



Menangle Park Planning Proposal

Bushfire Management Strategy

Menangle Park, NSW

May 2018



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Executive Summary

This report has been prepared to support an amendment to Campbelltown Local Environmental 2015 (Campbelltown LEP 2015) in relation to the Menangle Park Urban Release Area (URA), which comprises of 958 hectares of land at Menangle Park. The URA incorporates 498 ha of land owned or under the control of Dahua Group (Aust) Pty Ltd (Dahua) with the remaining area owned or under the control of other landowners. This report provides bushfire protection measures for Dahua controlled land (**Figure 1**) that meet the statutory and policy requirements for bushfire protection in NSW.

The site was rezoned from rural land to urban purposes on 18 November 2017 to accommodate approximately 3,400 residential lots, a retail/commercial town centre, employment lands and community and recreational facilities.

The proposed amendment builds upon the site's previous rezoning and associated Structure Plan to create a new sustainable, healthy and high quality residential community comprising:

- 5,250 dwellings (an increase of 1,850 dwellings);
- a new major town centre comprising 30,000m² of retail / employment gross floor area;
- a new neighborhood centre (approximately 3,500m² of employment floor space);
- a revised road and street network to provide better permeability throughout the site;
- sporting fields and parks;
- integrated passive recreation area within a riparian corridor network;
- land for environmental conservation;
- community facilities to support the proposed increase to the population; and
- primary school.

A number of strategies have been provided in the form of planning controls such that the risk from bushfire is reduced to an appropriate level and a level that meets the deemed to satisfy bushfire protection requirements for NSW.

The strategies used to reduce the bushfire risk associated with the proposal, include:

- Setbacks from bushfire prone vegetation (APZs);
- Integration of non-combustible infrastructure within APZs such as roads, easements and parking areas;
- Access and egress from the site through a well-designed road system;
- Landscaping and garden design principles and guidance to minimise bushfire risk;
- Underground electricity and gas services;
- Compliant water supplies;
- Emergency response planning; and
- Interim APZs and perimeter roads provided for each stage of development.

More detailed bushfire assessment to accurately prescribe setbacks, road infrastructure and landscaping is required for each stage of subdivision, however the planning proposal has provisions that allow this more detailed designed to occur smoothly and achieve the deemed to satisfy standards for subdivisions within NSW.

1 Introduction

1.1 Purpose of assessment

The proposal for the site will involve changes to part of the planning controls that currently apply over the site. This report is part of a thorough process of environmental assessment and planning review at State and Local Government levels. The report provides a bushfire management strategy for the planning proposal for the Dahua controlled land in Menangle Park. It specifically addresses the statutory and policy requirements for bushfire protection NSW in the structure plan.

The existing and potential bushfire hazard and associated risk (post development) is assessed using Planning for Bushfire Protection 2006 (PBP) Guidelines (NSW RFS, 2006).

1.2 Location

Figure 1 shows the location and extent of the site. Menangle Park is a rural-residential suburb located in Sydney's south west within the Greater Macarthur Priority Growth Area. It is approximately 5.5km to the south-west of the Campbelltown, 23km from the Liverpool Strategic Centre and 65km from Sydney CBD.

Menangle Park URA comprises 958 hectares of land at Menangle Park. The URA incorporates 498 ha of land owned or under the control of Dahua with the remaining area owned or under the control of other landowners.

The site was rezoned from rural land to urban purposes on 18 November 2017 to accommodate approximately 3,400 residential lots, a retail/commercial town centre, employment lands and community and recreational facilities.

The proposed amendment builds upon the site's previous rezoning and associated Structure Plan to create a new sustainable, healthy and high quality residential community comprising:

- 5,250 dwellings (an increase of 1,850 dwellings);
- a new major town centre comprising 30,000m² of retail / employment gross floor area;
- a new neighborhood centre (approximately 3,500m² of employment floor space);
- a revised road and street network to provide better permeability throughout the site;
- sporting fields and parks;
- integrated passive recreation area within a riparian corridor network;
- land for environmental conservation;
- community facilities to support the proposed increase to the population; and
- primary school.

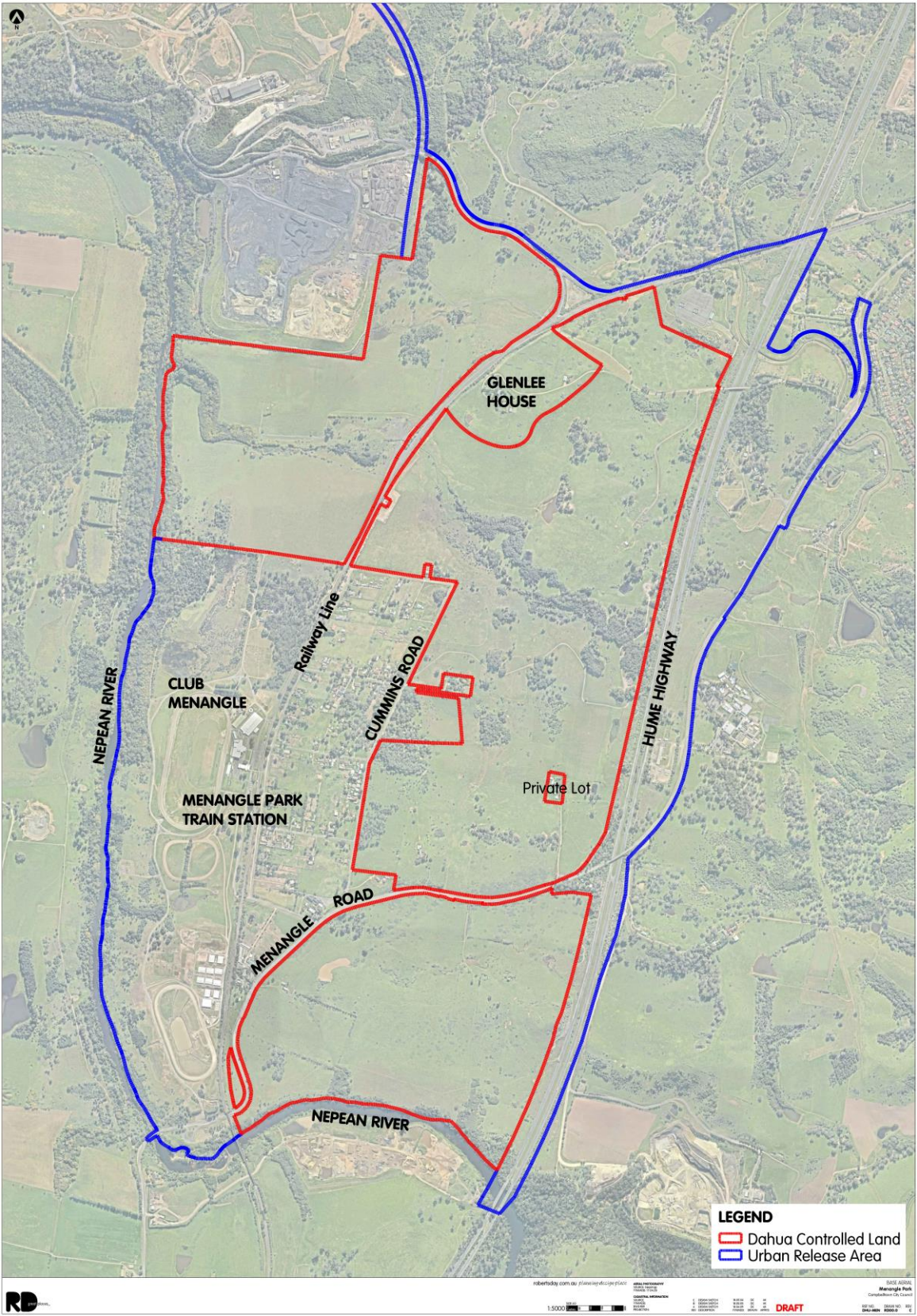


Figure 1: Location of Menangle Park URA and Dahua Controlled Land

1.3 Legislative and policy requirements

1.3.1.1 Environmental Planning and Assessment Act 1979

The NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) is the principal planning legislation for the state, providing a framework for the overall environmental planning and assessment of development proposals. Various legislation and instruments, such as the NSW *Threatened Species Conservation Act 1995* (TSC Act) and *Rural Fires Act 1997* (RF Act) are integrated with the EP&A Act.

Section 117(2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) issues directions to be followed when considering rezoning. Direction 4.4, *Planning for Bushfire Protection* identifies matters for consideration for planning proposals that will affect, or are in proximity to land mapped as bush fire prone. The relevant planning authority, in the preparation of a planning proposal, must:

'...consult with the Commissioner of the NSW Rural Fire Service following receipt of a gateway determination under section 56 of the Act, and prior to undertaking community consultation in satisfaction of section 57 of the Act, and take into account any comments so made'.

1.3.1.2 Biodiversity Conservation Act 2016

The land is situated within the Sydney Growth Centres biodiversity certified areas. In August 2017, the *Biodiversity Conservation Act 2016* was gazetted and repealed the *Threatened Species Conservation Act 1995* (TSC Act), however under section 43 of the *Biodiversity Conservation (Savings and Transitional) Regulation 2017* (Preservation of biocertification of Sydney Region Growth Centres SEPP, EPIs etc), the repeal of the TSC Act 1995 does not affect the operation of part 7 (Biocertification of Sydney Region Growth Centres SEPP and related EPIs) or 8 (Provisions consequent on changed arrangements for biodiversity certification) of Schedule 7 (Savings, transitional and other provisions) to that Act. The effect is that the Biodiversity Certification of the Growth Centres continues to have effect under the new legislation. Biodiversity certification removes the need to conduct impact assessment on certified land for threatened species population and communities listed under the TSC Act.

1.3.1.3 Rural Fires Act 1997

A large proportion of the bushfire issues in NSW are regulated by the *Rural Fires Act 1997* (RF Act). Both the EP&A Act and the RF Act were modified by the *Rural Fires and Environmental Assessment Legislation Amendment Act 2002* to enhance bushfire protection through the development assessment process (NSW RFS, 2006b). Key requirements of the RF Act include:

- The need for a bushfire safety authority to be issued by the RFS under section 100B of the RF Act for any development applications for subdivision (therefore considered integrated development)
- All landowners to exercise a duty of care to prevent bushfire from spreading on or from their land under Section 63 of the RF Act. This relates to the appropriate provision and maintenance of Asset Protection Zones (APZ), landscaping and any retained vegetation when developing land (NSW RFS, 2006b)

1.3.1.4 Planning for Bush Fire Protection 2006 (PBP)

Planning for Bush Fire Protection 2006 (PBP) was developed by the NSW Rural Fire Service (NSW RFS) to provide development standards for building in bush fire prone areas in NSW. It provides for the protection of human life and helps to minimise the impacts on property from the threat of bush fire.

Development on bushfire prone land must satisfy the requirements of *PBP* which includes having regard to the following planning principles:

- Provision of a perimeter road with two-way access which delineates the extent of the intended development.
- Provision at the urban bushland interface for the establishment of adequate asset protection zones for future housing.
- Specifying minimum residential lot depths to accommodate asset protection zones for lots on perimeter roads.
- Minimising the perimeter of the area of land, interfacing the hazard, which may be developed.
- Introduction of controls which avoid placing inappropriate developments in hazardous areas.
- Introduction of controls on the placement of combustible materials in asset protection zones.

PBP also provides performance and acceptable solutions for a range of bushfire protection measures required to minimise the risk associated with bushfire attack.

1.4 Building Code of Australia

The Building Code of Australia (BCA) is adopted in NSW through the EP&A Act. It contains provisions, which can be used for construction to resist bushfires in order to reduce the risk to life and minimise the risk of property loss in designated bushfire prone areas.

The BCA specific 'deemed to comply' measure is the *Australian Standard AS3959 Construction of buildings in bushfire-prone areas*.

1.5 Australian Standard AS3959-2009 Construction of buildings in bushfire-prone areas

The standard is applied throughout Australia to the construction of buildings on bushfire prone lands. Its objectives are to prescribe particular construction details for buildings to reduce the risk of ignition from a bushfire while the fire front passes.

1.6 Bush fire prone lands

Parts of the Menangle Park URA land is mapped as bush fire prone land on the Campbelltown City Council's Bushfire Prone Land map¹.

1.7 Assessment framework

The following section outlines how the relevant types of development will be assessed in accordance with PBP.

1.7.1 Residential

Future residential subdivision will be assessed under Section 100B of the RF Act and a Bush Fire Safety Authority (BFSA) must be obtained from the NSW RFS. Section 100B of the RF Act specifies

¹ <https://www.planningportal.nsw.gov.au/find-a-property>

conformance with the intent and performance criteria of the Bushfire Protection Measures outlined in PBP. The bushfire protection measures relevant to 100B of the RF Act within PBP 2006 are:

- *The provision of clear separation of buildings and bushfire hazards, in the form of fuel-reduced APZ (and their subsets, inner and outer protection areas and defensible space).*
- *Construction standards and design.*
- *Appropriate access standards for residents, firefighters, emergency service workers and those involved in evacuation.*
- *Adequate water supply and pressure.*
- *Emergency management arrangements for fire protection and/or evacuation; and*
- *Suitable landscaping, to limit fire spreading to a building.*

1.7.2 Special Fire Protection Purpose (SFPP)

SFPP developments include developments where occupants may be more vulnerable to bushfire attack. These developments require considerably larger APZs than residential developments and include the following types of uses:

- *A school*
- *A child care centre*
- *A hospital (including a hospital for the mentally ill or mentally disordered)*
- *A hotel, motel or other tourist accommodation*
- *A building wholly or principally used as a home or other establishment for mentally incapacitated persons*
- *Housing for older people or people with disabilities within the meaning of State Environmental Planning Policy No 5 - Housing for Older People or People with a Disability (now State Environmental Planning Policy (Seniors Living))*
- *A group home within the meaning of State Environmental Planning Policy No 9 - Group Homes*
- *A retirement village*
- *Any other purpose prescribed by the regulations. (Section 100B (6) of the RF Act).*

For these developments, the specific objectives of SFPP developments within PBP should be followed in addition to the requirements for residential developments. The specific objectives for SFPP developments are:

- *Provide for the special characteristics and needs of occupants. Unlike residential subdivisions, which can be built to a construction standard to withstand the fire event, enabling occupants and firefighters to provide property protection after the passage of fire, occupants of SFPP developments may not be able to assist in property protection. They are more likely to be adversely affected by smoke or heat while being evacuated.*
- *Provide for safe emergency evacuation procedures. SFPP Developments are highly dependent on suitable emergency evacuation arrangements, which require greater separation from bushfire threats. During emergencies, the risk to firefighters and other emergency services personnel can be high through prolonged exposure, where door-to-door warnings are being given and exposure to the bushfire is imminent.*

1.7.3 Industrial, Commercial, Other Development

Commercial, employment and/or industrial uses are classified in PBP 2006 as 'Other Development'. As such these developments need to satisfy the aims and objectives of PBP and a proposal needs to

incorporate these considerations along with an adequate combination of relevant bushfire protection measures (BPM). Generally, the BPMs listed in PBP 2006 for residential development can be used as a guide and are discussed in the following sections. The aim and objectives of PBP 2006 are as follows.

Aim of PBP

To use the NSW development assessment system to provide for the protection of human life (including firefighters) and to minimise impacts on property from the threat of bush fire, while having due regard to development potential, on-site amenity and protection of the environment.

Objectives of PBP

- (i) Afford occupants of any building adequate protection from exposure to a bush fire*
- (ii) Provide for a defendable space to be located around buildings*
- (iii) Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition*
- (iv) Ensure that safe operational access and egress for emergency service personnel and residents is available*
- (v) Provide for ongoing management and maintenance of bush fire protection measures, including fuel loads in the asset protection zone (APZ); and*
- (vi) Ensure that utility services are adequate to meet the needs of firefighters (and others assisting in bush firefighting).*

2 Bushfire Hazard Assessment

A broad scale bushfire hazard assessment was undertaken using the method prescribed in PBP and is described in the following sections.

Figure 3 shows the vegetation of the land. Open space areas will be located throughout the development with large expanses adjoining the riparian corridor traversing the Menangle Park North portion in an east-west direction. It is assumed that all open space areas will be managed such that a bushfire hazard does not occur and consistent with the requirements of an asset protection zone.

The riparian corridors occurring within the site will remain and undergo rehabilitation/revegetation; however the extent of this is unclear at this point in time. This assessment therefore assumes a worst-case scenario with the resulting vegetation community reflective of a 'forested wetland' in accordance with *Planning for Bush Fire Protection 2006*.

Low hazard vegetation (as classified under AS3959-2009) is proposed within the various 'internal green areas' such as those associated with existing powerlines. No APZ have been identified for these internal green areas as they will be APZ compliant as orchards, playing fields, managed landscapes etc. More detailed description of the vegetation management within these areas will be provided as part of the development application process.

3 Bush Fire Protection Measures

Application of the bushfire protection measures described in PBP minimise the risks from bushfire and ensure that the aims and objectives of PBP are met. This PBP approach has been applied for the site.

The following key bushfire protection measures are addressed in this assessment:

- Asset Protection Zones (APZs);
- Water supplies;
- Infrastructure (including access road provisions and other services);
- Evacuation and emergency management (including emergency access/egress arrangements); and
- Landscape management and garden design principles

3.1 Asset Protection Zones (APZs)

APZs are areas located between bushfire hazards and development to provide a defensible space in which to undertake emergency operations and to provide a buffer from direct flame contact, and the impacts of radiant heat, smoke and embers.

The width of APZs is based on a combination of:

- Predominant vegetation (using structural classification);
- Effective slope (i.e. slope most affecting fire behaviour adjacent to the interface); and
- Fire Danger Index (FDI) of 100 (a catastrophic fire weather day)

In NSW, PBP and the APZ dimension for residential development is currently undergoing review by the RFS as previously indicated (**Section 1.4.1.4**). The revised APZ requirements will therefore be applied in the future.

The APZ dimensions cited in this assessment will be refined for future subdivision as a more detailed assessment of slope, vegetation and bushfire attack is required for each individual allotment and development type, and the revised requirements of PBP 2017 will be applied. This includes specific APZ requirements for SFPP developments (see **Section 1.7.2**) and commercial developments (see **Section 1.7.3**).

APZs should be wholly contained within the proposed lot or land for which they are benefitting or protecting. However, in some circumstances APZs may consist of managed areas outside an allotment e.g. managed open space, managed service easements and roads. Perimeter roads form part of the APZs throughout the site except within the powerline corridors which are low hazard and are separated by a road or trail where it abuts higher hazard areas.

Figure 3 shows the proposed APZ for the Dahua controlled land. **Table 1** identifies the slope and vegetation type used to determine the APZ.

Table 1 identifies the relevant vegetation, slope and Asset Protection Zone (APZ) requirements for future residential development in the site. If any Special Fire Protection Purpose (SFPP) developments as defined under Section 100B of the *Rural Fires Act 1997* (e.g. schools, nursing homes, child care centres, etc.) are to occur within 100 m of any bushfire vegetation, then increased APZ dimensions will be required to account for the vulnerable nature of occupants.

There will also be temporary APZ in place at each stage the construction phase. This reduces construction requirements that would be required to account for temporary hazards. Common land ownership across most the site will facilitate these temporary arrangements.

It is noted that PBP is currently being reviewed by the NSW Rural Fire Service with expected release date in 2018. Although the outcomes of this review are not yet known, it is anticipated that there will be changes in APZ specifications which may impact on the site. The revised PBP will need to be accounted for in the planning and design of future development. As an indication, the draft requirements under the revised PBP are included in **Table 1** for information only. These should not be relied upon until the revised PBP is formally adopted.

Table 1: Threat assessment, APZ and category of bushfire attack

Direction from development	Vegetation ¹	Slope ²	PBP 2006 required APZ ³	Draft PBP 2017 required APZ ⁴	AS 3959-2009 BAL-29 APZ ⁵
Riparian corridor	Forested wetland (Forest)	>0-5° downslope	20 m	12 m (Forested wetland and Riverine forest)	32 m
South and west	Forested wetland (Forest)	>0-5° downslope	20 m	12 m (Forested wetland and Riverine forest)	32 m
West (adjoining land)	Woodland	Upslope	10 m	13 m (Grassy woodland)	16 m
South East (within Hume Highway road reserve)	Low hazard (remnant)	>0-5° downslope	10 m	To be confirmed due to proposed changes within draft PBP	14 m
North	Grassland	>0-5° downslope	10 m	20 m	10 m
West (adjoining land)	Grassland	Upslope	10 m	20 m	9 m

¹ Predominant vegetation is identified, according to PBP and “Where a mix of vegetation types exist the type providing the greater hazard is said to be predominate”.

² Slope most significantly influencing the fire behaviour of the site having regard to vegetation found. Slope classes are according to PBP.

³ Assessment according to Table A2.4 of PBP.

⁴ Assessment based on current draft PBP 2017 and this may change

⁵ Assessment according to Table 2.4.2 of AS 3959-2009.

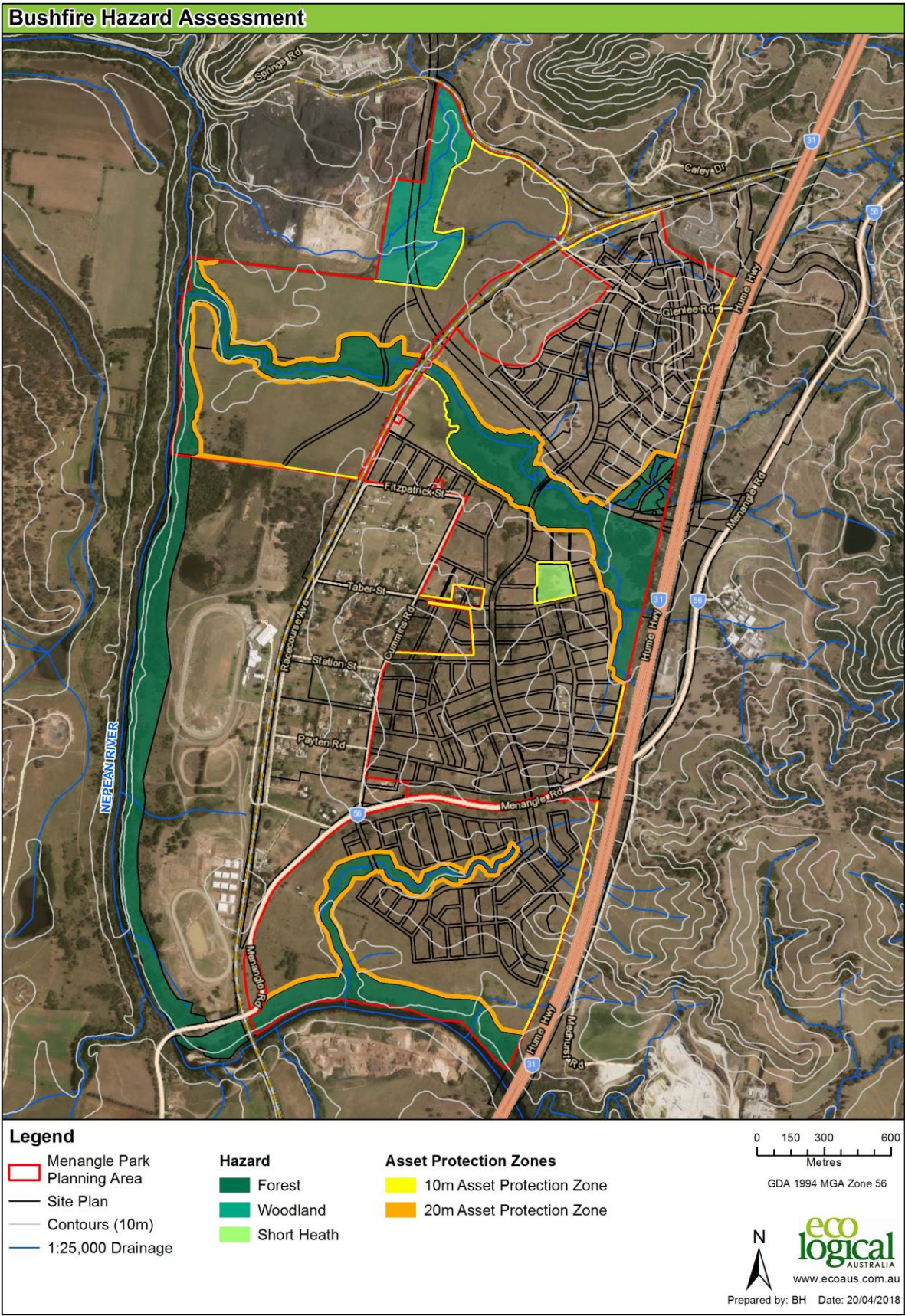


Figure 3: APZ mapping for Dahua Controlled Land

3.1.1 Fuel management within the APZ

The APZs are to be maintained by the owner of each future lot. Where the APZ is part of a road reserve or public place it will be maintained by the agency responsible e.g. Council. It is proposed that the total APZ will be managed to an Inner Protection Area standard.

3.1.2 Vegetation management requirements

The measures described in Appendix 5 of PBP (RFS 2006) for landscaping of APZ and gardens etc. will be applied in the site. These measures will assist in mitigating burning debris attack on gardens and subsequently buildings. It will be applied to residential, industrial and public zoned lots. A summary of these measures is below.

3.1.3 APZ maintenance

When establishing and maintaining an APZ the following requirements should apply as applicable:

- 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 ground;
- preference should be given to smooth barked and evergreen trees;
- avoid connective pathways across the ground toward a building;
- small isolated clumps needs to be site specific in design;
- avoid creating fuel ladders (shrubs, bark, dropped branches, leaves etc);
- select suitable plants (low flammability, avoid dense and elevated fine fuels);
- no plants near vulnerable building components (windows, decks); and
- leaves and vegetation debris should be removed

3.2 Access

Safe access, egress and defendable spaces are required for emergency services. Emergency management arrangements are also required such as procedures and routines for evacuation and consideration of safer places.

Specific management and evacuation plans may be required at a later stage especially where SFPP developments are proposed (e.g. for the proposed school and childcare centre sites).

A key to emergency access is a perimeter road with frequent direct access to the internal road system for easy and rapid access/egress. Feeder roads off the perimeter road should where possible radiate away from the bushfire hazard. Specifications for public roads and property access roads are provided below. **Figure 2** shows the indicative road plan as part of the masterplan.

3.2.1 Public roads

Public roads include both the perimeter road and the internal road system. A safe operational access to structures and water supply for emergency services personnel, while residents are seeking to evacuate from an area is required. Key requirements include road size (safe/efficient access/egress) and suitable location of water supply points (readily accessible during bushfire). **Appendix 1** provides additional details for NSW.

3.2.2 Perimeter roads

The requirements for perimeter roads are as follows:

- Located between (or within) the Asset Protection Zone and the boundary of the allotments.
- Providing firefighters with easier access to structures, allowing more efficient use of firefighting resources.
- Providing a safe retreat for firefighters.
- Providing a clear control line from which to conduct hazard reduction or back burning operations.
- Providing two-way access (carriageway 8 metres kerb to kerb) and compliance with the design specifications identified in PBP 2006 (see **Appendix 1**).

3.2.3 Property access roads

PBP 2006 states that property access is access from the public road system onto private land and to the habitable building by firefighters. The intent is to provide safe access to/from the public road system for firefighters providing property protection during a bushfire and for occupants faced with evacuation.

Property access road requirements are identified below:

- Short access roads are preferable; therefore buildings should be located as close as possible to the public road system.
- No access requirements apply to an urban development where the furthest part of the building is no farther than 70 m (unobstructed) from the public road system.
- Any building located more than 200 m from a public through road must provide one alternative property access road.
- Access roads should have a minimum width of 4 m.
- Additional detail is provided in **Appendix 2**.

3.3 Services – Water, electricity and gas

3.3.1 Water

The proposal will be serviced by a reticulated water supply. **Table 2** identifies the acceptable solution requirements of Section 4.1.3 of PBP:

Table 2: Performance criteria for reticulated water supplies (PBP page 27)

Performance Criteria	Acceptable Solutions
The intent may be achieved where:	
<ul style="list-style-type: none"> • water supplies are easily accessible and located at regular intervals 	<ul style="list-style-type: none"> • reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads. • fire hydrant spacing, sizing and pressures comply with AS 2419.1 – 2005. Where this cannot be met, the RFS will require a test report of the water pressures anticipated by the relevant water supply authority. In such cases, the location, number and sizing of hydrants shall be determined using fire engineering principles. • hydrants are not located within any road carriageway • all above ground water and gas service pipes external to the building are metal,

Performance Criteria	Acceptable Solutions
	<p>including and up to any taps.</p> <ul style="list-style-type: none"> the provisions of parking on public roads are met.

3.3.2 Electricity services

Electricity supply to / within the land is proposed to be located underground and therefore complies with Section 4.1.3 of PBP.

3.3.3 Gas services

Gas services (reticulated or bottle gas) are compliant with Section 4.1.3 of PBP, subject to the following specifications:

- Any gas services are to be installed and maintained in accordance with Australian Standard AS/NZS 1596 *The storage and handling of LP Gas* (SA 2014). Metal piping is to be used;
- All fixed gas cylinders are kept clear of all flammable materials to a distance of 10 metres and shielded on the hazard side of the installation;
- If gas cylinders need to be kept close to the building, the release valves are directed away from the building and at least 2 metres away from any combustible material, so that they do not act as a catalyst to combustion. Connections to and from gas cylinders are metal; and
- Polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not used.

3.4 Emergency management

The proximity of emergency services to the precinct are considered adequate, subject to the timing of completion of all access roads. Consultation with the NSW RFS and Fire and Rescue services will occur during subdivision design to ensure adequate emergency response during all phases of construction and occupation of development on the land. Consultation with RFS has also occurred as part of the social infrastructure assessment to ensure supply of services to future residents is consistent with RFS requirements.

4 Conclusions

A number of strategies have been provided in the form of planning controls such that the risk from bushfire is reduced to an appropriate level and a level that meets the deemed to satisfy bushfire protection requirements for NSW. The bushfire protection measures applied exceed national best practice bushfire risk reduction by taking into consideration research on dynamic fire propagation.

The strategies used to reduce the bushfire risk associated with the proposal, include:

- Setbacks from bushfire prone vegetation;
- Integration of non-combustible infrastructure within APZs such as roads, easements and parking areas;
- Access and egress from the site through a well-designed road system;
- Underground electricity and gas services;
- Compliant water supplies;
- Emergency response planning;
- Interim APZs and perimeter roads provided for each stage of development; and
- SFPP and more vulnerable development types are located further from the hazard.

More detailed bushfire assessment to accurately prescribe setbacks, road infrastructure and landscaping is required for each stage of subdivision, however the planning proposal has provisions that allow this more detailed designed to occur smoothly and achieve the deemed to satisfy standards for subdivisions within NSW.

5 Recommendation

It is recommended that the planning proposal be approved based upon the bushfire protection measures identified in this report, noting that more detailed bushfire assessments will be provided as part of the development application process.

References

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Standards Australia (SA). 2009. *Construction of buildings in bushfire-prone areas (including Amendments 1 – 3)*, AS 3959-2009. SAI Global, Sydney.

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

Appendix 1: Road standards public roads

Performance Criteria	Acceptable solutions
The intent may be achieved where:	
<ul style="list-style-type: none"> • firefighters are provided with safe all weather access to structures (thus allowing more efficient use of firefighting resources) 	<ul style="list-style-type: none"> • public roads are two-wheel drive, all weather roads.
<ul style="list-style-type: none"> • public road widths and design that allow safe access for firefighters while residents are evacuating an area 	<ul style="list-style-type: none"> • urban perimeter roads are two-way, that is, at least two traffic lane widths (carriageway 8 metres minimum kerb to kerb), allowing traffic to pass in opposite directions. Non perimeter roads comply with Table 4.1 – Road widths for Category 1 Tanker (Medium Rigid Vehicle). • the perimeter road is linked to the internal road system at an interval of no greater than 500 metres in urban areas. • traffic management devices are constructed to facilitate access by emergency services vehicles. • public roads have a cross fall not exceeding 3 degrees. • all roads are through roads. Dead end roads are not recommended, but if unavoidable, dead ends are not more than 200 metres in length, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end and direct traffic away from the hazard. • curves of roads (other than perimeter roads) are a minimum inner radius of six metres and minimal in number, to allow for rapid access and egress. • the minimum distance between inner and outer curves is six metres. • maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other. gradient specified by road design standards, whichever is the lesser gradient. • there is a minimum vertical clearance to a height of four metres above the road at all times.
<ul style="list-style-type: none"> • the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles. 	<ul style="list-style-type: none"> • the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles (approximately 15 tonnes for areas with reticulated water, 28 tonnes or 9 tonnes per axle for all other areas). Bridges clearly indicate load rating.
<ul style="list-style-type: none"> • roads that are clearly sign- posted (with easily distinguishable names) and buildings/properties 	<ul style="list-style-type: none"> • public roads greater than 6.5 metres wide to locate hydrants outside of parking reserves to ensure

Performance Criteria	Acceptable solutions
that are clearly numbered.	<p>accessibility to reticulated water for fire suppression.</p> <ul style="list-style-type: none"> public roads between 6.5 metres and 8 metres wide are No Parking on one side with the services (hydrants) located on this side to ensure accessibility to reticulated water for fire suppression.
<ul style="list-style-type: none"> there is clear access to reticulated water supply 	<ul style="list-style-type: none"> public roads up to 6.5 metres wide provide parking within parking bays and locate services outside of the parking bays to ensure accessibility to reticulated water for fire suppression. one way only public access roads are no less than 3.5 metres wide and provide parking within parking bays and locate services outside of the parking bays to ensure accessibility to reticulated water for fire suppression.
<ul style="list-style-type: none"> parking does not obstruct the minimum paved width 	<ul style="list-style-type: none"> parking bays are a minimum of 2.6 metres wide from kerb edge to road pavement. No services or hydrants are located within the parking bays. public roads directly interfacing the bushfire hazard vegetation provide roll top kerbing to the hazard side of the road.

Appendix 2: Property access road standards

Performance Criteria	Acceptable solutions
The intent may be achieved where:	
<ul style="list-style-type: none"> access to properties is provided in recognition of the risk to firefighters and/ or evacuating occupants. 	<ul style="list-style-type: none"> at least one alternative property access road is provided for individual dwellings (or groups of dwellings) that are located more than 200 metres from a public through road.
<ul style="list-style-type: none"> the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles. all weather access is provided. 	<ul style="list-style-type: none"> bridges clearly indicate load rating and pavements and bridges are capable of carrying a load of 15 tonnes. roads do not traverse a wetland or other land potentially subject to periodic inundation (other than a flood or storm surge).
<ul style="list-style-type: none"> road widths and design enable safe access for vehicles 	<ul style="list-style-type: none"> a minimum carriageway width of four metres for rural-residential areas, rural landholdings or urban areas with a distance of greater than 70 metres from the nearest hydrant point to the most external part of a proposed building (or footprint). <p><i>Note: No specific access requirements apply in a urban area where a 70 metres unobstructed path can be demonstrated between the most distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency firefighting vehicles (i.e. a hydrant or water supply).</i></p> <ul style="list-style-type: none"> in forest, woodland and heath situations, rural property access roads have passing bays every 200 metres that are 20 metres long by two metres wide, making a minimum trafficable width of six metres at the passing bay. a minimum vertical clearance of four metres to any overhanging obstructions, including tree branches. internal roads for rural properties provide a loop road around any dwelling or incorporate a turning circle with a minimum 12 metre outer radius. curves have a minimum inner radius of six metres and are minimal in number to allow for rapid access and egress. the minimum distance between inner and outer curves is six metres. the crossfall is not more than 10 degrees. maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads. <p><i>Note: Some short constrictions in the access may be accepted where they are not less than the minimum (3.5m), extend for no more than 30m and where the obstruction cannot be reasonably avoided or removed. The gradients applicable to public roads also apply to community style development property access roads in addition to the above.</i></p> <ul style="list-style-type: none"> access to a development comprising more than three dwellings have formalised access by dedication of a road and not by right of way.



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