



Bush Fire Assessment Report

Bunnings Small Format Store

Lot 602 Valley Drive, Lithgow

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Changeable guidelines	This report is based on the author's interpretation of <i>Planning for Bush Fire Protection 2019 (PBP)</i> and <i>Australian Standard AS 3959-2018 'Construction of buildings in bushfire-prone areas</i> as at the time of writing.
Conflict of interest	This report reflects the opinions and recommendations of the author only, and not those of the Rural Fire Service (RFS). Should Council or the RFS modify the recommendations or reject an assessment or proposal the author will not be held liable for any financial loss incurred as a result.
Remaining risk	Notwithstanding the recommendations made by the author, there can be no absolute guarantee that a bushfire will not occur or cause damage to property because of the extreme number of variables that bushfires present.
Measures not upheld in perpetuity	It is the responsibility of the client to maintain all bushfire protection measures proposed on an ongoing basis.

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1 Introduction

1.1 Purpose statement

The subject Lot/site is 'Bush fire prone land' as determined by local council bush fire prone land mapping under s.146 of the Environmental Planning and Assessment Act (EP&A) 1974.

The purpose of this report to show that the proposed developed will satisfy the broad aims and objectives of *Planning for Bushfire Protection 2019 (PBP)*

1.2 Proposal description

This report forms part of the submission requirements to support a Development Application and is summarised in **Table 1**. A new Bunnings Warehouse located within the newly approved Pottery Estate Precinct area, directly south Lithgow Valley Plaza within the Mixed Use area of the DCP (**Figure 1**).

Table 1: Proposal summary

Property Details	Bunnings Small Format Store Valley Drive, Lithgow
Type of Proposal	Commercial building development
Description	Proposed Bunnings Warehouse
Information relied upon	<ul style="list-style-type: none">• Site plans supplied by Project Innovations Pty Ltd (Figure 2)• Separation distances to bush fire interface provided by Project Innovations Pty Ltd (Figure 5)• FireMaps and ePlanning software - cadastral and topographic information and for New South Wales• Photos – Vegetation assessment. (Appendix A)

1.3 Assessment pathway and other known constraints

The National Construction Code – Building Code of Australia 2021 (NCC-BCA) does not provide for any **bushfire specific** performance requirements for types of developments other than 'Residential and Special Fire Protection Purposes (SFPP)' within bushfire prone areas. This development does not fit into these categories. As such the *Australian Standard 3959:2018 (Construction of buildings in bush fire prone areas)* **does not** apply as a set of 'deemed to satisfy' provisions.

The general fire safety construction provisions are taken as acceptable solutions, but the aims and objectives of *Planning for Bush Fire Protection. A guide for councils, planners, fire authorities and developers (2019)* – NSW Rural Fire Service, apply to other matters such as access, water and services, emergency planning and landscaping / vegetation management.

As infill development, the proposed development will be able to fully comply with the 'Acceptable Solutions' and 'Specific Objectives' for 'Infill development', provided within PBP 2019.

It is understood that the internal road layout of the Pottery Estate area has not be finalised. However, larger collector road and other internal roads will allow access into and outside the estate.

No threatened species or other known significant environmental or heritage constraints are known or have been advised. Council as the determining authority will assess more thoroughly any potential environmental and heritage issues

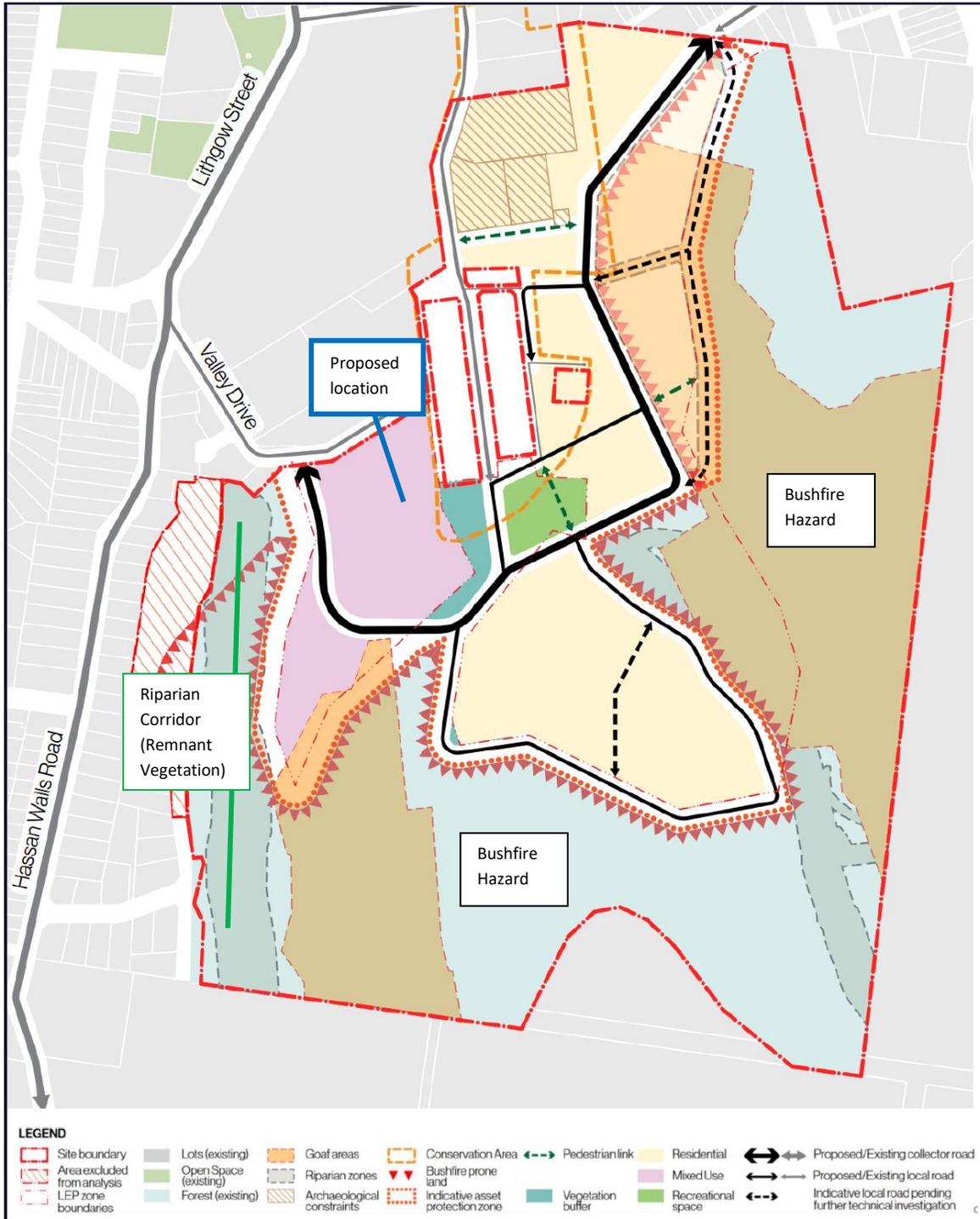


Figure 3: Pottery Estate Indicative Structure Plan

Source: Group GSA

Figure 1: Pottery Estate Plan

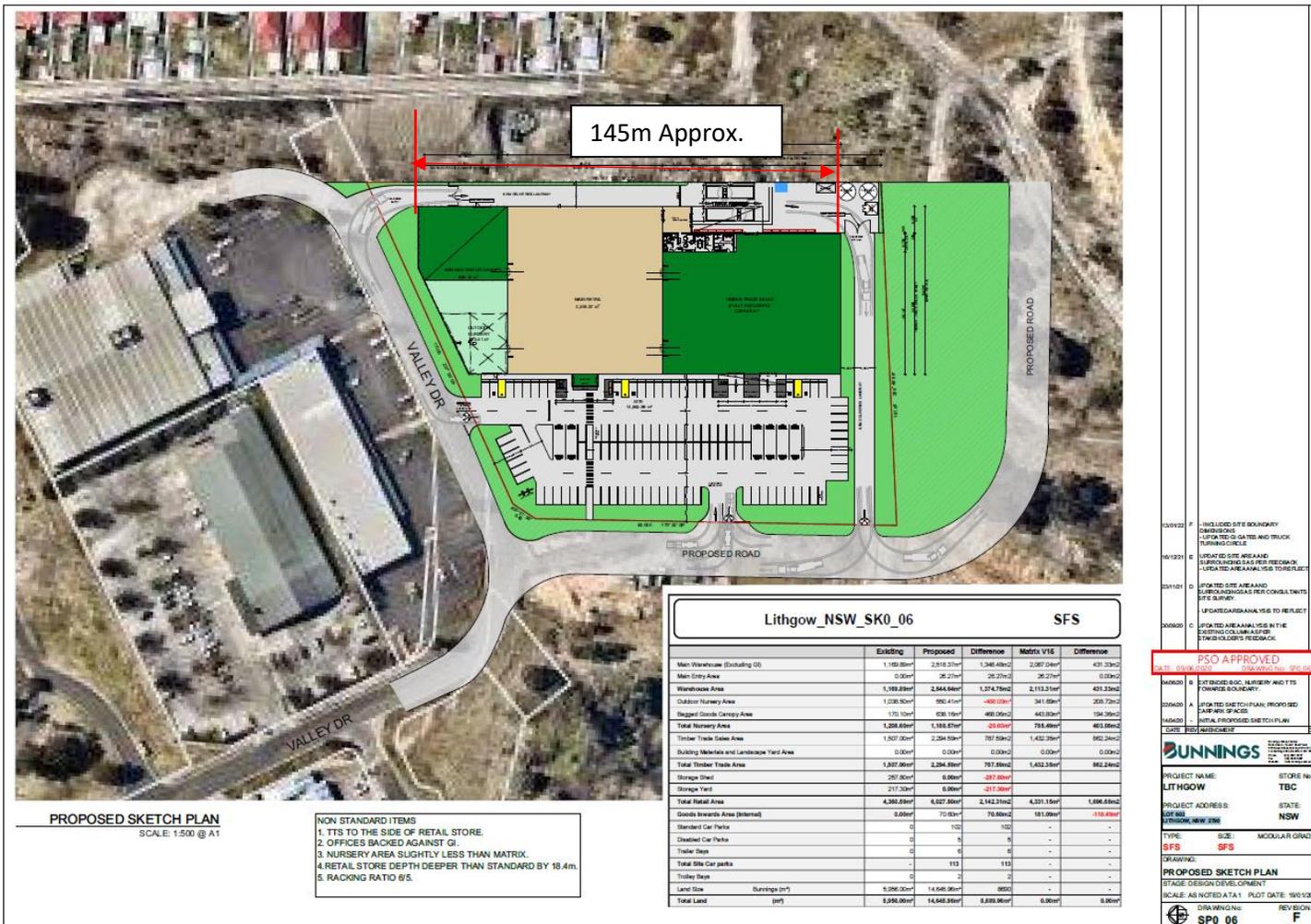


Figure 2: Floor Plan showing building dimensions

2 Bush fire assessment

The bush fire hazard assessment methodology is detailed below and summarised in **Table 2**.

2.1 Vegetation

Vegetation formations according to Keith (2004) were identified in all directions around the proposed development to a distance of 140m. Vegetation extent within the subject area has been derived from aerial photo interpretation, proposed extent of the Pottery Estate development (**Figure 1**) and a site inspection during the DCP stage (2/12/2020)

To the south and east of the subject site is an area mapped as a Category 1 bush fire hazard (**Figure 3**) and categorised as 'Forest' under PBP (**Photo 1, Appendix A**). The Forest vegetation will be separated from the proposed development by managed land within the Pottery Estate DCP area including proposed road network a, mixed use, and residential areas.

To the west is vegetated creek line (Riparian corridor) separating the DCP area with developed urban Lots to the east (**Photo 2, Appendix A**). Narrow vegetation corridors are assessed as Remnant Vegetation under PBP, using Rainforest setbacks as a surrogate for the reduced fire behaviour.



Figure 3: Bush fire prone land map

2.2 Effective Slope

The effective slope is considered to be the slope that most significantly influences the bush fire behavior and has been derived from topographic 2 m contour data. **Figure 4** shows the surrounding slope assessment undertaken by the author at the time of the Pottery Estate DCP.

All slopes on surrounding Forest are Upslope. Riparian Corridor to the west has a short (Downslope 0-5 Degrees) slope leading away to the creek line. Note **Figure 4** below does not align to any plan for the Pottery Estate land release and is shown for slope analysis only.



Figure 4: Slope analysis

2.3 Fire weather

Fire Danger Index (FDI) for Local Government Area (LGA): 80

2.4 Asset Protection Zones (APZ)

An APZ is an area around the building or asset that has the fuel (vegetation) reduced to provide a buffer from the bushfire hazard and provide defensible space for firefighting operations. *PBP 2019* acceptable solutions for Asset Protection Zones (specific development location) state that:

- An APZ is provided in accordance with Table A1.12.2 or A.1.12.3 in Appendix 1 of PBP.
- APZs are managed in accordance with the requirements of Appendix 4 of PBP.
- APZs are wholly within the boundaries of the development site.
- APZs are located on lands with a slope less than 18 degrees.

The subject site benefits from managed lands within the site, and external to the site (being a managed road reserve outside the fence line). APZ recommendations are as listed in Section 3.

2.5 Separation Distance

The distance measured from the bushfire hazard to the closet building element. This represents the Available APZ in that direction.

Figure 5 shows the separation distances to the bush fire interface once development of the DCP area and proposed road network is constructed. Figure 5 and separation distances provided by Project innovations Pty Ltd

2.6 Bush Fire Attack level (BAL)

The National Construction Code 2021 (NCC-BCA) does not provide for any **bushfire specific** performance requirements for 'other' development within bushfire prone areas.

As such the *Australian Standard 3959:2018 (Construction of buildings in bushfire prone areas)* does not apply as a set of 'deemed to satisfy' provisions.

The general fire safety construction provisions are generally taken as acceptable solutions.

Table 2: Bush fire hazard assessment

Transect ¹	Vegetation formation ²	Effective Slope ³	Separation Distance	BAL ⁴	Comments
West	Remnant (Rainforest)	Upslope	27m	BAL-12.5	<ul style="list-style-type: none"> Available APZ consists of area within newly formed Lot and managed land on proposed roads and verges.
South	Forest	Upslope	81m	BAL-12.5	
East	Forest	Upslope	>100m	BAL-LOW	
North	Managed land				

¹Direction of assessment from proposed development.

²Predominant vegetation classification over 140 m from proposed development.

³Effective slope assessed over 100 m from proposed development where the bushfire hazard occurs.

⁴PBP 2019 - Table A1.12.6 - Determination of BAL, FFDI 80 – infill development

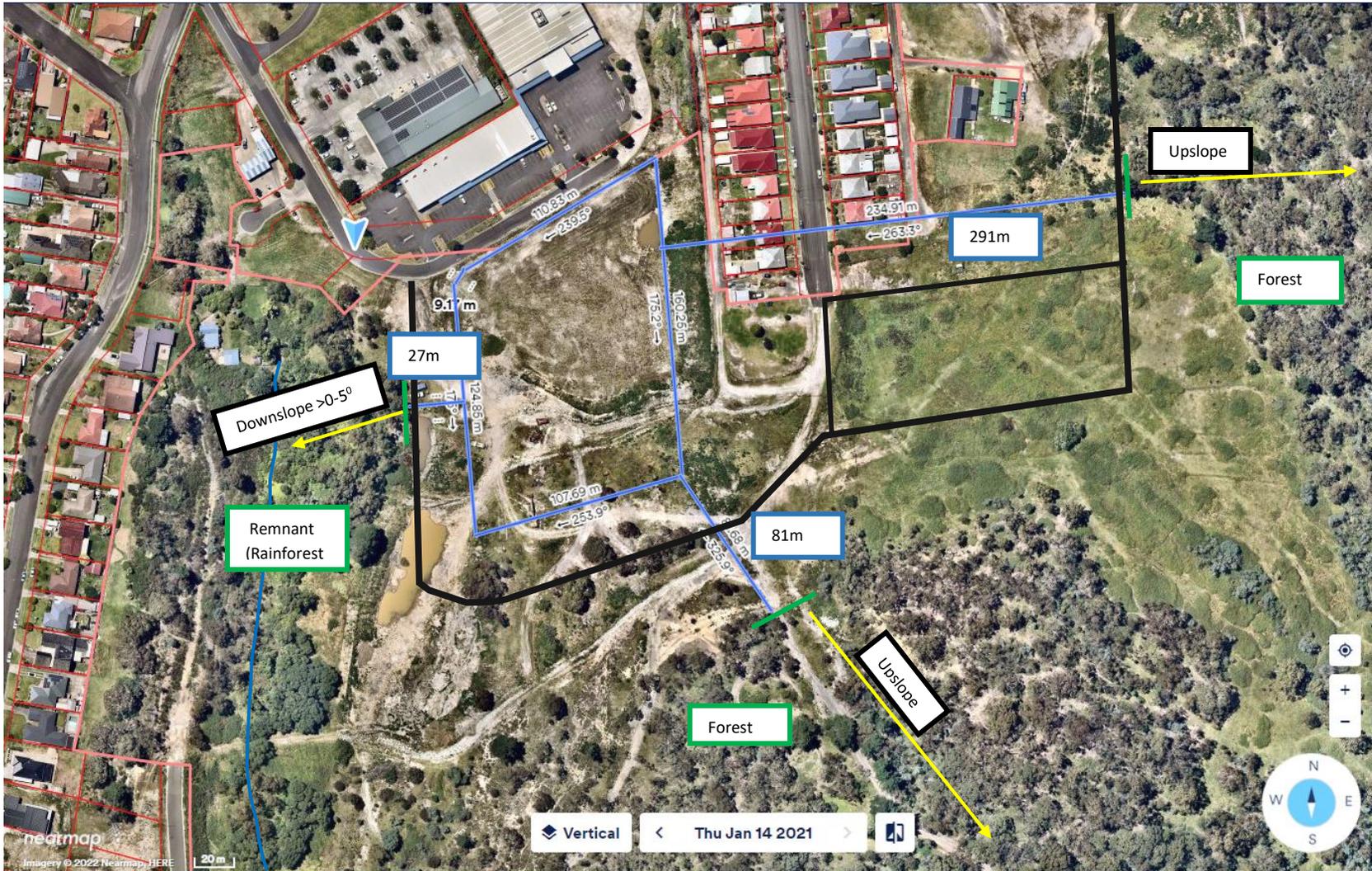


Figure 5: Bush Fire Hazard Assessment – Separation distances (blue) provided by Project Innovations

3 Bush fire protection measures

Under the building classification system within the NCC, Class 5 – 8 buildings include offices, shops, factories, warehouses, public car parks and other commercial facilities.

The NCC does not provide for any bush fire specific performance requirements for these particular classes of buildings. As such AS 3959 and the NASH Standard are not considered as a set of Deemed to Satisfy provisions, however compliance with AS 3959 and the NASH Standard must be considered when meeting the aims and objectives of PBP.

Whilst bush fire is not captured in the NCC for Class 5 – 8 buildings, the following objectives will be applied in relation to access, water supply and services, and emergency and evacuation planning.

- To provide safe access to / from the public road system for firefighters providing property protection during a bush fire and for occupant egress for evacuation.
- To provide suitable emergency and evacuation (and relocation) arrangements for occupants of the development.
- To provide adequate services of water for the protection of the buildings during and after the passage of bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building.
- Provide for the storage of hazardous materials away from the hazard wherever possible.

The general fire safety construction provisions of the NCC are taken as acceptable solutions however construction requirements for bush fire protection will need to be considered on a case-by-case basis.

3.1 Defendable Space/ Asset Protection Zone (APZ)

PBP does not identify a deemed-to-satisfy APZ dimensions for Commercial development. However, the objectives of PBP identify the need for 'defendable' space to be located around buildings. The APZ provided includes managed land within the warehouse complex and the proposed sealed road (Figure 1) surrounding the Lot, capable of supporting firefighting operations.

Recommendation 1:

Entire Lot is managed as an Inner Protection Area (IPA). The IPA 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 the curtilage around the warehouse building to the fence line consisting of a mown lawn areas 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 2m 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;
- 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.

3.2 Construction Standard Recommendations

Recommendation 2:

The proposed development will comply with the ‘general fire safety provisions’ of the NCC – BCA (2021). Based on the bush fire assessment given within Section 2.6 of this report there are ‘no specific bushfire construction standards’ recommended.

3.3 Access arrangements

The proposed access arrangements are designed to allow for access of large commercial vehicles, and as such will easily support the use of operational fire appliances. All roads and parking areas servicing the development, provide sealed all weather access.

All public roadway areas proposed in site plan (**Figure 1**) on approach to, and departure from, the subject property will be well formed and sealed two way public roadways which also service the surrounding commercial and residential areas.

Recommendation 3:

The proposed warehouse will incorporate an all-weather driveway(s) for vehicle access and parking within vicinity of the building.

The internal access road / driveway will provide direct access to the public road system to access and egress of vehicles and firefighting appliances;

No additional vehicle access requirements are recommended.

3.4 Water supply

The proposed development will be connected to reticulated water supply which services the warehouse area. The proponent has not provided any specific advice (at the time of this assessment) regarding the reticulated water infrastructure and mains size, supply pressure or guarantee of delivery.

Considering the building use and size, it is reasonably assumed that the site will be serviced by a fully compliant hydrant ring main, boosted at the front of the site, with all internal areas being located <90m from the nearest and reasonably available fire hydrant connection point.

PBP 2019 acceptable solutions for a reticulated water supply area (relevant to the subject development) are provided below.

Recommendation 4:

- Reticulated water is to be provided to the development.
- Fire hydrant spacing, design and sizing comply with the relevant clauses of AS 2419.1:2005. (Reasonably assumed).
- Hydrants are not located within any road carriageways.
- Fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2005.
- All above-ground water service pipes external to the building are metal, including and up to any taps.

3.5 Electrical services

The proposed development will be serviced by an underground ground electrical supply grid. The connection to the proposed development will also be located underground.

PBP 2019 acceptable solutions for electrical services (relevant to the subject development) state that:

- *Where practicable, electrical transmission lines are located underground; and*
- *Where overhead electrical transmission lines are proposed, as follows:*
 - *Lines are installed with short pole spacings (30m), unless crossing gullies, gorges or riparian areas; and*
 - *No part of a tree is closer to a power line than the distance set out in accordance with the specifications in 'ISSC3 Guideline for Managing Vegetation Near Power Lines'.*

Recommendation 5:

As the electricity supply will be located underground, no additional electricity supply conditions (above and beyond standard Council and Energy Supplier conditions) are required for *PBP 2019* compliance.

3.6 Gas services

PBP 2019 acceptable solutions for gas services (relevant to the subject development) state that:

- Reticulated gas is installed and maintained with AS/NZ 1596:2014 and the requirements of relevant authorities, and metal piping is used;
- Connections to and from gas cylinders are metal;
- Polymer-sheathed flexible gas supply lines are not used; and
- Above-ground gas service pipes are metal, including up to any outlets.

Recommendation 6:

- Any future / new reticulated gas connection is installed and maintained with AS/NZ 1596:2014 and the requirements of relevant authorities;
- Metal piping should be used; and
- Polymer sheathed flexible gas supply lines to gas meters adjacent to the building are not used.

3.7 Adequacy of maintenance plans and emergency procedures

Bushfire Maintenance Plan

It should be noted that the areas within the subject site mainly contain hardstand areas, carparking and vacant land. The proposed landscaping will be minimal in nature and not considered to present a bushfire risk to the subject development site.

All general fire safety provisions, installed within this development, would also be subject to the relevant legislation within the NCC – BCA, including ongoing maintenance and compliance checks etc. (i.e. Annual Fire Safety Schedule / Statements etc.).

Fire emergency procedures

PBP acceptable solutions for emergency and evacuation planning requirements (relevant to the subject development) include;

- *An emergency/evacuation plan is prepared consistent with the RFS guidelines for the Preparation of Emergency/Evacuation Plan.*
- *Compliance with AS 3745-2010 'Planning for Emergencies in Facilities'.*
- *An Emergency Planning Committee is established to consult with residents (and their families in the case of aged care accommodation and schools) and staff in developing and implementing an Emergency Procedure Manual.*
- *Detailed plans of all Emergency Assembly Areas including "onsite" and "offsite" arrangements as stated in AS 3745- 2010 are clearly displayed, and an annual (as a minimum) trial emergency evacuation is conducted.*

Recommendation 7:

The emergency/evacuation plan is to include the possibility of a bushfire event.

This is to be incorporated into the facilities Emergency Planning procedures, which should comply with AS 3745-2010 'Planning for Emergencies in Facilities'

Detailed plans of all Emergency Assembly Areas including "onsite" and "offsite" arrangements as stated in AS 3745-2010 are clearly displayed, and an annual (as a minimum) trial emergency evacuation is conducted.

4 Specific objectives for commercial infill development:

Table 3 lists the specific objectives for Infill development from PBP and how they are satisfied.

Table 3: Specific objectives

Specific Objective	Comment
To provide safe access to / from the public road system for firefighters providing property protection during a bush fire and for occupant egress for evacuation;	<ul style="list-style-type: none"> The site is located within an established commercial area with nearby shopping complex to the north. The development has direct access to the existing public road system. Proposed roads within the Pottery Estate DCP will surround the Lot on all sides.
To provide suitable emergency and evacuation (and relocation) arrangements for occupants of the development.	<ul style="list-style-type: none"> Suitable emergency management and evacuation planning is to be established within the development site, as part of normal procedures.
To provide adequate services of water for the protection of the buildings during and after the passage of bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building;	<ul style="list-style-type: none"> The recommendations (Section 3) relating to the design and construction of the development include a range of 'bushfire protection measures' that will enhance the chances of occupant and building survival.
Provide for the storage of hazardous materials away from the hazard wherever possible.	<ul style="list-style-type: none"> Suitable hazardous material handling and storage procedures are to be established within the development site, as part of normal business procedures.

5 Compliance or non-compliance with PBP 2019 Performance Criteria and intent for bushfire safety protection measures for infill development.

Table 4: Performance Criteria

Performance Criteria	Comment
<p>APZ APZs are provided commensurate with the construction of the building.</p> <p>A defensible space is provided.</p> <p>APZs are managed and maintained to prevent the spread of fire to the building.</p> <p>The APZ is provided into perpetuity.</p> <p>APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimised.</p>	<p>Can Comply – Recommendation No. 1</p> <p>A defensible space will be provided within the site boundaries with the majority of the site being maintained as an IPA.</p> <p>This is complimented by ‘cleared and managed lands’ on adjoining properties within the DCP area and established urban Lots to the north and east.</p>
<p>Access</p> <p>Firefighting vehicles are provided with safe all-weather access to structures and hazard vegetation.</p> <p>The capacity of access roads is adequate for firefighting vehicles.</p> <p>There is appropriate access to water supply. Firefighting vehicles can access the dwelling and exit the property safely.</p>	<p>Can Comply – Recommendation No. 3</p> <p>Access/Egress is provided from the existing public road system.</p> <p>The access arrangements are sufficient for operational firefighting and emergency egress.</p>
<p>Water Supplies</p> <p>An adequate water supply is provided for firefighting purposes.</p> <p>Water supplies are located at regular intervals. The water supply is accessible and reliable for firefighting operations.</p> <p>Flows and pressures are appropriate.</p> <p>The integrity of the water supply is maintained.</p>	<p>Can Comply – Recommendation No. 4</p>

<p>A static supply is provided for firefighting purposes in areas where reticulated water is not available.</p>	
<p>Electrical Services</p> <p>Location of the electrical services limits the possibility of ignition of surrounding bushland or the fabric of the buildings.</p>	<p>Can Comply – Recommendation No. 5</p>
<p>Gas Services</p> <p>Location and design of the gas services will not lead to of ignition of surrounding bushland or the fabric of the buildings</p>	<p>Can Comply – Recommendation No. 6</p>
<p>Construction Standards</p> <p>The proposed building can withstand bushfire attack in the form of embers, radiant heat and flame contact.</p> <p>Proposed fences and gates are designed to minimise the spread of bushfire.</p> <p>Proposed Class 10a buildings are designed to minimise the spread of bushfire.</p>	<p>Can Comply – Recommendation No. 2</p> <p>Predicated upon the recommended APZ areas and siting requirements, normal NCC building construction standards can achieve the performance requirements of the planning legislation.</p>
<p>Landscaping</p> <p>Landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind driven embers to cause ignitions.</p>	<p>Can Comply – Recommendation No. 1</p>

6 Statement assessing the environmental impact of any proposed bushfire protection measures.

Table 5: Environmental impact

Bushfire Protection Measure	Likely Environmental Impact	Comment
APZ (Rec. No. 1)	Insignificant	The Lot/building site is currently clear of all persistent vegetation.
Construction Standard (Rec. No. 2)	Insignificant	Development to be constructed within approved / current building envelope.
Water Supply for fire fighting (Rec. No. 4)	Insignificant	A reticulated water supply will service the proposed development.
Utility service protection (Rec. Nos. 5 -6)	Insignificant	Utilities will be located within the APZ, or underground.
Vehicle Access (Rec. No. 3)	Insignificant	Direct access to public road system by way of internal roads/driveways.

7 Conclusion

The proposed development can meet the requirements of the specific objectives of Commercial Infill development by compliance with the Acceptable Solutions for all Bush fire protection measures within ‘Planning for Bush Fire Protection 2019’

This assessment concludes that the proposal satisfies the provisions of PBP for Commercial infill development

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8 References

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Standards Australia (SA). 2009. *Construction of buildings in bushfire-prone areas*, AS 3959-2018. SAI Global, Sydney.

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

9 Appendix A - Photos



Photo 1: Looking north from Potter Estate DCP area towards Forest vegetation in background at distance >100m from proposed Bunnings Small Format Store



Photo 2: Looking west from DCP area towards vegetated Creek line (Riparian Corridor)