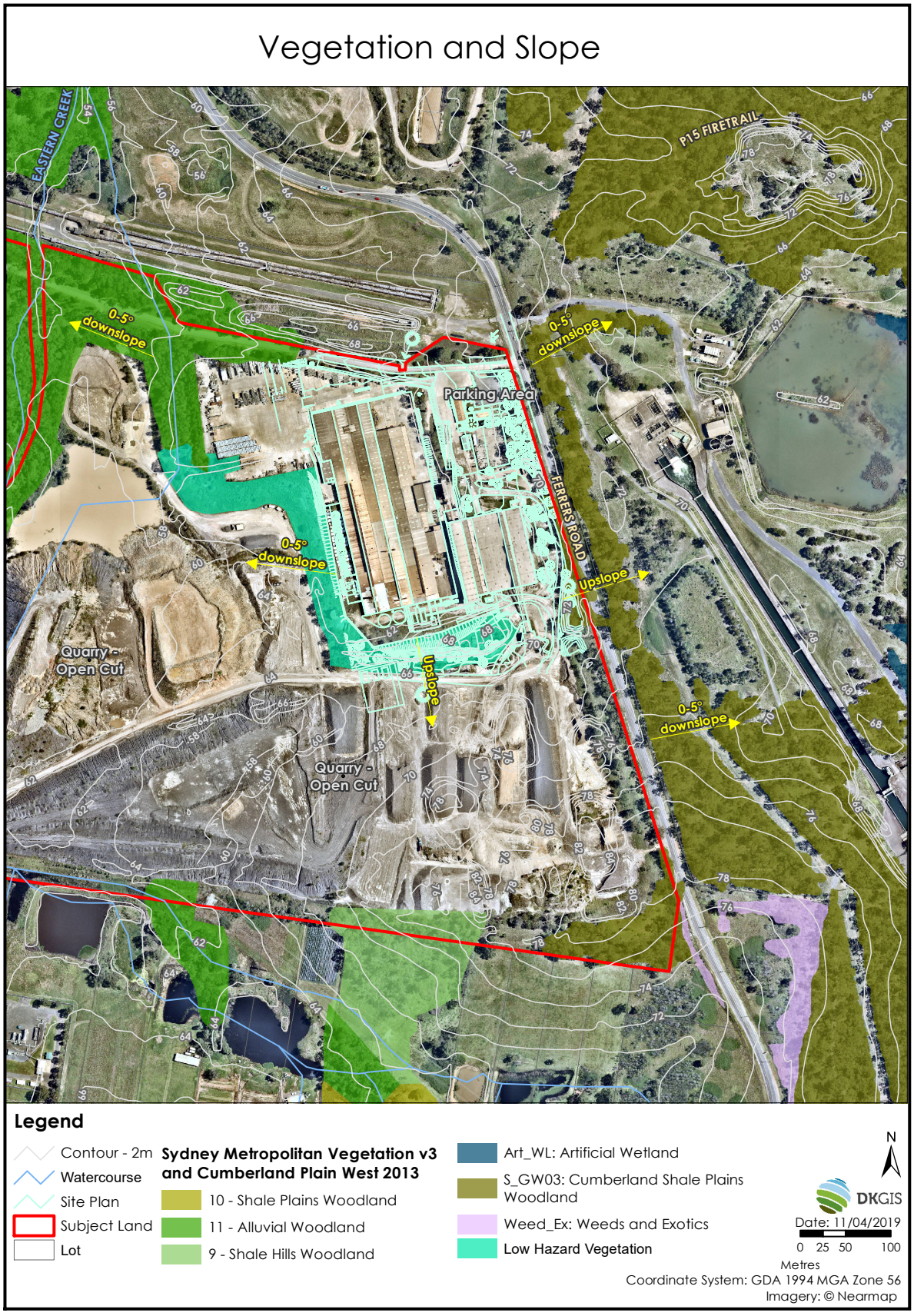
Predominant Vegetation is classified by structure or formation using the system adopted by Keith (2004) and by the general description using PBP 2018. Vegetation types give rise to radiant heat and fire behaviour characteristics.

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 5). 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 5 Vegetation and Slope



10.3. Slopes Influencing Bushfire Behavior

The 'effective slope' influencing fire behaviour approaching the sites has been assessed in accordance with the methodology specified within PBP 2018. 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 ranges from upslope in the south and south east to 0 – 5 degrees downslope in the west and north (See Figure 5).

10.4. 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 2018.

10.5. 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 2018 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 section10.6) 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.

Table 2 Bushfire Attack Levels (source PBP 2018 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

There are six bush fire attack levels that are used to determine the appropriate construction to be applied to a development:

- BAL-LOW;
- BAL-12.5;
- BAL-19;
- BAL-29;
- BAL-40;
- Flame Zone (Alternative Solution required).

The categories of attack are determined by:

- The type of vegetation;
- How close the building is to the vegetation;
- What the effective slope is (i.e. fire runs more readily and with greater intensity uphill);
- The Fire Danger Index applicable to the region.

The building requirements for design and construction vary according to the bushfire attack level that a development falls into. The building requirements for each BAL are set out in *Australian Standard: 3959 Construction of buildings in bushfire-prone areas 2009 (**AS3959**)*.

The various bush fire attack levels and the associated construction requirements are outlined below and are shown in Figure 5.

BAL-LOW

Minimal attack from radiant heat and flame due to the distance of the site from the vegetation, although some attack by burning debris is possible. There is insufficient threat to warrant specific construction requirements, but residents should still do basic property preparation.

BAL-12.5

Attack by burning debris is significant with low levels of radiant heat (not greater than 12.5kW/m2). Radiant heat is unlikely to threaten building elements (i.e. unscreened glass). Specific construction requirements for ember protection and accumulation of debris are warranted (Level 1 construction standards).

BAL-19

Attack by burning debris is significant with an increased radiant heat levels (not greater than 19kW/m2) threatening some building elements. Specific construction requirements for protection against embers and radiant heat are warranted (Level 2 construction standards).

BAL-29

Attack by burning debris is significant and radiant heat levels (not greater than 29kW/m2) can threaten building integrity. Specific construction requirements for protection against embers and higher radiant heat are warranted. Some flame contact is possible.

BAL-40

Increased attack from burning debris with significant radiant heat and the potential for flame contact. The extreme radiant heat and potential flame contact could threaten building integrity. Buildings must be designed and constructed in a manner that can withstand the extreme heat and potential flame contact.

Flame Zone

Radiant heat levels will exceed 40kW/m2. Radiant heat levels and flame contact are likely to significantly threaten building integrity and result in significant risk to residents who are unlikely to be adequately protected. The flame zone is outside the scope of the BCA and the NSW Rural Fire Service may recommend protection measures where the applicant does not provide an adequate performance solution.

11. 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 6 and meet the requirements of PBP 2018 to provide a defendable space and minimises material ignition.

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 6 Asset Protection Zones

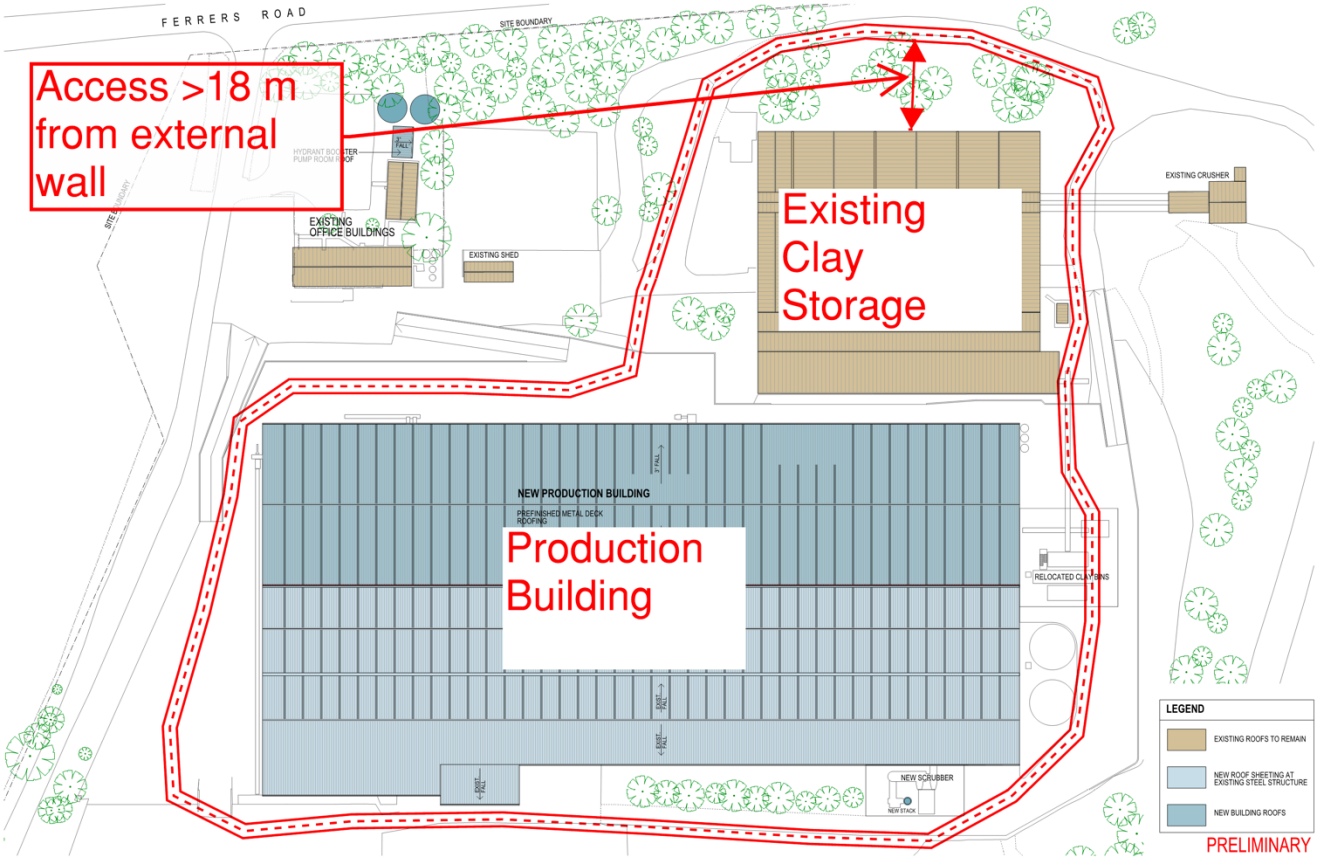
12. Access

PBP 2018 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.

Access to the site is via Ferrers Road and extensive internal road networks. Figure 2 shows the Site Plan including a number of existing roads. All facilities have perimeter roads around them including designated "Fire Roads" 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.

The Core Engineering report identifies the provision of perimeter road access for firefighting as shown in Figure 6. The load road will be sealed and able to carry a RFS Category 1 fire appliance. wept paths and ramp gradients to accommodate aerial appliance as per FRNSW Policy No 4 which is greater than that required by the RFS.

Figure 7 Proposed Perimeter Access for Fire Fighting



13. Water Supply and Utilities

PBP 2018 (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.

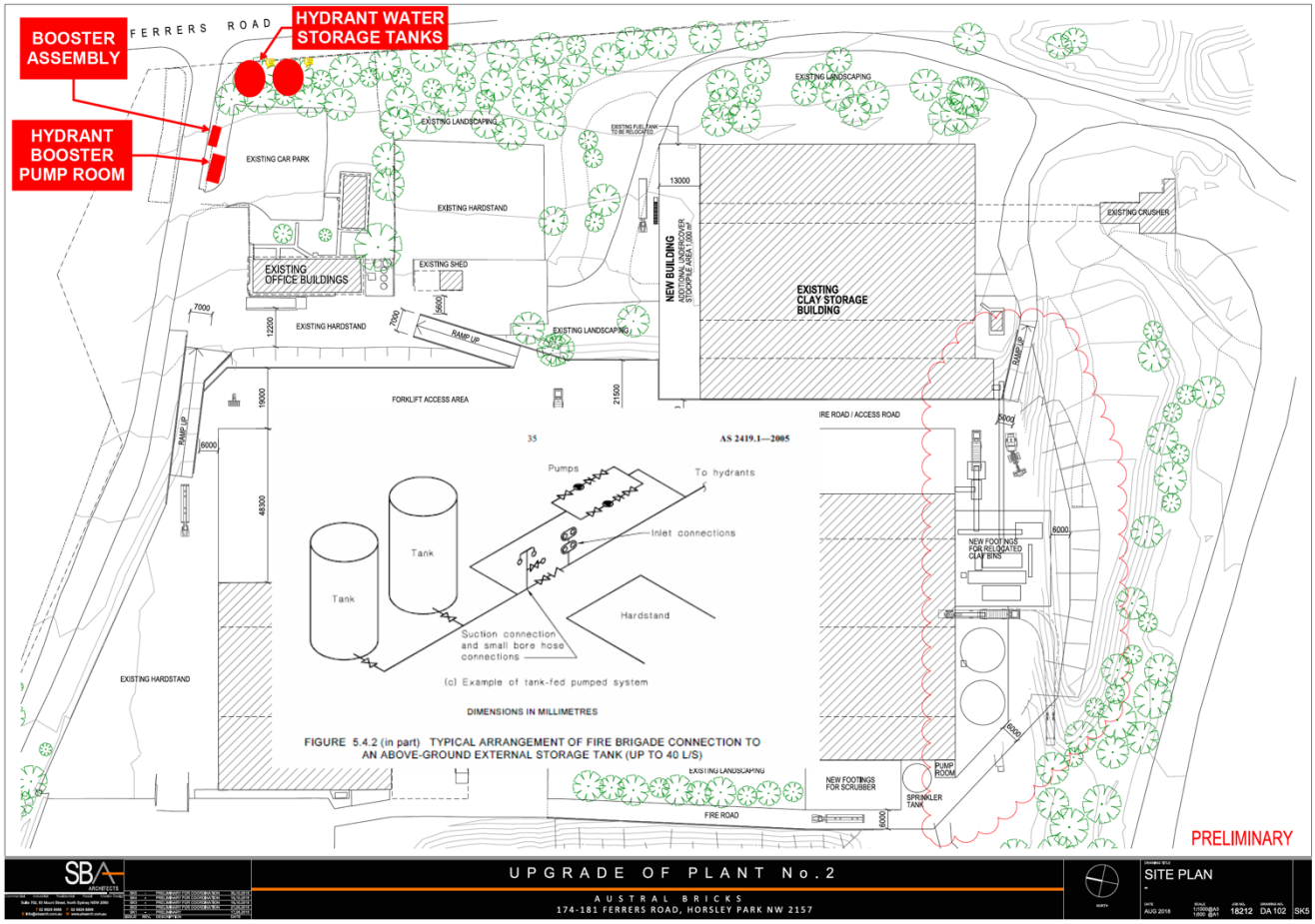
Suitable water supply arrangements shall be provided for firefighting that meet the NSW RFS requirements. It is essential to ensure that any water sources are maintained at the appropriate capacity. Preliminary firefighting water services are shown in Figure 8. Tanks are located around the site that 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

Figure 8 Preliminary Water and Fire Fighting Tanks



14. 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 2018 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).

15. Recommendations

The following recommendations are made for the upgrade of Brickworks Plant 2 brick manufacturing facility at 780 Wallgrove Road, Horsley Park:

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 of the Blackash Bushfire Hazard Assessment Report dated 16 April 2019 such that 8m is provided to the south, 12m to the west and 9m to the south east around the existing clay storage building. The APZ shall be established and maintained as an inner protection area as outlined within *Planning for Bushfire Protection 2018* 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.

16. Conclusion

Blackash Bushfire Consulting have completed a Bushfire Assessment Report for a for upgrade works to the existing Brickworks Plant 2 brick manufacturing facility at 780 Wallgrove Road, Horsley Park in the Fairfield Local Government Area.

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 bushfire protection strategies incorporated into the development provide for a better outcome than currently exists on site with upgraded water supply, hydrant installation, fire detection systems, asset protection zones and perimeter access around the proposed 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 2018* (RFS), in particular the provision of 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 2018* 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. The fire engineering solutions (section 9), upgraded water provisions and enhanced access provide a significantly better bushfire outcome for the site than currently exists

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 2018.

This report has considered all elements of bushfire attack and provided the proposed development is constructed in accordance with the recommendations included in section 15 of this report, it is my considered opinion that the development satisfies the Aims and Objectives of Planning for Bushfire Protection 2018.

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). 2018. 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).