Fernhill Estate

Subdivision of 88-89 Nepean Gorge Drive Mulgoa NSW

Bushfire Assessment

August 2017

Table of contents

Table index

Figure index

1. Introduction

This bushfire assessment report is prepared for Fernhill Estate to support an application for a bush fire safety authority for the subject land, in accordance with Clause 44 of the *Rural Fires Regulation (2013)*.

The subject land is designated as:

88-89 Nepean Gorge Drive Mulgoa (part of Lot No. 1 Plan No. 549247)

The following subdivision is proposed:

A two lot residential subdivision and two lot biobank

This proposed two lot residential subdivision is an 'integrated development' under Section 91 of the *Environmental Planning and Assessment Act* (EP&A Act) and requires the issuance of a bush fire safety authority under Section 100B of the *Rural Fires Act (1997),* and compliance with the relevant performance criteria identified in *Planning for Bushfire Protection 2006* (NSWRFS 2006) (PBP).

This report identifies that within each of the two proposed residential lots the proposed building footprint will not be exposed to radiant heat levels greater than 29kW/m^2 and each lot can accommodate the relevant acceptable solutions (identified in Planning for Bush Fire Protection (NSWRFS 2006), including the asset protection zones (APZ).

These bushfire protection measures incorporated in the subdivision qualifies for the issuance of a bush fire safety authority.

It should be noted that the measures identified in this report cannot guarantee that a building will survive a bushfire event on every occasion. This is substantially due to the degree of vegetation management, the unpredictable nature and behaviour of fire, and extreme weather conditions.

(a) Description of the property

This is a bushfire assessment report for part Lot No. 1 Plan No. 549247 for a proposed rezoning to facilitate a proposed two lot residential lot subdivision and two lot biobank, 88-89 Nepean Gorge Drive/Fairlight Road Mulgoa (hereafter referred to as the 'subject land') (Figure 1).

The subject land is located within Penrith City Council that is within the 'Greater Sydney Region' and has a corresponding FDI rating of 100 (NSWRFS 2006).

The subject land is currently zoned as E3 Environmental Management.

The subject land is shown in Figure 1 and consists of a:

- An eastern lot (Residential Lot 1 (20,000m^3)) adjoining Nepean Gorge Drive;
- A southern lot (Residential Lot 2 (20,000m^3)) adjoining Fairlight Road; and
- Two biobank lots adjoining Fairlight Road and Nepean Gorge Drive (Lot 1 (55.2 ha) and Lot 2 (55.9 ha)).

Residential Lot 1 is bounded to the:

- South by private rural-residential lots along Nepean Gorge Drive– an all-weather two-wheel drive formed access road;
- East by an undeveloped residential lot consisting of dry sclerophyll forest; and

- North and west by dry sclerophyll forest within a proposed biobanking area that has historically been grazed and is planned to be set aside for biodiversity conservation.

Residential Lot 2 is bounded to the:

- South by Fairlight Road – an all-weather two-wheel drive formed access road.
- East and south by rural-residential development consisting of houses, maintained gardens and hobby farms.
- North and west by dry sclerophyll forest within a proposed biobanking area that has historically been grazed and is planned to be set aside for biodiversity conservation.

Access to both residential lots of subject land is via Fairlight Road or Nepean Gorge Drive, local two-way access roads.

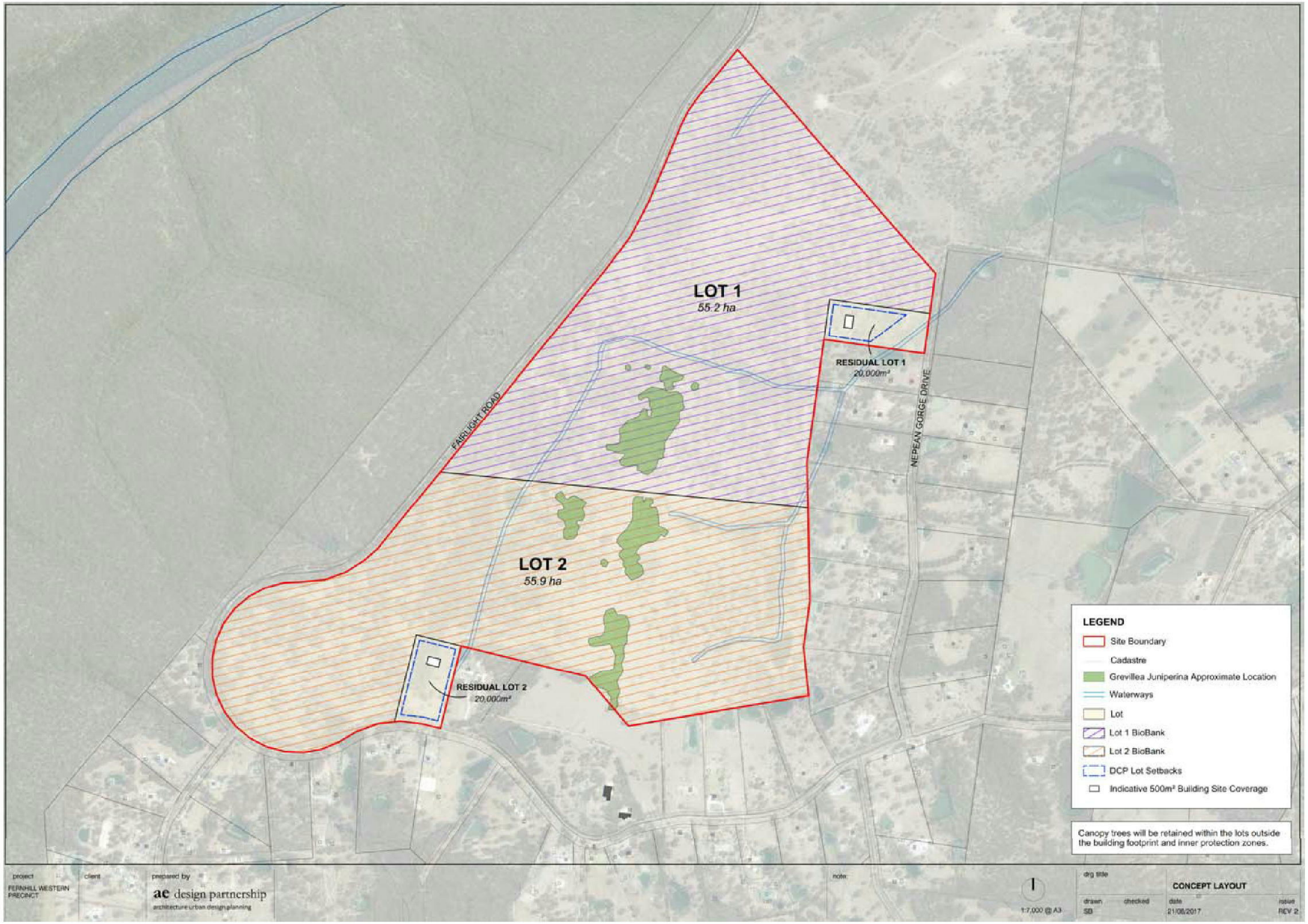


Figure 1 Location Map

(b) Vegetation classification

The identification of bush fire prone areas is required under Section 146 of the Environmental Planning and Assessment Act (1979). The subject land is designated as bushfire prone (as per Penrith City Council mapping -see Figure 2) due to the presence of bushfire prone land within and adjoining the site. A site-based hazard assessment was used to confirm bushfire prone vegetation adjoining the subject land.

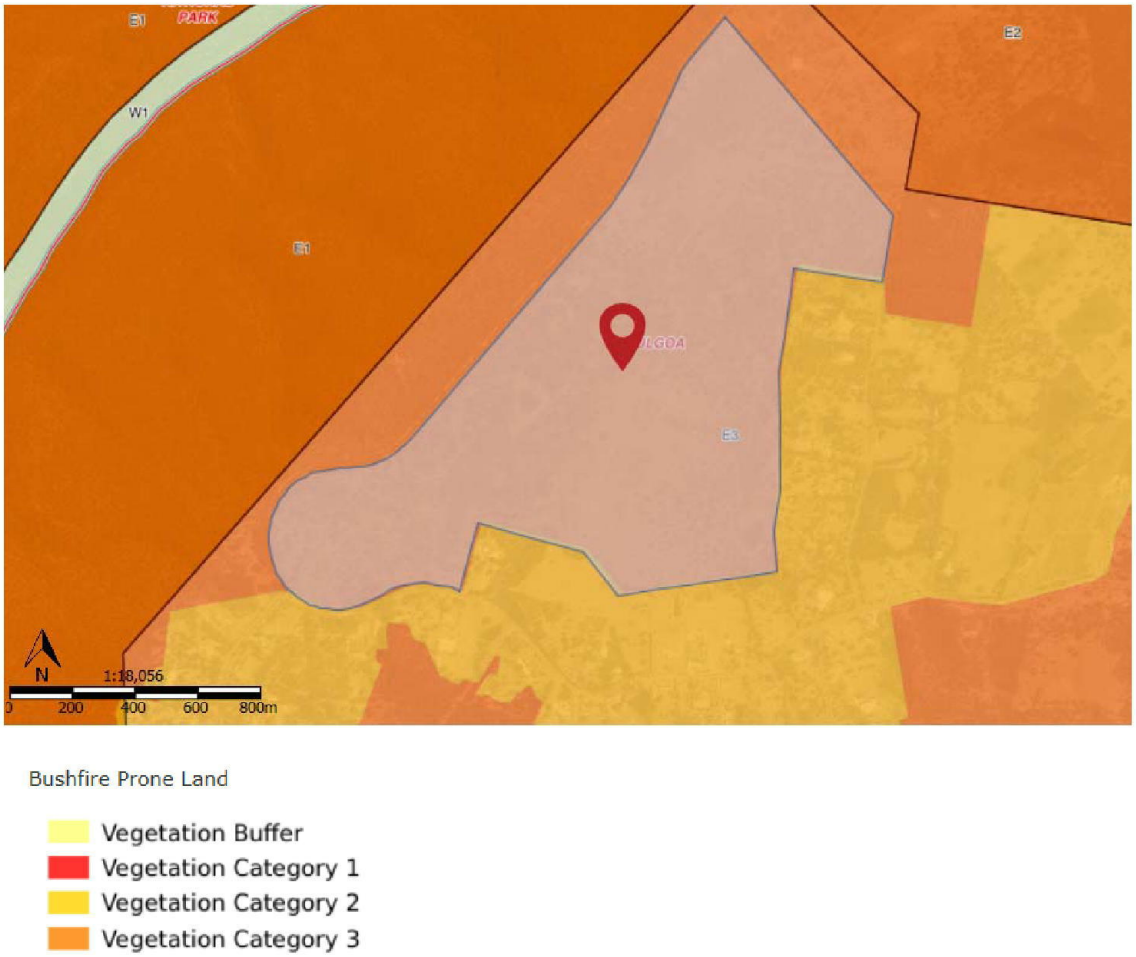


Figure 2 Bushfire Prone Lands Mapping

Survey transects of up to 140 m in length were completed on 8 September 2016 to confirm the "Predominant Vegetation Class Formation" in accordance with *Planning for Bushfire Protection* (NSWRFS 2006). The vegetation classes broadly correspond with the vegetation types shown in Figure 4 and Table 1.

Note: In the assessment we have assigned the vegetation classification based on:

- How the adjoining vegetation hazard in the biobank potentially *may* regenerate in the long term (as per *Planning for Bushfire Protection* (Appendix 2 – A2.2(ii) (NSWRFS 2006); and
- Adopting a purposefully conservative approach to avoid any potential confusion at the planning approval stage and therefore assigning a vegetation community (*forest*) where higher vegetation set back provisions apply. Based on this conservative approach the full extent of adjoining vegetation was classified as *forest* for the purpose of assigning asset protection zones and calculating bushfire attack levels. Though it should be noted that it is possible and likely that parts of the biobank may regenerate fully to a climax state as a *woodland* (*Coastal Valley Grassy Woodland* as per Keith 2004) rather than the *forest* classification applied here.

Table 1 Vegetation Type, Formation and Classification

Vegetation Type	Vegetation Formation (Keith 2004[1])	AS3959:2009[2] Classification
Red Bloodwood - Grey gum woodland (HN564)	*Dry Sclerophyll Forests (Shrub subformation)*	Forest
Hard-leaved Scribbly Gum - Parramatta Red Gum woodland (HN542)	*Dry Sclerophyll Forests (Shrub subformation)*	Forest
Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest (HN556)	*Dry Sclerophyll Forests (Shrub/grass subformation)*	Forest

The vegetation identified as *Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest* matches the description of *Dry Sclerophyll Forest – Shrubby Grass* vegetation formation (NSWRFS 2006) for the following reasons;

- Dominated by eucalypts >10m tall with foliage cover 20-50%;
- Presence of grasses in the understorey; and
- A significant shrub component in areas.

The scribbly gum and red bloodwood vegetation types match the description of *Dry Sclerophyll Forest – Shrubby* vegetation formation (NSWRFS 2006) owing to a predominance of understorey shrubs (over grasses in the community type above).

These vegetation formations can support high intensity bushfires, most likely burning as a crown fire in forest formations and as a faster moving surface fire in open woodland communities without a shrubby understorey. The subject land has been subject to high intensity bushfires in the past.

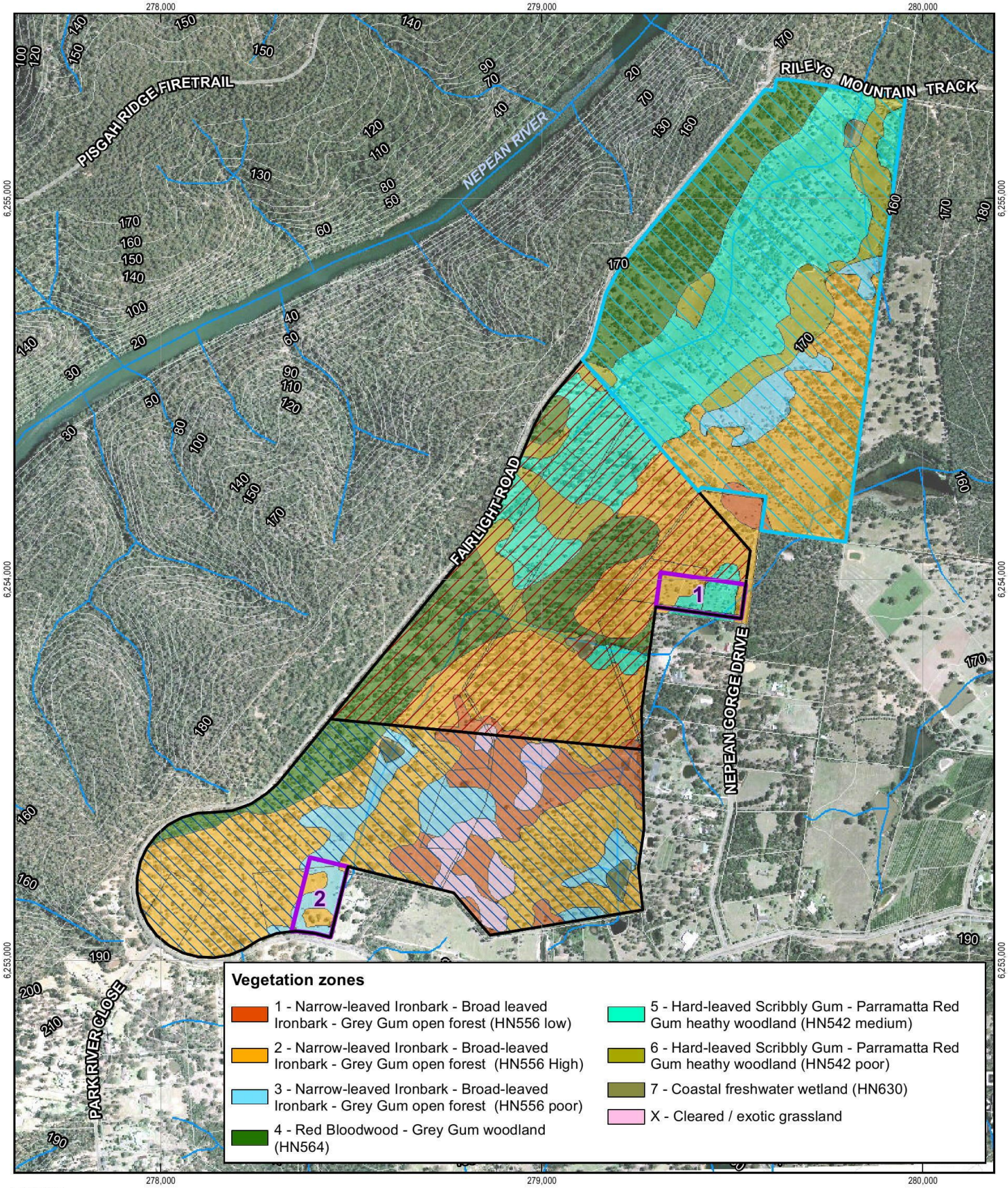
Photographs of vegetation formations are shown in Figure 3 and vegetation formations presented in Figure 4.

Figure 3 Vegetation photographs

[1] Keith, D.A. (2004) Ocean Shores to Desert Dunes, the native vegetation of New South Wales and the ACT. NSW Department of Environment and Conservation, Sydney.
[2] Standards Australia 1999. AS3959 – 2009 Construction of Buildings in Bushfire-prone areas. Standards Australia, Sydney.

(c) Slope description

Survey transects, 100 m in length were utilised to confirm the "Effective Slope" in accordance with *Planning for Bush Fire Protection* (NSWRFS 2006). Overall slope classes within the vegetation hazard were *>0-5 degrees downslope*. There are some areas adjoining the proposed where the slope is *upslope - 0 degrees* however the downslope areas are more likely to influence fire behaviour. Slope classes for the subject land are shown in Figure 5.



LEGEND

- New Lot boundaries
- Development site
- Fernhill Lot 1 biobank
- Fernhill Lot 2 biobank
- Northwest Biobank Site Boundary
- Watercourse
- Roads
- Cadastre

Paper Size A4

0 200 400

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

Angas Securities Pty. Ltd.
Fernhill Lot 1 DP 549247
Subdivision Ecology Assessment

Job Number 22-16709
Revision A
Date 29 Aug 2017

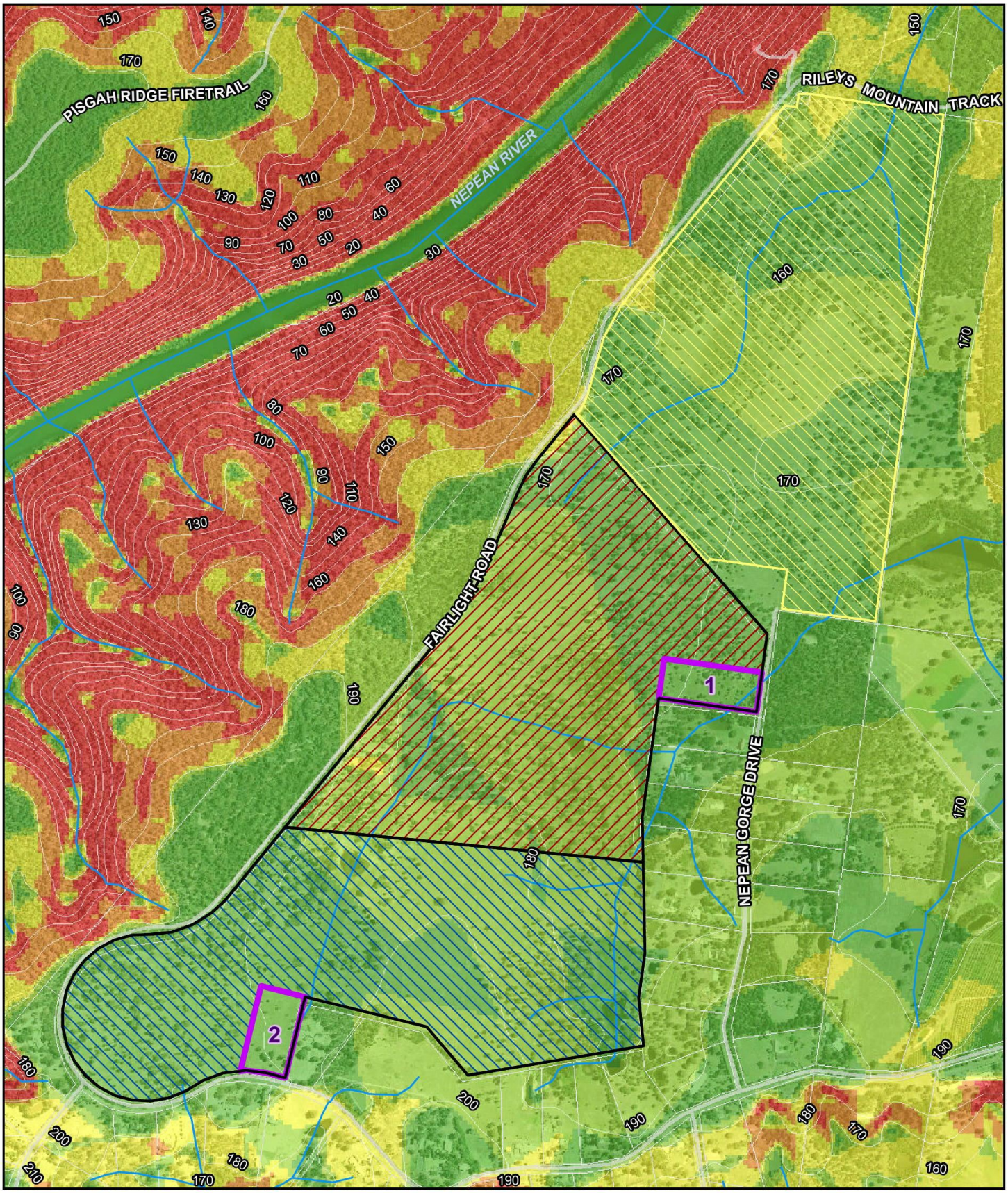
Vegetation zones

Figure 4

N:\AU\Sydney\Projects\22\16709\GIS\Maps\Bushfire_Assessment\22_16709_Z002_VegZones.mxd

Level 15, 133 Castlereagh Street Sydney NSW 2000 T 61 2 9239 7100 F 61 2 9239 7199 E sydmail@ghd.com.au W www.ghd.com.au

Data source: Geoscience Australia: 250k Data - Jan 2011;Google Earth Pro: Aerial Imagery, Accessed: 2013; Mott Macdonald: Indicative development footprint, digitised from hardcopy; GHD: Vegetation 22-10-2013. Created by:apmiller



LEGEND

- New Lot boundaries
- Development site
- Northwest Biobank Site Boundary
- Fernhill Lot 1 biobank
- Fernhill Lot 2 biobank
- Watercourse
- Roads
- Cadastre

Slope (Degrees)

- 0°
- 0° - 5°
- 5° - 10°
- 10° - 15°
- 15° - 20°

Paper Size A4

0 200 400

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

Angas Securities Pty. Ltd.
Fernhill Lot 1 DP 549247
Subdivision Ecology Assessment

Job Number 22-16709
Revision A
Date 29 Aug 2017

Slope assessment

Figure 5

N:\AU\Sydney\Projects\22\16709\GIS\Maps\Bushfire_Assessment\22_16709_Z003_Slope.mxd

Level 15, 133 Castlereagh Street Sydney NSW 2000 T 61 2 9239 7100 F 61 2 9239 7199 E sydmail@ghd.com.au W www.ghd.com.au

Data source: Geoscience Australia: 250k Data - Jan 2011;Google Earth Pro: Aerial Imagery, Accessed: 2013; Mott Macdonald: Indicative development footprint, digitised from hardcopy; GHD: Vegetation 22-10-2013. Created by:apmiller

(d) Significant environment values

Each lot adjoins a proposed OEH registered biobank. A National Park is located to the west and north of the study area.

(e) Threatened fauna and threatened flora

The vegetation community within and adjoining the subject land consists of

- Red Bloodwood – Grey gum woodland (HN564)
- Hard-leaved Scribbly Gum - Parramatta Red Gum heathy woodland (HN542)
- Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest (HN556) (potentially Shale/Sandstone Transition Forest EEC#); and

Note: The Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest (HN556) is potentially listed as EECs under the schedules of the NSW *Threatened Species Conservation Act 1995* or *Environment Protection and Biodiversity Conservation Act 1999.*

The threatened species *Grevillea juniperina* subsp. *juniperina* is recorded on the subject land but not on any of the proposed Lot sites.

(f) Aboriginal Cultural Heritage sites present

There is no Aboriginal object (within the meaning of the National Parks and Wildlife Act 1974) or Aboriginal place (within the meaning of that Act) that is known to the applicant situated on the property.

(g) Scope and limitations

This report: has been prepared by GHD and may only be used and relied on by for the purpose agreed as set out in Section 1 of this report.

The measures identified in this report cannot guarantee that a building will survive a bushfire event on every occasion. This is substantially due to the degree of vegetation management, the unpredictable nature and behaviour of fire, and extreme weather conditions.

GHD otherwise disclaims responsibility to any person arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

Determination of vegetation types is based on the vegetation types identified in the approved OEH biobank plan which adjoins the subject land. Slope classes are as based on state based mapping data sets.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

Site conditions (including the presence of hazardous substances and/or site contamination) may change after the date of this Report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.

2. Bush fire risk assessment of the proposed development

2.1 The extent to which the development is to provide for setbacks, including asset protection zones

Asset Protection Zones (APZ) are determined based on vegetation and slope.

APZ's for the subject land shall be applied (refer Figure 6 for the location) from the building dwelling wall outwards and accommodated entirely within the lot. They must comprise of Inner Protection Area (IPA) and an Outer Protection Area (OPA) of the dimensions shown in the table below. The residential dwelling is to be contained outside the APZ. The APZ widths in Table 2 are in accordance with Appendix 2 of the *PBP* (NSWRFS 2006).

Table 2 APZ dimensions applying to Residential Lots 1 and 2

Vegetation	Slope Class	APZ	IPA	OPA
Forest*	0-5 degrees	25 m	15 m	10 m

[* refer to note in Section 1.3]

Class 10b buildings (such as fences, retaining walls, walls and swimming pools) within the APZ need to be constructed of non-combustible materials. Where an above ground pool is erected it should not adjoin or be attached directly to the wall of the dwelling (NSWRFS 2006).

Class 10a buildings (such as a garage, carport, shed or other non-habitable buildings) need to be located greater than 10 m away from the dwelling. If the building is located within 10 m of the dwelling, the 10a building must meet the construction standard specified for the dwelling (NSWRFS 2006).

Inner Protection Area (IPA)

The IPA will extend from the building line. It is contained within the residential allotments and be maintained in accordance with *PBP* (NSWRFS 2006):

> *An IPA should provide a tree canopy cover of less than 15% and should be located greater than 2 m from any part of the roofline of a dwelling. Garden beds of flammable shrubs are not to be located under trees and should be no closer than 10 m from an exposed window of door. Trees should have lower limbs removed up to a height of 2 metres above ground.*

The property owner is responsible for the maintenance of the IPA.

Outer Protection Area (OPA)

The OPA will extend from the IPA (*i.e.* from the building line) towards the hazard. The landholder is responsible for the OPA contained within the subject land. Parts of the OPA may comprise an all-weather access road or fire trail managed. The OPA within the residential allotments is to be maintained in accordance with *PBP* (NSWRFS 2006) as a minimum requirement:

> *An OPA should provide a tree canopy cover of less than 30% and should have understorey managed (mowed) to treat all shrubs and grasses on an annual basis in advance of the fire season (usually September).*

Maintenance of bushfire fuel

Within the IPA and OPA fuels are to be managed in accordance with the *Standards for Asset Protection Zones* (NSWRFS 2005), this requires;

1. 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.

2. Mowing of grass:

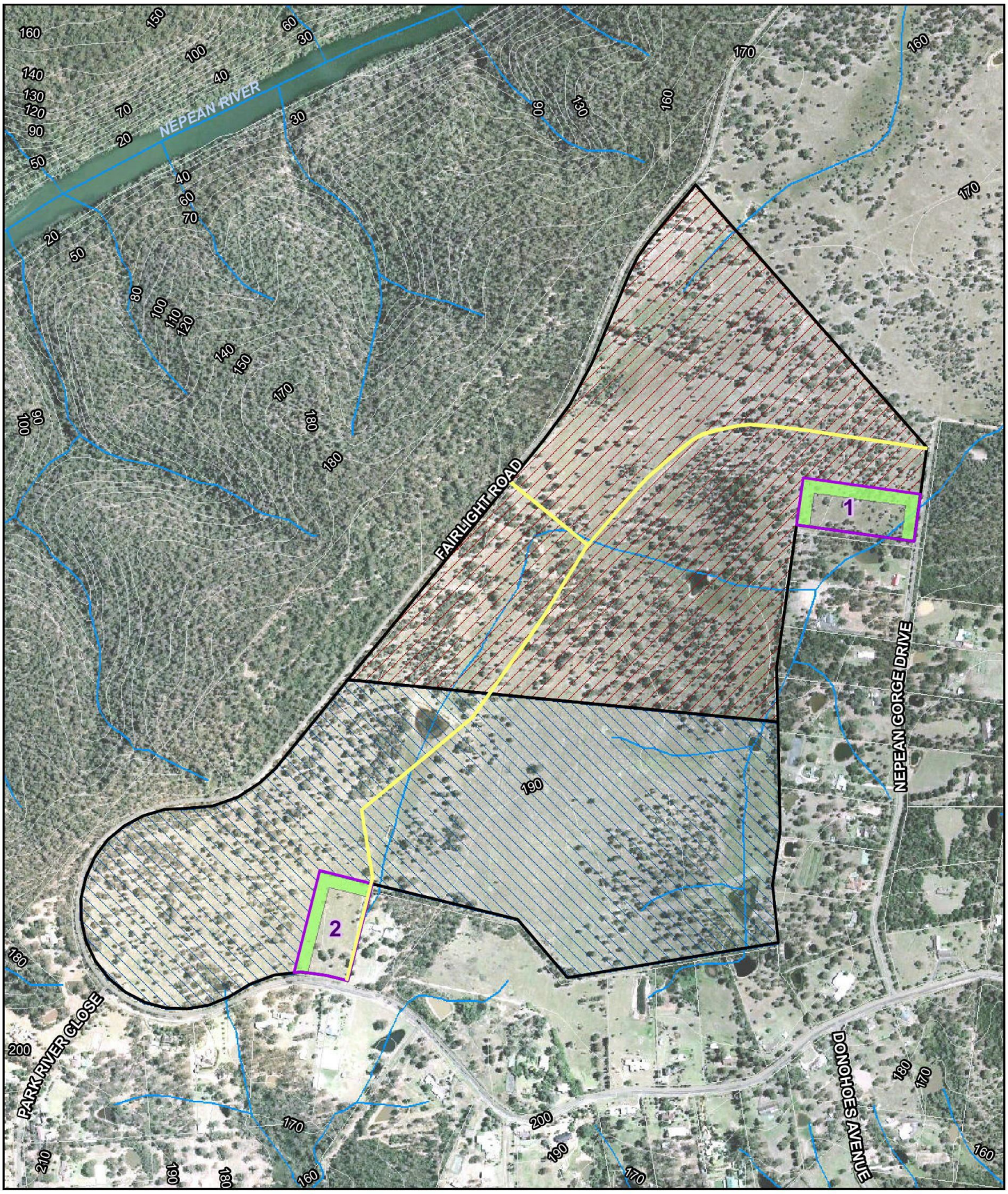
Grass needs to be kept short and where possible, green.

3. Removal or pruning of trees, shrubs and understorey:

Prune or remove trees so that there is discontinuous canopy leading from the hazard to the asset. Separate tree crowns by at least two to five metres. A canopy should not overhang within two to five metres of any building.

Native shrubs and trees should be retained as clumps or islands and should maintain a covering of no more than 20% of the area.

Performance Criteria Summary
✓ APZs can be installed, managed and maintained within each lot to prevent the spread of a fire towards the proposed building locations ✓ APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is negated



LEGEND

- New Lot boundaries
- Development site
- Fernhill Lot 1 biobank
- Fernhill Lot 2 biobank
- Watercourse
- Roads
- Cadastre
- Proposed Firetrail
- APZ 25m

Paper Size A4

0 200 400

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

Angas Securities Pty. Ltd.
Fernhill Lot 1 DP 549247
Subdivision Ecology Assessment

Job Number 22-16709
Revision A
Date 29 Aug 2017

APZ map

Figure 6

N:\AU\Sydney\Projects\22\16709\GIS\Maps\Bushfire_Assessment\2216709_Z005_APZ.mxd

Level 15, 133 Castlereagh Street Sydney NSW 2000 T 61 2 9239 7100 F 61 2 9239 7199 E sydmail@ghd.com.au W www.ghd.com.au

Data source: Geoscience Australia: 250k Data - Jan 2011;Google Earth Pro: Aerial Imagery, Accessed: 2013; Mott Macdonald: Indicative development footprint, digitised from hardcopy; GHD: Vegetation 22-10-2013, Base Topo Data: NSW LPI. Created by:apmiller

2.2 Siting and adequacy of water supplies for fire fighting, and electricity and gas

Water supply – non reticulated

Dedicated tank water will be supplied for each lot within the subject land and will include dedicated water tanks for fire fighting. As all lots are greater than 1 hectare each lot and will require water tanks:

- Of 20,000 litre capacity
- Located within the IPA (but away from the structure)
- Fitted with a 65mm Storz outlet (and gate or ball valve fitted)
- Manufactured of concrete or metal (for above ground tanks), with shielding where located on the hazard side of the building
- With associated external piping and taps made of metal
- Where located underground tanks must have an access hole of 200 mm to allow tankers to direct fill from the tank, and a hardened ground surface for truck access within four metres of the hole.

Electricity

Electricity lines within the subject land and servicing the proposed development will be overhead lines with the powerline owner responsible for installing, inspecting and completing powerline vegetation clearance works which comply with required regulatory requirements.

Gas

In order to comply with the Rural Fires Regulation, all gas supplies are to be installed and maintained in accordance with AS/NZS 1596 – 2014

Performance Criteria Summary

✓ For each lot a dedicated accessible water supply is to be located on each lot which must:

- Of 20,000 litre capacity
- Located within the IPA (but away from the structure)
- Fitted with a 65mm Storz outlet (and gate or ball valve fitted)
- Manufactured of concrete or metal (for above ground tanks), with shielding where located on the hazard side of the building
- With associated external piping and taps made of metal
- Where located underground tanks must have an access hole of 200 mm to allow tankers to direct fill from the tank, and a hardened ground surface for truck access within four metres of the hole.

✓ Gas and electricity can be installed to limit the potential for ignition to bushland

2.3 Capacity of public roads in the vicinity to handle increased volumes of traffic in the event of a bush fire emergency

Public roads

The subject land is accessed from Nepean Gorge Drive and Fairlight Road.

The existing public roads are two way, two-wheel drive, all weather roads (comprised of sealed and unsealed sections) and are of sufficient width to allow fire fighting vehicles to work. The width of the road complies with Table 4.1 of *Planning for Bushfire Protection 2006,* as shown below.

Curve radius (inside edge)	Swept Path (metres width)	Single lane (metres width)	Two way (metres width)
<25	3.6	4.5	8.7
25-39	3.3	4.2	8.1
40-69	3.0	3.9	7.5
70-100	2.7	3.6	6.9
>100	2.5	3.5	6.5

Source: AS2890.2 – 2002.

Table 4.1 – Road widths for Category 1 Tanker (Medium Rigid Vehicle)

Traffic management devices are not installed and curves are minimal to allow rapid access and egress. Curves have a minimum inner radius of six metres and the distance between the inner and outer curves is 6 m.

Maximum road grades do not exceed 3 degrees cross fall, are not > 10 degrees slope and the carrying capacity is sufficient to carry a fully loaded fire-fighting vehicle (15 tonnes).

A minimum vertical clearance width of 4 metres is present.

Parking bays are not provided and therefore will not obstruct or reduce the paved width.

Performance Criteria Summary

- ✓ Fire fighters are provided with two-way all weather access to each lot
- ✓ Public road width allows safe access for fire fighters and evacuating residents
- ✓ Road capacity is sufficient to carry a fully loaded fire vehicle
- ✓ Fairlight Road and Nepean Gorge Drive is clearly signposted
- ✓ Parking does not obstruct the paved width

Property access

Fire appliance will generally be operating from the public road and driveway and dwellings are not located more than 200 metres from a public road.

Performance Criteria Summary

- ✓ Property access from the public road to proposed building locations does not exceed 200 metres and each property will have dedicated water supply to be located within the IPA (see Section 2.2)

2.4 Adequacy of arrangements for access to and egress from the development site for an emergency response

The public road network (as described in Section 2.3) provides suitable access fo rand egress for fire management and emergency response purposes.

2.5 Adequacy of bush fire maintenance plans and fire emergency procedures for the development site

The need to formulate an emergency evacuation plan should be advised to future residents, and they should complete a Bush Fire Survival Plan as formulated by the NSW Rural Fire Service and the NSW Fire Brigades; however, an emergency evacuation plan is not recommended as a condition of consent.

2.6 Construction standards to be used for building elements in the development

The Australian Standard AS 3959:2009 (*Construction of buildings in bushfire prone areas*) provides methodologies (*Method 1* (simplified) and *Method 2* (detailed)) to calculate bushfire attack level (BAL). The simplified procedure methodology (*Method 1*) is applied to subject land and identifies the BAL requirements that are triggered based on the vegetation and slope class, as shown in the table below.

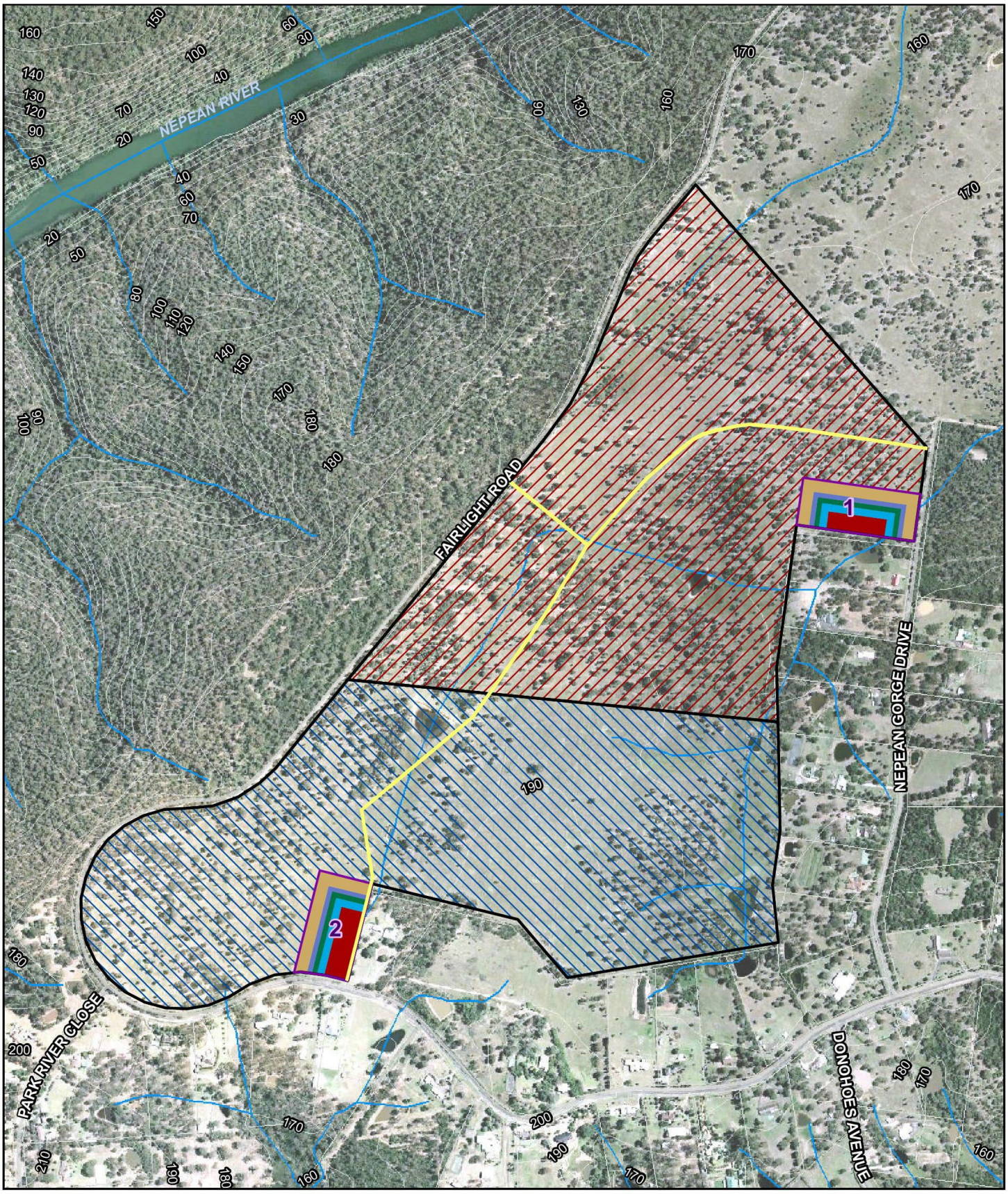
Both the lots in the subdivision can achieve the performance criteria of BAL not exceeding 29 kW/m^2 identified in *PBP* (NSWRFS 2006).

Table 3 AS 3959:2009 BAL Calculation and distance separation for subdivision lots

Residential Lots	Vegetation	Slope Class	FZ& BAL40 - Construction not permitted for lots	BAL 29	BAL 19	BAL 12.5
Lot 1 and Lot 2	Forest	0-5 degrees	<32m	32-<43m	43-<57m	57-<100m
			Minimum distance from residential structure to predominant vegetation in metres			

Performance Criteria Summary

- ✓ For both lots a building footprint can be located within the lot such that the radiant heat levels at any point on a proposed building site will not exceed 29 kW/m^2. The subdivision can achieve the PBP performance criteria of the BAL not exceeding 29 kW/m^2 .



LEGEND

- New Lot boundaries
- Development site
- Fernhill Lot 1 biobank
- Fernhill Lot 2 biobank
- Watercourse
- Roads
- Cadastre
- Proposed Firetrail

BAL Zone

BAL FZ | BAL 29 | BAL 12.5 | BAL 40 | BAL 19

Paper Size A4

0 200 400

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

Angas Securities Pty. Ltd.
Fernhill Lot 1 DP 549247
Subdivision Ecology Assessment

Job Number 22-16709
Revision A
Date 29 Aug 2017

BAL map

Figure 6

N:\AU\Sydney\Projects\22\16709\GIS\Maps\Bushfire_Assessment\2216709_Z006_BAL.mxd

Level 15, 133 Castlereagh Street Sydney NSW 2000 T 61 2 9239 7100 F 61 2 9239 7199 E sydmail@ghd.com.au W www.ghd.com.au

Data source: Geoscience Australia: 250k Data - Jan 2011;Google Earth Pro: Aerial Imagery, Accessed: 2013; Mott Macdonald: Indicative development footprint, digitised from hardcopy; GHD: Vegetation 22-10-2013, Base Topo Data: NSW LPI. Created by:apmiller

2.7 Adequacy of sprinkler systems and other fire protection measures to be incorporated into the development

Sprinkler systems are not proposed or required to improve bushfire protection of the subdivision.

2.8 Assessment of the extent to which the proposed development conforms

The bushfire protection measures that apply to the subject land comply with the "acceptable solutions" for each "performance measure " for a residential / rural residential subdivision within Sections 4.1 and 4.2 of PBP(NSWRFS 2006). As a result, compliance with the objectives of PBP has been achieved, as summarised in the table below. The development including the bushfire protection measures outlined in Section 2 of this report is therefore appropriate for the issuance of bush fire safety certificate.

Table 4 Compliance with *Planning for Bushfire Protection 2006*

Measure	Assessment of Compliance with Acceptable Solutions	Meets performance criteria?
Asset Protection Zones	The proposed development has achieved the performance criteria by complying with the acceptable solutions in Section 4.1.3 of PBP, i.e. • An APZ can be provided in accordance with Appendix 2 of Planning for Bushfire Protection 2006 (refer to Section 2.1) • The APZ for each lot can be wholly within the boundaries of the development site (refer to Section 2.1) • The APZ will be managed in accordance with the requirements of Standards for Asset Protection Zones (RFS 2005) (refer to Section 2.1) • The APZ for each lot is located on lands with slopes less than 18 degrees (refer to Section 2.1)	Yes
Public Roads	The proposed development has achieved the performance criteria by complying with the acceptable solutions, i.e.; • Existing public roads are two-wheel drive (refer to Section 2.3) • Traffic calming devices are not proposed (refer to Section 2.3) • Public roads will have a crossfall not exceeding 3 degrees and grades not exceeding 10 degrees. • A minimum vertical distance of >4 m will be maintained (refer to Section 2.3).While the two public roads are dead-end roads, each single lot adjoins an existing lot and access and egress is not through developed rural subdivisions. • Curves are minimal and have the required dimensions. • Existing public roads have a capacity of greater than 15 tonnes and there are no bridges with load restrictions. • Parking will be within driveways and will not obstruct minimum paved width	Yes
Property Access Roads	Each lot has direct access to a public road (<200m).	Yes

Services – Water, electricity and gas	The proposed development has achieved the performance criteria by complying with the acceptable solutions, i.e.; • Non-reticulated tank water will be provided within the required specifications and capacity (refer to section 2.2) • Hydrants will not be located within parking areas and will comply with AS 2419.1 (2005). • Electricity will be supplied via overhead powerlines with 30 m pole spacing and in accordance with Energy Australia specifications (NS179, 2002) and maintained according to National distribution network standards. • Gas supplies, where installed, will be in accordance with AS/NZS 1596 (2014).	Yes

3. Recommendations

The following bushfire protection measures are made for the proposed two lot residential subdivision of the subject land on Nepean Gorge Road and Fairlight Road Mulgoa (part Lot No. 1 Plan No.549247). Application of these recommendations allows the development to conform with the standards, specific objectives and performance criteria set out in Sections 4.1 and 4.2 (Performance Based Controls) of Planning for Bush Fire Protection (NSWRFS 2006), as detailed in Section 2 of this report.

1. Bush Fire Safety Authority	As the proposed subdivision can achieve compliance with the relevant performance criteria of *Planning for Bushfire Protection* (NSWRFS 2006), the issuance of a bush fire safety authority under Section 100B of the Rural Fires Act (1997) is appropriate.
2. Construction Standard	Both lots within the proposed subdivision shall enable the construction of a residence to BAL 29 (or less) as per the requirements of AS3959:2009 'Construction of Buildings in Bushfire Prone Areas'
3. Asset protection zones	From the commencement of construction and in perpetuity, each lot shall incorporate an APZ, including an inner protection area and outer protection area, in accordance with the dimensions identified in Table A2.4 and Table A2.7 in Appendix 2 of PBP, and the NSW RFS document 'Standards for asset protection zones'. Inner Protection area should provide a tree canopy cover of less than 15% and should be located greater than 2 m from any part of the roofline of a dwelling. Garden beds of flammable shrubs are not to be located under trees and should be no closer than 10 m from an exposed window of door. Trees should have lower limbs removed up to a height of 2 metres above ground. An Outer Protection Area should provide a tree canopy cover of less than 30% and should have understorey managed (mowed) to treat all shrubs and grasses on an annual basis in advance of the fire season (usually September).
4. Emergency and evacuation planning	It is advised that the residents should complete a Bush Fire Survival Plan as formulated by the NSW Rural Fire Service and the NSW Fire and Rescue. An emergency evacuation plan is not recommended as a condition of consent.
5. Water supplies and services	For each lot a dedicated accessible water supplies must be located on each lot which must be: ○ Of 20,000 litre capacity ○ Located within the IPA (but away from the structure) ○ Fitted with a 65mm Storz outlet (and gate or ball valve fitted) ○ Manufactured of concrete or metal (for above ground tanks), with shielding where located on the hazard side of the building ○ With associated external piping and taps made of metal

	○ Where located underground tanks must have an access hole of 200 mm to allow tankers to direct fill from the tank, and a hardened ground surface for truck access within four metres of the hole. Electricity will be supplied via overhead powerlines with 30 m pole spacing and in accordance with Energy Australia specifications (NS179,2002) and maintained according to National distribution network standards. Gas supplies, where installed, will be in accordance with AS/NZS 1596(2014).

4. Summary

This report consists of a bushfire risk assessment to support a proposed rezoning to facilitate a proposed two lot residential subdivision (and two lot biobank subdivision), 88-89 Nepean Gorge Drive/Fairlight Road Mulgoa (part Lot No. 1Plan No. 549247).

The report concludes that the development is on bushfire prone land and the legislative requirements for development in bushfire prone areas are applicable.

This report has considered all of the elements of bushfire attack and provided the proposed development is constructed in accordance with the recommendations included in Section 3 of this report, the development is considered to satisfy the Objectives and Performance requirements of the Building Code of Australia, Planning for Bushfire Protection 2006 and Australian Standard AS3959, 2009.

This report has demonstrated that the proposed subdivision can comply with the Specific Objectives for Subdivision in accordance with the requirements of PBP and therefore qualifies for a Bushfire Safety Authority.

5. References

NSWRFS (NSW Rural Fire Service) 2005. *Standards for Asset Protection Zones.*

NSWRFS (NSW Rural Fire Service) 2006. *Planning for Bush Fire Protection: A Guide for Councils, Planners, Fire Authorities and Developers.* Prepared by NSW Rural Fire Service in cooperation with the Department of Planning.

Standards Australia 2009. *AS3959 – 2009 Construction of Buildings in Bushfire-prone areas.* Standards Australia and the Australian Building Codes Board, Sydney.

Standards Australia 2014 *AS/NZS 1596 The Storage and Handling of LP Gas.*

Standards Australia 2005. *AS2419.1 – 2005 Fire Hydrant installations – System design, installation and commissioning*

GHD

133 Castlereagh St Sydney NSW 2000

-

T: +61 2 9239 7100 F: +61 2 9239 7199 E: sydmail@ghd.com.au

G:\22\16709\WP\217746.docx

Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	D.Adshead	P.deMar		DMA		29/08/2017

www.ghd.com