

UPDATED

BUSHFIRE RISK ASSESSMENT REPORT

FOR THE

MONCRIEFF ESTATE DEVELOPMENT PLAN

AUSTRALIAN CAPITAL TERRITORY

PREPARED FOR THE

LAND DEVELOPMENT AGENCY



Australian Bushfire Protection Planners Pty Limited.

ACN 083 085 474

RMB 3411 Dog Trap Road

SOMERSBY 2250 NSW

Phone: (02) 43622112 Fax: (02) 43622204

Email: abpp@bigpond.net.au

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Assessment Number	Document	Preparation Date	Issue Date	Directors Approval
B132163	Final	1.3.2012	8.1.2014	<i>G.L.Swain</i>

BACKGROUND TO UPDATED REPORT

Australian Bushfire Protection Planners Pty Limited was commissioned by the Land Development Agency [LDA] to prepare a revised Bushfire Risk Assessment that determines the level of bushfire risk, and the protection measures required to mitigate the risk to the proposed suburb of Moncrieff. The revised report was issued on the 13.3.2012.

The advice contained within the report provided the bushfire planning principles to be used in the planning of the new suburb.

A review of the proposed bushfire protection measures to the new suburb has resulted in changes being made to the extent of management of the planned Open Space areas and the width of the Asset Protection Zone to the north-western, northern and north-eastern aspects of the new suburb which includes the Horse Park Drive corridor.

The decision to manage the majority of the Open Space areas, except for the area to the south and east of the new suburb removes the need to provide and manage Asset Protection Zones and apply construction standards to the future dwellings located adjacent to the Open Space areas.

The increase in the width of the Asset Protection Zone to the north-western, northern and north-western aspects of the new suburb have been made so as to remove the requirement to apply building construction standards to dwellings which will ultimately be surrounded by residential development within the future suburb of Taylor and Jacka.

This report updates those sections of the revised report issued on the 13.3.2012 to address the decisions taken in respect to the management of the Open Space areas and the increased width of the Asset Protection Zone to the north-western, northern and north-western aspects of the new suburb.

EXECUTIVE SUMMARY

Section 1 of this report outlines the background to the assessment and describes the site and details the site inspection carried out on the 30th August 2010.

Section 2 of the report provides a description of the site and the precinct [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 suburb 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 proposed new suburb and determines the level of risk to the future residential development.

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:

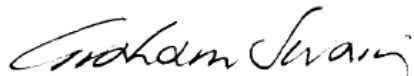
- Bushfire fuel reduction;
- Provision of temporary & permanent Asset Protection Zones;
- Construction standards;
- Water supply provisions for fire-fighting;
- Access for fire-fighting;
- Evacuation planning; and
- Standards for fire protection zones.

Section 6 and 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 western, north-western and northern aspects to the suburb of Moncrieff, prior to the implementation of the recommended fire protection measures, is extreme;
- The assessment has also determined that there is a varying level of risk to future residential development which adjoins unmanaged vegetation retained within the Open Space areas within the new suburb; and
- If the protection measures recommended in this report are fully implemented to the western, north-western and northern aspects, the level of risk will be reduced from extreme to high.

Section 8 provides a graphical depiction of the recommended bushfire protection measures.



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

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SECTION 1

INTRODUCTION

1.1 Background.

The Land Development Agency has been engaged to complete the planning, design, construction, development and marketing of land in the new suburb of Moncrieff, ACT.

The new suburb of Moncrieff contains 190.2 hectares of land which is bound to the south by the existing suburbs of Ngunnawal and Amaroo and to the southwest by the new suburb of Ngunnawal 2C. The northern boundary is defined by the Horse Park Drive alignment, currently under construction.

The land to the northwest, north and northeast of the Horse Park Drive alignment forms the future suburbs of Taylor and Jacka however, until these suburbs are developed these areas remain bushfire prone and potentially subject to catastrophic bushfire events.

The Moncrieff Context Plan identifies that the new suburb will contain areas of Open Space, set aside for the retention of woodland/grassland vegetation. These areas are predominantly located in the southern portion of the suburb with a corridor running along the south-western edge, between the existing suburb of Ngunnawal and the new residential development within Ngunnawal Stage 2.

Corridors of Open Space land also occur throughout the proposed suburb, including discrete 'pocket' parks. Except for the larger area of open Space located in the south-eastern and eastern section of the new suburb the Open Space will be managed to remove the potential bushfire hazard.

The retained woodland/grassland vegetation on the unmanaged Open Space land will remain a hazard to the adjoining urban development.

This report therefore examines the bushfire risk to that part of the Moncrieff suburb which is exposed to a bushfire threat, including the exposure to a fire occurrence in the unmanaged woodland/grassland vegetation within the unmanaged Open Space lands and the woodland/grassland vegetation on the land which forms the future suburbs of Taylor and Jacka, to the northwest, north and northeast of Moncrieff.

1.2 Aim of the Brief.

The aim of this report is to prepare a bushfire risk assessment in accordance with Australian Standard for Risk Management, AS/NZS ISO 31000:2009, the ACTPLA “*Planning for Bushfire Risk Mitigation 2009*” guideline and the *Strategic Bushfire Management Plan for the ACT (2009)* taking into account the status of the planning / construction of the adjacent development within the new suburb of Jacka, to the northeast, and the potential reduction of risk that the adjacent development, including the construction of Horse Park Drive and the future suburb of Taylor may have on the new suburb of Moncrieff.

1.3 Objective of the Brief.

The objective of the brief is to identify the bushfire constraints on the development of the Estate Development Plan, including any building or landscaping requirements to meet relevant bushfire regulations and guidelines.

1.4 The Project.

The project involves preparation of an ***Estate Development Plan*** for the suburb of Moncrieff.

The Moncrieff Concept Plan was prepared by ACTPLA and adopted onto the Register of Planning Guidelines on the 18th January 2008 under the Territory Plan. The Territory Plan identifies that Moncrieff contains Residential, Commercial, Community Facility and Urban Open Space. According to the Variation to the Territory Plan 130, it is proposed that Moncrieff will accommodate approximately 1800 dwellings, a group centre and a large community facility site. This community facility site is identified as a government secondary college reserve site.

Access to the suburb will be from Horse Park Drive and Mirrabai Drive with the main access provided by way of the signalised intersection of Horse Park Drive and Mirrabai Drive. Edge roads are to be utilised as buffers between areas of residential development and open space with edge roads or service roads utilised along Horse Park Drive.

The landscape setting and values are to be enhanced and bushland revegetation shall be undertaken on the steeply sloped ridge on the eastern edge of Moncrieff, overlooking the Amaroo Playing Fields.

Significant hilltops and ridges are to be retained in Open Space and managed remnant stands of woodland are to be retained within Urban Open Space [pocket parks] and open space, where appropriate.

Under ‘*Further Investigations*’ the Concept Plan recommends that ‘*a bushfire risk assessment*’ is required to be undertaken.

Figure 1 – Territory Plan Landuse – ACTPLA – 2008

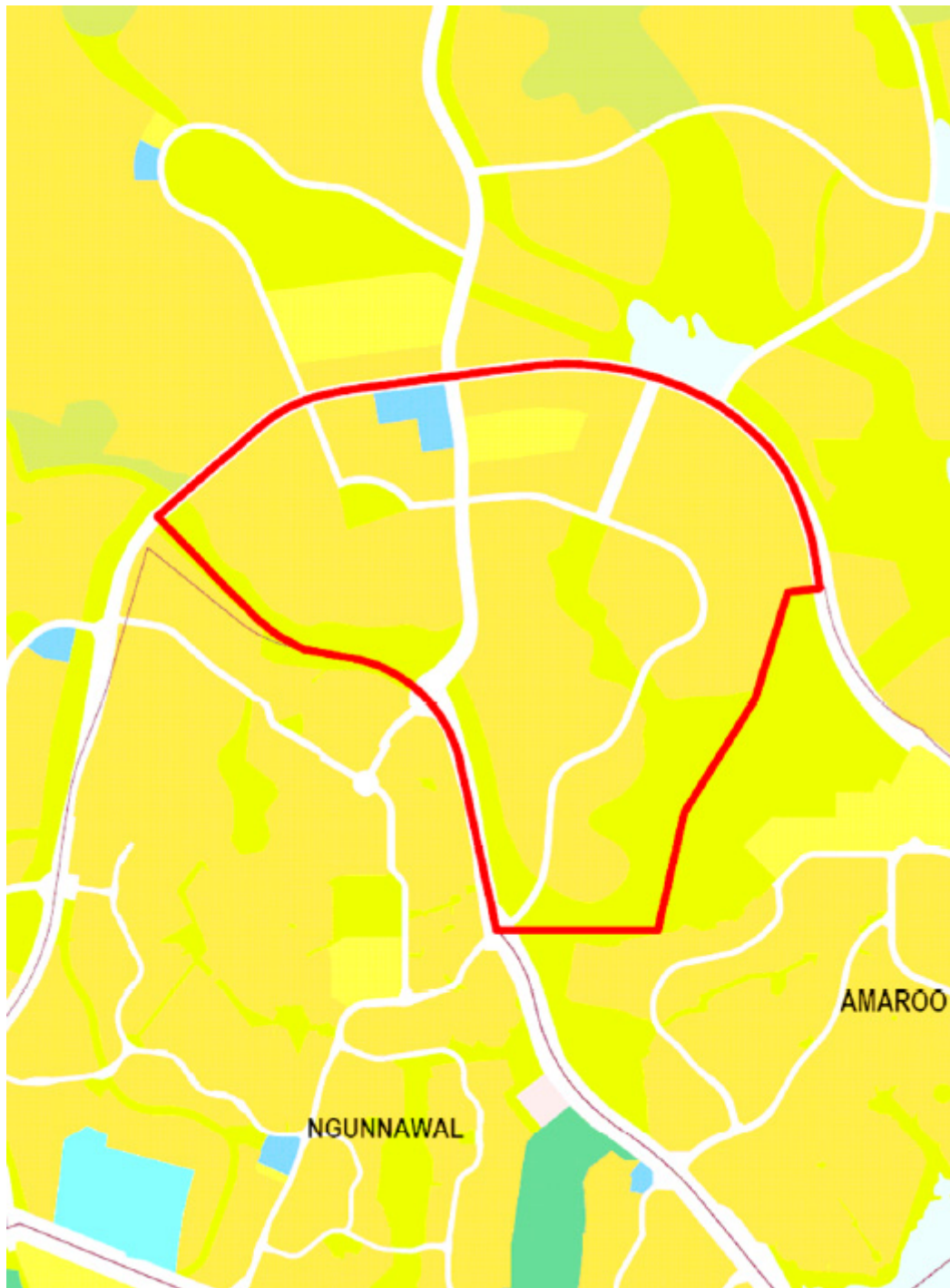


Figure 2 – Moncrieff Concept Plan – ACTPLA – 2008

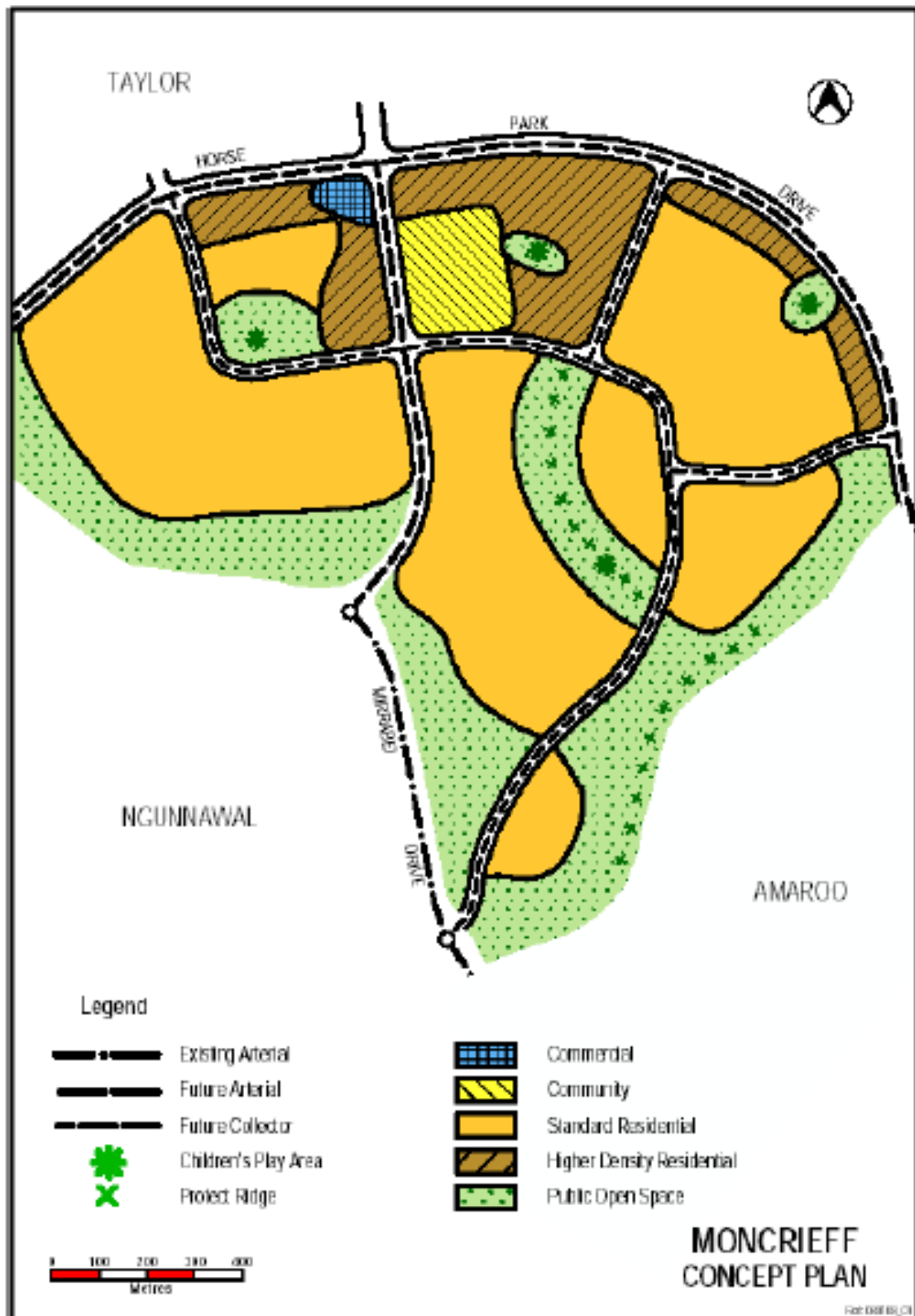
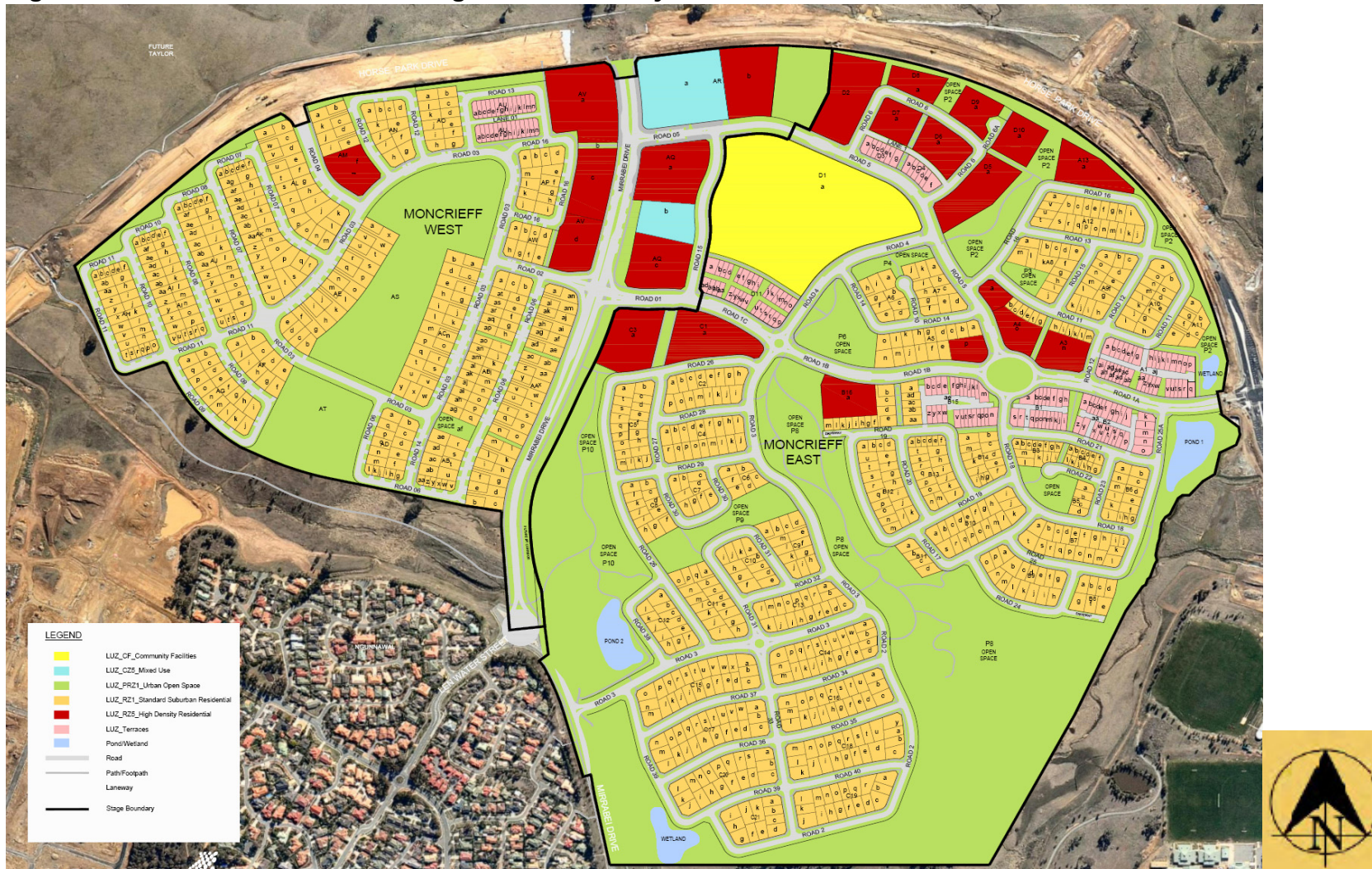


Figure 3 – Moncrieff Landuse Zoning Plan – Territory Plan.



1.5 Project Site.

The Moncrieff development precinct contains approximately 190.2 hectares of land which extends to the north of the existing suburbs of Amaroo and Ngunnawal.

The Moncrieff development precinct is bound to the northwest, north and northeast by Horse Park Drive [currently under construction] with the future suburb of Jacka occupying the land to the northeast and the future suburb of Taylor located to the northwest.

The landform within the development precinct consists of gently undulating topography that falls to the northeast and southwest from a central ridgeline that occupies the south-eastern portion of the new suburb.

The land within the Moncrieff development precinct is currently leased grazing land.

Figure 4 – Location of the new suburb of Moncrieff showing the context of the surrounding development.

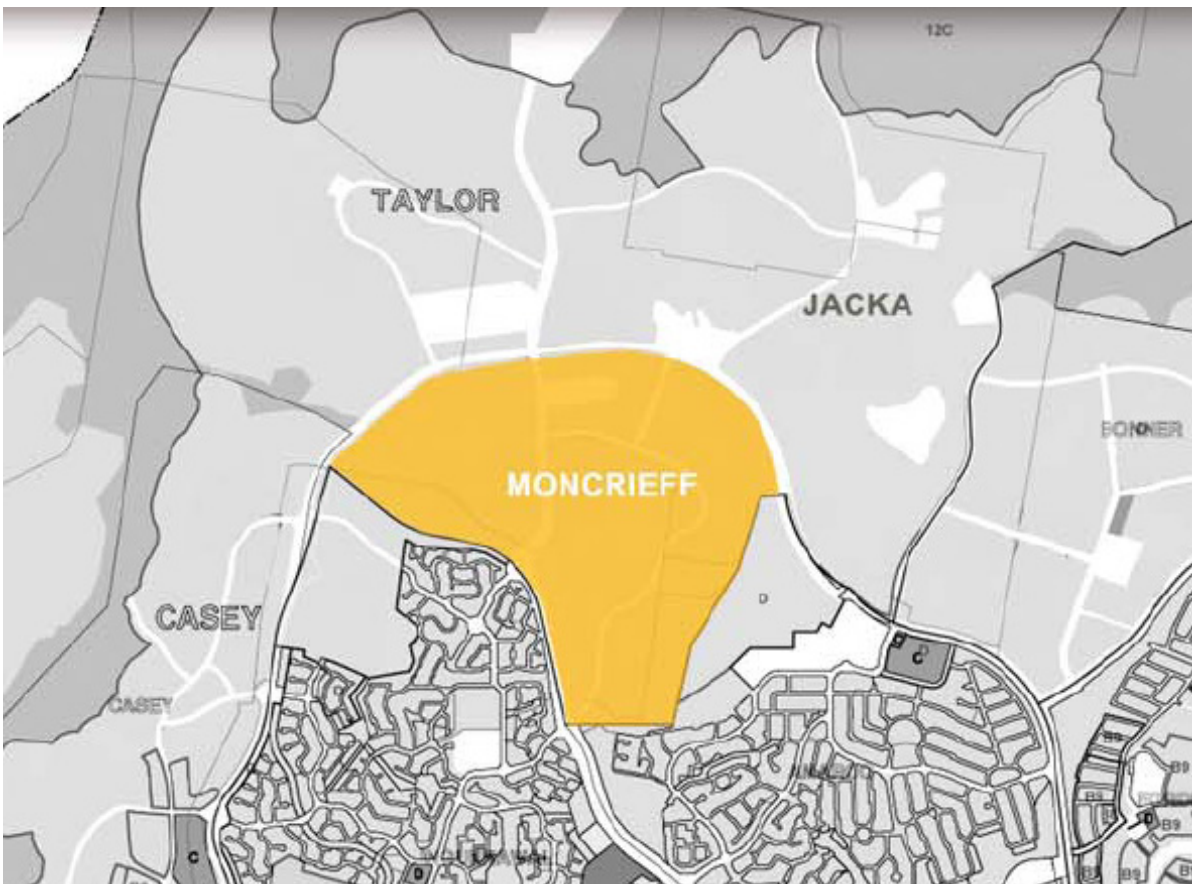
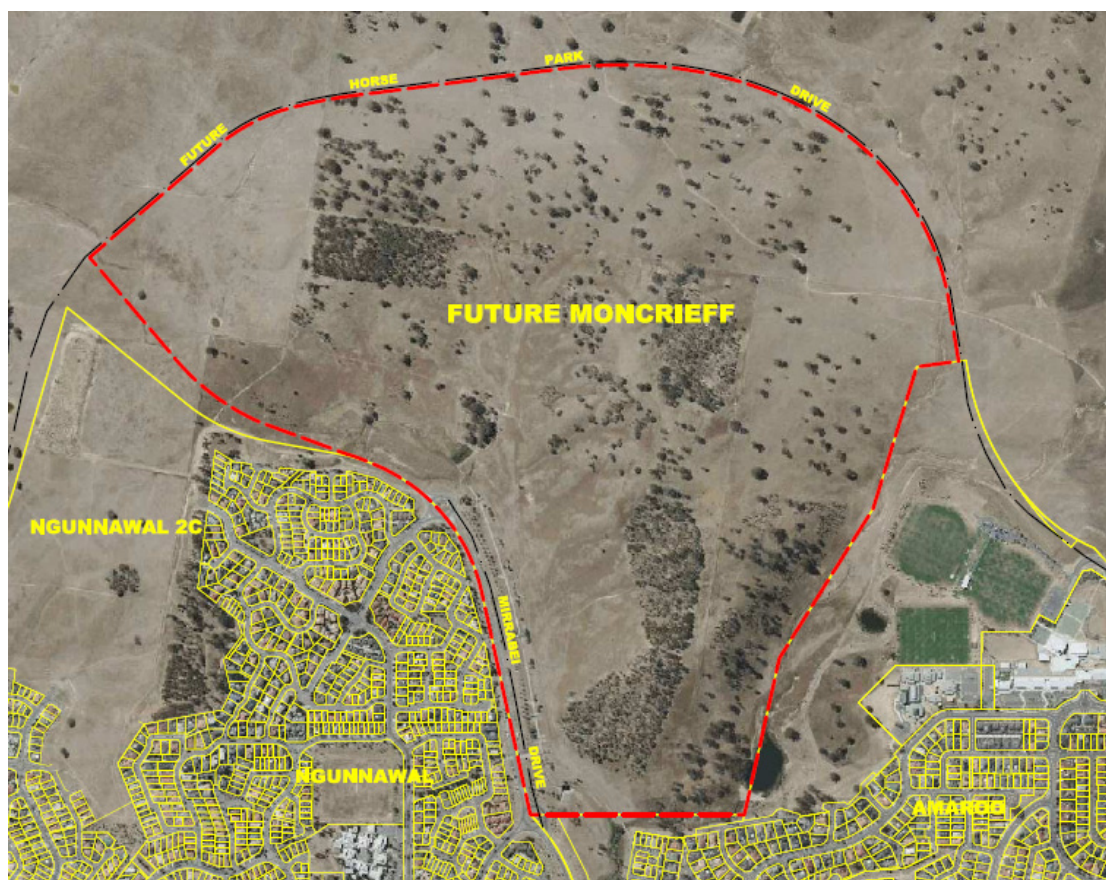


Figure 5 – Aerial Photograph showing location of the new suburb of Moncrieff and context of the surrounding development.



1.6 Study Area.

For the purpose of this report, the boundaries of the Moncrieff study area extend beyond the site boundaries to incorporate land within 400 metres of the Horse Park Drive alignment to the northwest, north and northeast and the suburbs of Amaroo & Ngunnawal to the south and southwest.

1.7 Scope of Study.

A Bushfire Risk Assessment is to be prepared, in accordance with Australian Standard for Risk Management, AS/NZS ISO 31000:2009. The assessment is to be undertaken with reference to the following methodology:

(a) Identify the fire scenarios including an assessment of:

- The exposure to possible ignition/fire sources;
- Vegetation type and likely fuel loads and fire hazards arising using the “Overall Fuel Hazard Guide” – Third edition (NRE May 1999);
- The impact of climate and likely fire runs during severe fire danger periods.

(b) Identify and describe the surrounding natural environment and the likelihood of each fire scenario identified (before mitigation):

- The steepness, slope/terrain;
- Define each level of Likelihood stating assumed frequency of event assigned to each level of Likelihood.

(c) Identify and describe the proposed urban community and consequences of a bushfire (before mitigation):

- Type of proposed development (density, residential, aged care etc) refer to the *Moncrieff – Estate Development Plan*;
- Identify any “wicks” in to the suburb through connected open space with careful regard to fuel load and likely future maintenance regimes.
- Assumed fire impacts / consequence if exposed to fire events; including during severe/catastrophic fire danger periods.
- Define each level of consequence stating level of impacts.

(d) Analyse the inherent risk of each identified fire scenario.

- The best available information and techniques should be used and expressed in the terms of likelihood with all assumptions identified.
- Develop risk statements with assigned risk levels reflecting assigned likelihood and consequence of each fire scenario.

(e) Risk Mitigation Measures:

- ***Provide risk mitigation options following consideration of:***
 - ❖ The necessary bushfire protection measures in accordance with Australian Standard AS3959-2009 “*Construction of Buildings in Bushfire Prone Areas*” and any addenda or amendments; and
 - ❖ The ACT *Planning for Bushfire Risk Mitigation*
- ***Evaluate the mitigation measures with consideration of the following:***
 - ❖ Protection zone requirements (home, inner and outer protection zone);
 - ❖ Building standards;
 - ❖ Location, treatment and connectivity to Stromlo Forest Park and the undeveloped land to the north and Stromlo Village to the south;
 - ❖ Access for Emergency Services Vehicles;
 - ❖ Engineering infrastructure including water supply, fire trails, edge roads.

(f) Evaluate the fire scenarios to establish the residual risk:

- Evaluate the residual risk level following mitigation including the vulnerability of the proposed development, and possible consequences of fire during severe fire danger periods;
- Compare the residual risk level against best practice criteria;
- Rank the fire scenarios in order of risk level.

SECTION 2

DESCRIPTION OF STUDY AREA

2.1 Site Inspection.

Graham Swain inspected the development precinct on the 30th August 2010 to assess the topography, slopes and vegetation classification within and adjoining the development precinct. Adjoining land was also inspected to determine the surrounding landuse / land management, vegetation communities and topography.

2.2 Existing Land Use.

The Moncrieff development precinct contains existing short term leased grazing land.

2.3 Surrounding Land Use.

a) North

The land to the north of the Moncrieff development precinct, beyond the Horse Park Drive alignment, is short term leased grazing land.

b) Northeast & east

The land to the northeast & east of the Moncrieff development precinct, beyond the Horse Park Drive alignment, is short and long term leased grazing land within the future suburb of Jacka and the Amaroo Playing Fields [to the east].

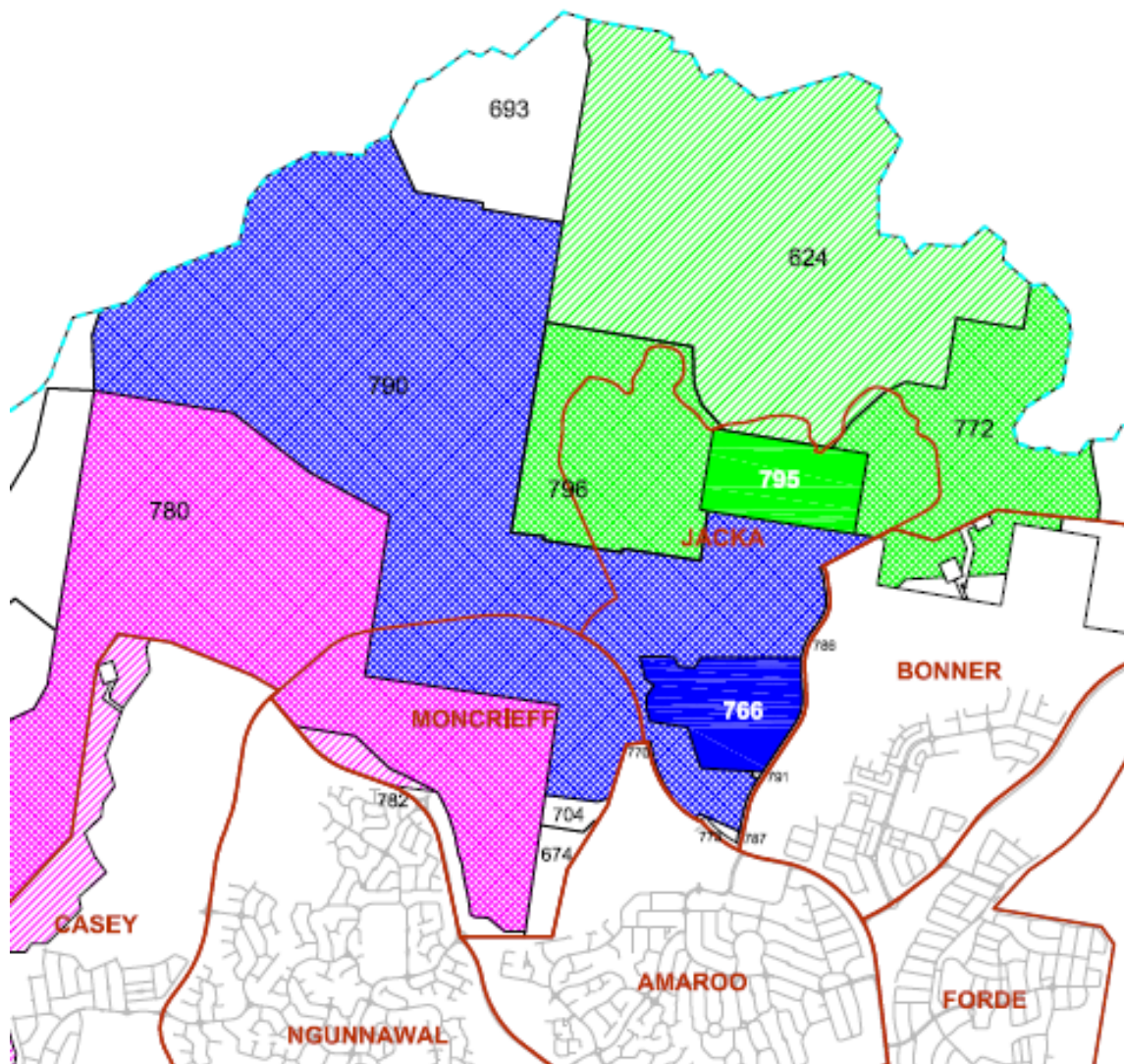
c) South

The existing suburbs of Amaroo and Ngunnawal extend to the south of Moncrieff.

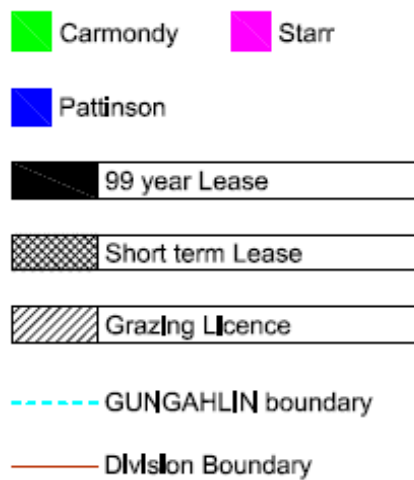
d) Northwest

The land to the northwest of the Moncrieff development precinct, beyond the Horse Park Drive alignment, is short term grazing land within the future suburb of Taylor.

Figure 6 – Landuse Plan.



GUNGAHLIN LEASES AND LICENCES



2.4 Topography.

2.4.1 Within the Development Precinct.

The Moncrieff development precinct contains a ridgeline [three hills] located within the central southern portion of the new suburb, within the proposed Grassland/Woodland Reserve.

The landform within the remainder of the development precinct falls to the northeast and north into Ginninderra Creek and to the southwest into a tributary of Ginninderra Creek. The land to the west of the ridgeline forms a saddle that rises to the west.

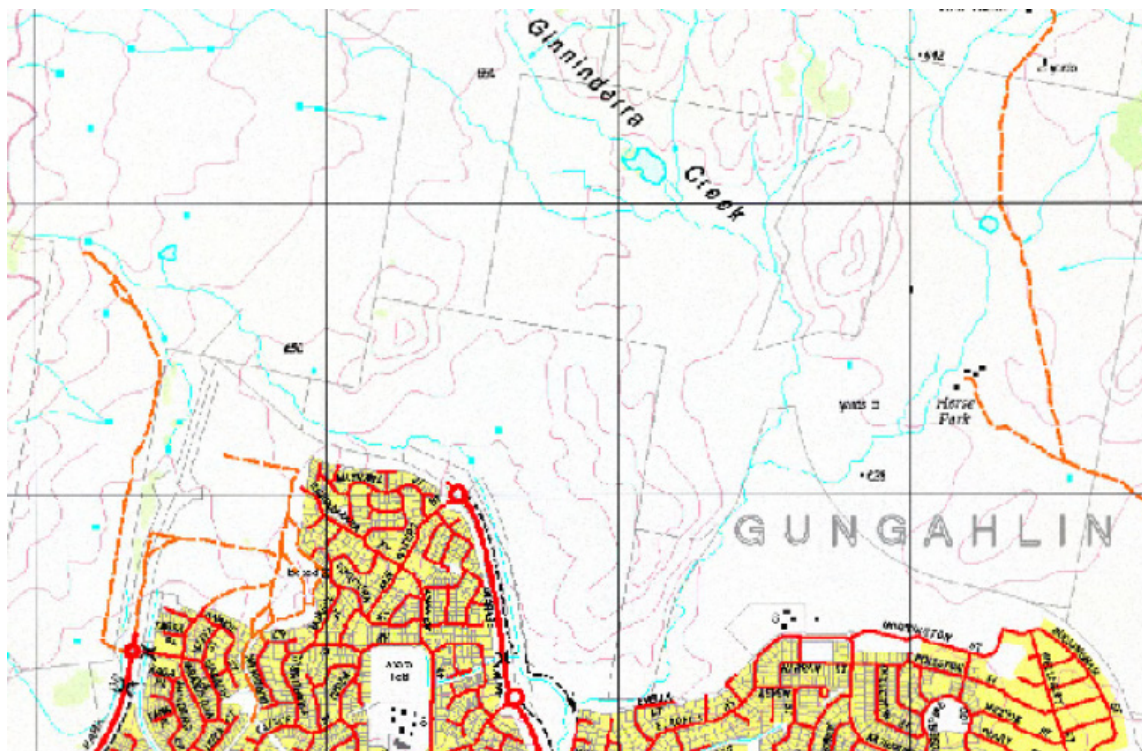
2.4.2 Beyond the Development Precinct.

The land to the northeast of the development precinct, beyond Ginninderra Creek, rises to form a ridgeline that runs in a northwest to southeast direction.

The land to the north, beyond the Horse Park Drive alignment, continues to fall to the north into Ginninderra Creek before rising to the north to the ridgeline.

The land to the northwest and west rises to the west across the future suburb of Taylor whilst the land to the southwest, beyond the tributary to Ginninderra Creek rises across the adjoining residential development within the suburb of Ngunnawal.

Figure 7 – Topographic Map.



2.5 Vegetation within the Development Precinct.

The vegetation within the development precinct consists of Yellow Box-Red Gum Woodland, Lowland Woodland and secondary grassland.

2.6 Vegetation on Adjoining Lands.

(a) North, Northeast & East

At the time of the site inspection the vegetation to the north and northeast of the Moncrieff development precinct consisted of grazed grassland and scattered Yellow Box-Red Gum Woodland. The Amaroo Playing Fields to the east contain managed grass.

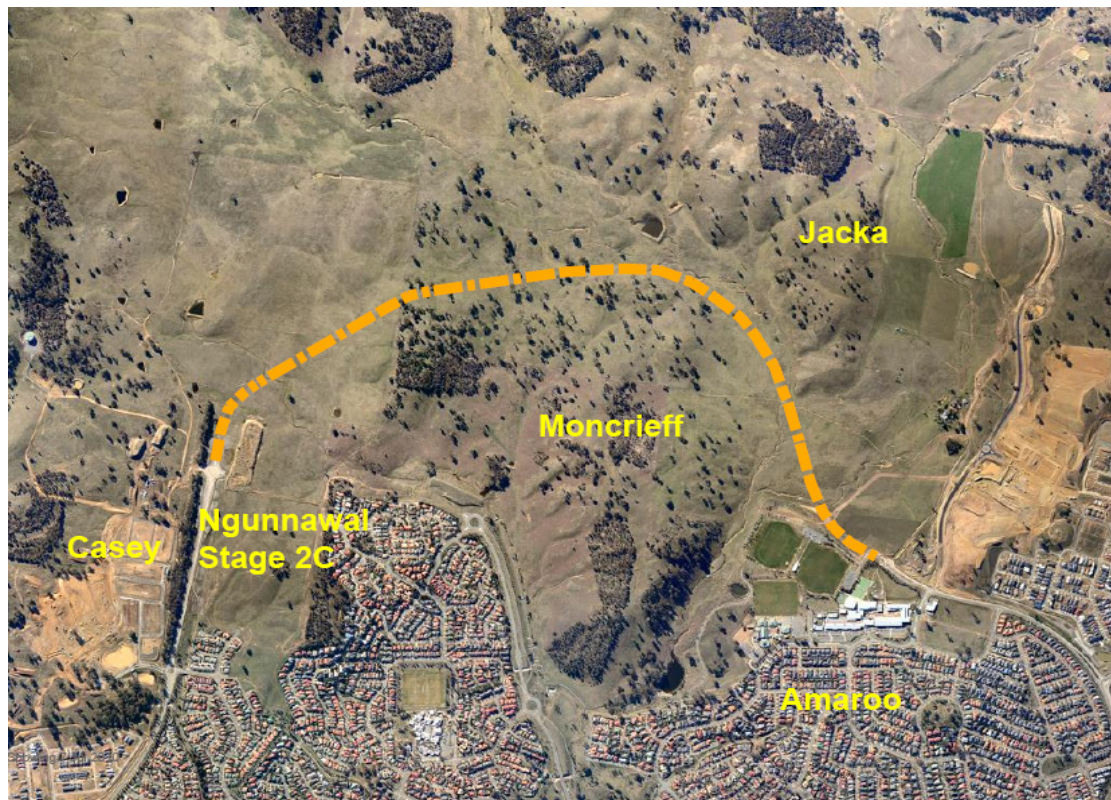
(b) South & southwest

The vegetation within the suburb of Ngunnawal consists of managed curtilages to the dwellings and grassland within the Ngunnawal Stage 2C precinct [recently removed as part of the construction of the Ngunnawal Stage 2C subdivision].

(c) West and Northwest

At the time of the site inspection the vegetation to the northwest and west of the Moncrieff development precinct consisted of grazed grassland and scattered Yellow Box-Red Gum Woodland/Lowland Woodland.

Figure 8 – Aerial Photograph of Moncrieff development precinct and surrounding lands.



2.7 Site Photographs

Photograph No. 1 - Taken from Mirrabei Drive looking northeast to the ridgeline within the proposed Reserve.



Photograph No. 2 - Taken from the future Horse Park Drive looking east towards the woodland vegetation within the proposed Reserve.



Photograph No. 3 - Taken looking to the northeast across Moncrieff and the future suburb of Taylor.



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 1st 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.

A preliminary assessment of the risk to the development precinct was undertaken during the site inspection and identified that until development occurs to the north, within the future suburb of Taylor and within the future suburb of Jacka, the bushfire risk to the new suburb if Moncrieff remains.

Therefore, the following Risk Assessment and resultant recommendations seek to address the protection of the proposed residential development from future unplanned fire events that may occur within the surrounding woodland/grassland vegetation.

SECTION 4

BUSHFIRE RISK

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. 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.

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. 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).

SECTION 5

BUSHFIRE RISK ASSESSMENT

5.1 Introduction.

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 south westerly wind influence.
- Fire in the landscape not effectively suppressed.

In the case of the Moncrieff development precinct, being located on the northern edge of the Gungahlin District, the problem is the potential exposure of the future residential development to woodland/grassland fires that will occur in the vegetation to the northwest, north and northeast within the future Taylor and Jacka development precincts and on the land further to the north and northwest, including the land within NSW.

A further concern is the potential for fires to occur in the woodland/grassland vegetation retained in the open space areas within the suburb of Moncrieff, burning under the influence of southwest, northeast and southeast winds.

This potential risk has been addressed with the decision taken that, except for the larger area of Open Space land to the south and east of the new residential precinct the Open Space land will be managed to comply with Clause 2.2.3.2 – Exclusions – low threat vegetation and non-vegetated areas as defined in Australian Standard A.S. 3959 – 2009 – ‘Construction of Buildings in Bushfire Prone Areas’.

The second part of the risk assessment process identifies the potential risk on the development within the Moncrieff precinct by examining:

- Fire History;
- Exposure to possible ignition / fire sources;
- Vegetation type and likely fuel loads and fire hazards arising using the “Overall Fuel Hazard Guide” – Third edition (NRE May 1999);
- The impact of climate and likely fire runs during severe fire danger periods;
- Wind effects; and
- The impact of surrounding land uses and fuel loads.

The following sections of this report undertake an assessment of these elements to establish the bushfire risk to the proposed development.

5.2 Fire History.

Natural fires have long been part of the ACT landscape. A combination of inherently inflammable vegetation, dry summers, periodic drought and lightning ignitions, resulted in fires of small and large size, of high and low intensity, with periodic conflagrations that have covered the landscape. Much of the native vegetation in the ACT is subject to periodic fires; particularly the dry forest, woodland and grassland communities, and many are fire-adapted ecosystems. Recurrent bushfires and management burning have shaped the condition of the existing plant communities.

The Strategic Bushfire Management Plan for the ACT [version two] states: *“The ACT has a history of severe damaging bushfires with large areas burnt in the bushfire seasons of 1919/20; 1925/26; 1938/39; 1951/52; 1978/79; 1982/83; 1984/85; 2000/01 and in 2002/03”.*

A review of the large fire history data within the Strategic Fire Management Plan for the ACT has identified that the Casey, Ngunnawal, Moncrieff, Amaroo, Bonner and Forde precincts were impacted in the 1979 bushfire season with a fire that ignited south of the Barton Highway extending to the northeast under the influence of a south-westerly wind.

5.3 Ignition / Fire Sources.

Causes of bushfires, including those in the ACT, are natural or human caused. Human causes can be categorised as:

- Malicious – including arson;
- Careless – such as escaped campfires, children and burning off without a permit; and

- Accidental – uncommon but includes motor vehicle and industrial accidents.

The only common natural cause of bushfires in the ACT is lightning. The vast majority of ACT bushfires are human caused with many classified as arson.

Accidental ignition, especially from agricultural and recreational pursuits, of the grassland/woodland vegetation on the land to the west, northwest, north and northeast of the Moncrieff precinct will present a threat to the future development, pending development of the future suburbs of Taylor and Jacka.

Malicious fire ignition can occur wherever humans operate. Deliberately lit (arson) fires are probable within unmanaged woodland/grassland and lightning maybe an ignition source for fires within the vegetation on the ridgelines to the west, northwest [One Tree Hill] and north with resultant fire runs from the northwest and north spreading towards the northern edge of the Moncrieff precinct.

5.4 Climate.

The ACT has a relatively dry, continental climate with warm to hot summers and cool to cold winters. The climate of Canberra is strongly influenced by a band of high pressure systems located around the globe at about 30 – 40S, known as the sub-tropical ridge.

During summer, the sub-tropical ridge is located over southern Australia resulting in warm to hot conditions with winds generally from the east through to northwest.

The average annual rainfall is 629 mm with an average of 108 rain days per year with rainfall reasonably evenly distributed throughout the year with the wettest month being October and the driest being June.

Rainfall tends to be influenced by cold fronts during the winter 6 months and thunderstorm activity during the summer 6 months. While rainfall in most years is reasonably reliable, drier than average years are closely related to ENSO events in the Pacific Ocean and all significant droughts have occurred in El Nino years and these years tend to be significant bushfire seasons as well.

Rainfall across the ACT varies considerably, with much higher rainfall occurring in the ranges to the west and less rainfall to the east.

January is the hottest month with a mean daily maximum temperature of 27°C and an average of 10 days of 30°C or more with 2 days of 35°C or more.

Canberra tends to get cooler easterly winds penetrating from the coast during many summer evenings which can sometimes bring cloud in with the moister air.

The highest recorded maximum temperature was 42.2°C on February 1st 1968 followed closely by 41.4°C on the previous day [31st January 1968]. Relative humidity in Canberra is around 37 – 40% at 3pm in summer.

The fire season in the ACT corresponds with the summer months' high temperatures and low rainfall, and can occur from September to April with a proclaimed bushfire danger period from October to March. There is significant variability from year to year. Fire seasons may be serious in three out of every 15 years, but this can vary considerably.

Extreme and uncontrollable bushfires typically occur when the fire danger rating is over 50, a rating of Extreme. Many of the major house loss events have occurred at fire danger ratings over 70, on a scale of 0 to 100.

Analysis of 1951 – 2004 meteorological records identified 105 days of Extreme fire danger from the Forest Fire Danger Index (FFDI) at Canberra airport.

These were broken down into the following FFDI ratings:

- 61 days 50 – 59 FFDI;
- 25 days 60 – 69 FFDI;
- 9 days 70 – 79 FFDI;
- 4 days 80 – 89 FFDI; and
- 6 days 90 – 100.

Eighteen percent [18%] of January days had Very High FFDI and 2% of January days had Extreme FFDI.

The Very High and Extreme Forest Fire Danger conditions mainly occur between November and March.

[Source SBMP for the ACT].

[The (McArthur) Forest Fire Danger Index (FFDI) was developed in the 1960s by CSIRO scientist A.G. McArthur to measure the degree of danger of fire in Australian forests. The index combines a record of dryness, based on rainfall and evaporation, with daily meteorological variables for wind-speed, temperature and humidity.]

A fire danger rating of between 12 and 25 on the index is considered a "high" degree of danger, while a day having a danger rating of over 50 is considered an "Severe" fire danger day. Since the Victorian Bushfires the Fire Danger Rating has been reviewed with 'Extreme' danger rating being for days that have an FDI greater than 75 and a Catastrophic rating occurs when the FDI exceeds 100.

Canberra generally is not very windy with, on average, 25 days of strong winds a year. Late Winter/Spring tends to be the windiest time with just over half of these days [13 days] occurring in the four [4] months between August and November.

Wind is an important factor in bushfire behaviour as it influences the rate of spread of the fire front and spreads burning embers / sparks, providing ignition sources for spot fires ahead of the main fire front.

The new suburb of Moncrieff has an exposure to strong, hot and dry north-northwest, westerly and south-westerly wind influences. These winds can spread burning embers from both small and large fires over long distances and ignite cured grassland fuels ahead of the main fire front.

Fires that may occur in the vegetation on the land within NSW have the potential to rapidly burn upslope from the northwest and west with the hills and ridges changing the direction of the prevailing wind direction and causing turbulence on the lee side of the higher terrain to the northwest and west of the Moncrieff development precinct.

This turbulence will affect the rate of spread and direction of the fire, potentially spreading embers and smoke into the estate.

Fires which ignite in the Gungahlin Eucalyptus Plantation, to the north of the future suburb of Jacka, have the potential to shed embers onto the grassland vegetation on the leased land along Ginninderra Creek, to the northeast of the Moncrieff development precinct.

5.5 Slope & Fire Paths.

Slope is a critically important factor when assessing fire risk and likely behaviour. The rate of fire propagation doubles up a slope of 10 degrees (18%) and increases almost fourfold up a slope of 20 degrees (40%).

The rate of progress downslope tends to slow at a corresponding rate however wind direction in the lee of hills/ridgelines tends to be unpredictable and can cause fires to change direction unpredictably.

The land to the north and northwest of the northern portion of the Moncrieff development precinct rises gently to the northwest to the foot-slopes of One Tree Hill, therefore providing a slight downslope fire path from the northwest and west.

The calculated rate of spread across this undulating landscape is 0.85 km/h. However, the open nature of the landform will not prevent the rapid spread of fire across this landscape.

Wind effects on the lea side of the mountain which change wind speed and direction and cause turbulence such as 'eddies' and wind shear therefore negating any benefit that the downslope fire path from the west may have provided.

The upslope fire path from Ginninderra Creek, under north-easterly winds, will impact on the north-eastern edge of the development precinct.

Figure 9 – Fire Paths – Northwest, Northeast & Southeast.

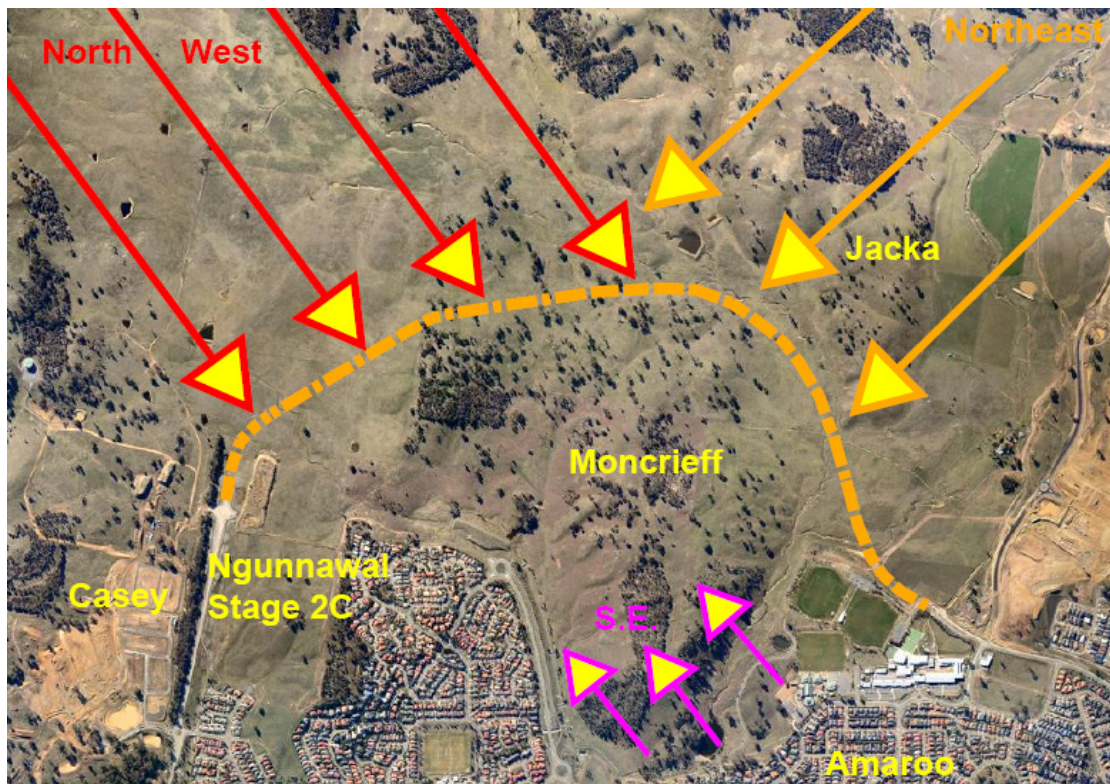
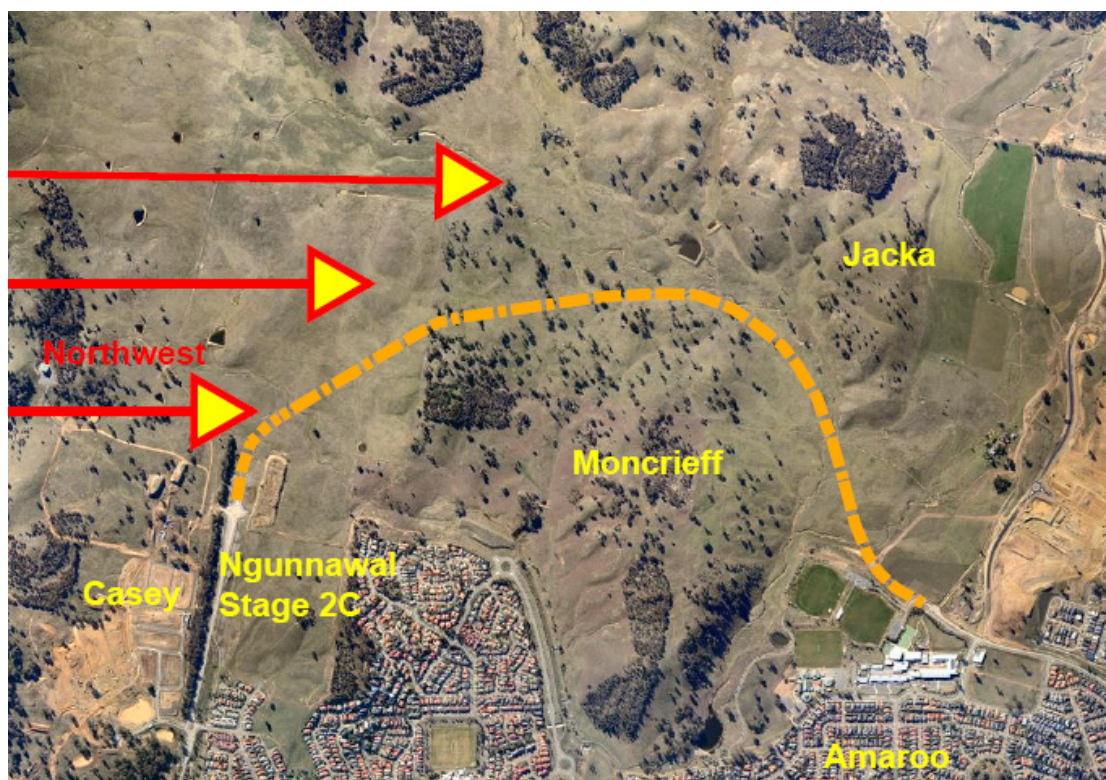


Figure 10 – Fire Paths – West.



5.6 Bushfire Fuels.

Fuel is a critical element in bushfire risk management, as it is the one factor relating to fire behaviour that can be managed.

Fuel in forests, woodlands and shrubland can be divided into four layers, each based on its position on the vegetation profile. They relate to the distribution and nature of combustible material within a vegetated environment and are defined by the DSE Overall Fuel Hazard Guide [Fourth Edition July 2010] as:

- Bark fine fuel;
- Elevated fine fuel;
- Near Surface fine fuel; and
- Surface fine fuel.

Bark on the tree trunks and branches has the potential to travel significant distances in a fire situation (spotting) and act as a ladder between surface fuels and the forest crown. Bark contributes to fire hazard when it is loose and fibrous, present in large quantities and in long loose ribbon forms.

Elevated material is defined as shrubs, heath and suspended material greater than 0.5 metres above ground.

Elevated fuel hazard is highest when the foliage, twigs and other fuel particles are very fine; proportion of dead material is high; fuels are arranged with high level of density and/or horizontal and vertical continuity that promotes the spread of fire and the live foliage has low fuel moisture content.

Near surface fine fuel exists where live and dead fuels effectively touch the ground but do not lay on it. Fuel has a mixture of vertical and horizontal orientation; either the bulk of the fuel is closer to the ground than the top of this layer, or is distributed fairly evenly from the ground up, sometimes contains suspended leaves, bark or twigs and cover varies from continuous to having gaps many times the size of the fuel patch.

Surface fine fuels are defined as the litter bed [leaves, twigs, bark and other fine fuel] lying on the ground. Predominantly horizontal in orientation and includes the partly decomposed fuel [duff] on the soil surface.

Grasses add to the near surface fine fuels and therefore need to be taken into account when assessing the hazard. The risk is higher where greater depth and volume of litter and surface material are present.

5.7 Assessment of Fuel Hazard.

An overall Fuel Hazard for vegetation within the grassland and woodland vegetation on the grazing land to the west, northwest, north and northeast can be determined, from an assessment of the contributing fuel hazards and will reach maximum hazard when the current grazing practices are removed or not undertaken during any bushfire danger period when the Spring growth of grasses is prolific and curing of the vegetation occurs in early summer.

The fuel hazard on the land to the northeast, within the future suburb of Jacka and to the northwest, within the future suburb of Taylor will remain until development of these future suburbs permanently removes the combustible fuels.

The grassy woodland vegetation within the area of Open Space land to the south and east of the residential precinct will also retain bushfire fuels which will maintain a hazard to the adjoining development. The remaining Open Space land, including the 'Pocket Parks' will be managed to create a 'low threat' or 'exempt' vegetation classification in accordance with Clause 2.2.3.2 of Australian Standard A.S. 3959 – 2009 – '*Construction of Buildings in Bushfire Prone Areas*'.

The predominant vegetation that will create the most significant fire impact on the Moncrieff development precinct will therefore be the grassland / woodland vegetation on the land to the west, northwest north and to the northeast and the grassy woodland vegetation within the area of unmanaged Open Space land.

5.7.1 Grassland vegetation.

Using the methodology provided within the DSE Overall Fuel Hazard Guide, the following Fuel Hazard observation was determined for the grassland vegetation on the land beyond the Moncrieff development precinct.

Surface & Near Surface Fine Fuel Hazard:

Surface Fine Fuel Hazard is assessed by measuring litter-bed height and can vary, depending on the land management practices.

The estimated litter bed height for unmanaged grassland vegetation is 15 - 25mm and due to the extent of “near-surface fuels” – i.e. grass tussocks or wire grass up to 0.9 – 1.2m high, the Surface Fine Fuel Hazard Rating can increase from High to Very High for unmanaged grassland vegetation.

Managed grassland [i.e. – grazed/slashed to a maximum height of 100 – 150mm during the Bushfire Danger Period] reduces the combustible fuel density and therefore the overall fuel hazard for managed grassland vegetation reduces to Low – Moderate – that is if the grazing continues on the land the leased land adjoining the suburb of Moncrieff.

5.7.2 Grassy Woodland vegetation on the land to the northwest, north and northeast of the suburb and in the unmanaged Open Space lands within the suburb.

Using the methodology provided within the DSE Overall Fuel Hazard Guide, the following Fuel Hazard observation was determined for the Grassy woodland vegetation on the land beyond the north-western, northern and north-eastern boundaries of the suburb and within the unmanaged Open Space area within the suburb – based on the assumption that management works do not mitigate the accumulation of combustible fuels within the existing and regenerating vegetation within the unmanaged Open Space area.

- **Bark Hazard :**

The Woodland vegetation includes Yellow Box-Red Gum, which has a smooth trunk and long ribbons of bark into the crown of the tree. Therefore this vegetation has a High Bark hazard.

- **Elevated Fuel Hazard :**

Elevated fuel comprises shrub, heath and suspended material. The level of hazard depends on the fuel continuity (horizontal and vertical), height, and proportion of dead material, thickness of the foliage and twigs and flammability [dryness] of the live foliage.

The flammability of the elevated fuel is highest when:

- The foliage, twigs and other fuel particles are very fine (e.g. maximum thickness 1-2 mm);
- The proportion of dead material is high;
- The fuels are arranged with a high level of density and horizontal and vertical continuity that promotes the spread of flame;
- The live foliage has low, live fuel moisture content.

The vegetation type and time lapse since the most recent fire or management by grazing substantially determines the level of elevated fuel hazard.

The grassy woodland vegetation on the land beyond the new suburb is likely to continue to be grazed and therefore understorey vegetation will not be present with a resultant low level of Elevated Fuel Hazard.

The area set aside as unmanaged 'Open Space' to the south and east of the residential precinct contains grassland and grassy woodland vegetation which has been grazed. However, the Territory Plan requires that this area of vegetation be rehabilitated with native vegetation [woodland] which will include a grassy/shrub understorey layer to 1.2 – 1.5 metres.

Due to the extent of the scrubby, grassy component of this vegetation an estimated Elevated Fuel Hazard of Very High was determined for the unmanaged grassy woodland vegetation within the Open Space.

- **Surface & Near Surface Fine Fuel Hazard :**

Surface Fine Fuel Hazard is assessed by measuring litter-bed depth. Near surface fuels – i.e. grass tussocks, dead bracken, low shrubs or low wiregrass up to 0.5m high – interact with surface litter to increase fire behaviour and therefore need to be considered when assessing Surface Fine Fuel Hazard and the next highest Surface Fine Fuel Hazard rating.

Due to the extent of the 'near-surface fuels' component of the grassland vegetation, if not managed, an estimated Surface Fine Fuel Hazard of High has been determined.

Assessment of Overall Fuel Hazard – Grassy Woodland Vegetation:

The Overall Fuel Hazard for unmanaged Grassy Woodland vegetation is Very High.

5.8 Asset Interface Classification [AIC].

The ACT ESA & Rural Fire Service have developed a methodology for determining the classification of potential exposure 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 for the urban edge of Canberra;

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 new suburb of Moncrieff identifies the following classifications:

Table 2: Asset Interface Classification – Moncrieff

Aspect of Fire Run	Length of Fire Run to Asset Interface (through unmanaged vegetation)		
	<100m	100 – 350m	>350m
North, northwest & west across land beyond Horse Park Drive – Unmanaged grassland & woodland vegetation			Primary
Northeast across land beyond Horse Park Drive – Unmanaged grassland vegetation			Secondary
South & Southeast across unmanaged Open Space Corridor – Unmanaged grassy woodland vegetation			South Secondary Southeast Lee
East across the unmanaged Open Space – Unmanaged grassy woodland vegetation			Secondary

5.9 Likely Fire Scenarios.

The following fire scenarios have been identified as a probability for impact on the new suburb:

- (1) Fire in the open grassy woodland vegetation to the west, northwest & north of the development precinct, burning under westerly, north-westerly and northerly winds across the adjoining grazing paddocks towards the western, north-western and northern edge of Moncrieff.

This potential fire impact will remain [until the development of the suburb of Taylor] if the current management practices are removed or are not effective during periods of growth in the grass vegetation.

This fire occurrence is possible during consecutive fire seasons when conditions are such that the grassland vegetation has not been grazed/managed and the Fire Danger Index is Extreme (FDI > 50);

- (2) Fire in the open grassy woodland vegetation within the future suburb of Jacka, to the northeast of Moncrieff, burning under a north-easterly wind influence, towards the north-eastern edge of Moncrieff.

This potential fire impact is unlikely to remain for a long period as construction works will occur in the new suburb of Jacka, therefore removing the bushfire risk to the north-eastern aspect of Moncrieff.

However, if this is not the case the risk will remain that the north-eastern edge of Moncrieff could be impacted by a fire burning across the vegetation on the land to the west of Bonner.

- (3) Fire in the Woodland vegetation within the unmanaged Open Space land to the south and east of the residential precinct.

The risk from the woodland vegetation within the unmanaged Open Space will increase once the current management practices [grazing] are removed and the rehabilitation of this vegetation commences.

Due to the location and shape of the unmanaged Open Space impact may be experienced under the influence of southerly, south-easterly and north-easterly wind influences – with varying levels of Asset Interface Classification [AIC], depending on the fire run length and aspect.

5.10 Risk Statement.

Table 5 provides a statement of risk for each fire scenario that may impact the Moncrieff estate [prior to mitigation measures being adopted/implemented and/or the adjoining suburbs of Taylor and Jacka being constructed] and assigns risk levels reflecting identified levels of likelihood and consequences for a 'worst case' fire occurrence which may occur if the vegetation on the land to the north, northwest and west is not managed to reduce the combustible fuels available to burn during extreme to catastrophic fire weather conditions.

Table 2 provides a list of qualitative measures of consequence [or impact] whilst Table 3 provides a list of qualitative measures of likelihood – used to determine the level of risk in Table 5.

Table 4 provides a qualitative risk analysis matrix – used to determine the level of risk in Table 5.

Table 2 – Qualitative Measures of Consequence or Impact.

Level	Descriptor	Detail Description
1	Insignificant	No public safety injuries or impact to buildings
2	Minor	No public safety injuries – minor impact to buildings
3	Moderate	Burns and Respiratory Issues – moderate damage to buildings
4	Major	Death of people exposed to radiant heat & major property damage
5	Catastrophic	Death of people exposed to radiant heat and total destruction of buildings

Table 3 – Qualitative Measures of Likelihood.

Level	Descriptor	Detail Description
A	Almost Certain	Is expected to occur during severe fire danger periods
B	Likely	Will probably occur during severe fire danger periods
C	Possible	May occur during severe fire danger periods
D	Unlikely	Unlikely to occur during severe fire danger periods
E	Rare	Will rarely occur during severe fire danger periods

Table 4 – Qualitative risk analysis matrix – used to determine the level of risk in Table 5.

Likelihood	Risk Rating				
	Consequences				
	Insignificant 1	Minor 2	Moderate 3	Major 4	Catastrophic 5
A – almost certain	High	High	Extreme	Extreme	Extreme
B – likely	Moderate	High	High	Extreme	Extreme
C – possible	Low	Moderate	High	Extreme	Extreme
D – unlikely	Low	Low	Moderate	High	Extreme
E – rare	Low	Low	Moderate	High	High

**Table 5 – Bushfire Risk Register:
Extreme – Catastrophic Bushfire Event – if high levels of combustible
fuels/unmanaged vegetation exist in the landscape.**

The Risk What can happen?	The consequences of an event happening		Adequacy of protection measures	Consequence Rating	Likelihood Rating	Level of Risk	Risk Priority
	Consequences	Likelihood					
(1) Fire burning in unmanaged open grassy woodland to the west, northwest and north of Moncrieff – under westerly; north-westerly and northerly wind influences	Catastrophic	Possible	Good when managed by grazing Poor if current fuel management is not continued	5	C	Extreme	1
(2) Fire burning in unmanaged open grassy woodland to the northeast of Moncrieff – under the influence of north-easterly winds	Major	Possible	Good when managed by grazing. Poor if current fuel management is not continued	4	C	Extreme	2
(3) Fire burning in the unmanaged grassy Woodland vegetation in the Open Space areas – under southeast, southerly, north-easterly and easterly wind influences.	Moderate	Possible	Poor if fuel management is not undertaken	3	C	High	3

5.11 Summary of Bushfire Risk.

Fire ignitions that occur within the open grassy woodland vegetation on the land to the west, northwest and north of the future suburb of Moncrieff, if the current management practices are removed, will place the northern, north-western and western edge of Moncrieff at extreme level of risk from a catastrophic bushfire event.

Whilst the north-easterly aspect of Moncrieff is currently exposed to bushfire risk, the development works in the future suburb of Jacka will modify the vegetation on the leased grazing land and therefore remove the bushfire risk.

The rehabilitation of the woodland vegetation on the proposed Open Space land will increase the amount of unmanaged vegetation on the ridgeline in the southern portion of the suburb, which will lead to an increase in the level of bushfire risk to the adjacent development.

SECTION 6

BUSHFIRE PROTECTION MEASURES.

6.1 Introduction.

Based on the following assumptions:

- The open grassy woodland vegetation on the leased land beyond the Horse Park Drive corridor is not adequately managed to prevent the spread of fire across the landscape towards the western, north-western, northern and north-eastern edge of the new suburb;
- The Open Space land within the suburb is managed to provide a low threat or exempt fuel hazard in accordance with Clause 2.2.3.2 of Australian Standard A.S. 3959 – 2009 – ‘Construction of Buildings in Bushfire Prone Areas’;
- The Open Space land located to the south and east of the residential precinct is rehabilitated and is NOT managed; and
- Bushfire Protection Measures are applied to the western, north-western, northern and north-eastern aspects of the suburb in order to remove the need for the application of bushfire construction standards to the future dwellings the following fire protection measures shall be implemented:

6.2 Bushfire Protection Measures – Asset Protection Zones:

6.2.1 Western, north-western & northern aspect to Moncrieff

(a) Provision of Managed Inner Asset Protection Zone:

The full width of the Horse Park Drive corridor shall be managed as an Inner Asset Protection Zone.

(b) Provision of Managed Outer Asset Protection Zone:

There shall be provided an Outer Asset Protection Zone, of a minimum width of 300 metres, to the west, northwest, north and northeast of the Horse Park Drive carriageway. This recommendation is based on the road corridor being managed as an Inner Asset Protection Zone and shall remain in place pending development of the future suburb of Jacka and Taylor.

(c) Provision of Ember [HAPZ] Zone:

There is no requirements to provide an ember zone to the western, north-western, northern and north-eastern aspect of the suburb due to the provision of the 300 metre wide OAPZ.

6.2.2 Development having exposure to the bushfire threat within the unmanaged Open Space Zoned lands.

The Asset Interface Classification for development which adjoins the grassy woodland vegetation within the unmanaged Open Space land varies, depending on aspect and the length of fire path.

Table 6 below provides a list of fire protection measures required to be applied to these interfaces.

Table 6: Fire Protection Zones to development adjoining the unmanaged Open Space Zoned land.

Aspect of Fire Run	Length of Fire Run to Asset (through unmanaged vegetation)			OAPZ	IAPZ	HAPZ	Figure Reference
	<100m	100 – 350m	>350m				
From the east across unmanaged grassy woodland vegetation within the Open Space			Secondary	Nil	20m	230m – BAL 19 30 – 41m; BAL 12.5 remainder	No. 1
		Lee		Nil	10m	50m – BAL 12.5	No. 2
From the south across unmanaged grassy woodland vegetation within the Open Space		Secondary	Secondary	Nil	20m	230m – BAL 19 30 – 41m; BAL 12.5 remainder	No. 1
From the southeast across unmanaged grassy woodland vegetation within the Open Space			Lee	Nil	10m	50m – BAL 12.5	No. 2
From the northeast across unmanaged grassy woodland vegetation within the Open Space			Lee	Nil	10m	50m – BAL 12.5	No. 2

Map Reference – refer to Section 9

6.3 Fuel Management Protocols:

(a) Asset Protection Zones:

The management of the Inner Asset Protection Zones, the Outer Asset Protection Zones recommended in this report shall comply with the management protocols as provided in Schedule C – Fuel Management Standards for Fire Management Zones of the ‘Strategic Bushfire Management Plan for the ACT – Version 2 – October 2009’.

The full width of the Horse Park Drive corridor shall be maintained as an Inner Asset Protection Zone, including the road verges.

Street trees shall be planted in rows to permit mowing of the grass with a mature tree canopy separation of 10 metres in a single row or 10 metre off-set mature tree canopy separation in a multiple row planting.

The outer edge of the defined Outer Asset Protection Zone to the west, northwest, north and northeast of the new suburb shall be fenced with a stock proof fence, complete with access gates to permit stock movement and access for fire appliances and maintenance machinery.

The vegetation within this Outer Asset Protection Zone shall be monitored during late winter & spring and the gazetted Bushfire Danger Period. This monitoring shall determine the height, density and dryness [curing] of the grassland fuels in order to determine necessary management actions required to maintain the Grassland Fire Hazard to less than 35 when grassland curing has reached 70% – refer to Table 4 – Grassland Fuel Hazard treatment guide – *Strategic Bushfire Management Plan for the ACT – 2009*.

(b) Managed Urban Open Space Zones including Pocket Parks:

Clause 2.2.3.2 of Australian Standard A.S. 3959 – 2009 defines low threat vegetation as any of the following:

- a) Vegetation of any type that is more than 100 metre from an asset;
- b) Single areas of vegetation less than one [1] hectare and not within 100 metres of other areas of vegetation classified as bushfire prone vegetation;
- c) Multiple areas of vegetation less than 0.25 hectares in area and not within 20 metres of an asset;
- d) Strips of vegetation less than 20 metres in width, regardless of length and not within 20 metres of an asset or each other, or other areas of vegetation classified as bushfire prone vegetation;
- e) Non-vegetated areas, including waterways, roads, footpaths, buildings and rocky outcrops;
- f) Low threat vegetation, including managed grassland, maintained lawns, golf courses, maintained public reserves and parklands, botanical gardens, vineyards, orchards, cultivated ornamental gardens, commercial nurseries, nature strips and wind breaks.

The design and maintenance of the managed Open Space Zones shall achieve a 'low threat' vegetation classification as defined by Clause 2.2.3.2 of A.S. 3959 – 2009.

The managed Open Space Zones shall be prepared and rehabilitated to permit maintenance by mowing. This shall include but not limited to the following:

1. The zone shall be regraded to provide a slope of < 1:4 and be free of holes, logs rocks or other obstacles;
2. Planted with suitable grass;
3. Retained unmanaged pockets of grassy woodland shall have an area of less than one [1] hectare and be separated by more than 100 metres from unmanaged bushfire prone vegetation having an area of more than one [1] hectare;
4. Retained unmanaged multiple pockets of grassy woodland vegetation shall have an area of less than 0.25 hectares and shall not be located less than 20 metres from an asset;
5. Retained strips of unmanaged grassy woodland vegetation shall be no more than 20 metres in width, regardless of length and not within 20 metres of an asset or each other, or other areas of vegetation classified as bushfire prone vegetation;
6. Trees located within the mown areas of the Open Space Zone shall be under-pruned to permit mowing under the tree canopy.

6.4 Access for Fire-fighting Operations:

Edge roads shall be constructed within the Inner Asset Protection Zone setback to all bushfire prone interfaces and shall be continuous to allow access to the full length of the defined bushfire prone interface [e.g. unmanaged Open Space Zones and to the west, northwest, north and northeast aspect to the new suburb] and constructed to a width of 7.5 metres with corners, intersections and turning heads designed to accommodate both an Urban Pumper and Aerial Appliances in locations with multi-level development and Rural Fire Service Tankers (Refer to Access provisions provided by each Service).

Corners and roundabouts shall be constructed to provide access for urban and rural fire service vehicles with a turning circle of 24 metres, with an inner radius of 6 metres and an outer radius of 12 metres for corners. Bridges and road surfaces shall be designed to carry a live load of 25 tonnes.

Internal estate roads shall have a minimum width of 5.5 metres with parking/passing bays located clear of the formed road width and a 3 metre verge to each side to allow unencumbered access by emergency crews to all sides of their vehicles. Corners and roundabouts shall be constructed to accommodate Urban Pumpers and Aerial Appliances in locations of multi-level medium density development.

Access gates shall be provided from Horse Park Drive into the Outer Asset Protection Zone to the west, northwest, north and northeast of the new suburb.

Provision shall also be provided for management/emergency service access into the managed Open Space Zones. Where Cycle/Pedestrian access is provided within the managed Open Space Zones a four [4] metre wide compacted gravel road-base shall be provided in order to provide access for emergency service vehicles.

6.5 Water Supplies for Fire Fighting Operations:

A 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 edge roads.

6.6 Temporary Asset Protection Zones:

The provision of temporary Asset Protection Zones shall be determined at an individual development stage.

A minimum 200 metre wide managed Outer Asset Protection Zone shall be provided to the edge of a development stage, on land which is the subject of future residential development. Where the stage adjoins permanent Asset Protection Zones or managed Open Space land the management prescriptions prescribed within this report shall apply.

SECTION 7

RESIDUAL RISK.

7.1 Introduction.

Table 7 evaluates the residual bushfire risk to the future development within the new suburb of Moncrieff, 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 catastrophic fire danger periods.

Table 7 – Bushfire Risk Register & Action Treatment Plan – extreme / catastrophic bushfire events, post implementation of the recommended protection measures.

The Risk What can happen?	The consequences of an event happening		Risk before mitigation	Strategy to reduce the risk	Consequences & Likelihood after mitigation measures applied	Residual Level of Risk
	Consequences	Likelihood				
(1) Fire burning in unmanaged open grassy woodland to the west, northwest and north of Moncrieff – under westerly; northerly and northerly wind influences	Catastrophic	Possible	Extreme	Provision & management of Asset Protection Zones	Moderate / Possible <i>[Refer to Note 1 below]</i>	High <i>[Refer to Note 1 below]</i>
(2) Fire burning in unmanaged open grassy woodland to the northeast of Moncrieff – under the influence of north-easterly winds	Major	Possible	Extreme	Provision & management of Asset Protection Zones	Moderate/ Possible <i>[Refer to Note 1 below]</i>	High <i>[Refer to Note 1 below]</i>
(3) Fire burning in the unmanaged grassy Woodland vegetation in the Open Space areas – under southeast, southerly, north-easterly and easterly wind influences.	Moderate	Possible	High	Provision & management of Asset Protection Zones & construction standards to buildings	Minor/ Possible	Moderate

Note 1: This level of residual risk will remain until such time that the new suburbs of Taylor & Jacka are completed and removes the bushfire risk to the west, northwest, north and north-eastern aspect of the suburb of Moncrieff.

7.2 Summary of Residual Bushfire Risk.

Table 7 provides a review of the residual level of risk to residents and emergency services personnel and others within the future suburb of Moncrieff and has been determined on the basis that the recommended bushfire mitigation measures are implemented and maintained over the life of the development.

The implementation and permanent management of the recommended Asset Protection Zones and the construction of the buildings [located adjacent to the unmanaged Open Space land] to the nominated bushfire protection standards will play a significant role in decreasing the bushfire hazards and the level of risk from fire events within the open grassy woodland vegetation to the west, northwest, north and northeast and the grassy woodland vegetation retained/rehabilitated in the proposed Open Space Zoned land that occurs within the southern portion of the proposed suburb.

SECTION 8

CONCLUSION

The development proposal reviewed in this Updated Bushfire Risk Assessment [BFRA] is the Context Plan for the new suburb of Moncrieff which is located on the north-western edge of the existing residential development within the suburbs of Amaroo and Ngunnawal.

The proposed landuse in the new suburb consists of RZ1 Residential Suburban Zone; RZ4 Residential Zone – Medium Density; RZ5 Residential Zone – High Density; CZ5 – Commercial Mixed Use Zone; PRZ1 – Parks & Recreation Urban Open Space Zone, Open Space and Community Facilities.

This updated report has examined the likely fire-paths which may impact on the proposed suburb from external fire sources to the west, northwest, north and northeast and also, due to the proposal to establish an area of Open Space Zoned land containing unmanaged grassy woodland vegetation to the south of the residential precinct, the potential fire paths which may occur inside the suburb.

Following discussions with ESA and ACT Fire & Rescue recommendations have been made on the provision of statutory bushfire protection zones required to be implemented to the perimeter of the new suburb.

A decision has also been taken to increase the protection provided to the western, north-western, northern and north-eastern aspects to the suburb so that the statutory requirement to provide an 'Ember Zone' can be removed, thus removing the need to apply bushfire construction standards to dwellings which will ultimately be located within a wider residential precinct that includes the future suburb of Taylor and Jacka.

Consideration has also been given to the reduction of the potential bushfire hazard created within the Open Space Zoned lands and a decision taken that, except for the Open Space Zoned land to the south and east of the residential precinct, all remaining Open Space Zoned land will be maintained to provide a low hazard vegetation classification as defined by Clause 2.2.3.2 of Australian Standard A.S. 39509 – 2009 – '*Construction of Buildings in Bushfire Prone Areas*'. Management prescriptions that satisfy this requirement are provided in this updated report.



Graham Swain
Managing Director
Australian Bushfire Protection Planners Pty Limited.

REFERENCES:

- Strategic Bushfire Management Plan for the ACT – January 2005 & October 2009;
- The Canberra Spatial Plan – ACT Planning & Land Authority – March 2004;
- AS/NZ - 4360 : 2004 Risk Management;
- Emergency Risk Management – Applications Guide. (EMA) 2000);
- Overall Fuel Hazard Guide – NRE. May 1999;
- Planning for Bushfire Risk Mitigation 2006 & Update 2009.

SECTION 9 – Plan of Bushfire Protection Measures.

