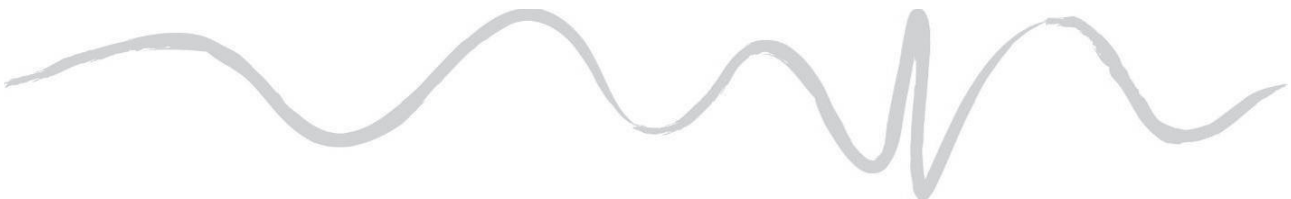


Preliminary Bushfire Hazard Assessment

Lake Macquarie City Council
George Booth Drive, Edgeworth
Local Environmental Study



Preliminary Bushfire Hazard Assessment

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Local Environmental Study

Prepared for: Lake Macquarie City Council
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<i>UPR</i>	<i>Description</i>	<i>Date Issued</i>	<i>Issued By</i>	<i>Reviewed By</i>
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Executive Summary

GeoLINK has been engaged by Lake Macquarie City Council (LMCC) to prepare a preliminary bushfire hazard assessment for land described as Lot 88 DP755262, Lot 107 DP100048 and Part Lots 6 and 7 DP 4647. The total area of the site is 99.15 ha and is located approximately 17 km west of Newcastle, NSW. This assessment will inform a rezoning application for future urban development of the site.

LMCC's bushfire prone land mapping indicates that the site contains category one and category two vegetation as well as the associated buffers and is therefore classified as bushfire prone land.

The site contains extensive stands of native vegetation, four powerline easements and numerous tracks and trails. Five vegetation communities were recorded within the site (Eastcoast Flora Surveys 2008) identified as:

- Hinterland Spotted Gum – Red Ironbark Forest;
- Coastal Plains Stringybark-Apple Forest;
- Red Mahogany-Apple Paperbark Forest;
- Red Ironbark – Paperbark Forest; and
- Depression Paperbark Forest.

Development of the site will require substantial vegetation removal which has been assessed within the Local Environmental Study. It is not expected that there will be any adverse impacts to any items of environmental or cultural significance as a result of implementing and/or maintenance of bushfire protection measures.

The site is typified by moderately undulating terrain, dominated by a rounded ridgeline which lies north/north-west with a prominent rounded peak located in the centre of the site. Elevation on the site ranges from 18 to 61 m AHD.

Bushfire protection measures are required on bushfire prone land at the development application (DA) stage therefore a further assessment must be undertaken at the DA stage.

Based on consideration of the vegetation, effective slope and fire danger index, the assessment has identified that adequate and appropriate bushfire hazard protection measures are available, and can be implemented to facilitate future urban development of the site. The proposed rezoning conforms to the standards, specific objectives and performance criteria set out in *Planning for Bushfire Protection 2006*.

Introduction

1.1 Scope and Purpose

GeoLINK has been engaged by LMCC to prepare a preliminary bushfire hazard assessment for land described as Lot 88 DP755262, Lot 107 DP100048 and Part Lots 6 and 7 DP 4647. The total area of the site is 99.15 ha and it is located approximately 17 km west of Newcastle, NSW. This assessment will inform a rezoning application for future urban development of the site.

Section 2 of this assessment describes the site and the proposed development. **Section 3** provides an assessment with regard to the aims and objectives of PBP, including asset protection zones (APZs), access and water and utility requirements. **Section 4** provides a summary of the issues addressed.

The assessment contained in this report has been prepared with regard to:

- *Planning for Bushfire Protection (PBP) 2006;*
- *Addendum: Appendix 3 (2010) Planning for Bushfire Protection*
- *Environmental Planning and Assessment Act 1979;*
- *Rural Fires Act 1997;*
- *Rural Fires and Environmental Assessment Legislation Amendment Act 2002;* and
- *Australian Standard 3959-2009 Construction of Buildings in Bushfire Prone Areas.*

Background data has been reviewed and a detailed site inspection has been completed. This report serves to:

- identify the site and proposed development;
- determine the bushfire threat; and
- identify precautions required to improve the chances of building survival in the event of a bushfire.

1.2 Legislative Framework

The *Rural Fires Act 1997*, *Rural Fires and Environmental Assessment Legislation Amendment Act 2002* and the *Environmental Planning and Assessment Act 1979* institute a framework for environmental planning and assessment to consider bushfire hazard issues.

LMCC's bushfire prone land mapping indicates that the site is mapped as containing vegetation category one, two and associated buffers. The site is therefore classified as bushfire prone land (refer to **Illustration 1.1**). Council's bushfire prone land mapping has been prepared as a requirement of Section 146 of the *Environmental Planning and Assessment Act 1979* and in accordance with the *NSW Rural Fire Services Guideline to Bushfire Prone Land Mapping*.

Section 91 of the *Environmental Planning and Assessment Act 1979* and Section 100B of the *Rural Fires Act 1997* establishes that a *Bushfire Safety Authority (BSA)* is required for:

- subdivision of bushfire prone land that could be lawfully used for residential or rural residential purpose; or
- development of bushfire prone land for a 'special fire protection purpose' (SFPP - includes uses such as schools, child care centres, tourism development, retirement homes etc).

Bushfire protection measures are required on bushfire prone land at the DA stage. This report however, accompanies a rezoning application, therefore only a preliminary assessment has been undertaken. A further assessment, whereby all requirements outlined within *Clause 46 Application for Bushfire Safety Authority* of the *Rural Fires Regulation 2002* to obtain a BSA, must be undertaken at the DA stage. At the DA stage, an assessment to determine building requirements in accordance with *Australian Standard 3959-1999 Construction of Buildings in Bushfire Prone Areas* will also be required.

Planning for Bushfire Protection 2006 has been adopted through the *Environmental Planning and Assessment Amendment (Planning for Bushfire Protection) Regulation 2007* and the *Rural Fires Amendment Regulation 2007*. This version replaces *Planning for Bushfire Protection 2001*. The changes were gazetted on 28 February 2007 and took effect on 1 March 2007.



LEGEND

- Site boundary
- Bushfire vegetation buffer (100 m and 30 m)
- Vegetation category 1
- Vegetation category 2



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Background

2.1 Location and Description

The land is described in real property terms as Lot 88 DP755262, Lot 107 DP100048 and Part Lots 6 and 7 DP 4647. The site is bound by George Booth Drive to the north, the suburbs of Edgeworth to the east, Barnsley to the south and Holmesville to the west (refer to **Illustration 2.1**).

The site is 99.15 ha of mostly vegetated land with cleared areas associated with the two major electricity easements.



Plate 1.1 Vegetation and cleared powerline easements on the site



Plate 1.2 Moderately undulating terrain on the site

2.2 Zoning and Land Use

The site is zoned 10 Investigation Zone under the Lake Macquarie Local Environmental Plan 2004 (refer to **Illustration 2.2**). Land adjoining the site is zoned 5 Infrastructure, 2(1) Residential, 7(3) Environmental General, 6(1) Open Space and 7(2) Conservation (Secondary).

Native vegetation covers the site, with cleared corridors associated with power transmission lines. Land to the south, east and north-west of the site comprises residential areas.

2.3 Significant Environmental Features

There are no SEPP 14 Coastal Wetlands or SEPP 26 Littoral Rainforest within the site. SEPP 14 Coastal Wetland number 55169 is located 1.5 km south-east of the site.

2.4 Threatened Species, Populations or Endangered Ecological Communities

Eastcoast Flora Surveys undertook a vegetation assessment of the site. The site contains:

- 173 native plant taxa across five definable vegetation communities:
 - Hinterland Spotted Gum – Red Ironbark Forest;
 - Coastal Plains Stringybark-Apple Forest;
 - Red Mahogany-Apple Paperbark Forest;
 - Red Ironbark – Paperbark Forest; and
 - Depression Paperbark Forest;
- two species listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* or NSW *Threatened Species Conservation Act 1995*:
 - Netted Bottlebrush (*Callistemon linearifolius*);
 - Black-eyed Susan (*Tetratheca juncea*);
- one species listed under the Rare or Threatened Australian Plants (RoTAP), *Eucalyptus fergusonii*;
- two Endangered Ecological Communities (EECs) that occupy 54% of the total site:
 - Lower Hunter Spotted Gum-Ironbark Forest, Sydney Basin bioregions (LHSGIF); and
 - Swamp Sclerophyll Forest on Coastal Floodplains, North Coast, Sydney Basin and South-east Corner bioregions.

Forest Fauna Surveys Pty Ltd undertook a fauna investigation and survey of habitat trees of concern for the site. The findings of the fauna investigation are as follows:

- 58 bird species, 16 mammal species, three reptiles and seven frog species were recorded within, or immediately adjacent to the site;
- five threatened species were recorded during the fauna surveys:
 - Squirrel Glider (*Petaurus norfolcensis*),
 - Little Bent-wing Bat (*Miniopterus australis*),
 - Eastern Bent-wing Bat (*Miniopterus schreibersii oceanensis*),
 - Large-eared Pied Bat (*Chalinolobus dwyeri*), and
 - Grey-headed Flying-fox (*Pteropus poliocephalus*);
- an additional threatened species was possibly recorded on site, either the Greater Broad-nosed Bat (*Scoteanax rueppellii*) or Eastern Falsistrelle (*Falsistrellus tasmaniensis*);
- two habitat types were defined for the site, Open Forest and Open Grassland;
- the site has experienced a high degree of disturbance to the native vegetation by impacts of logging (past and present), vehicle and pedestrian tracks, dumping of domestic and commercial waste, weeds, clearing of easements for infrastructure utilities (powerlines) and fire;
- parts of the site experience a high to very high fire frequency. The general age of the forest structure is juvenile aged trees with an average of 1.3 habitat trees per hectare (very low); and
- the condition of the fauna habitat within the site is rated as very poor for many fauna species, particularly smaller terrestrial vertebrates.

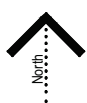
The survey of habitat trees of concern found that the threatened Masked Owl (*Tyto Novaehollandiae*) utilises the site extensively for roosting and nesting.

2.5 Proposed Rezoning

The proposed rezoning application is for future urban development including low density residential, medium density residential, a neighbourhood centre, live/work precinct and a business park (refer to **Illustration 2.3**). Additionally, a significant part of the site will be rezoned for environmental protection purposes.

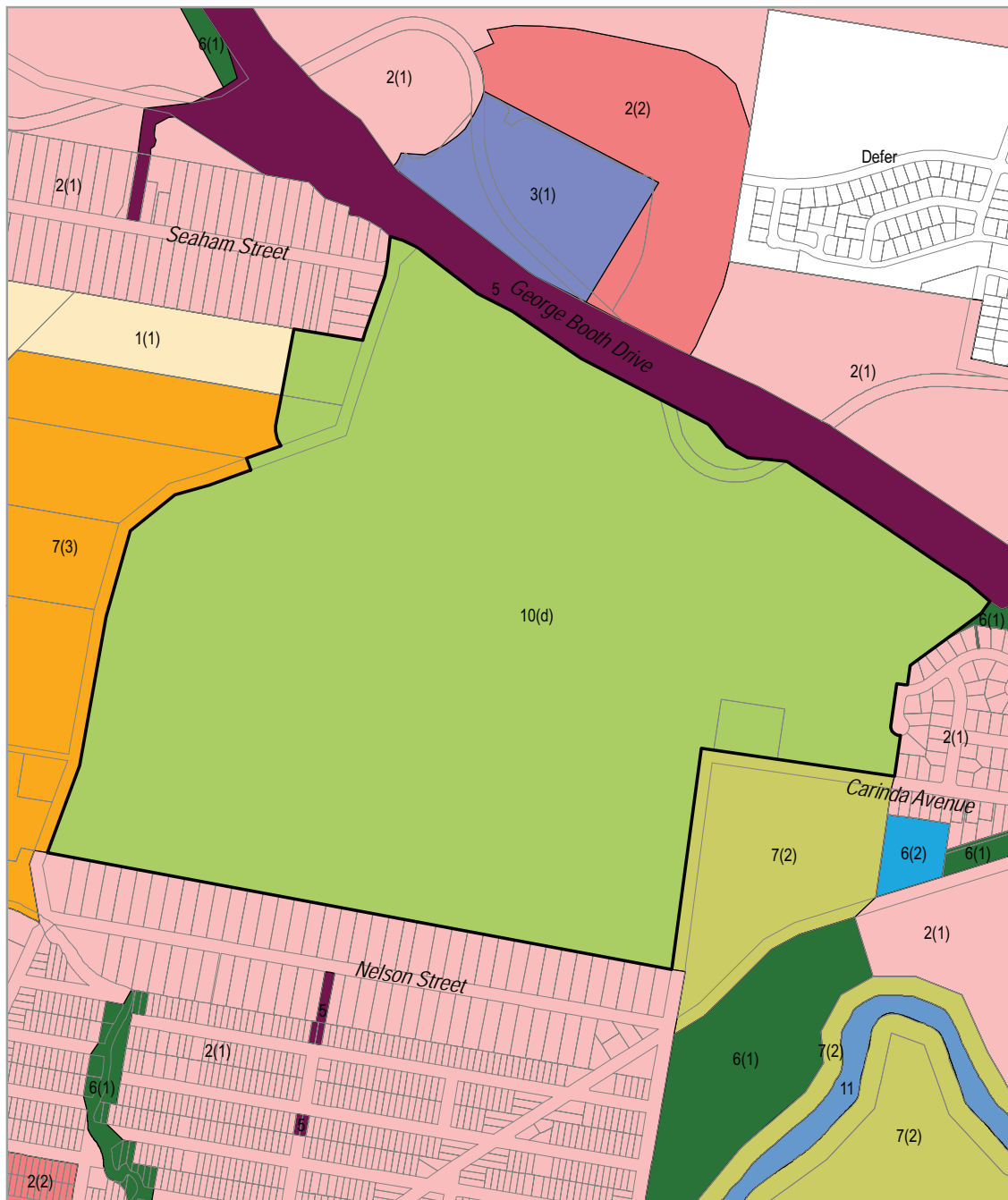
The proposed rezoning will include:

- creation of residential lots and business precincts;
- water reticulation to each lot; and
- stormwater management works.



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LEGEND

Site boundary	6(2) Tourism and Recreation
1(1) Rural Production	7(2) Conservation (Secondary)
2(1) Residential	7(3) Conservation (General)
2(2) Residential (Urban Living)	10(d) Investigation Zone
3(1) Urban Centre	11 Lake and Waterways
5 Infrastructure	Deferred Matter
6(1) Open Space	



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LEGEND

-  Site boundary
-  Development areas



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Planning for Bushfire Protection

3.1 Bushfire Assessment

3.1.1 Vegetation

The site contains extensive stands of native vegetation, four cleared powerline easements and numerous tracks and trails. Plates 3.1 to 3.3 provide images of vegetation on the site. Five vegetation communities were recorded within the site (Eastcoast Flora Surveys 2008) identified as:

- Hinterland Spotted Gum – Red Ironbark Forest;
- Coastal Plains Stringybark-Apple Forest;
- Red Mahogany-Apple Paperbark Forest;
- Red Ironbark – Paperbark Forest; and
- Depression Paperbark Forest.



Plate 3.1 Vegetation on the site



Plate 2.1 Vegetation on the site



Plate 2.2 Vegetation on the site

Vegetation has been assessed in terms of potential fire hazard using the formation classes provided within Table A2.1 of PBP 2006. Council's bushfire prone land mapping indicates that the main bushfire hazard is the native vegetation occupying the site.

The proposed development areas are located in the north of the site (Area 1) and a small area in the east of the site (Area 2) (refer to **Illustration 2.3**). Dominant vegetation formations for 140 m around the proposed development areas are outlined in **Table 3.1**.

Table 3.1 Predominant Vegetation Classes

<i>Aspect</i>	<i>Vegetation Classes Present</i>	<i>Dominant Vegetation Class</i>	<i>Vegetation Classes Present</i>	<i>Dominant Vegetation Class</i>
	Area 1		Area 2	
North	Forest, Managed Land	Forest	Forest	Forest
North-east	Forest, Managed Land	Forest	Managed Land	Managed Land
East	Forest	Forest	Managed Land	Managed Land
South-east	Forest	Forest	Managed Land	Managed Land
South	Forest	Forest	Forest	Forest
South-west	Forest	Forest	Forest	Forest
West	Forest, Managed Land	Forest	Forest	Forest
North-west	Managed Land	Managed Land	Forest, Managed Land	Forest

3.1.2 Slope

The area is typified by moderately undulating terrain, dominated by a rounded ridgeline which lies north/north-west with a prominent rounded peak located in the centre of the site. Elevation on the site ranges from 18 to 61 m AHD. The peak located in the centre of the site contains the highest point, which has an elevation of approximately 61 m AHD. The site slopes down to Slatey Creek in the west and Crooked Hat Creek in the east (refer to **Illustrations 3.2** and **3.3**).

The effective slope however, is that part of the overall slope under the vegetation assessed as being a hazard that will have the greatest influence on the bushfire behaviour in relation to the development. The effective slope for the proposed development areas are summarised in **Table 3.2**.

Table 3.2 Effective Slope

<i>Aspect</i>	<i>Effective Slope Category</i>	<i>Effective Slope Category</i>
	Area 1	Area 2
North	>0-5°	>0-5°
North-east	>0-5°	>0-5°
East	>0-5°	>0-5°
South-east	>5-10°	>0-5°
South	>5-10°	>0-5°
South-west	>0-5°	>0-5°
West	>0-5°	>0-5°
North-west	>0-5°	>0-5°

3.1.3 Fire Weather Area

LMCC local government area is located within the 'Greater Hunter' fire area, with a Fire Danger Index (FDI) rating of 100.



LEGEND

-  Site boundary
-  Coastal Plains Stringybark - Apple Forest
-  Depression Paperbark Thicket
-  Disturbed - Canopy only
-  Hinterland Spotted Gum - Red Ironbark Forest
-  Red Ironbark - Paperbark Forest
-  Red Mahogany - Apple Paperbark Forest



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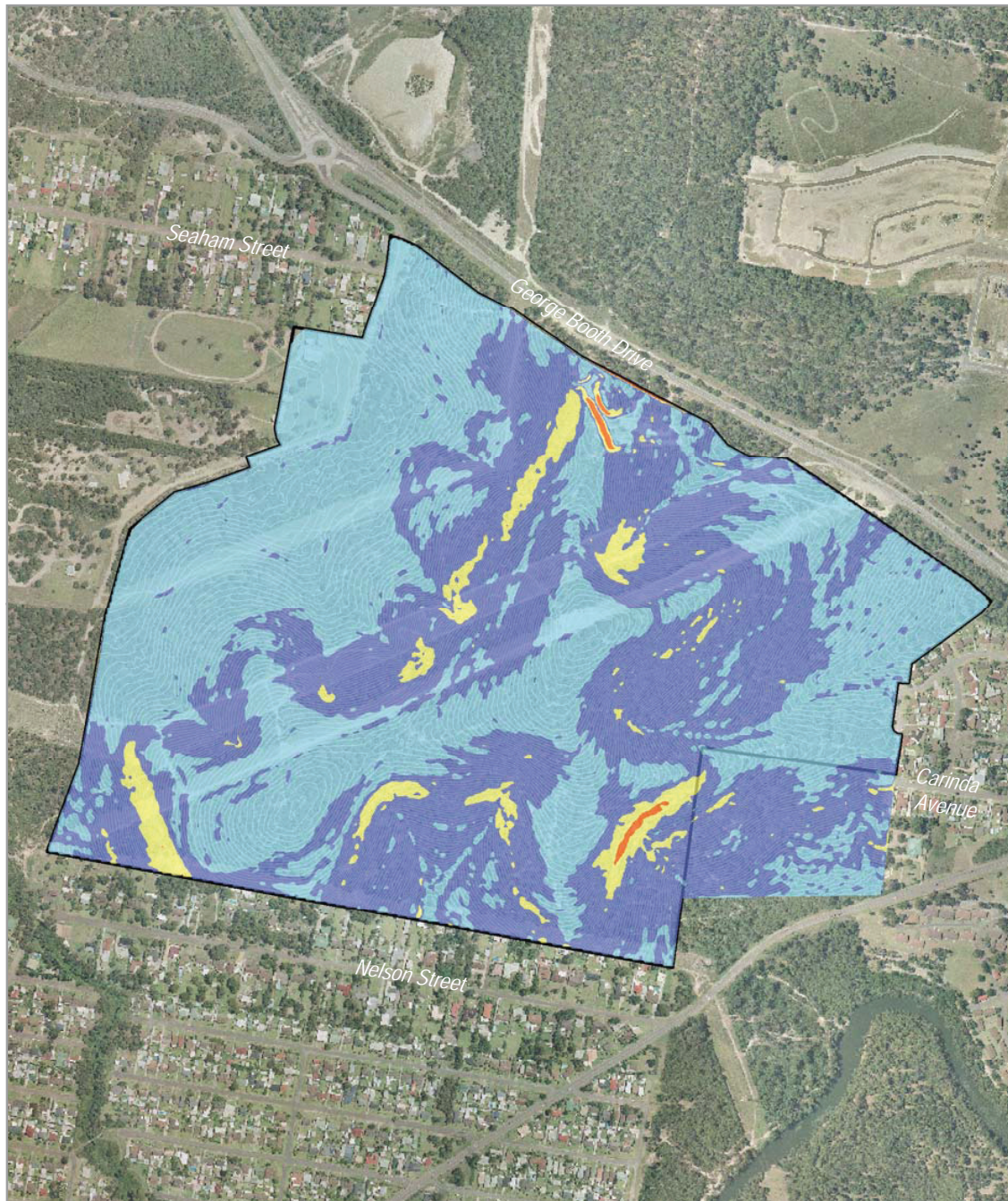
LEGEND

-  Site boundary
-  Contours at 0.5 metre centres



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LEGEND

-  Site boundary
-  0-5 degrees
-  5-10 degrees
-  10-15 degrees
-  >15 degrees
-  Contours at 0.5 metre centres



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3.2 Bushfire Protection Measures

3.2.1 Asset Protection Zones

The APZ requirements have been calculated based on the effective slope, FDI rating and vegetation formations (refer to **Tables 3.3 and 3.4**).

Table 3.3 APZ Requirements for Area 1

<i>Aspect</i>	<i>Dominant Vegetation Formation</i>	<i>Effective Slope Category</i>	<i>Inner Protection Area (IPA)</i>	<i>Outer Protection Area (OPA)</i>	<i>Total Asset Protection Zone (m)</i>
North	Forest	>0-5°	15	10	25
North-east	Forest	>0-5°	15	10	25
East	Forest	>0-5°	15	10	25
South-east	Forest	>5-10°	20	15	35
South	Forest	>5-10°	20	15	35
South-west	Forest	>0-5°	15	10	25
West	Forest	>0-5°	15	10	25
North-west	Managed Land	>0-5°	APZ not required		

Table 3.4 APZ Requirements for Area 2

<i>Aspect</i>	<i>Dominant Vegetation Formation</i>	<i>Effective Slope Category</i>	<i>Inner Protection Area (IPA)</i>	<i>Outer Protection Area (OPA)</i>	<i>Total Asset Protection Zone (m)</i>
North	Forest	>0-5°	15	10	25
North-east	Managed Land	>0-5°	APZ not required		
East	Managed Land	>0-5°	APZ not required		
South-east	Managed Land	>0-5°	APZ not required		
South	Forest	>0-5°	15	10	25
South-west	Forest	>0-5°	15	10	25
West	Forest	>0-5°	15	10	25
North-west	Forest	>0-5°	15	10	25

The APZs can be located wholly within the boundary of the site (refer to **Illustration 3.4**).

3.2.1.1 APZ Maintenance and Establishment

APZs should consist of open areas with minimal fuel at ground level that could be set alight by bushfire. Some trees and shrubs are permissible within the APZ, provided crown separation can be achieved and vegetation does not overhang buildings. In addition, no combustible materials (e.g. wood piles, flammable building materials) should be stored in the APZ.

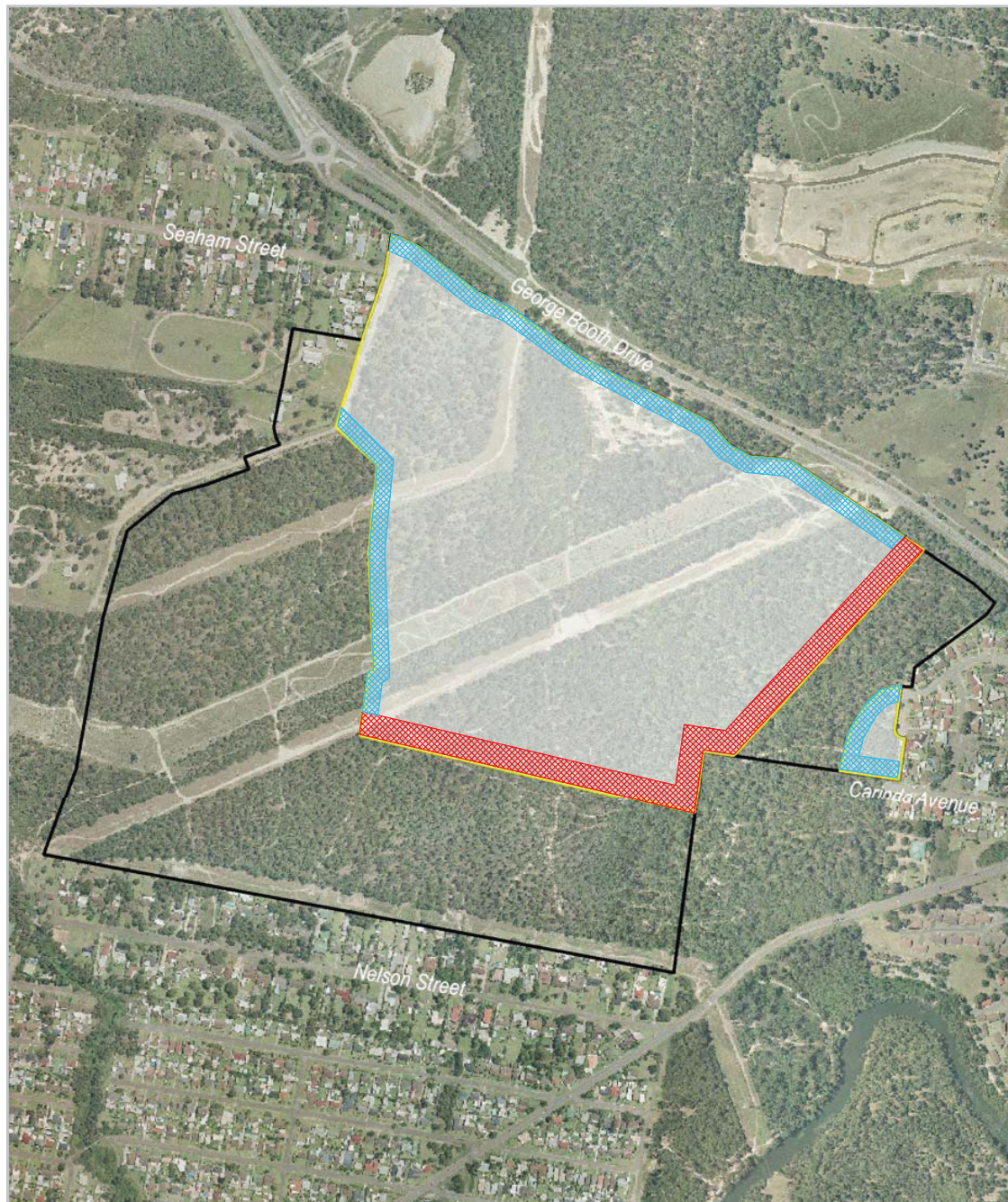
Within the APZs the following measures should be undertaken:

- plant trees and shrubs that are fire retardant and do not form a continuous canopy (crown separation of approximately 2 m);
- maintain the understorey in a mown state;
- trim dead branches from any existing trees and maintain the understorey with minimal leaf litter and combustible material; and
- trim limbs of trees and shrubs to ensure they do not touch or overhang buildings.

To enhance APZs, weed management activities should be undertaken regularly to control weeds. A monitoring program should be established to trigger the need to check fuel load build-up and program appropriate fuel reduction works in a timely manner. Please refer to *Standards for Asset Protection Zones* (RFS 2005) for more details on the establishment and maintenance of APZs.

3.2.1.2 Inner Protection Areas and Outer Protection Areas

APZs consist of Inner Protection Areas (IPAs) and Outer Protection Areas (OPAs) for forest and woodland vegetation. 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 building. An OPA should provide a tree canopy cover of less than 30% and should have an understorey managed (mowed) to treat all shrubs and grasses on an annual basis.



LEGEND

- Site boundary
- Development area
- 25 metre asset protection zone
- 35 metre asset protection zone



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3.2.2 Compliance with Deemed-to-Satisfy Criteria

In accordance with Section 4.1.3 of PBP 2006, Table 3.5 demonstrates that future urban development of the site can meet the *deemed-to-satisfy criteria*.

Table 3.5 Demonstration of Compliance

<i>Criteria</i>	<i>Application</i>
Asset Protection Zones	APZs have been calculated in accordance with the relevant tables/ figures in Appendix 2 of PBP 2006 and specified in Section 3.1.4 of this report. APZs calculated in accordance with relevant tables/ figures in Appendix 2 of PBP 2006 and stated within Tables 3.3 and 3.4 of this assessment can be achieved wholly within the boundaries of the site. APZs are not located on slopes greater than 18 degrees.
Public Roads	Public roads that are proposed as part of the future development of the site to be rezoned can meet the acceptable solutions of PBP 2006.
Property Access	Property access proposed as part of the future development of the site to be rezoned can meet the acceptable solutions of PBP 2006.
Fire Trails	It is unlikely that fire trails will be required on the site. Perimeter roads will be encouraged as part of the future urban design. If fire trails are required, they can meet the acceptable solutions of PBP 2006.
Services – Water, Electricity and Gas	Provision of services to the site can comply with acceptable solutions of PBP 2006. The site will be serviced by a reticulated town water supply.

3.2.3 Construction Standards

The level of bushfire attack is required to be calculated in accordance with Addendum: Appendix 3 (2010) of PBP for class 1, 2, 3 and 4 habitable buildings. The levels of bushfire attack are translated into required building construction level standards (AS 3959 – 2009). Bushfire construction requirements apply to any proposed building located within 100 m of a bushfire hazard. It is recommended that BALs be assessed at the DA stage for each proposed lot to determine the final bushfire construction level.

If a separation distance between the proposed building and the bushfire hazard of more than 100 m is achieved, no bushfire construction standards apply. The level of construction cannot fall to less than Bushfire Attack Level (BAL) 12.5 construction level where any part of the building is closer than 100 m to the source of a bushfire attack. A building with any façade identified as requiring a construction level must build all facades to at least BAL 12.5. Where more than one façade is exposed to a hazard, then the façade with the highest construction requirement is used to determine the appropriate level of construction. All other facades may be reduced by one level of construction unless that façade is also subject to the same category of bushfire attack.

3.3 Special Considerations

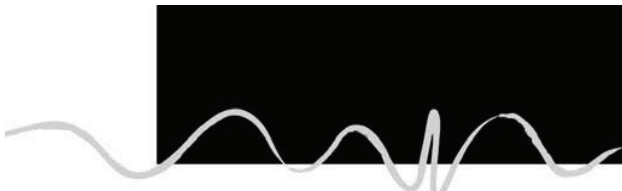
Development of the site will result in significant vegetation removal which has been assessed in the Local Environmental Study. It is not expected that there will be any further adverse impacts to any items of environmental or cultural significance as a result of the implementation and/or maintenance of APZs.

Summary

GeoLINK has been engaged by LMCC to prepare a preliminary bushfire hazard assessment for land described as Lot 88 DP755262, Lot 107 DP100048 and Part Lots 6 and 7 DP 4647, George Booth Drive, Edgeworth. This assessment will inform a rezoning application for future urban development of a 99 ha parcel of land.

Bushfire protection measures are required on bushfire prone land at the DA stage therefore a further assessment must be undertaken at the DA stage.

Based on consideration of the vegetation, effective slope and fire danger index, the assessment has identified that adequate and appropriate bushfire hazard protection measures are available, and can be implemented to facilitate future urban development of the site. The proposed rezoning conforms to the standards, specific objectives and performance criteria set out in Planning for Bushfire Protection 2006.



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