

Georges Cove Marina

Bushfire Assessment

Prepared for Benedict Industries Pty Limited | 26 October 2015



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Final

Report J14149RP10 | Prepared for Benedict Industries Pty Limited | 26 October 2015

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Date 26 October 2015

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Document Control

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Acronyms

APZ	Asset protection zone
DA	Development application
EMM	EMM Consulting Pty Limited
FDI	Fire danger index
IPA	Inner protection area
LEP	Local environmental plan
LGA	Local government area
OPA	Outer protection area
PBP	Planning for bushfire protection
RFS	NSW Rural Fire Service
SEARs	Secretary's Environmental Assessment Requirements

1 Introduction

This bushfire assessment has been prepared by EMM Consulting Pty Limited (EMM) for the proposed Georges Cove Marina (the project), as sections of the lot are shown in the Liverpool Bushfire Prone Land maps as being bushfire prone (Figure 1.1). This bushfire assessment has been prepared in accordance with the NSW Rural Fire Service's *Planning for Bush Fire Protection Guideline* (RFS 2006) (PBP). It considers the bushfire hazard associated with the project and describes mitigation measures, in accordance with Appendix 4 of the PBP (Submission requirements for DAs on bushfire prone land).

1.1 Project description

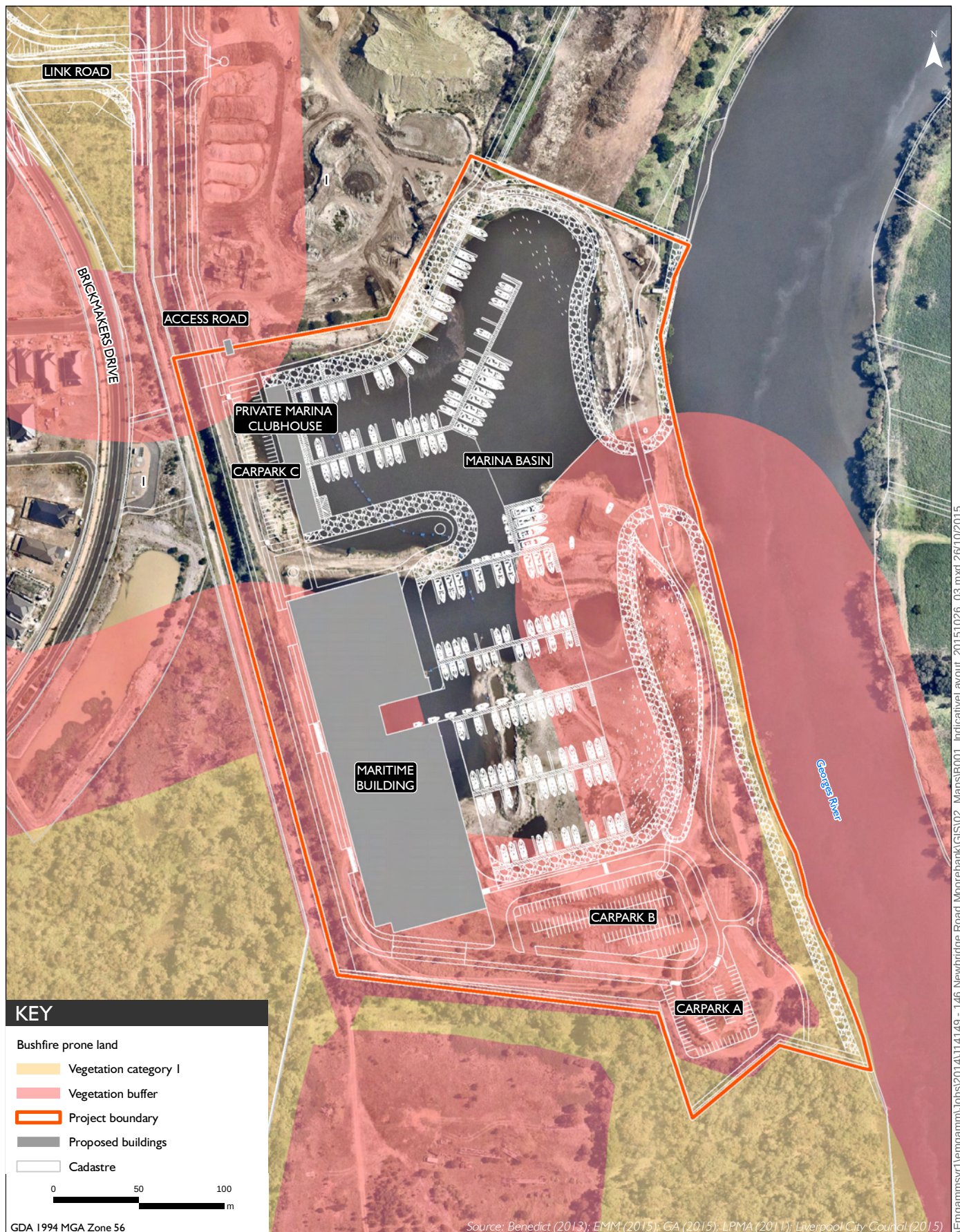
The project will be on the southern portion of Lot 7 DP 1065574, Moorebank, in the Liverpool Local Government Area (LGA) (the site).

The proposed development includes the construction and operation of the following main elements (Figure 1.1):

1. The Maritime Building located near the south-western boundary of the marina site. This structure will house:
 - a dry berth facility providing 250 berths for small craft;
 - a function centre;
 - tourist, entertainment and recreational and club facilities; and
 - a petrol tank (about 60,000 L) and a diesel tank (about 60,000 L).
2. A wet berth facility for 186 small craft (including casual berths) which will comprise:
 - a marina basin;
 - rock protection of the basin and foreshore including embellishment and revegetation of the river foreshore;
 - construction of public recreational facilities on the foreshore including bike paths, barbeque facilities and shelters;
 - floating berths and walkways;
 - fuel pumping facilities;
 - sewage pumpout facilities; and
 - emergency berth access.
3. Three external carparking areas and basement carparking providing a total of 637 car spaces.
4. A private marina clubhouse in the north-west of the site.
5. Support infrastructure – power, water and sewerage.

1.1.1 Designated development application

An application for Secretary's environmental assessment requirements (SEARs) for designated development was submitted to the NSW Department of Planning and Environment on 19 March 2015 (application number SEAR 912). The SEARs for the project were issued on 24 April 2015.



Indicative Georges Cove Marina Layout and Liverpool Bushfire Prone Land Map

1.2 Bushfire assessment statutory requirements

Section 79BA of the *Environmental Planning and Assessment Act 1979* (EP&A Act) requires developments on bushfire prone land to conform to the specifications in the PBP. This assessment has been prepared in accordance with the PBP.

Section 63(2) of the *NSW Rural Fires Act 1997* requires the owners of land to prevent the ignition and spread of bushfires on their land. The recommended measures in this bushfire assessment will ensure that the risk of bushfire ignition and spread will be as low as practically possible.

The Liverpool Local Environmental Plan 2008 (LEP) covers the project application area and Section 5 of the Liverpool Development Control Plan 2008, made under the LEP, requires that development on bushfire prone land comply with PBP. This bushfire assessment has been prepared in accordance with the PBP.

1.3 Objective and scope

1.3.1 Objective

The project is categorised in section 1.1 of the PBP as ‘other development’, that is, development which is not an ‘integrated development’ such as residential/rural residential subdivision or special fire protection purposes. For ‘other development’, only the aim and objectives of the PBP apply.

The aim of the PBP is:

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

The objectives of the PBP are as follows:

- *afford occupants of any building adequate protection from exposure to a bushfire;*
- *provide for a defendable space to be located around buildings;*
- *provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition;*
- *ensure that safe operational access and egress for emergency service personnel and residents is available;*
- *provide for ongoing management and maintenance of bushfire protection measures, including fuel loads in the asset protection zone (APZ); and*
- *ensure that utility services are adequate to meet needs of firefighters (and other assisting in bushfire fighting).*

1.3.2 Scope

The PBP focuses on protection of habitable buildings from bushfire. However, while the marine buildings are not currently intended for use as residences this report assesses the proposed as if they are habitable buildings as they are intended for public use.

2 Existing environment

This chapter determines if the proposed buildings will be on bushfire prone land and describes vegetation and slope within 100 m of the project boundary, as required by Appendix 4 of the PBP.

2.1 Bushfire prone land

The southern and north-western sections of the site are in the 100 m bushfire prone vegetation buffer on the Liverpool Bushfire Prone Land Map (Figure 1.1).

2.2 Vegetation

Dr David Keith compiled broad scale native vegetation classifications and maps between 2001 and 2004 for NSW (the Keith formations) (Keith 2004). The PBP uses the Keith formations to classify bushfire hazard vegetation (the PBP classifications). Vegetation on the site was investigated between 2006 and 2015 (EMM 2015). This mapping does not extend beyond the site boundary so the Sydney Metropolitan Catchment Management Authority (2009) vegetation mapping was used for this assessment. The PBP classifications, distance and direction of native vegetation from buildings within 100 m of the project boundary on bushfire prone land are shown in Table 2.1 and on Figure 2.1. In areas where there are two or more vegetation types, the PBP states that the vegetation type providing the greatest bushfire hazard should be considered as predominant. The predominant PBP vegetation is used to determine APZs (see Section 3.1).

Table 2.1 Vegetation on bushfire prone land within 100 m of the project boundary

Building	Vegetation community ¹	PBP classification	Direction
Maritime Building	Cumberland Riverflat Forest	Forest	S, W
	Coastal Sand Swamp Mahogany Forest	Forested wetlands	W
	Coastal Freshwater Reedland	Freshwater wetlands	W
Private Marina Clubhouse	Castlereagh Shale-Gravel Transition Forest	Forest	SW
	Cumberland Riverflat Forest	Forest	NW

Source: EMM (2015).

1. Sydney Metropolitan Catchment Authority (2009).

2.3 Slope

Slope is an important contributor to a bushfire's rate of spread. A bushfire will spread quicker up a steep slope compared to a gradual slope or flat land. Slopes are classified according to the PBP, and are combined with vegetation classes in an area to determine appropriate APZs (see Section 3.1). The slope over a distance of 100 m from the project boundary on bushfire prone land was determined using a digital terrain model (1 m height resolution). The slopes were classified according to the PBP (Table 2.2 and Figure 2.2):

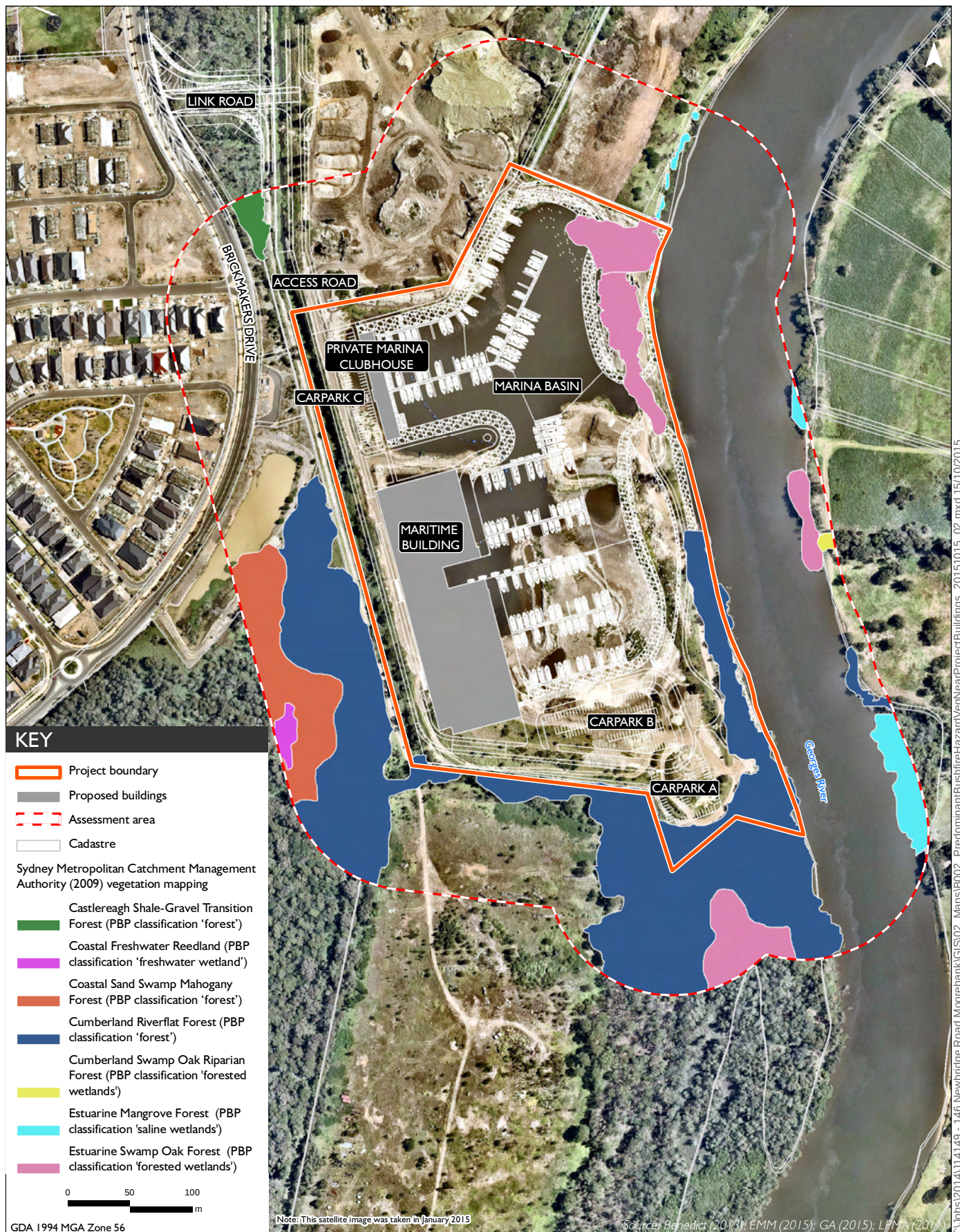
- i) All flat and upslope vegetation (considered 0°);
- ii) >0 to 5° downslope vegetation;
- iii) >5 to 10° downslope vegetation;

- iv) >10 to 15° downslope vegetation; and
- v) >15 to 18° downslope vegetation.

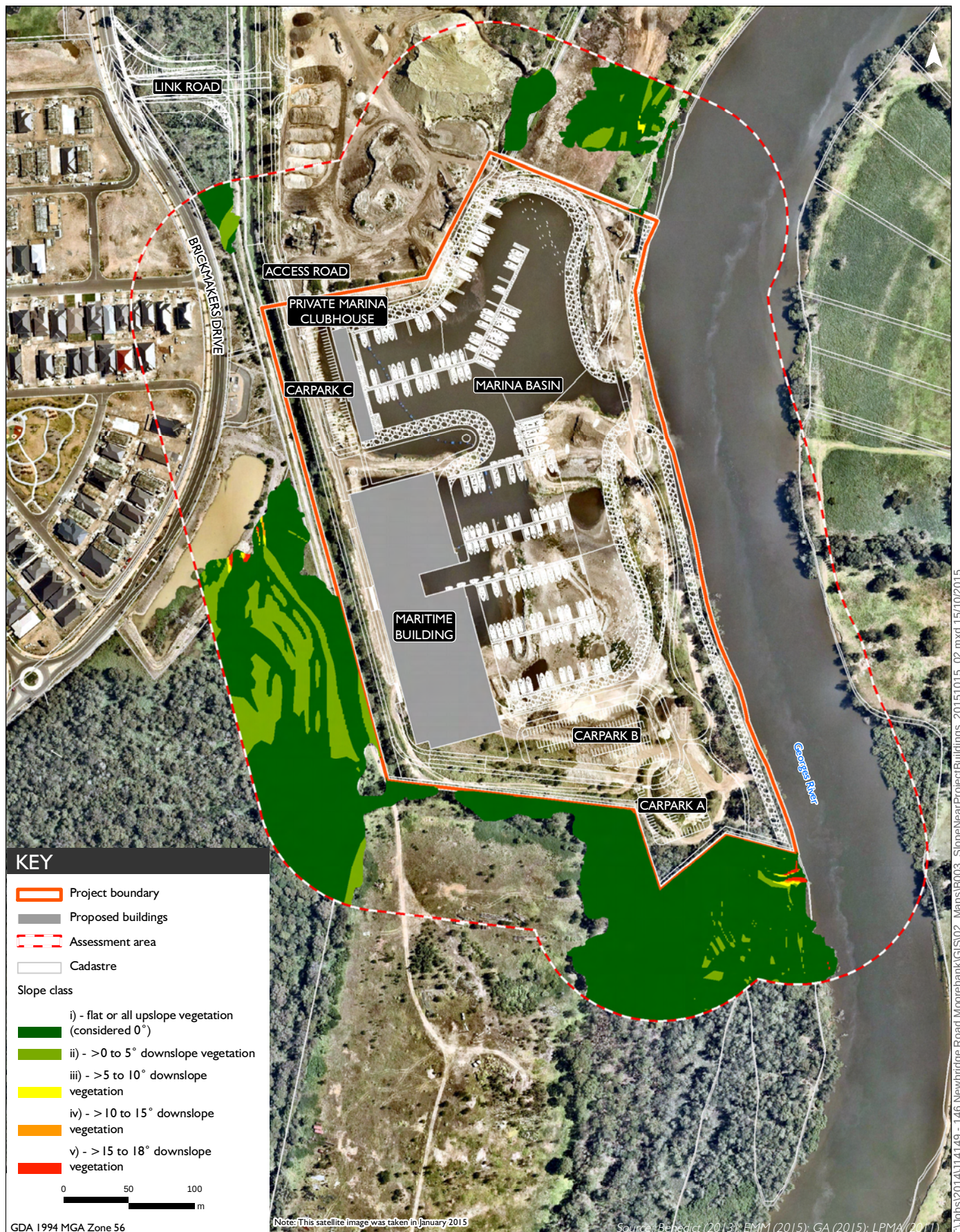
Table 2.2 **Slope on bushfire prone land within 100 m of the project boundary**

Buildings	The PBP slope class in direction of bushfire hazard vegetation							
	N	NE	NW	S	SE	SW	E	W
Maritime Building	–	–	–	i)	i)	i)	–	i), ii)
Private Marina Clubhouse	–	–	i), ii)	–	–	i)	–	–

The slope class with the most significant hazardous vegetation (forest) for both buildings is i).



Predominant bushfire hazard vegetation within 100 m of the Project boundary



Slope within 100 m of the Project boundary

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Figure 2.2

3 Bushfire prevention and protection

This chapter identifies APZs, including appropriate widths, maintenance requirements and specifications for service and access provision as provided in Chapter 4 of the PBP.

3.1 Asset protection zones

The PBP does not specify APZ for ‘other development’, including industrial buildings. However, such development is required to comply with the objectives of the PBP, including provision of buffers between buildings and bushfire prone vegetation. Appendix 2 of the PBP provides a procedure for determining APZs for habitable buildings, which has been adopted in this bushfire assessment.

An APZ is the distance that buildings are set back from vegetation that represents a bushfire hazard (see Appendix 2 of the PBP). APZs are provided for the following reasons:

- to provide sufficient separation from buildings for safe fire fighting;
- to reduce radiant heat at buildings;
- to reduce the influence of convection driven winds;
- to reduce the threat of ember attack on buildings; and
- to allow for dispersal of smoke.

APZs are divided into an ‘inner protection area’ (IPA) and an ‘outer protection area’ (OPA) where there is adjacent forest vegetation. Only an IPA is required where there is adjacent woodland vegetation. The IPA provides a defensible space and reduces heat intensities near buildings. The OPA helps reduce the length of flames, the speed of fire advance and the likelihood of fire spread by ‘crowning’.

APZs are determined by referring to tables A2.5 and A2.7 (for forest and woodland vegetation) in the PBP, which compare predominant fire hazard vegetation formations (see Table 2.1), highest slope classes near subject buildings (see Table 2.2) and fire weather at a site. The fire weather or ‘fire danger index’ (FDI) for Liverpool LGA is 100 (Table A2.3 in the PBP). The resulting APZs for the project are shown in Table 3.1 and on Figure 3.1.

The APZs will comprise roads, car parks and vegetation maintained as described in Section 3.1.1. No clearing of existing vegetation will be required to accommodate the APZs.

Table 3.1 Asset protection zones

Buildings	Asset protection zone (m)		Direction from building
	Inner protection area	Outer protection area	
Maritime Building	10	10	S, SW, W, NW
Private Marina Clubhouse	10	10	SW, NW



Asset protection zones

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Figure 3.1

3.1.1 Maintenance of APZs

The APZs will be maintained in a manner that prevents accumulation of fine flammable debris on the ground so that fuel quantities are reduced, thus lessening flame heights and potential crowning. General maintenance guidelines are described in Appendix 2 of the PBP.

The IPAs will be maintained as follows:

- canopy cover kept at less than 15% of total surface area and at least 2 m from the roof line of a building;
- garden beds and shrubs not to be located under trees and sited at least 10 m from any exposed windows or doors; and
- lower limbs of trees up to 2 m above the ground are removed.

The OPAs will be maintained as follows:

- canopy cover kept at less than 30% of total surface area; and
- understorey mowed annually before the fire season (usually September) to remove shrubs and long grasses.

3.2 Services

Water, gas and electricity services will be located and installed in a manner that reduces the potential for them to contribute to fire hazard. Detailed design has not taken place for the project. However, the specifications given below will be incorporated into the detailed project design.

3.2.1 Water

The site has an existing Sydney Water connection with a 40 mm hydrant service and a 20 mm domestic service. This will be upgraded to a 100 mm hydrant service and a 50 mm domestic service (fire hose reels will be connected to the domestic service). This will be completed as part of the upgrading of services to Lot 7 DP 1065574. It is understood that the pressure within the upgraded Sydney Water supply system will be sufficient to meet fire fighting requirements without the need for additional booster pumps.

It is proposed to store about 50,000 L of rainwater from the maritime building and private marina clubhouse roofs.

3.2.2 Electricity and gas

Electricity and gas services will be located so they do not contribute to the risk of fire to a building. The following guidelines will be followed during detailed project design (from Chapter 4 of the PBP):

- it is preferable to place electrical transmission lines underground. However, if overhead electrical transmission lines are to be used, they will be installed and managed in accordance with Ausgrid 2010 *NS179 Vegetation Safety Clearances*;
- *AS/NZS 1596:2008 The storage and handling of LP gas* will be followed for bottled gas installation and maintenance. Metal piping will be used;

- there will be minimum 10 m distance between fixed gas cylinders and flammable materials and shielding will be placed on the hazard side of the cylinders; and
- release valves on gas cylinders close to buildings will be directed away from the building and minimum 2 m from combustible material. Metal connections will be used.

3.3 Access

The project is proposed to be accessed from Brickmakers Drive via a new sealed, two-way link road which has been approved by Liverpool City Council.

Internal roads to buildings will be designed in accordance with the Austroads 2009 *Guide to Road Design* and the following PBP guidelines:

- a minimum vertical clearance of 4 m to any overhead obstructions including branches; and
- bridges and pavements capable of carrying more than 15 tonnes.

3.4 Marina operations

A fire or explosion in the infrastructure areas could initiate a bushfire. The risk of this occurring will be reduced if the following measures are implemented:

- refuelling will be undertaken in designated refuelling areas (there will not be any vegetation in these areas), especially when the fire danger rating is very high or above;
- fire extinguishers will be maintained in buildings, and marina and refuelling areas;
- water will be made available to assist with fire fighting when required; and
- spill response kits will be available should there be a spill of flammable substances.

4 Bushfire construction levels

Section A4.1 of the PBP requires an assessment of whether specified non industrial buildings are capable of complying with the bushfire construction levels described in *Australian Standard 3959 – 2009 Construction of buildings in bushfire prone areas* (AS 3959 – 2009). The specified buildings are classified by the *Building Code of Australia* (2011) as class 1, 2, 3, and 4 buildings; and some class 9 and 10 buildings.

The project buildings are industrial and commercial and, therefore, do not have bushfire construction levels specified in AS 3959 – 2009. Notwithstanding, the PBP requires that such buildings comply with the general bushfire construction requirements in section 3 of AS 3959 – 2009. The buildings for the project will be constructed to comply with these requirements.

5 Conclusion

The project will be on mapped bushfire prone land and this assessment describes measures to enable the project to comply with the objectives of the PBP. Specifically, APZs will be provided and managed to enable fire fighting vehicle access and to distance project buildings from vegetation which represents a fire hazard. The risk of the project initiating a bushfire will be minimised through the implementation of management measures.

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