

# **Attachment H**

Bushfire Risk Assessment Report



# **BUSHFIRE RISK ASSESSMENT REPORT**

## **YARRALUMLA BRICKWORKS PRECINCT**

**BLOCK 1, BLOCK 7 & BLOCK 764,  
SECTION 102**

**YARRALUMLA,**

**AUSTRALIAN CAPITAL TERRITORY**

***Australian Bushfire Protection Planners Pty Limited.***

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**UPDATED**

**BUSHFIRE RISK ASSESSMENT REPORT**

**YARRALUMLA BRICKWORKS PRECINCT**

**BLOCK 1, BLOCK 7 & BLOCK 764,  
SECTION 102**

**YARRALUMLA,**

**AUSTRALIAN CAPITAL TERRITORY**

<b>Assessment Number</b>	<b>Document</b>	<b>Preparation Date</b>	<b>Issue Date</b>	<b>Directors Approval</b>
B203479 - 8	Final	17.04.2020	21.07.2023	<i>G.L.Swain</i>

## FOREWARD

*Australian Bushfire Protection Planners Pty Limited* was commissioned by the *Land Development Agency [LDA]* in 2014 to prepare a Bushfire Risk Assessment (Reference B142415 dated 29.01.2016) that determined the level of bushfire risk and the protection measures required to mitigate the risk to the proposed development within the Yarralumla Brickworks, Block 1, Block 7 and Block 764 Section 102 Yarralumla, ACT.

The 2016 report provided recommendations on the provision of measures required to be implemented to mitigate the potential bushfire risk to future residential development on the site. These measures included:

- The management of the vegetation within Block 1, Section 127 to the west of the development precinct;
- The provision of a 10 and 30 metre wide Inner Asset Protection Zone (IAPZ) against the retained vegetation on Block 3 Section 94 to the southeast of the development precinct; and
- The provision of a 30 metre wide Inner Asset Protection Zone to the southwest of the development precinct – unless the adjacent land outside the Lease Boundary was managed as an Outer Asset Protection Zone (OAPZ).

*Australian Bushfire Protection Planners Pty Limited* was commissioned by BLOC to prepare an updated Bushfire Risk Assessment Report (Reference B203479 – dated 03.09.2020) to determine the level of bushfire risk to the future residential development within the Yarralumla Brickworks precinct, Block 1, Block 7 and Block 764, Section 102 Yarralumla, ACT.

The Bushfire Risk Assessment prepared for BLOC reviewed the report undertaken in 2016 and undertook an assessment of the risk to the proposed residential development, including the determination of the Asset Interface Classification using the methodology in the ACT Bushfire Management Standards.

This methodology confirmed the 2016 report's recommendation on the widths of the Asset Protection Zones to the southeast and southwest and the need for the management of the vegetation within Block 1, Section 127, to the west and southwest of the proposed residential development.

The 2020 report was subsequently referred to the ACT Emergency Services Agency (ESA). The review undertaken by ESA identified the following matters required by ACTF&R to be resolved:

*Bushfire Assessment Report:*

ACTF&R has reviewed bushfire assessment report **B203479** - prepared by **Australian Bushfire Protection Planners Pty Ltd** and request further information.

1. ACTF&R notes the Bushfire Risk Assessment Report references AS3959-2009. This standard has been superseded by AS3959-2018 and is required to be used for any future development within the Yarralumla Brickworks precinct as well as inform this EDP.
2. ACTF&R is concerned with the construction standards to buildings on Blocks T1 – T6 and Buildings N, P, Q, R and S. The construction standard has been assessed to comply with BAL 12.5. ACTF&R considers this BAL assessment to be insufficient given the proximity to the identified unmanaged vegetation on Block 3 Section 94. Field observations of slope and vegetation undertaken during inspection on 05/08/2020 do not support this BAL assessment. Analysis of AS3959-2018 also indicates this BAL assessment to be insufficient using method 1.
3. ACTF&R notes the vegetation classification of woodland to the SE of the development. Field observations conducted on the 05/08/2020 does not support this assessment.
4. ACTF&R notes the report presents the BOP along Dunrossil Drive as developed by the National Capital Authority on page 16. This plan indicates works up to Autumn 2018.
5. ACTF&R notes the report indicates Block 1 Section 127 has been added to the ESA Bushfire Operations Plan which has been highlighted as incorrect by the ACTRFS.
6. ACTF&R notes the report has used the Asset Interface Classification System within the ACT Bushfire Management Standards to establish a 10m IAPZ to the south and south east of the development adjoining Blocks T1 – T6 and Buildings P and Q. It should be noted this IAPZ along with the recommendation of BAL 12.5 construction standards is not supported as discussed in point 2 above.

ACTF&R requests further detailed clarification on the APZ and BAL assessment for the construction standards for Blocks T1 – T6 and Buildings N, P, Q, R and S, using AS3959-2018.

ACTF&R requires further information on the BOP for Dunrossil Drive before support can be provided for the management of the land as an OAPZ.

ACTF&R requires any APZ or other land management identified on adjoining land be confirmed, in writing, with the detail on the ongoing management, to what standard the land will be managed to and to whom this responsibility will rest.

These matters were addressed in a response prepared in October 2020 with subsequent site meetings and discussions held between BLOC and ESA.

Following a meeting between Deed Management; Parks & Conservation ACT Fire & Rescue; ACT Rural Fire Service; Statutory Planning and Suburban Land Agency a resolution was reached on the provision of bushfire protection measures to be established to the southeast of Precinct 7 of the approved Master Plan for the Brickworks Site.

This report amalgamates the supplementary report into the original report to produce a single report that assesses the bushfire risk to the estate.

## EXECUTIVE SUMMARY

*Australian Bushfire Protection Planners Pty Limited* was commissioned by BLOC to prepare a Bushfire Risk Assessment that determines the level of bushfire risk, and the protection measures required to mitigate the risk to the future residential development within the Yarralumla Brickworks precinct, Block 1, Block 7 and Block 764, Section 102 Yarralumla, ACT.

The site has an area of 16 hectares and is zoned CZ6 – Leisure and Accommodation, RZI Suburban Zone and PRZ2 Restricted Access Recreation Zone.

The Yarralumla Precinct Code allows residential landuse [up to three storeys] on the CZ6 & RZ1 zoned land and Rule 3 states that ‘The minimum setback to the northern and eastern boundary is 20 metres’ [against the existing residential development].

The ACT Government will be responsible for the design and construction of a new access road from the southern interface of the site connecting into Dudley Street.

BLOC seeks to ascertain the bushfire risk and mitigation measures which should be included in the Concept Estate Development Plan – Concept Master Plan for the site.

**Section 1** of this report outlines the background to the assessment and describes the site and details the site inspection carried out on the 12<sup>th</sup> November 2015 and the desk-top review of this information undertaken for the preparation of this assessment.

**Section 2** of the report provides a description of the site and the precinct [bushfire study area] it is contained within. It examines the topography as well as the vegetation both within and external to the site.

**Section 3** determines the bushfire risk to the site by examining background information on the:

- Fire history of the area;
- Ignition and fire sources;
- Climate and weather;
- Wind and fire paths;
- Slope;
- Bushfire fuels;
- Assessment of the fuel hazard;
- Likelihood of each fire scenario;
- Description of the Asset Interface Classification;
- Risk statement; and
- Summary of the bushfire risk.

**Section 3** examines the context of bushfire risk within the ACT.

**Section 4** outlines a range of factors influencing bushfire risk and identifies the broad strategies to manage the risk and examines the two elements of risk – *likelihood* which is described as the chances of a bushfire occurring, and *consequence*, the impact of the bushfire when it occurs.

**Section 4** also undertakes an assessment of the potential bushfire risk to the site and determines the level of risk to future development on the site.

The details of the bushfire protection measures required to be put in place and fully implemented to reduce the level of risk to the assets are provided in **Section 5**.

This Section describes the measures for:

- Bushfire fuel reduction;
- Provision of Asset Protection Zones for future development;
- Construction standards to the buildings;
- Water supply provisions for fire-fighting;
- Access for fire-fighting;
- Evacuation planning; and
- Standards for fire protection zones.

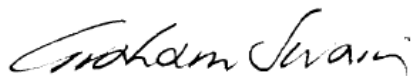
**Section 6** examines the residual risk once the bushfire protection measures recommended are implemented.

The conclusions to the assessment are outlined in **Section 7** of the report. These include:

- The assessment undertaken in this report has found that the bushfire risk to the Yarralumla Brickworks precinct may occur as a result of a fire in the vegetation within the North Curtin Horse Paddock, located to the southwest of Cotter Road and the woodland vegetation in the PRZ2 Zoned land to the south/southeast and that, prior to the implementation of bushfire protection measures, the risk is high/low;

and

- If the protection measures recommended in this report are fully implemented, the level of risk will be reduced from high to moderate/low.



Graham Swain,  
Managing Director  
**Australian Bushfire Protection Planners Pty Limited.**



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## SECTION 1

### INTRODUCTION

#### 1.1 Background.

*Australian Bushfire Protection Planners Pty Limited* was commissioned by the *Land Development Agency [LDA]* in 2014 to prepare a Bushfire Risk Assessment that determined the level of bushfire risk, and the protection measures required to mitigate the risk to the proposed development within the Yarralumla Brickworks, Block 1, Block 7 and Block 764 Section 102 Yarralumla, ACT.

The final ABPP report (Reference B142415 dated 29.01.2016) found that the bushfire risk to the Yarralumla Brickworks precinct may occur as a result of a fire in the *Pinus Radiata* vegetation on the land to the west; the vegetation within the North Curtin Horse Paddock, located to the southwest of Cotter Road and the woodland vegetation in the PRZ2 Zoned land to the southeast and that, prior to the implementation of bushfire protection measures, the risk is high.

The report provided recommendations on the provision of measures required to be implemented to mitigate the potential bushfire risk to future residential development on the site.

Following a response from ESA, a supplementary report was prepared in May 2022 which re-examined the bushfire protection requirements for the southeast corner of the estate. Further investigations then took place to identify appropriate bushfire protection measures to development in the southeast corner of the estate. These measures have been included in the updated Estate Development Plan (EDP).

#### 1.2 Aim of this Report.

The aim of this report is to review the Concept Estate Development Plan – Concept Masterplan against the recommendations of the Bushfire Risk Assessment prepared by ABPP – Reference B142415 – Dated 29.01.2016 and prepare an updated bushfire risk assessment that amalgamates the recommendations of the supplementary report for the southeast corner of the estate into one report that provides recommendations on measures required to be implemented to comply with the *ACT Bushfire Management Standards (2014)*.

### **1.3 Objectives of the Report.**

The objectives of the updated report are to:

- Identify the level of risk to the future development within the site in accordance with best practice bushfire risk management, the requirements of any relevant Australian Standards and the Emergency Services Agency's *Strategic Bushfire Management Plan – 2014 – Version 3* Bushfire Management Standards and any recommendations of the Emergency Services Agency;
- Identify how levels of risk can be mitigated.

### **1.4 Scope of Work.**

The following is an outline of the scope of work undertaken in the assessment of bushfire risk to the future development within the Yarralumla Brickworks within Block 1, Block 7 and Block 764 Section 102 Yarralumla, ACT.

- Identify and describe the study area environment;
- Establish the context of the bushfire risk to the proposed landuse;
- Identify measures that might assist to reduce bushfire risk;
- Identify the location of any bushfire protection measures required to protect the future landuse.

### **1.5 Site Inspection.**

Graham Swain undertook an inspection of the study area on the 12<sup>th</sup> November 2015 to assess the topography of the land and the classification of the vegetation within and external to the site.

This inspection reviewed the general topography and gradients of the land and vegetation classification.

Adjoining land was also inspected to determine the surrounding landuse / type and adequacy of land management, vegetation communities, topography and whether the land contained vegetation which has the potential to support fire.

Prior to the preparation of this report a desk-top assessment was undertaken using the latest aerial photography and ACTMAPi information, the latter being used to confirm the Bushfire Prone Land Mapping and Bushfire Operations Plan details.

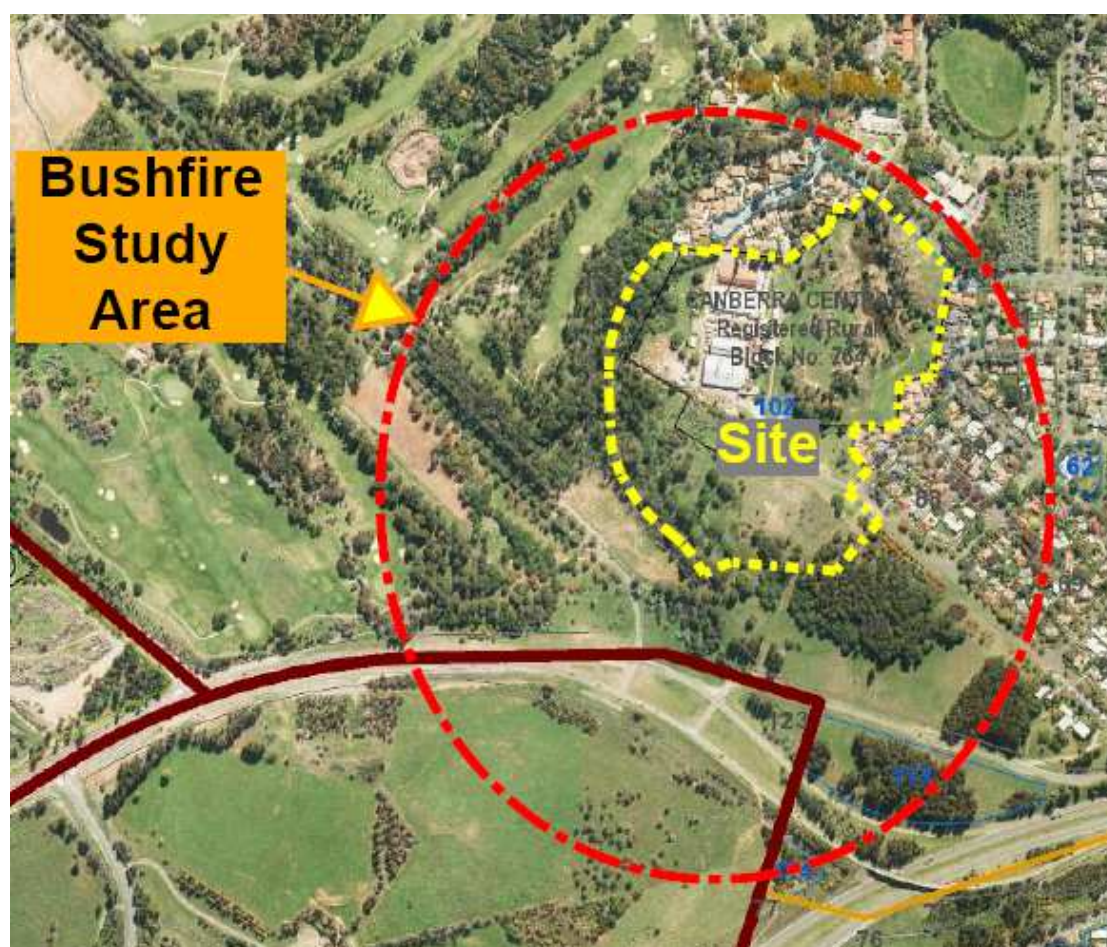
## SECTION 2

### DESCRIPTION OF STUDY AREA

#### 2.1 The Study Area.

For the purpose of examining the potential bushfire risk to the Yarralumla Brickworks precinct the study area consists of land within Section 102, 103 & 113 Yarralumla; Sections 123 Curtin; Section 125 & 127 Yarralumla; Section 94 and the North Curtin Horse Paddocks within Section 121 Curtin – refer to Figure 1 below.

*Figure 1 – Bushfire Risk Assessment Study Area.*



#### 2.2 Existing Land Use.

Except for the former Yarralumla Brickworks complex on Block 764 Section 102 Yarralumla, the development precinct contains vacant land – refer to Figure 2 - Aerial Photograph of the Yarralumla Brickworks Precinct and the surrounding landuse on Page 11.

**Figure 2 – Aerial Photograph of the Yarralumla Brickworks Precinct and the surrounding landuse.**



### 2.3 Adjoining Land Use.

The land to the north, northeast and east of the development precinct contains existing residential development.

The land to the immediate west of the development precinct is vacant land zoned PRZ2 – Restricted Access Recreation. The land further to the west contains the Royal Canberra Golf Club.

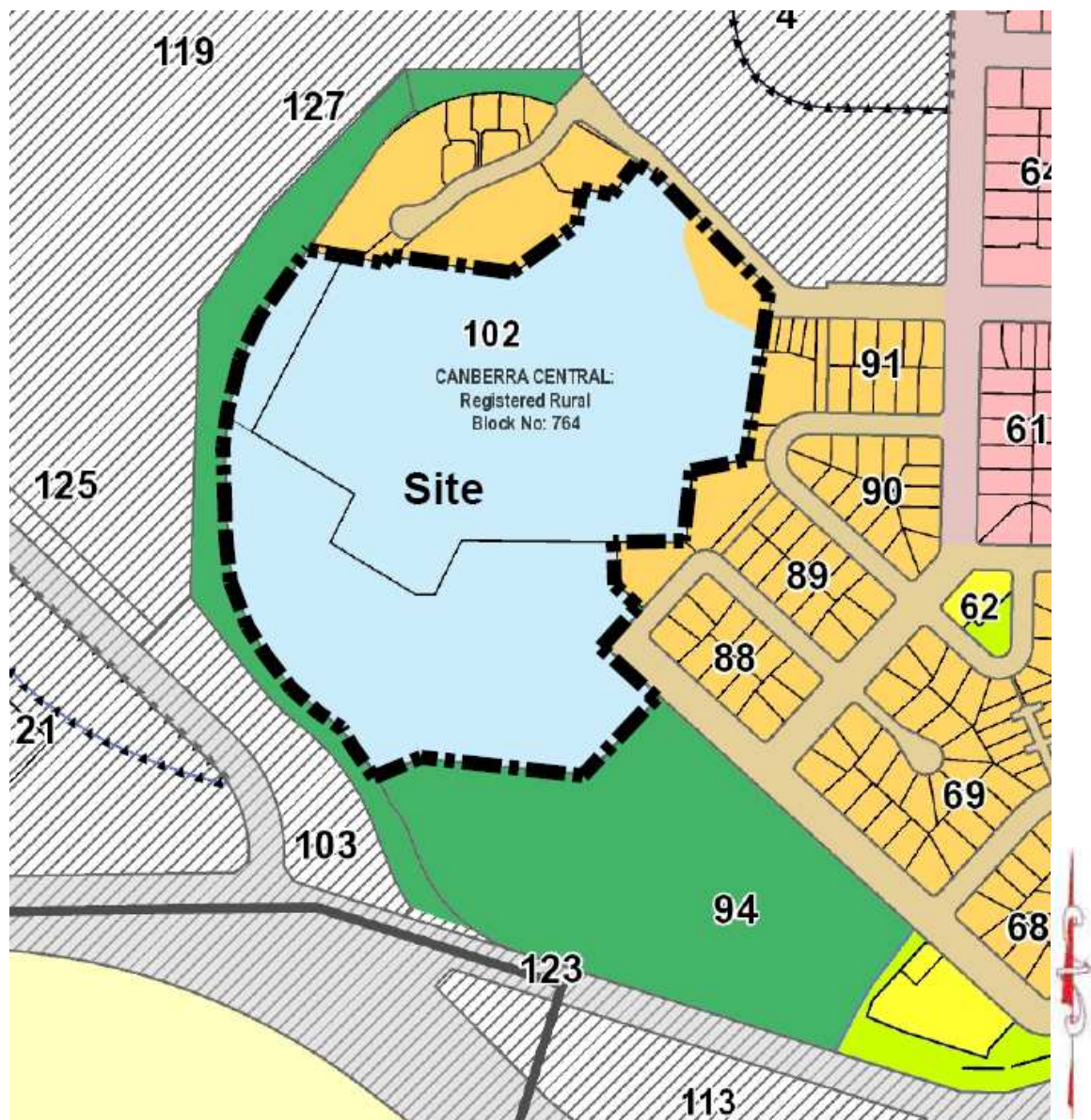
The land to the southwest is vacant land zoned PRZ2 – Restricted Access Recreation. The Dunrossil Drive corridor, which leads to Government House, is located beyond the PRZ2 zoned land and is identified as a Designated Area on the ACT Territory Plan.

The land to the southeast and south of the development precinct is vacant land zoned PRZ2 – Restricted Access Recreation – refer to Figure 3 – Territory Plan on Page 13 and Figure 4 – Aerial Photograph on Page 14.

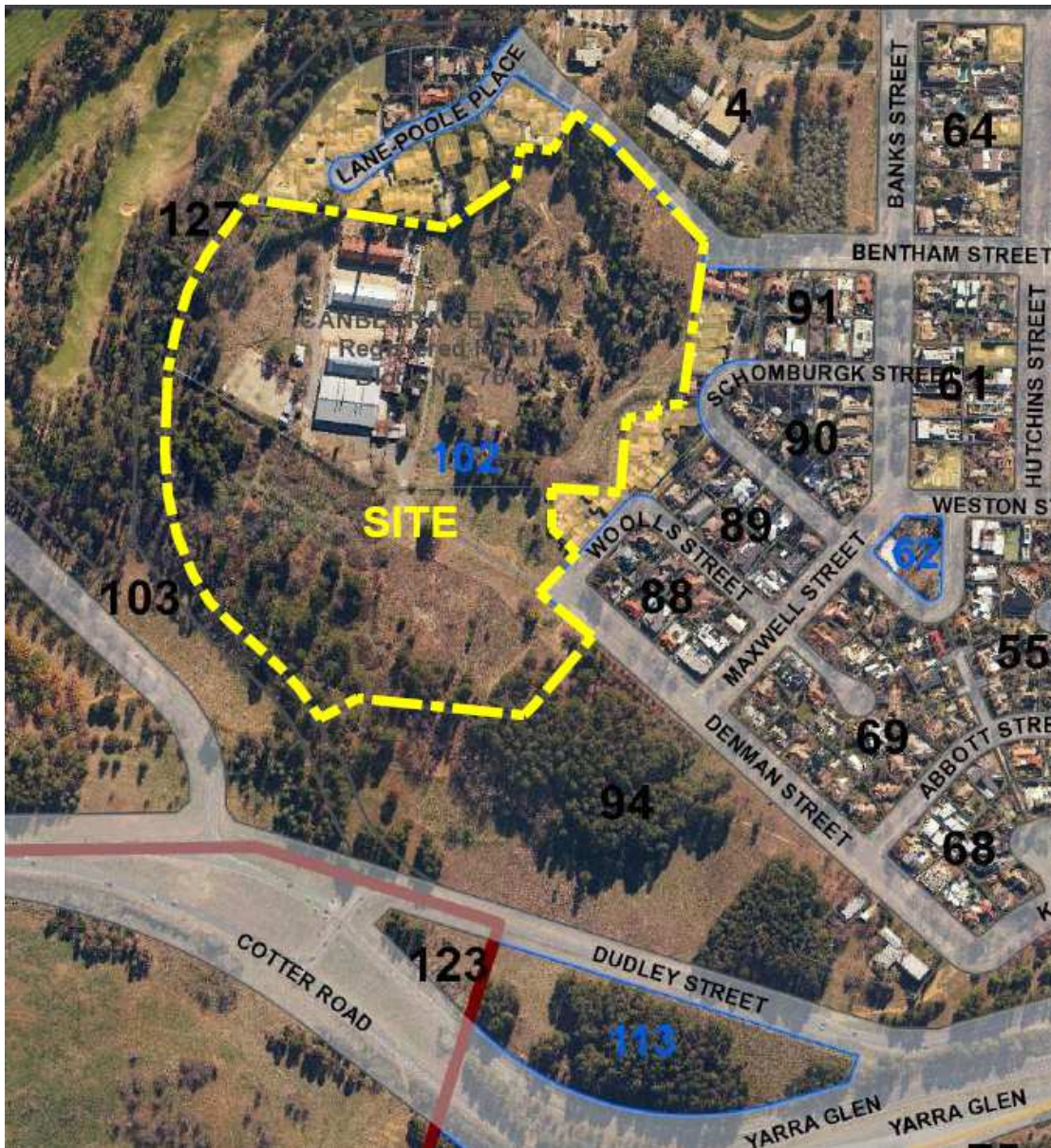
The Legend to the landuse on the Territory Plan is provided below:

 Designated Areas	 Commercial - CZ4 - Local Centre
 Residential - RZ1 - Suburban	 Commercial - CZ5 - Mixed Use
 Residential - RZ2 - Suburban Core	 Commercial - CZ6 - Leisure and Accomodation
 Residential - RZ3 - Urban Residential	 Industrial - IZ1 - General Industrial
 Residential - RZ4 - Meduim Density Residential	 Industrial - IZ2 - Industrial Mixed Use
 Residential - RZ5 - High Density Residential	 Urban Parks and Recreation - PRZ1 - Urban Open Space
 Communities Facilities	 Urban Parks and Recreation - PRZ2 - Restricted Access Recreation
 Commercial - CZ1 - Core	 Transport and Services - TSZ1 - Transport
 Commercial - CZ2 - Business	 Transport and Services - TSZ2 - Services
 Commercial - CZ3 - Services	 Non Urban - NUZ1 - Broadacre

**Figure 3 – Territory Plan.**



**Figure 4 – Aerial Photograph.**



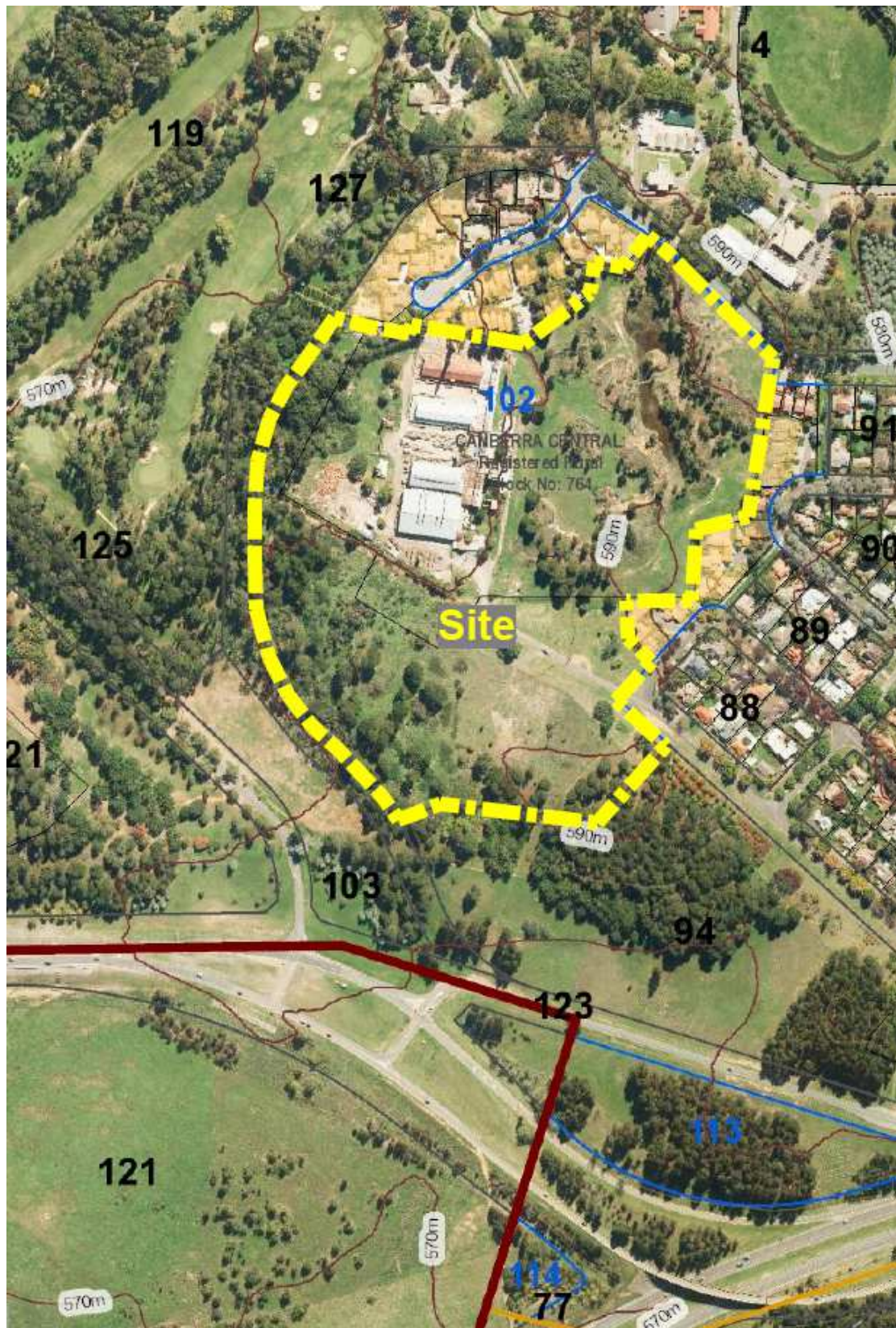
## **2.4 Topography.**

The landform within the Yarralumla Brickworks precinct is gently undulating with a fall to the west and southwest of less than 10%.

The land beyond the precinct falls to the northwest at less than 10% across the Royal Canberra Golf Club and the Dunrossil Drive corridor, rising to the west beyond the Dunrossil Drive corridor. The land within the North Curtin Horse Paddock to the southwest of Cotter Road falls to the south and southwest at less than 10% into Yarralumla Creek – refer to Figure 5 – Contour Plan on Page 15.



Figure 5 – Contour Plan.



## 2.5 Vegetation.

The vegetation within the Yarralumla Brickworks precinct was assessed by DSB Architects [refer to Yarralumla Brickworks Precinct Tree Assessment – 25<sup>th</sup> November 2015]. The report identifies that the predominant species within the precinct is *Pinus Radiata*, *Pinus ponderosa* and *Pinus silvestris* and *Ulmus procera* and various tree and weed species.

Within Block 7 the Pines generally are of low quality and the isolated elm trees are subject to elm leaf beetle. Adjacent to Dunrossil Drive, on the southwestern edge of Block 7 the vegetation consists of an 8 metre high unmanaged dense thicket of urban weed tree species and other weed species.

Along the western edge of the precinct the Pines are at, or approaching, the end of their useful life. This vegetation will be cleared as part of the development proposal.

The vegetation within the adjoining residential development to the north, northeast and east of the precinct consists of managed landscaped gardens which do not constitute bushfire prone vegetation.

The PRZ2 zoned land to the west and southwest of the development precinct [within Block 1, Section 127] contains mature *Pinus Radiata* with a dense weed infested understorey. The Royal Canberra Golf Club, to the west and northwest of the Brickworks precinct, contains mown lawns and managed grass [which is irrigated] beneath a canopy of *Pinus Radiata* trees. This vegetation is not currently deemed to be bushfire prone vegetation.

The mature *Pinus Radiata* trees in the Dunrossil Drive corridor have been removed and tree replanting has commenced with the retention of the existing central avenue of Elm trees, surrounded by a second avenue of mixed trees [Pine & Oak], with an evergreen tree backdrop formed by creating a third outer avenue using an evergreen species of Oak and then replanting the Pine plantation on the outside of the avenue – refer to Figure 6 – Plan and Section of the Dunrossil Drive planting on Page 17.

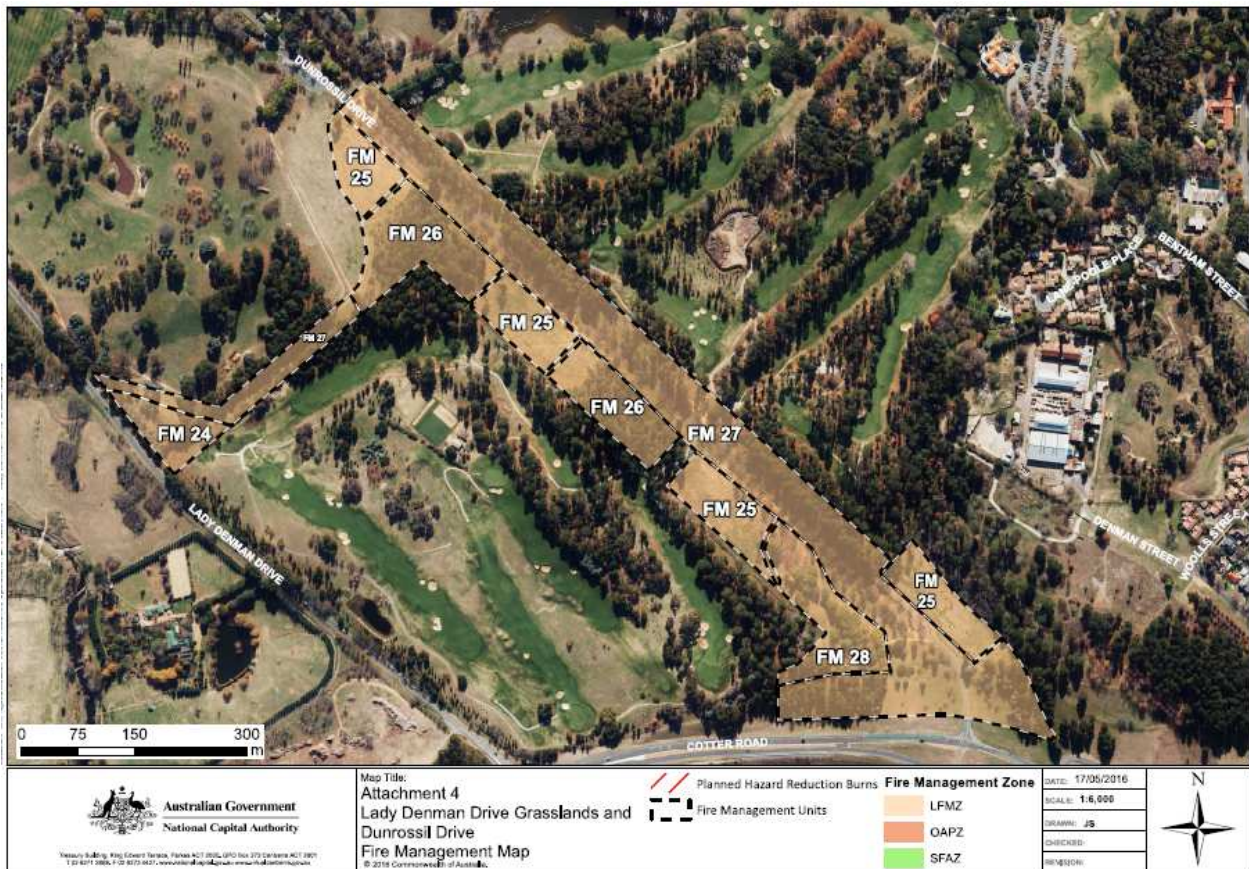
The latest version of the National Capital Bushfire Operations Plan [June 2018] identifies that the vegetation within the Dunrossil Drive corridor will continue to be regularly managed (slashed) and the Royal Canberra Golf Club Fairways, located to the southwest of the Dunrossil Drive corridor, also contains managed vegetation.

The vegetation within the Dunrossil Drive corridor and the Royal Golf Club Fairways is therefore not deemed to be bushfire prone – refer to Figure 7 - Lady Denman Drive Grasslands and Dunrossil Drive Fire Management Map and Management Program on Page 18.

**Figure 6 – Plan and Section of the Dunrossil Drive planting**



**Figure 7 – Lady Denman Drive Grasslands and Dunrossil Drive Fire Management Map and Management Program – Source National Capital Authority.**



Fire Mgt Area	Fire Mgt Unit	Fire Mgt Zone	Winter 2016	Spring 2016	Summer 2016-17	Autumn 2017	Winter 2017	Spring 2017	Summer 2017-18	Autumn 2018	Notes
Lady Denman/ Dunrossil	FM24 Lady Denman Grassland (0.7Ha)	Landscape Fire Management Zone									Last burnt in Spring 2015. Planned burn again in Spring 2019
Lady Denman/ Dunrossil	FM25 Original Westborne Woods (2.6Ha)	Landscape Fire Management Zone	Slashing every 6-8 weeks	Slashing every 6-8 weeks	Slashing every 6-8 weeks	Slashing every 6-8 weeks	Slashing every 6-8 weeks	Slashing every 6-8 weeks	Slashing every 6-8 weeks	Slashing every 6-8 weeks	Pine Plantation harvested in Summer 2013
Lady Denman/ Dunrossil	FM26 Original Westborne Woods (3.0Ha)	Landscape Fire Management Zone	Slashing every 6-8 weeks	Slashing every 6-8 weeks	Slashing every 6-8 weeks	Slashing every 6-8 weeks	Slashing every 6-8 weeks	Slashing every 6-8 weeks	Slashing every 6-8 weeks	Slashing every 6-8 weeks	Pine Plantation harvested in Summer 2016
Lady Denman/ Dunrossil	FM27 Cycle path link (1.0Ha)	Landscape Fire Management Zone	Slashing every 6-8 weeks	Slashing every 6-8 weeks	Slashing every 6-8 weeks	Slashing every 6-8 weeks	Slashing every 6-8 weeks	Slashing every 6-8 weeks	Slashing every 6-8 weeks	Slashing every 6-8 weeks	
Lady Denman/ Dunrossil	FM28 Oak tree area (1.6Ha)	Landscape Fire Management Zone	Slashing every 6-8 weeks	Slashing every 6-8 weeks	Slashing every 6-8 weeks	Slashing every 6-8 weeks	Slashing every 6-8 weeks	Slashing every 6-8 weeks	Slashing every 6-8 weeks	Slashing every 6-8 weeks	

The North Curtin Horse Paddock, located to the southwest of Cotter Road, contains grazed grassland with scattered woodland shade trees. Figure 8 on Page 19 provides a copy of the Bushfire Operations Plan (BOP) for the fuel management of the vegetation within the North Curtin Horse Paddocks and within Block 3 Section 94, to the southeast of the Brickworks precinct, and the vegetation on the land within the Cotter Road reserve.

**Figure 8 provides a copy of the Bushfire Operations Plan (BOP) for the fuel management of the vegetation within the North Curtin Horse Paddocks and within Block 3 Section 94.**

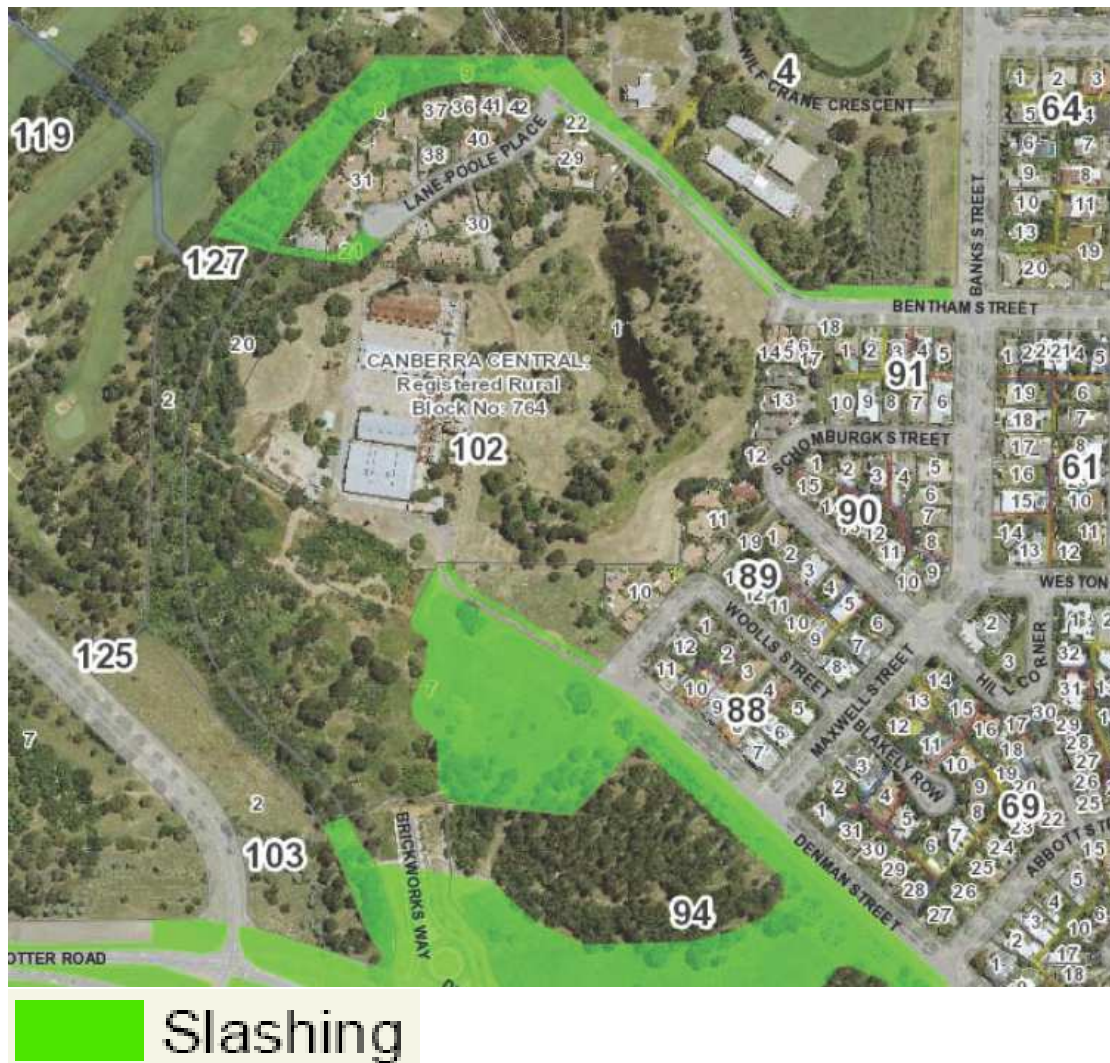


Figure 9 on Page 20 is an extract from the ACTMapi Strategic Bushfire Management Plan.

Figure 10 on Page 21 is an extract from the ACTMapi Bushfire Prone Land Map.

**Figure 9 – Extract ACTMapi Strategic Bushfire Management Plan.**

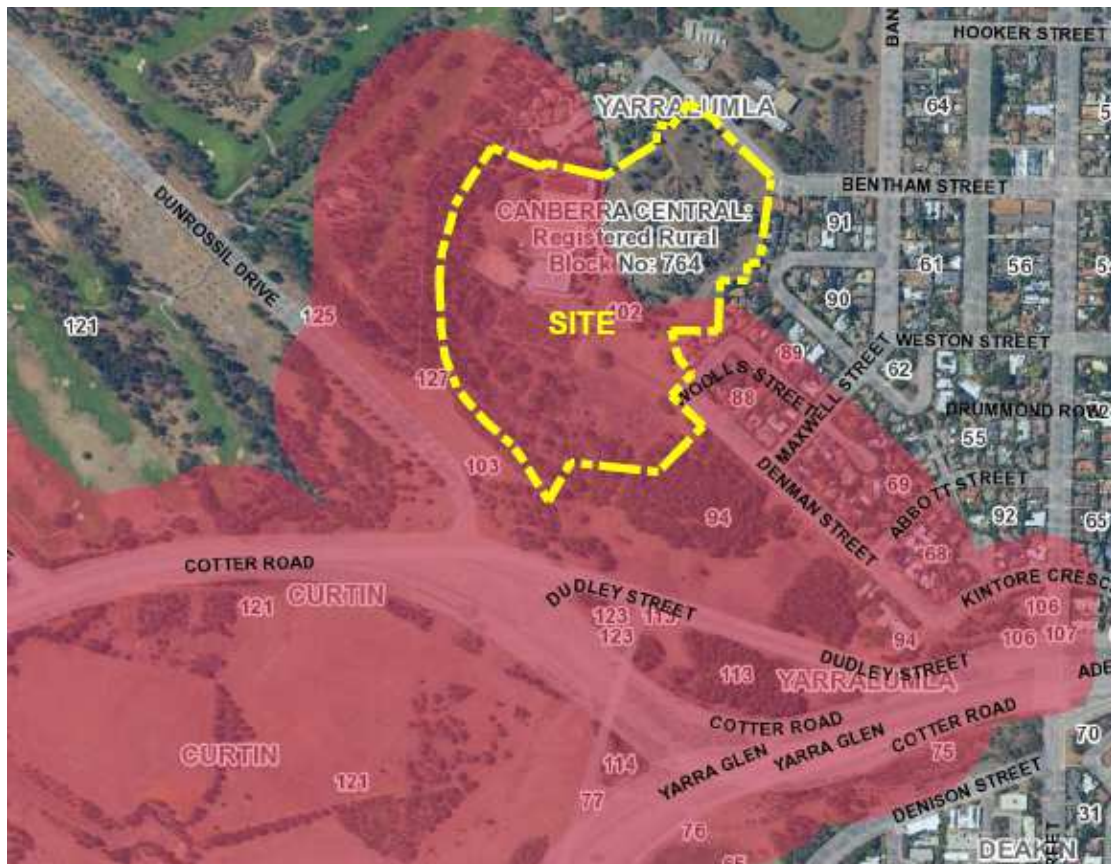


**Strategic Bushfire Management Zones**

- Inner Asset Protection Zone
- Outer Asset Protection Zone

The review of the ESA Bushfire Prone Land Map – refer to Figure 10 on Page 21 – has identified that the only vegetation which is deemed to present a direct bushfire hazard to the development precinct is the weed infested *Pinus Radiata* vegetation within the PRZ2 zoned land to the west and southwest and the retained vegetation in the narrow corridor of PRZ2 land to the south [within Block 1, Section 127] and the copses of retained forest vegetation within Block 3, Section 94, to the southeast of the Brickworks precinct.

**Figure 10 – ESA Bushfire Prone Land Map.**



Based on the current management practices within the Canberra Golf Club, the Dunrossil Avenue corridor, including Block 2 Section 103, this report examines the bushfire risk to the development precinct created by the vegetation within Block 1 Section 127 and Block 3 Section 94 and the grassy woodland within the Horse Paddock precinct - refer to Site Photographs..

## 2.6 Site Photographs.



***Photograph No. 1 – Taken from Cotter Road looking to the south - across to the Mint Oval and the commercial development within West Deakin.***



***Photograph No. 2 – Taken from Cotter Road looking to the southwest across the North Curtin Horse Paddock.***





***Photograph No. 3 – Taken from the Cotter Road/Dunrossil Drive intersection looking to the southwest – Horse Paddock on the left, vegetation within the Dunrossil Drive corridor on the right.***



***Photograph No. 4 – Taken looking to the southeast from Dunrossil Drive showing managed vegetation.***



***Photograph No. 5 – Taken looking to the north from Block 1, Section 127 showing the managed, irrigated land within the Royal Canberra Golf Club.***



***Photograph No. 6 – Taken looking to the southwest from Block 1, Section 127 showing the managed, irrigated land within the Royal Canberra Golf Club.***



***Photograph No. 7 – Taken from Block 1 Section 127 looking southwest to Dunrossil Drive showing the managed, irrigated land within the Royal Canberra Golf Club.***



***Photograph No. 8 – Taken from Block 1 Section 127 looking to the west showing the managed, irrigated land within the Royal Canberra Golf Club.***

## 2.7 Ecological Constraints.

An ecological assessment was undertaken in late 2014 within the PRZ2 Area and adjoining land. Figure 10, below, provides the results of this study and identifies that the areas of grassland between the east and west bound lanes of Cotter Road and an area to the southwest and south of Denman Street contains Natural Temperate Grassland.

**Figure 11 – Ecological Constraints Plan – Natural Temperate Grassland.**



Figure 12 on Page 27 provides the results of an ecological assessment to determine the extent of habitat for Golden Sun Moth in the grassland vegetation between the east and west bound lanes of Cotter Road, the area to the southwest and south of Denman Street and in the vegetation to the south of the west bound lane of Cotter Road [within the road verge and adjacent Horse Paddocks].

Figure 8 on Page 19 provides an extract from the ESA Bushfire Operations Plan which shows the fuel management works within the Yarralumla Brickworks precinct and within the North Curtin Horse Paddocks.

**Figure 12 – Ecological Constraints Plan – Golden Sun Moth Habitat.**

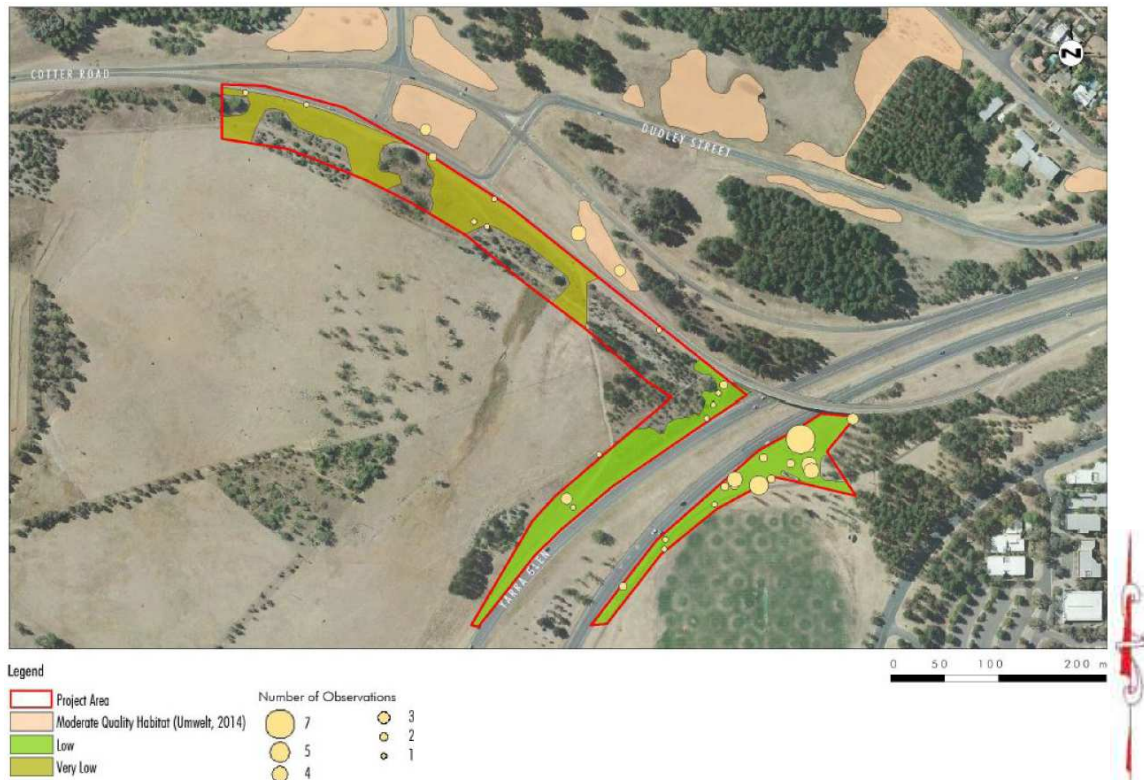


Figure 8 – ESA Bushfire Operations Plan [BOP] for the North Curtin Horse Paddocks and the vegetation within Section 94, Section 113 and Section 127 [Cotter Road reserve] on Page 19 identifies that most of the area nominated on Figure 12 [above] as containing potential Sun Moth Habitat and Natural Temperate grassland is maintained by slashing for Amenity & Urban Roads and Fire & Rural fuel management purposes.

Figure 8 also identifies the area of the Curtin Horse Paddock which is managed by grazing to reduce the bushfire fuels. This area does not constitute the entire Horse Paddock precinct with the central and north-eastern portion not managed by grazing or by slashing.

### **2.8 Ecological Constraints found on the land beyond the Canberra Brickworks precinct.**

The northern portion of the North Curtin Horse Paddock was not studied as part of the most recent ecological surveys.

However, the presence of potential Sun Moth habitat within the Horse Paddock is shown on the ACTmap Significant Plants Map – refer to Figure 13 on Page 28.

**Figure 13 – ACTMapi Significant Plants Map.**

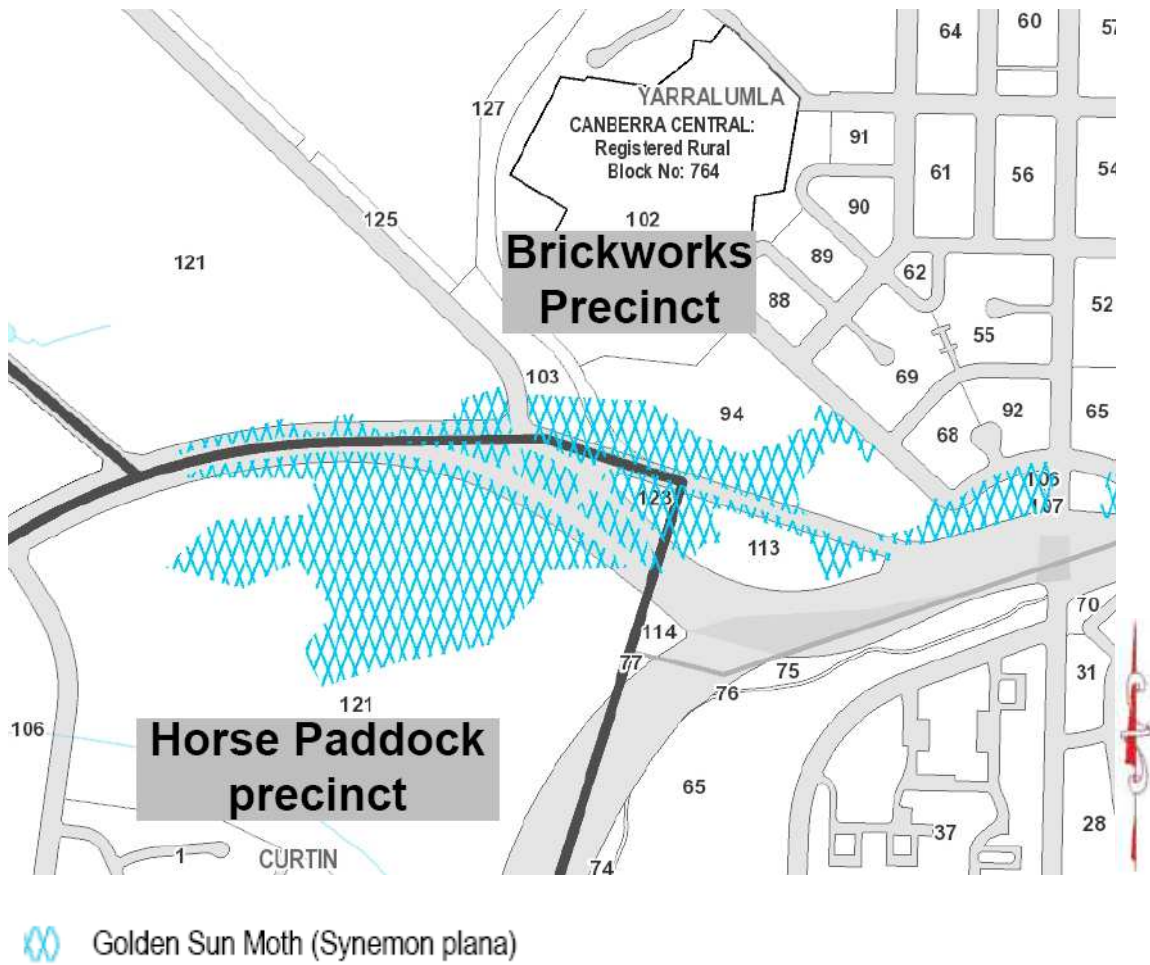
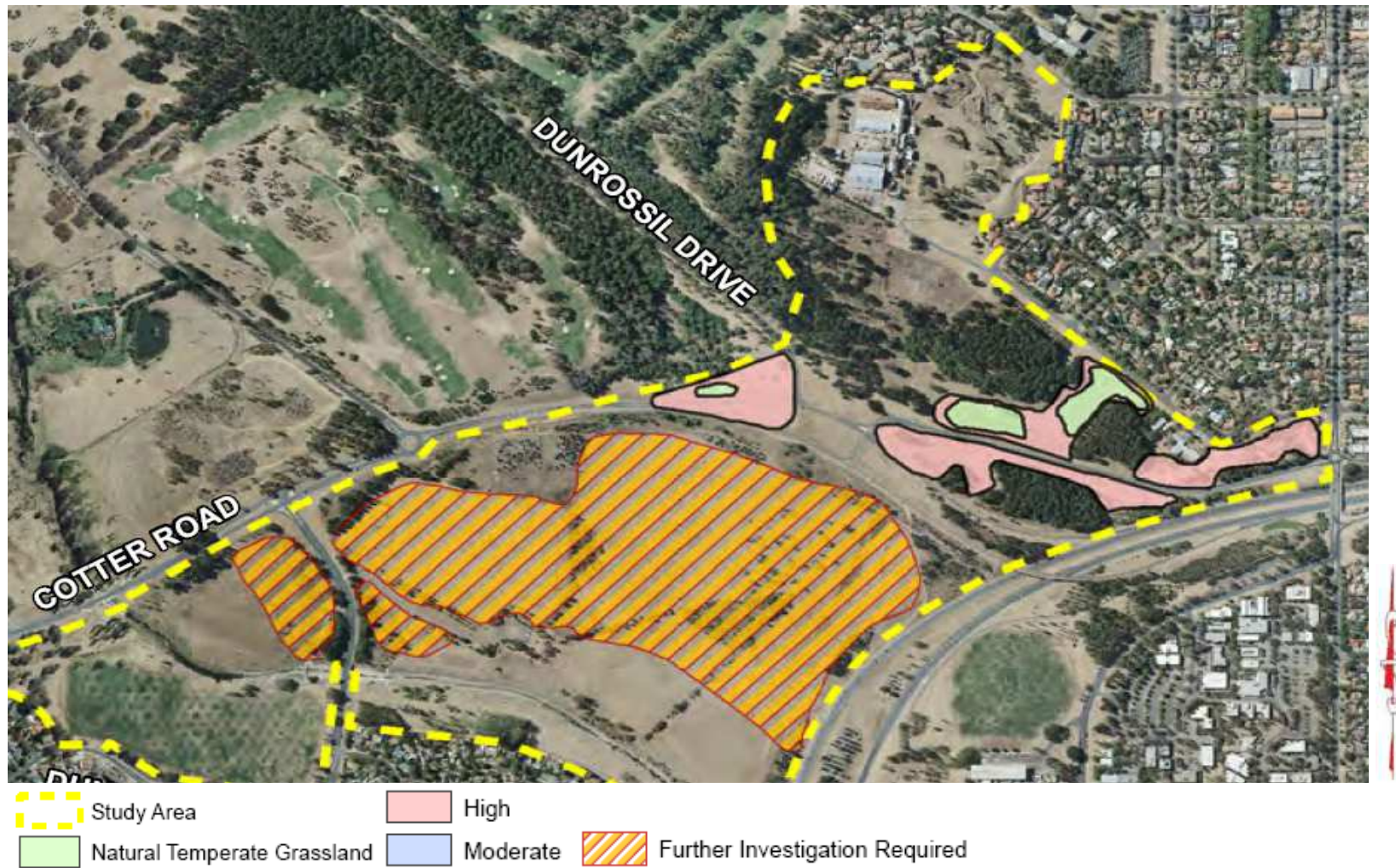


Figure 14 on Page 29 is an extract from the National Capital Authority Yarralumla and North Curtin Study Area Environmental Constraints plan, dated 8.2.2010.

Figure 14 – Ecological Constraints Plan – National Capital Authority Yarralumla & North Curtin Study Area.



## SECTION 3.

### CONTEXT OF THE BUSHFIRE RISK ASSESSMENT

The ACT Government enacted the *Emergencies Act 2004*, as part of its response to the needs identified by the McLeod Inquiry to replace the *Bushfire Act 1936* and sets the legislative basis for bushfire related planning.

Resulting from the changes in legislation, the ACT Planning & Land Authority prepared "*Planning for Bushfire Risk Mitigation*", a guideline adopted under the Territory Plan, that provides guidance to mitigate adverse impacts from bushfires in the ACT.

The Guideline is one of many documents that informs planning and development in the ACT and is taken into account by the ACT Planning & Land Authority when determining development applications and is complementary to the ACT Emergency Services Authority's *Strategic Bushfire Management Plan*, a strategic document outlining measures for the Prevention, Preparedness, Response and Recovery from bushfire in the ACT.

A *Bushfire Prone Area* for the ACT was declared through the *Building Regulations* and came into effect on the 1<sup>st</sup> September 2004. Under the declaration, all parts of the ACT outside the defined urban area have been designated bushfire prone and the Authority, under Part A (Consideration of Land Use and Development Proposals) of the Territory Plan, can require a site specific bushfire risk assessment to be undertaken during the planning/design process.

This Bushfire Risk Assessment addresses this requirement and has been undertaken using the *Australian Standard for Risk Management AS/NZS ISO 31000:2009* and AS 3959 - 2009.

This assessment determines the level of bushfire risk on the proposed development within the Yarralumla Brickworks precinct from a fire that may occur in the vegetation on the North Curtin Horse Paddock to the southwest, a fire in the retained vegetation on Block 1, Section 127 and a fire in the unmanaged vegetation on Block 3, Section 94 and provides recommendations on measures required to mitigate the effects of such fire events.



## SECTION 4

### BUSHFIRE RISK ASSESSMENT – YARRALUMLA BRICKWORKS PRECINCT

#### 4.1 Introduction.

The Australian Standard AS/NZS ISO 31000:2009, the ACT Government Enterprise-wide risk management framework and the Emergency Management Australia (EMA) emergency risk management process provide the framework for establishing the context, analysis, evaluation, treatment, monitoring and communication of risk.

Risk has two elements: likelihood, the chances of a bushfire occurring and consequence, the impact of a bushfire when it occurs.

Bushfire risk is defined as the chance of a bushfire occurring that will have harmful consequences to human communities and the environment. Bushfire risk is usually assessed through consideration of the likelihood of ignition and consequences of a bushfire occurring. Risk reduction can be achieved by reducing the likelihood of a bushfire, the opportunity for a bushfire to spread or the consequence of a bushfire (on natural and built assets).

Bushfire management should have a clear objective to reduce both the likelihood of bushfires and reduce the negative impacts of bushfires. It should also consider the costs, inconvenience and dangers of measures taken to reduce the risk of bushfires.

The consequences of bushfire management activities and the failure to implement programs also need to be considered. A range of factors influence bushfire risk – these include:

- The likelihood of human and natural fire ignitions, as influenced by time, space and demographics;
- The potential spread and severity of a bushfire, as determined by fuel, topography and weather conditions;
- The proximity of assets vulnerable to bushfire fuels, and likely bushfire paths; and
- The vulnerability of assets including natural assets, or their capacity to cope with, and recover from bushfire.

## 4.2 Management Strategies.

Broad strategies to manage bushfire risk include:

- Eliminate the bushfire risk (make the land-use decision first by asking the question about whether development should or should not proceed in a given area);
- Design or substitution (review boundary locations and shape, change the types of land-use policy);
- Engineering controls (infrastructure, building standards and landscaping) and
- Administration and organisation; (community preparedness measures).

## 4.3 Risk Assessment.

An assessment of bushfire risk must firstly define the problem. This involves the identification of the nature and scope of issues to be addressed and defining the possible boundaries for the assessment (*Emergency Risk Management – Applications Guide*. (EMA Echo Press, 2000).

For the purpose of analysing fire risks that might emerge in the ACT, a dangerous and damaging fire has the potential to occur when the following conditions prevail:

- Continuous available fuel – fuel at moisture content sufficiently low to enable rapid combustion, arising from drought effects or the maturing and drying, of grasslands;
- Exposure of vulnerable assets. The ‘catchment’ for such fires may be within several hundred metres or many (60-70) kilometres from the asset/s;
- A combination of weather conditions that generate a forest or grass fire danger index of Very High (24) or greater. Typically, in the ACT, prevailing adverse fire weather will have a strong northerly, through to south-westerly wind influence;
- A fire in the landscape which is not effectively suppressed.

The preliminary assessment of the risk to the Yarralumla Brickworks precinct was undertaken during the site inspection and identified that the retained vegetation within the PRZ2 zoned land to the west, southwest and south, within Block 1 Section 127 and to the southeast presented a moderate risk to the future development within the Yarralumla Brickworks precinct, if it remained unmanaged.

Advice from Doma confirms that the vegetation within Block 1 Section 127, to the west, southwest and south will be removed and this land managed, extending the existing management protocols to the west of the residential development along the western, south-western and southern edge of the Yarralumla Brickworks precinct, removing the bushfire risk from these aspects of the Brickworks precinct.

The continued management of the vegetation within the Canberra Golf Club land, the Dunrossil Avenue corridor and the land within Block 1 Section 127 removes the risk of bushfire to the Brickworks precinct from the northwest, west and southwest directions.

At a broader scale, the unmanaged grassland vegetation within the North Curtin Horse Paddock, located to the southwest of Cotter Road (beyond the Canberra Golf Club), presents an indirect risk to the development precinct from ember attack.

This risk will be removed with the development of the North Curtin Diplomatic Estate.

The forest vegetation within Block 3 Section 94, to the southeast of the Brickworks precinct will remain and therefore present the only bushfire risk to the development precinct.

## SECTION 5

### PROTECTION MEASURES TO BE IMPLEMENTED TO REDUCE THE BUSHFIRE RISK TO THE PROPOSED DEVELOPMENT.

#### 5.1 Introduction.

The ACT ESA & Rural Fire Service developed a methodology for determining the classification of potential exposure (risk) of the urban edge to severe bushfires and introduces Asset Interface Classification [AIC], which is defined as the boundary between an asset and the bushfire paths that approach it.

It is determined by an assessment of:

- The maximum fire size an asset may be subject to;
- The part of the fire [head, flank, back] an asset maybe subject to recognizing the major fire threat from the north and west;
- The fire run length criteria and the length of fire run.

The following table provides an Asset Interface Classification [AIC], at a broader scale:

**Table 1: Asset Interface Classification**

Aspect of Fire Run	Length of Fire Run to Asset Interface (through unmanaged vegetation)		
	<100	100 – 350	>350
N	Secondary	Primary	Primary
NW	Secondary	Primary	Primary
W	Secondary	Primary	Primary
SW	Lee	Secondary	Primary
S	Lee	Secondary	Secondary
SE	Lee	Lee	Lee
E	Lee	Lee	Secondary
NE	Lee	Lee	Secondary

An examination of the Asset Interface Classification at a precinct level for the site identifies the following results:

**Table 2: Asset Interface Classification – Canberra Brickworks Site.**

Aspect of Fire Run	Length of Fire Run to Asset Interface (through unmanaged vegetation)		
	<100m	100 – 350m	>350m
Southeast: Managed grassland vegetation; Managed Outer Asset Protection Zone and retained copses of unmanaged forest vegetation within Section 94		<b>Lee</b>	

## 5.2 Asset Protection Zones.

The ESA have advised that the small area of vegetation that remains to the southeast of the Brickworks site, following the establishment and management of the Outer Asset Protection along the south-western side of Denman Street, can be assessed as ‘remnant forest’ for the purpose of determining the width of Inner Asset Protection Zone to the building erected on Precinct 7 and also determination of the required level of bushfire construction to the proposed buildings.

A.S. 3959 – 2018 – ‘Construction of Buildings in Bushfire Prone Areas’ provides the methodology for determining the width of the Asset Protection Zone and construction standards to the buildings in Precinct 7, based on the following parameters:

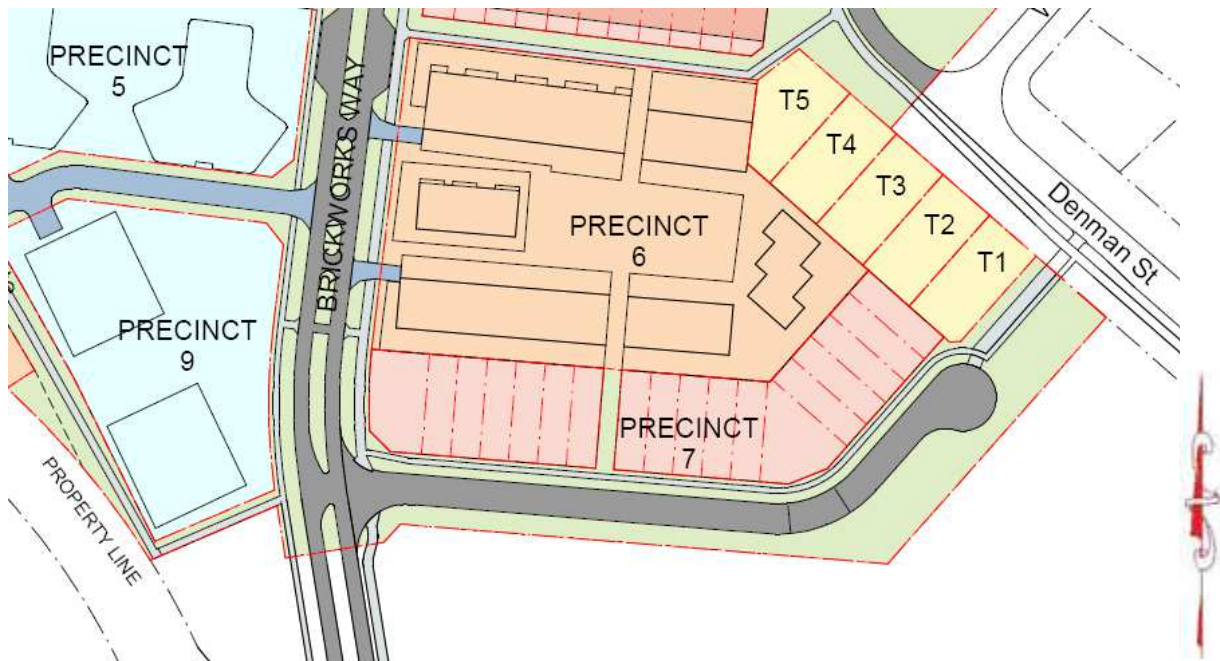
- Fire Danger Index for the area: 100;
- Vegetation Classification: Remnant Forest (as defined by RFS/ACT F&R) reclassified as low hazard ‘rainforest’;
- Effective slope under the low hazard vegetation – level.

From Table 2.4 of A.S. 3959 – 2018, to achieve a Bushfire Attack Level (BAL) of 29, the required width of Asset Protection Zone is 11 metres.

Figure 15 on Page 36 provides a diagrammatic layout of the Asset Protection Zone measured from the south-eastern and the southern boundary of Precinct 7.

The Asset Protection Zone shall be maintained to the standards of an Inner Asset Protection Zone (IAPZ) in accordance with the ACT Bushfire Management Standards.

**Figure 15 – Extract from the Draft EDP Masterplan showing the Asset Protection Zone and access provisions to Precinct 7.**



**Note 1:**

The vegetation to the west and southwest of the development precinct, within Block 1, Section 127 consists of a narrow band [20 – 45 metres wide] of poor quality *Pinus Radiata* trees which will be removed and the area managed as 'parkland', removing the current bushfire risk from this vegetation.

**Note 2:**

The management of the Cotter Road and Dunrossil Drive corridors, as described in the National Capital Bushfire Operations Plan [BOP] for the Dunrossil Avenue corridor and the ESA Bushfire Operations Plan [BOP] for the Cotter Road corridor, provides a managed Outer Asset Protection Zone to the south and southwest of Block 1, Section 127 and the Brickworks precinct.

The National Capital Bushfire Operations Plan [BOP] identifies that the Dunrossil Avenue corridor, including the replanted Pines within Block 2, Section 103, will be slashed at 6 – 8 week intervals – satisfying the prescriptions of an Outer Asset Protection Zone.

The ESA Bushfire Operations Plan [BOP] identifies the grassland vegetation within the Cotter Road corridor, including the grassland vegetation within Block 3, Section 94 is slashed. The site inspection confirmed that the current management practices maintain this area to the standards of an Outer Asset Protection Zone – i.e. maintain a Grassland fire hazard rating of < 35 when grassland curing reaches > 70%.

### **5.3 Construction Standards to Buildings.**

The bushfire construction standards to the elevations of the buildings which are exposed to the hazard (remnant forest vegetation) shall comply with Section 3 and Section 7 (BAL 29) with the elevations not exposed to the hazard constructed to comply with Section 3 and Section 6 (BAL 19) of A.S. 3959 – 2018 – *'Construction of Buildings in Bushfire Prone Areas'*.

### **5.4 Access for Fire-fighting Operations.**

The ESA have also advised that there is required to be provided an edge (perimeter) road between the hazard and the buildings in Precinct 7 and that the perimeter road shall have a width of 7.5 metres, kerb to kerb and constructed in accordance with the performance criteria of Table 10 of the ACT Strategic Bushfire Management Plan.

These performance criteria include:

- Curves shall have an inner radius of 6 metres and an outer radius of 12 metres;
- Minimum vertical clearance height of 4.2 metres above the road;
- Hydrants shall be provided and located clear of parking bays.

### **5.5 Water Supplies for Fire Fighting Operations.**

Hydrants for fire-fighting operations are to be provided along the perimeter road to the satisfaction of the ACT Fire Brigade [Fire & Rescue ACT]”.

The hydrant supply shall be installed to comply with the agreed standards for water supply and require type F5 standard 45 l/s single standard hydrants at 60 metre intervals to the hazard interface.

### **5.6 Management of Pocket Parks, Open Space Areas & Asset Protection Zones.**

The Asset Protection Zones and Pocket Parks within the development precinct shall be maintained to the prescriptions of an Inner Asset Protection Zone as defined by the *ACT Strategic Bushfire Management Standards*.

Management shall also comply with the 'Low Threat Vegetation' as defined by Section 2.2.3.2 of Australian Standard A.S. 3959 – 2018 – *'Construction of Buildings in Bushfire Prone Areas'*.

### **5.6 Management of Block 127 as an Inner Asset Protection Zone.**

Doma have agreed to undertake management works within Block 127, to the west of the development precinct, to create an Inner Asset Protection Zone.

This work will include:

1. The removal all dead/dangerous Radiata Pines;
2. Removal of the shrubby/weedy understorey using a forestry mower to mulch down the vegetation into a mulch layer. Note, any shrubs worthy of retention should be tagged and not removed;
3. Monitor the regrowth of the weeds/shrubs and undertake spraying with Glyphosate to kill off the regrowth. Note: This process will take some time until the area is clear of weeds and unwanted shrubs;
4. Replant the area with (native) grass species that can withstand regular slashing to a maximum height of 100mm;
5. Landscape the area with native shrubs to a total area of 10% of the IAPZ. Shrubs shall be planted in clumps;
6. Maintain the area as an inner Asset Protection Zone until handed over to Transport Canberra City Services (TCCS) to continue management in perpetuity.



## SECTION 6

### RESIDUAL RISK.

#### 6.1 Introduction.

Table 3 evaluates the residual bushfire risk to the proposed development following the implementation of the recommended bushfire protection measures, and determines the vulnerability of the proposed development, the possible consequences and residual bushfire risk during extreme to catastrophic fire danger periods.

**Table 3 – Bushfire Risk Register & Action Treatment Plan – catastrophic bushfire events, post implementation of the recommended protection measures.**

The Risk What can happen?	The consequences and likelihood of an event happening		Risk before mitigation	Strategy to reduce the risk	Consequences & Likelihood after mitigation	Residual Level of Risk
	Consequences	Likelihood				
Fire burning in the forest land vegetation to the southeast of the development site, spreading under southeast winds	Minor	Unlikely to occur during severe fire danger periods	Low	Provision of Asset Protection Zones & construction standards to buildings	Minor/Unlikely	Low

#### 6.2 Summary of Residual Bushfire Risk.

Table 3 provides a review of the residual level of risk to the assets within the Yarralumla Brickworks precinct and has been determined on the basis that the recommended bushfire mitigation measures are implemented and maintained over the life of the development.

## SECTION 7

### CONCLUSION

This assessment examines the potential bushfire risk to the proposed Yarralumla Brickworks precinct within Block 1, Block 7 and Block 764, Section 102 Yarralumla, ACT.

The report has examined the topography and vegetation on the land adjoining the development precinct, identified the fire-paths which may present a threat to the future development, determined the level of risk prior to and the residual risk after the implementation of the recommended bushfire protection measures.

The examination of the potential risk has identified that the grassy open woodland on the North Curtin Horse Paddocks to the southwest and the copses of forest vegetation on Block 3, Section 94, to the southeast of the development site, currently present a hazard to the proposed development.

The development of the North Curtin Horse Paddocks to create the North Curtin Diplomatic Residential Estate will remove the bushfire risk to the Brickworks site.

The management of the vegetation within Block 1, Section 127 to the west and southwest of the development precinct is a mandatory requirement as part of the ESA Bushfire Operations Plan in order to remove, in perpetuity, the hazard adjoining the western and south-western edges of the Brickworks site.

The management of the Dunrossil Avenue and Cotter Road removes the bushfire risk to the southwest of the Brickworks site.

The risk from the vegetation on the land to the southeast will remain.

The provision of an eleven (11) metre width Asset Protection Zone setback plus the construction of the buildings to meet BAL 29 bushfire construction standards reduces the risk to low.

This risk has been determined to be low



Graham Swain  
Managing Director - **Australian Bushfire Protection Planners Pty Limited**

## REFERENCES:

- Strategic Bushfire Management Plan for the ACT – Version 1 – January 2005; Version 2 – October 2009 and Version 3 – 2014;
- ACT Planning Strategy – 2012;
- Australian Standard AS/NZS ISO 31000:2009 Risk Management;
- Emergency Risk Management – Applications Guide. (EMA) 2000);
- Overall Fuel Hazard Guide – Department of Sustainability & Energy [DSE] Victoria; July 2010;
- Planning for Bushfire Risk Mitigation 2006 & update 2009;
- National Capital Bushfire Operations Plan [BOP];
- Bushfire Operations Plan [BOP] – North Curtin Horse Paddocks and Brickworks Precinct;
- Emergency Services Agency (ESA) Bushfire Operations Plan [BOP];
- Yarralumla & North Curtin Environmental Constraints Mapping;
- ACTmap – Significant Plants, Animals & Registered Trees Map - Yarralumla & North Curtin;
- ACTmap – Natural Temperate Woodland Mapping – Yarralumla & North Curtin; and
- ACTmap – Sun Moth Habitat Mapping – Yarralumla & North Curtin;
- DSB Tree Assessment;
- Umwelt Ecological Assessment – 2004.