



Strategic Bushfire Study

South Creek West Cobbitty
Sub-Precinct 5

Rezoning

BHL

03 April 2024

(Ref: 19183)

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Executive summary

This report is a 'Strategic Bushfire Study' prepared to address the requirements of the NSW Rural Fire Service (RFS) document *Planning for Bush Fire Protection 2019* (NSW RFS 2019) and the *Environmental Planning and Assessment Act 1979* Section 9.1(2) Ministerial Direction 4.3 – 'Planning for Bush Fire Protection' for the proposal to rezone land at South Creek West Cobbitty Sub-Precinct 5 in the South West Growth Area of Sydney. The future uses will include residential development, a village centre, school and employment lands.

This study presents the results of a detailed investigation into landscape and site influences on bushfire behaviour and development design. The study maps the risk across the subject site to inform the development of the Indicative Layout Plan (ILP) and apply site specific bushfire protection measures. The study also assesses the access and evacuation capacity as well as impacts on emergency management.

Research on bushfire hazard (comprising vegetation and topography), fire weather, fire history and fire intensity patterns has allowed an analysis of potential fire scenarios that could impact the subject site. Potential fire paths identified included bushfire spread from west to east emanating from the woodland vegetated hills further to the west and across substantial areas of agricultural land towards the subject site.

Risk profile mapping for the subject site resulted in an unconstrained development environment with no high risk areas identified. Land within 100 m of a boundary adjacent woodland vegetation was identified as medium risk with the remainder of the subject site mapped low risk. Development can occur within both risk areas with compliant bushfire protection measures such as APZs and adequate access. The more vulnerable uses (medium density development, school site, local centre and service station) are situated within the areas mapped low risk.

This study demonstrates the proposal to rezone the subject site satisfies EP&A Act s.9.1(2) Direction 4.3 – 'Planning for Bush Fire Protection' and *Planning for Bush Fire Protection 2019*.

1 Introduction

1.1 Overview of Planning Proposal

This Strategic Bushfire Study has been prepared by Peterson Bushfire on behalf of BHL Group (the proponent), the applicant. It accompanies a Planning Proposal for a proposed amendment to the State Environmental Planning Policy (Precincts – Western Parkland City) 2021 (Parkland City SEPP) for the site located along the Northern Road and which forms part of Cobbitty Sub-Precinct 5, in the South Creek West Land Release Area. The location of the site is shown on Figure 1.

This planning proposal is seeking to rezone 172.74ha of land which forms 57% of Precinct 5. The remainder of Precinct 5 (130.41ha, 43%) is owned by a separate landowner, which is not subject to this Planning Proposal. The intended outcomes of this planning proposal is to amend the Parkland City SEPP as follows:

- Incorporate the site on the 'Land Application Map' for the Parkland City SEPP
- Rezone the land to part:
 - E1 Local Centre
 - MU1 Mixed Use
 - C2 Environmental Conservation
 - C4 Environmental Living
 - R2 Low Density Residential
 - R3 Medium Density Residential
- Introduce building heights as follows:
 - 9 metres for low-density residential uses, allowing for developments of up to two storeys in height.
 - 12 metres for medium-density residential uses, allowing for development of up to three storeys in height.
 - 21 metres for the village centre where mixed-use developments are proposed and will allow for development of up to 5 storeys in height.

The Planning Proposal is supported by a revised Indicative Layout Plan (refer to Figure 2) which will accommodate approximately 2,312 dwellings and a population of approximately 7,056 people. This will be supported by a thriving local centre and 19.97ha of active and passive open space.

The proposed ILP has also sought to embed the Government Architect's Connecting with Country design framework through its design. The ILP has designed with Country by protecting ridgelines; creeks and view corridors; celebrating the riparian corridors and waterways through incorporation into open space and locating key uses on flat parts of the site to limit cut and fill.

The proposed amendments seek to transition the existing rural landscape into a new residential community, which importantly builds on the NSW Government's vision and aspirations under the Western Sydney Growth Areas program. In line with the NSW Government's vision, a diverse range of housing typologies will be planned, targeted for and delivered to meet the residential market desire in Southwest Sydney.

1.2 Report purpose

This report is a 'Strategic Bushfire Study' as described by the NSW Rural Fire Service (RFS) document *Planning for Bush Fire Protection 2019* (NSW RFS 2019). It addresses the requirements for assessment of rezoning proposals involving bushfire prone land, namely the *Environmental Planning and Assessment Act 1979* Section 9.1(2) Ministerial Direction 4.3 – 'Planning for Bush Fire Protection'.

This study is based on a detailed investigation into landscape and site influences on bushfire behaviour and development design. An iterative process occurred identifying development constraints amongst a wider planning team to inform the preparation of an Indicative Layout Plan. This report demonstrates compliance with the relevant bushfire protection legislation and policy.

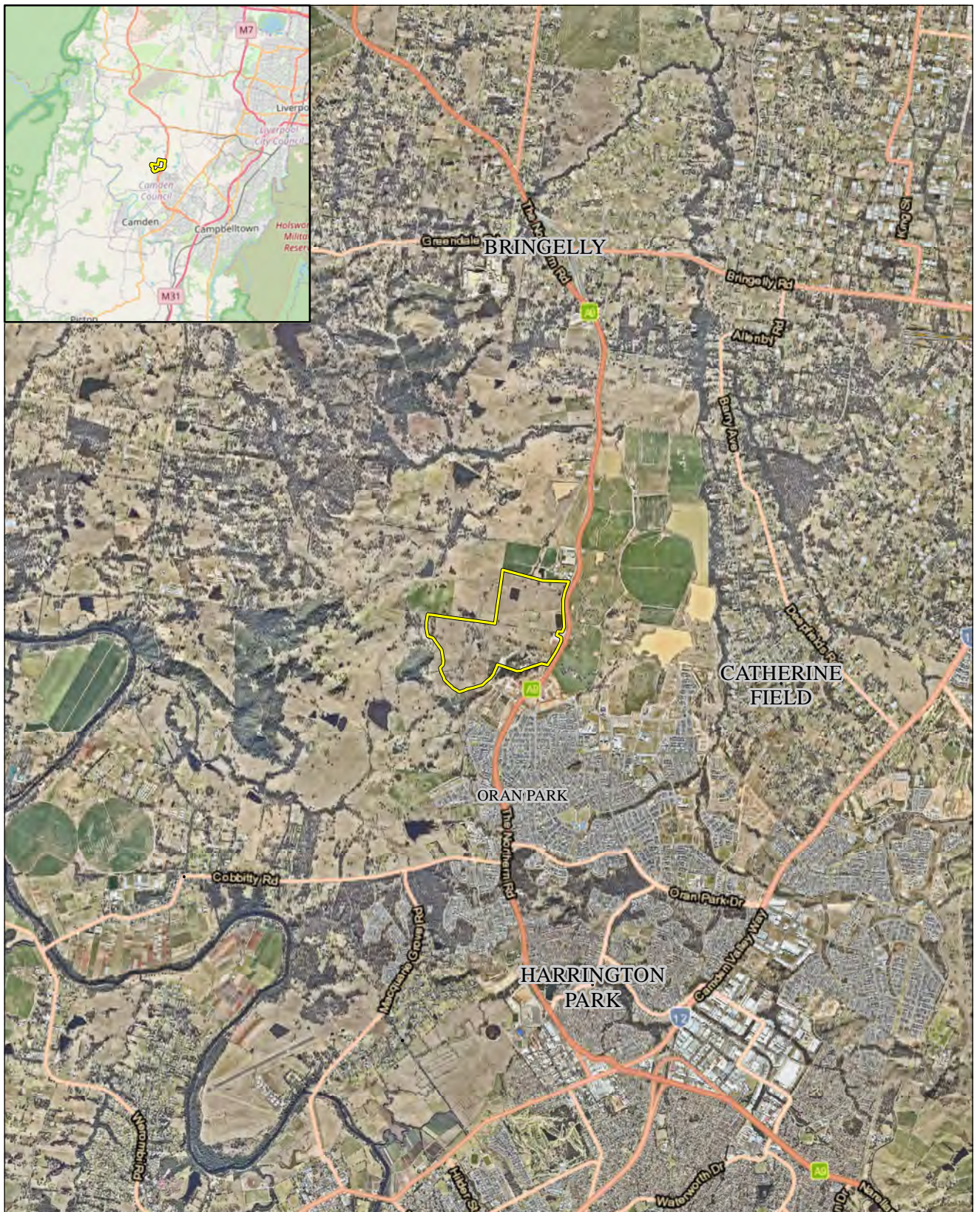
1.3 Background

Following an extensive review by Council (and the APP Group) and the Local Planning Panel, the planning proposal and Strategic Bushfire Study have been amended to reflect feedback and enable Council endorsement for its progression to gateway.

This report addresses the following comments and feedback received from Council and the Local Planning Panel.

Table 1: Response to Council/APP comments

Comment	Response
Streets along the perimeter of the western edge appear to be shown as half streets. It is understood that that BHL and Arkendale (McIntosh land) are in discussions to resolve this. The land in the vicinity of the boundary would satisfy the requirements for Planning for Bushfire Protection 2019.	<p>The design has allowed for at least half roads on our land, in the event that the Arkendale development does not eventuate. The final outcome to be determined during the development application phase, which should ensure integration with the possible adjoining development at the time and satisfy bushfire requirements.</p> <p>Accordingly, the ILP has been updated to include an annotation regarding geometry and arrangement of interface roads subject to detailed design at the Development Application / Construction Certificate phase</p>



Legend

Subject Site



Date: 8/12/2022

0 0.5 1 2

Kilometers

Figure 1: Location

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

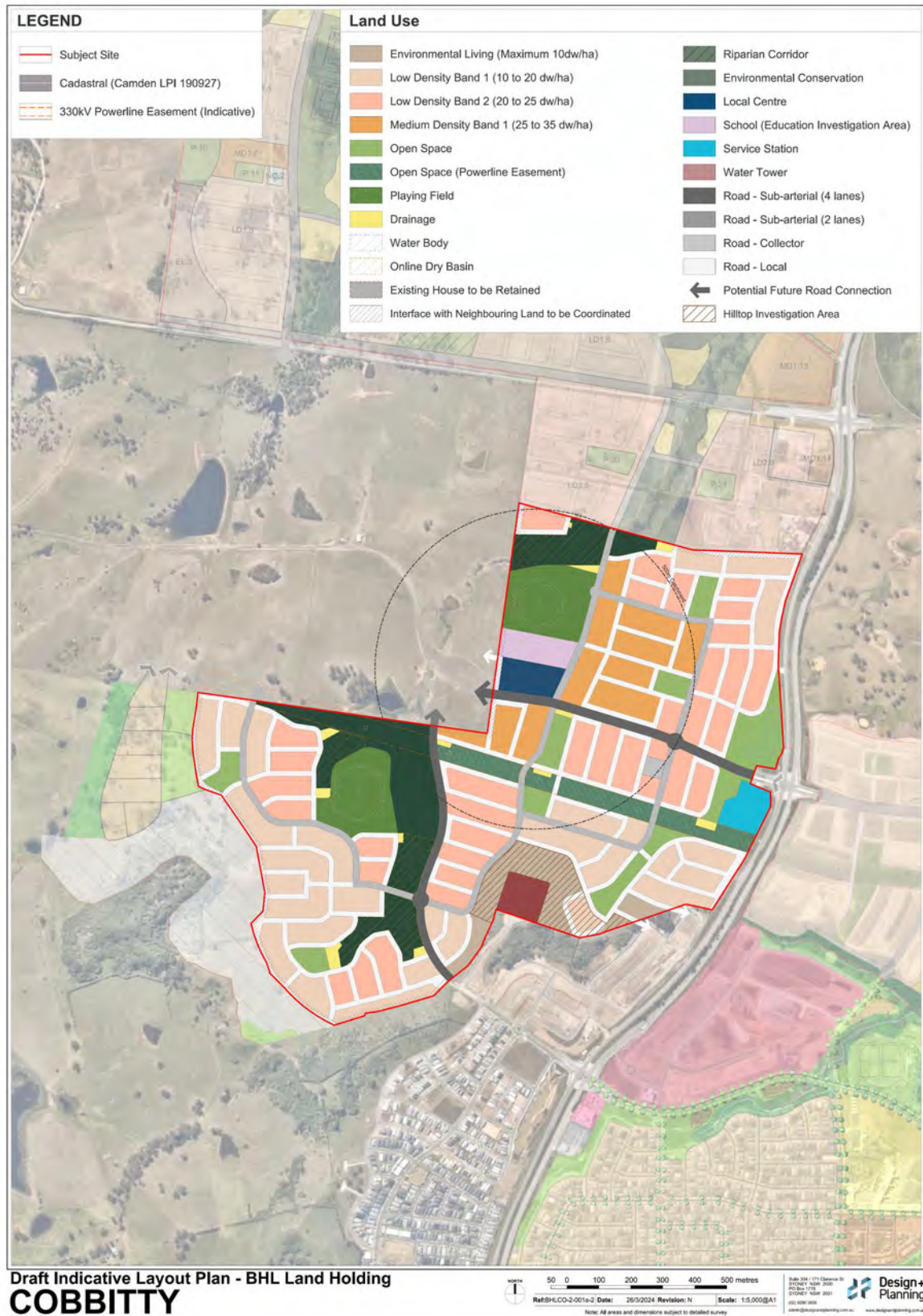


Figure 2: Indicative Layout Plan (ILP)

1.3 Bushfire assessment requirements and approach

The subject sites are identified as bushfire prone land as they contain and are within 100 m of vegetation that has the potential to sustain a bushfire or contribute to bushfire attack. Figure 3 shows the bushfire prone land mapping relating to the sites.

When investigating the capability of bushfire prone land to be rezoned, submissions must have regard to Section 9.1(2) Direction 4.3 – ‘Planning for Bush Fire Protection’ of the *Environmental Planning and Assessment Act 1979*. The objectives of Direction 4.3 are:

- *To protect life, property and the environment from bushfire hazards, by discouraging the establishment of incompatible land uses in bushfire prone areas; and*
- *To encourage sound management of bushfire prone areas.*

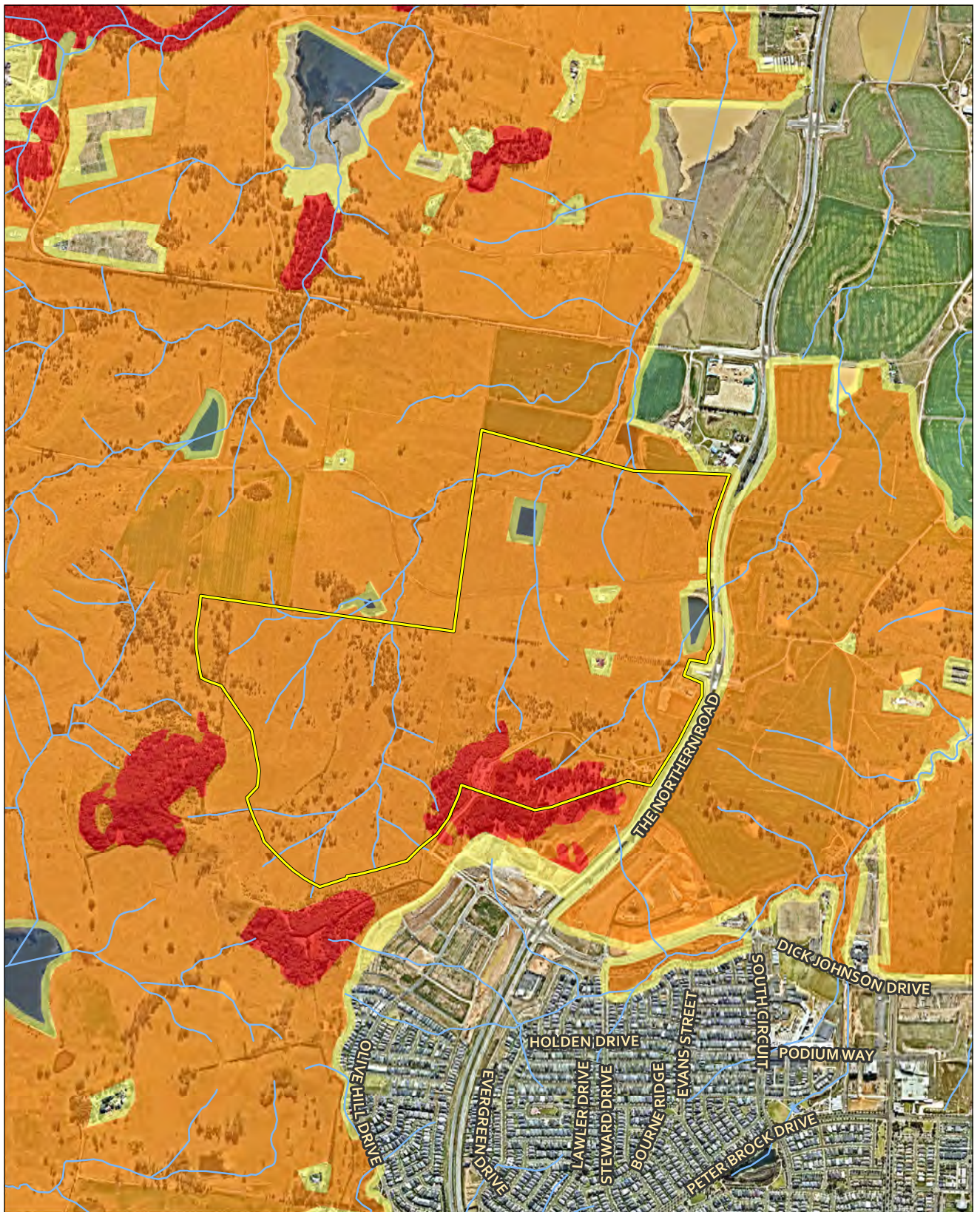
Direction 4.3 instructs councils on the bushfire matters which need to be addressed when drafting and amending Local Environmental Plans (LEP). They are as follows:

- *In the preparation of a planning proposal the relevant planning authority must consult with the Commissioner of the NSW Rural Fire Service following receipt of a gateway determination under section 3.34 of the Act, and prior to undertaking community consultation in satisfaction of clause 4, Schedule 1 to the EP&A Act, and take into account any comments made.*
- *A planning proposal must:*
 - *have regard to the document Planning for Bush Fire Protection 2019;*
 - *introduce controls that avoid placing inappropriate developments in hazardous areas; and*
 - *ensure that bushfire hazard reduction is not prohibited within the Asset Protection Zone (APZ).*
- *A planning proposal must, where development is proposed, comply with the following provisions, as appropriate:*
 - *provide an Asset Protection Zone (APZ) incorporating at a minimum:*
 - *an Inner Protection Area bounded by a perimeter road or reserve which circumscribes the hazard side of the land intended for development and has a building line consistent with the incorporation of an APZ, within the property, and,*
 - *an Outer Protection Area managed for hazard reduction and located on the bushland side of the perimeter road.*
 - *for infill development (that is development within an already subdivided area), where an appropriate APZ cannot be achieved, provide for an appropriate performance standard, in consultation with the NSW Rural Fire Service. If the provisions of the planning proposal permit Special Fire Protection Purposes (as*

defined under Section 100B of the Rural Fires Act 1997), the APZ provisions must be complied with,

- *contain provisions for two-way access roads which links to perimeter roads and/or to fire trail networks,*
- *contain provisions for adequate water supply for fire-fighting purposes,*
- *minimise the perimeter of the area of land interfacing the hazard which may be developed,*
- *introduce controls on the placement of combustible materials in the Inner Protection Area.*

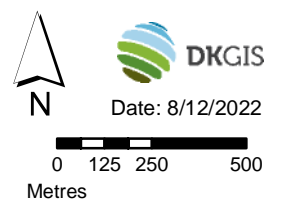
This Strategic Bush Fire Study has been prepared in order to address the above requirements following the format specified by Section 4.2 of *Planning for Bush Fire Protection 2019* (referred to as 'PBP' throughout this report). The study is to present a landscape assessment of fire behaviour that may impact the site and implications for land use, development layout, access and evacuation, and fire-fighting infrastructure.



Legend

- Subject Site
- Bushfire Prone Land
- Vegetation Category 1
- Vegetation Category 3
- Vegetation Buffer

Figure 3: Bushfire Prone Land



Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

2 Bushfire landscape assessment

An analysis of the bushfire landscape, or parameters that give rise to the bushfire threat, provides the foundation for strategic decision-making on appropriate land use patterns. The parameters to be analysed are discussed in the following subsections and consist of bushfire hazard (comprising vegetation and topography), fire weather, fire history, and fire intensity.

Figure 4 shows the wider landscape influencing a bushfire approaching the subject site. The predominant bushfire landscape features within the 5 km assessment area consist of:

- Predominantly cleared agricultural lands, which may present a grassland hazard.
- Woodland vegetation on steep hills along the ridgeline forming the southern boundary of the subject site.
- Woodland remnants within property to the north.
- Woodland amongst hilly country within 1 km generally to the west and north-west.

2.1 Vegetation communities

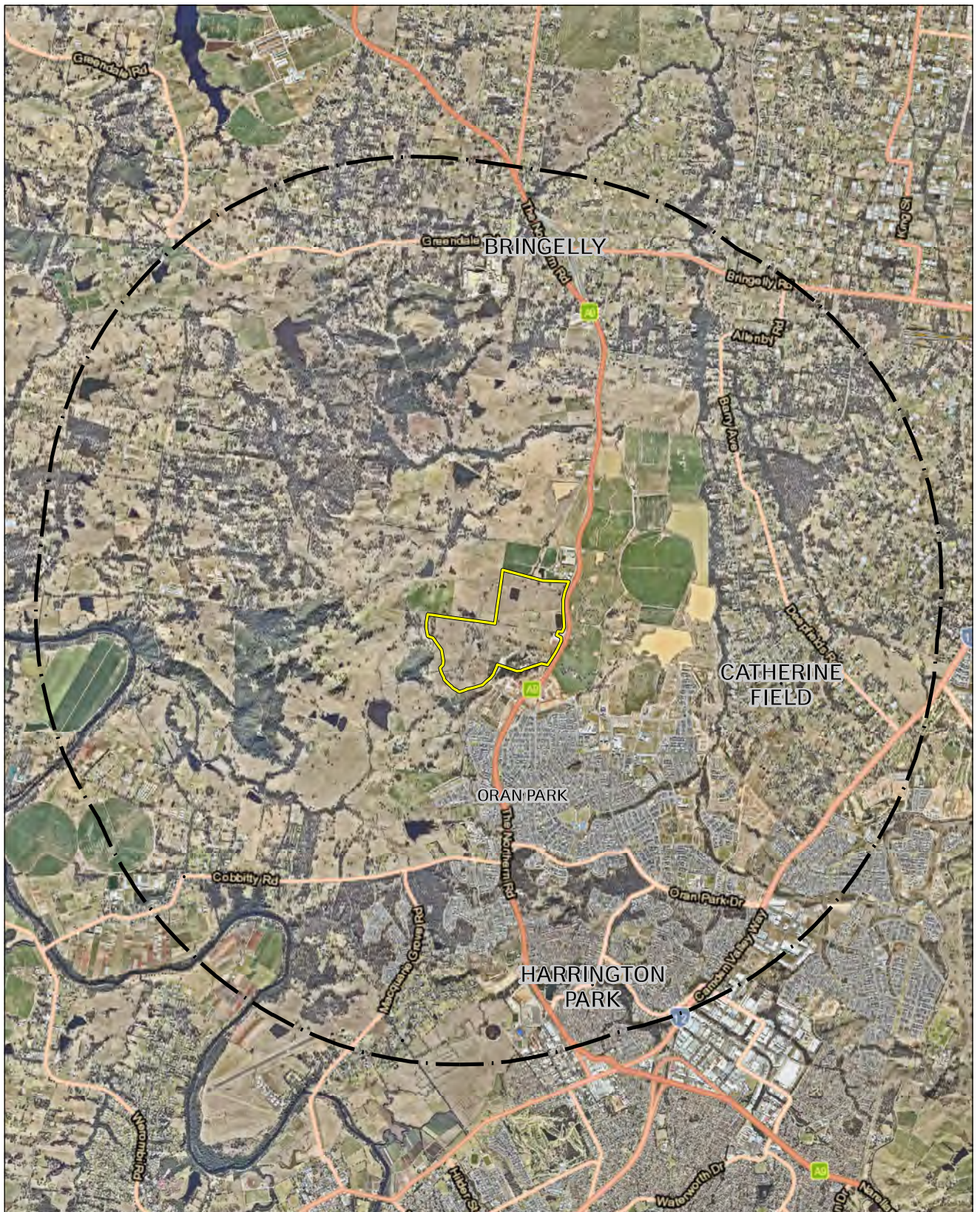
Bushfire fuel is the vegetative material in the landscape that burns during a bushfire. Bushfire behaviour is significantly influenced by fuel load, driving the intensity of a bushfire.

The vegetation communities known to occur within and surrounding the subject site are listed in Table 2 below and mapped on Figure 5. The communities have been categorised into vegetation structural formations according to Keith (2004) in order to assign likely climax fuel loads following the RFS document *Comprehensive Vegetation Fuel Loads* (NSW RFS 2019).



The predominant vegetation structural formation across the site and surrounding landscape is grassland followed by woodland as evident on Figure 5. Two riparian corridors will be retained and enhanced within the subject site (refer to Figure 2). These corridors will be revegetated to create a woodland community.

Table 2: Vegetation communities and corresponding structural formations and fuel loads

Vegetation community	Structural formation	Fuel load
Shale Plains Woodland	Woodland	10/18.07 tonnes/hectare
Shale Hills Woodland	Woodland	
Alluvial Woodland	Woodland	
Moist Shale Woodland	Woodland	
Riparian Forest	Woodland	
Western Sydney Dry Rainforest	Rainforest	10/13.2 tonnes/hectare
Grassland	Grassland	6/6 tonnes/hectare



Legend

-  Subject Site Buffer - 5km
-  Subject Site



Date: 8/12/2022

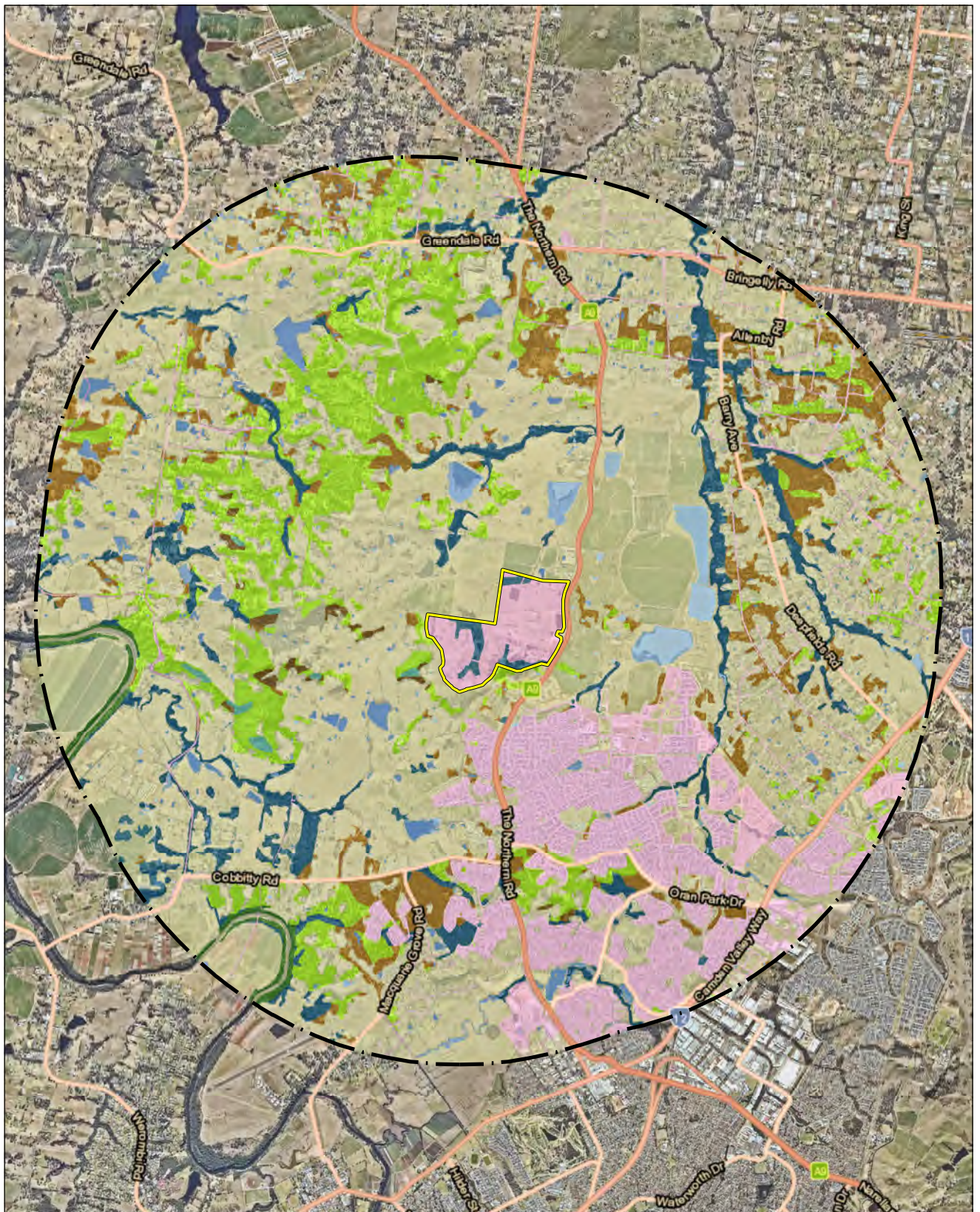
0 0.5 1 2

Kilometers

Figure 4: Landscape Context

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap



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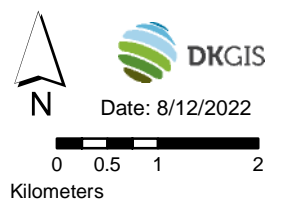
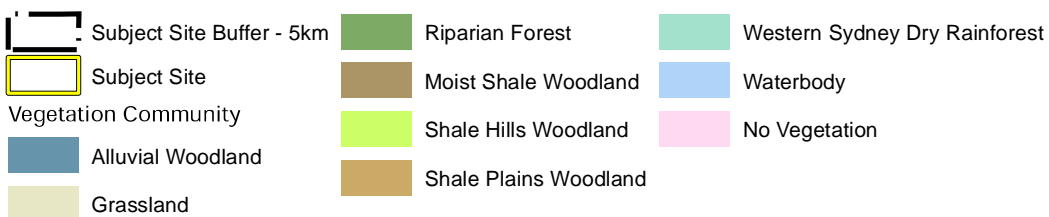


Figure 5: Vegetation Communities

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

2.2 Topography

Steeper slopes can significantly increase the rate of spread of fires, and it has been shown that with each 10 degree increase or decrease in slope a corresponding doubling or halving, respectively, in the rate of spread can be expected (McArthur 1962). Therefore, slope is a major factor determining the direction and rate of fire spread.

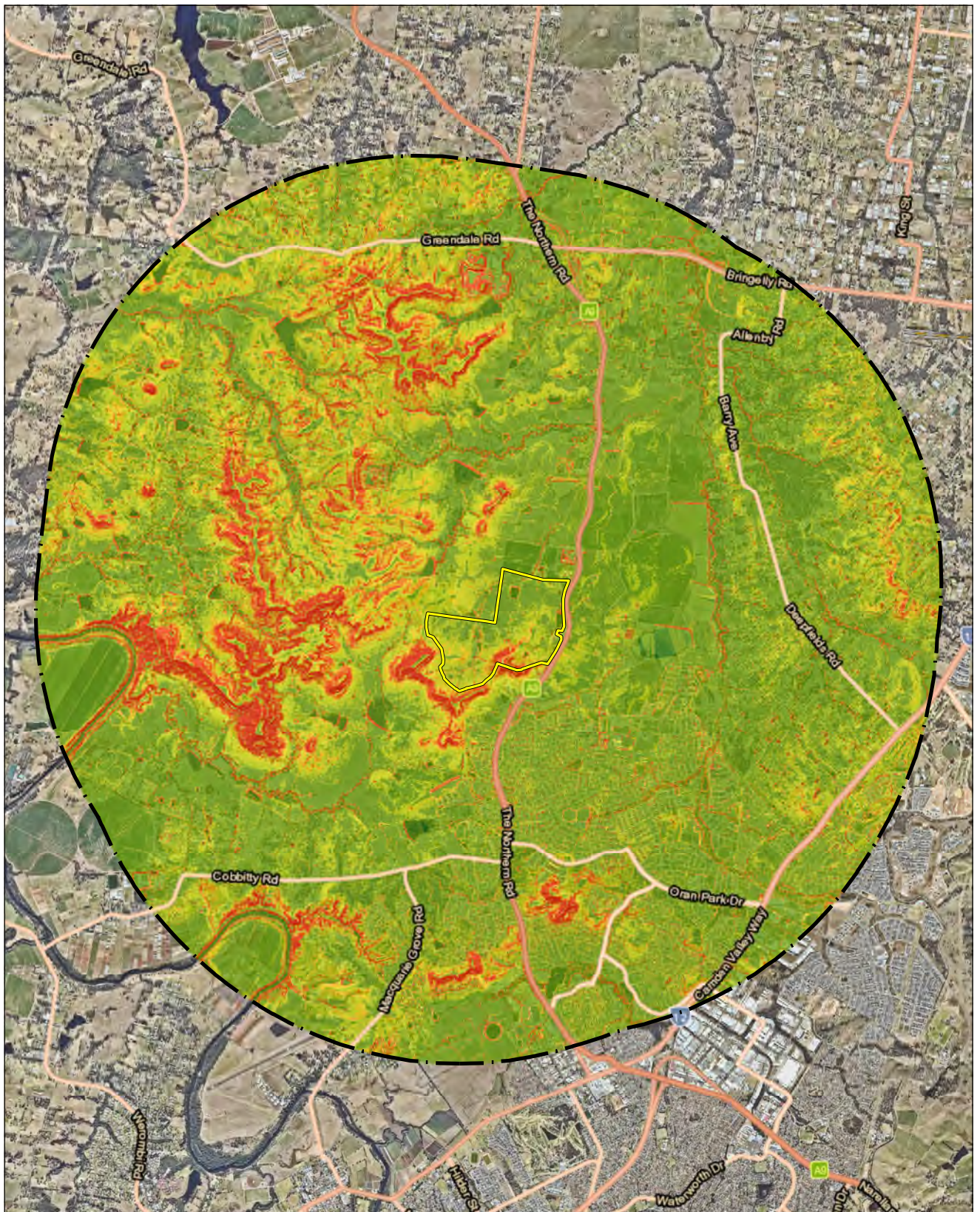
Figure 6 shows the pattern of the terrain across the subject site and surrounding landscape. The predominant features are the adjacent hills along the southern boundary of the subject site, and the hilly terrain further to the west of the site. The topography in the remaining directions and within the subject site can be described as gently undulating.

2.3 Fire weather

As described in the *Macarthur Bush Fire Risk Management Plan* (Macarthur Bush Fire Management Committee 2012) the area has a temperate climate with warm to hot summers and cool winters. Rainfall predominantly occurs during the summer.

The bushfire season usually runs from October to March whereby problematic fire weather can occur; a combination of high summer-time temperatures with low humidity and moderate to strong winds from the westerly sector. Dangerous bushfire seasons are most commonly associated with a combination of two or more of the following factors:

- Occurrence of an extended drought period;
- Lower than average rainfall through winter and spring;
- Persistent north-west winds; and
- Spring/summer thunderstorm activity ('dry' lightning strikes).



Legend

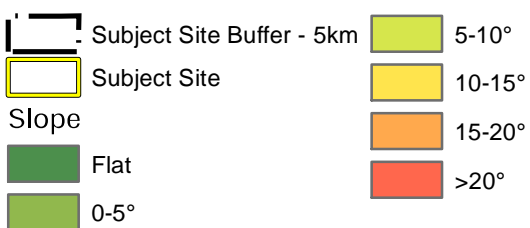
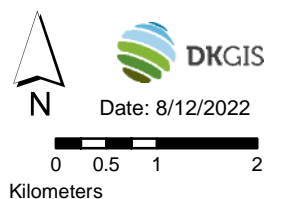


Figure 6: Slope



Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

2.4 Fire history

Information on fire history such as temporal and spatial pattern of fire spread is a useful factor in understanding the bushfire risk. The *Macarthur Bush Fire Risk Management Plan* (Macarthur Bush Fire Management Committee 2012) does not provide a detailed account of fire history and there are no adjacent or nearby reserves to rely on fire management plans for fire history.

The *Macarthur Bush Fire Risk Management Plan* notes that there are 5 fires per year that could be considered a major fire, and these are usually in the eastern part of the district (i.e. Campbelltown LGA). The historical major fires discussed (1965, 1968, 1990 and 2001) were all in the eastern part of the district associated with the forested catchment lands and reserves. The recent fires during 2019/2020 were arrested in Wollondilly LGA to the west of Camden LGA.

Fire history (time since fire) is shown on Figure 7. The fire history mapping shows that there has been negligible fire occurrence within 5 km of the subject site and only smaller fires confined to bushland remnants within 5-10 km of the subject site. Ignitions may have occurred, however limited vegetation connectivity, increased surveillance and higher response times has resulted in subdued fire activity on a landscape scale in the immediate area.

Major fire activity has occurred greater than 10 km to the west associated with larger areas of bushland that have proximity and connectivity to Burragorang State Conservation Area and beyond. Fire frequency on Figure 8 highlights that there has only 1 or 2 fires within the same area of bushland within or close to 10 km of the subject site. Multiple fires overtime is not a trend within the surrounding lands.



Legend



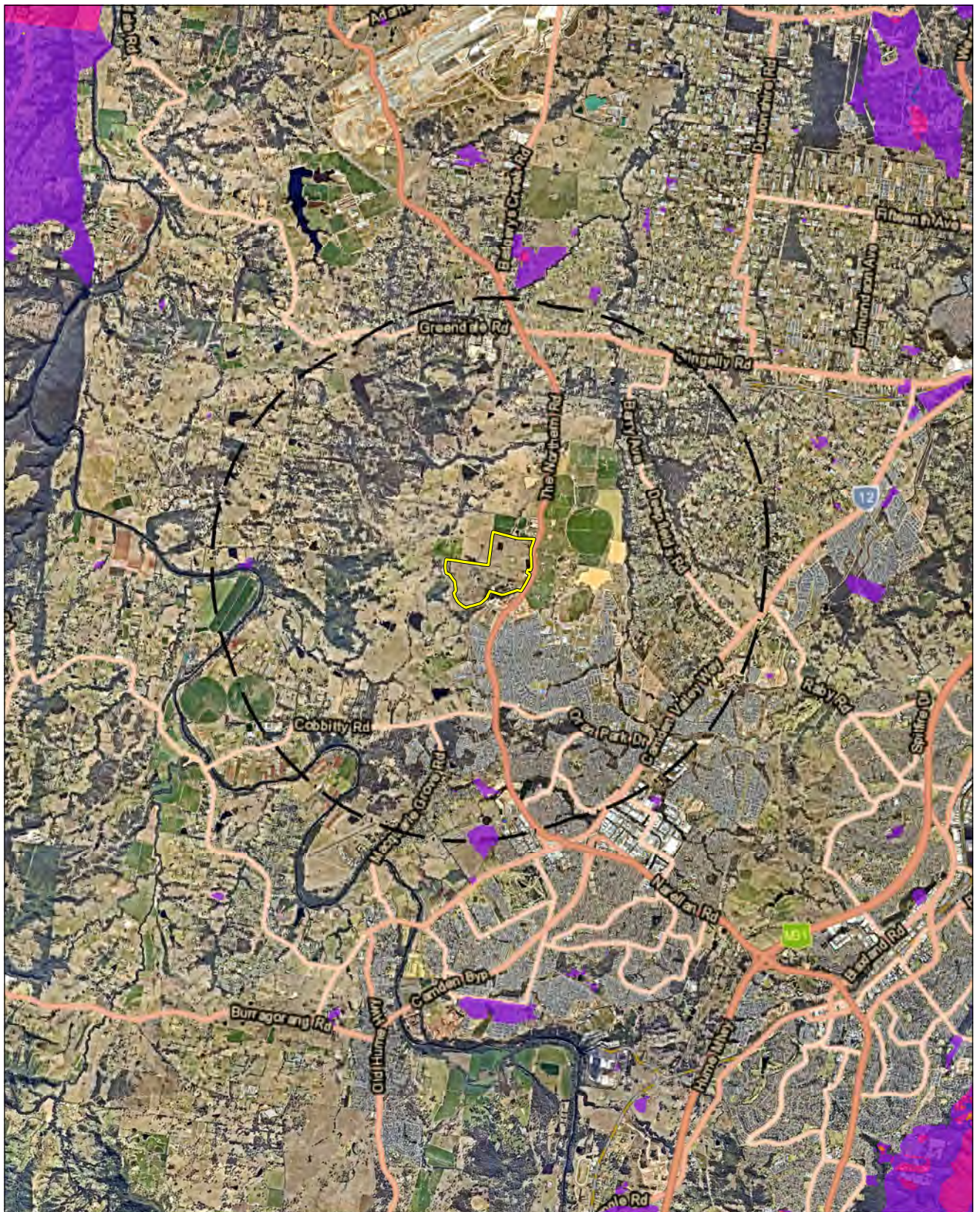
Date: 8/12/2022

0 0.5 1 2
Kilometers

Figure 7: Time Since Fire

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap



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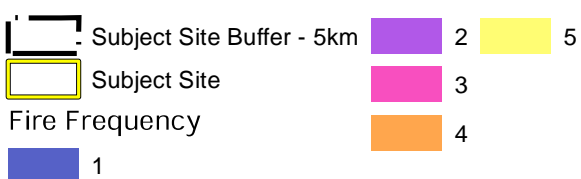


Figure 8: Fire Frequency



Date: 8/12/2022

0 0.5 1 2
Kilometers

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

2.5 Fire intensity analysis

The predicted fire intensity within 5 km of the site has been modelled using GIS. The GIS model is based on the fire behaviour formula of McArthur Mk 5 (1962) and utilised inputs of vegetation (fuel load), slope and aspect as summarised below:

- Vegetation (Figure 5) fuel loads (t/ha) based upon likely climax fuel loads as specified by the NSW Rural Fire Service document *Comprehensive Vegetation Fuel Loads* (NSW RFS 2019);
- Slope in degrees (Figure 6);
- Fire weather represented by a Fire Danger Index (FDI) of 100 (which is a day of 'catastrophic' fire weather on the fire weather warning system). This is the planning (design) level specified by PBP; and
- A direction of fire spread under the influence of problematic fire weather from the western sector.

The fire intensity mapping on Figure 9 displays the intensity of a fire travelling under winds from the western sector and provide an understanding of rate of spread, risk to fire-fighters, fire control line feasibility and the relative bushfire risk across the landscape.

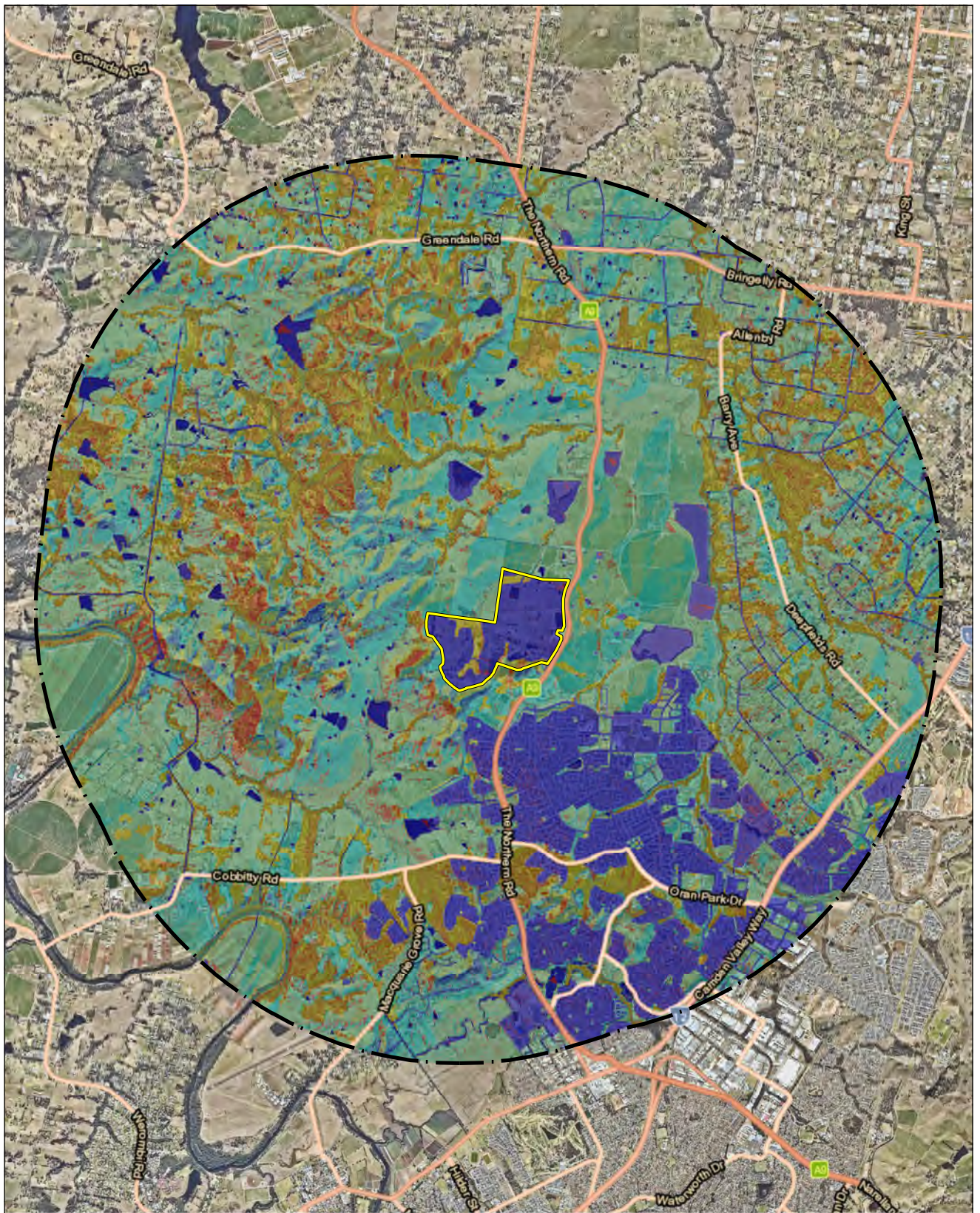
The mapping of areas into varying degrees of intensity does not indicate how often an area will receive potentially damaging fires, however, it provides a useful comparative ranking across the landscape. Mapping intensity assists in understanding the potential behaviour of bushfires and fire pathways. For example, locations with an expanse of higher bushfire intensity running in a west to east direction may represent a potential fire pathway.

The intensity mapping highlights the vegetated hilly areas to the west and north-west of the site. These areas of higher intensity indicate a potential fire path whereby a fire could propagate towards the site along the steeper slopes and ridgelines under the influence of westerly winds.

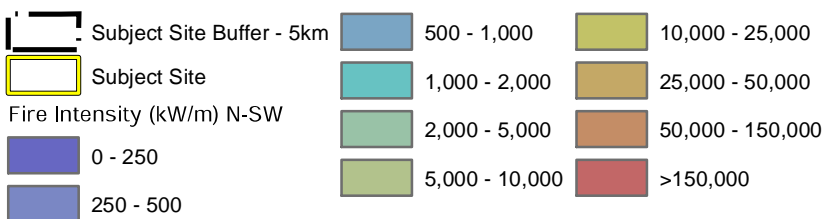
2.6 Potential fire scenarios

Based on the information provided in the preceding sections on hazard, weather, historical fire activity, and intensity, likely fire behaviour and potential fire paths and scenarios can be predicted.

The problematic fire scenario is the combination of undesirable fire weather (i.e. hot and dry westerly winds during late spring and summer) combined with ignition to the west creating the potential for a bushfire to spread eastwards across the vegetated hills and across the grasslands towards the subject site. A fire could also emanate from the remnant woodlands along the southern boundary and burn downhill towards the subject site. The potential fire scenarios are illustrated on Figure 10.



Legend



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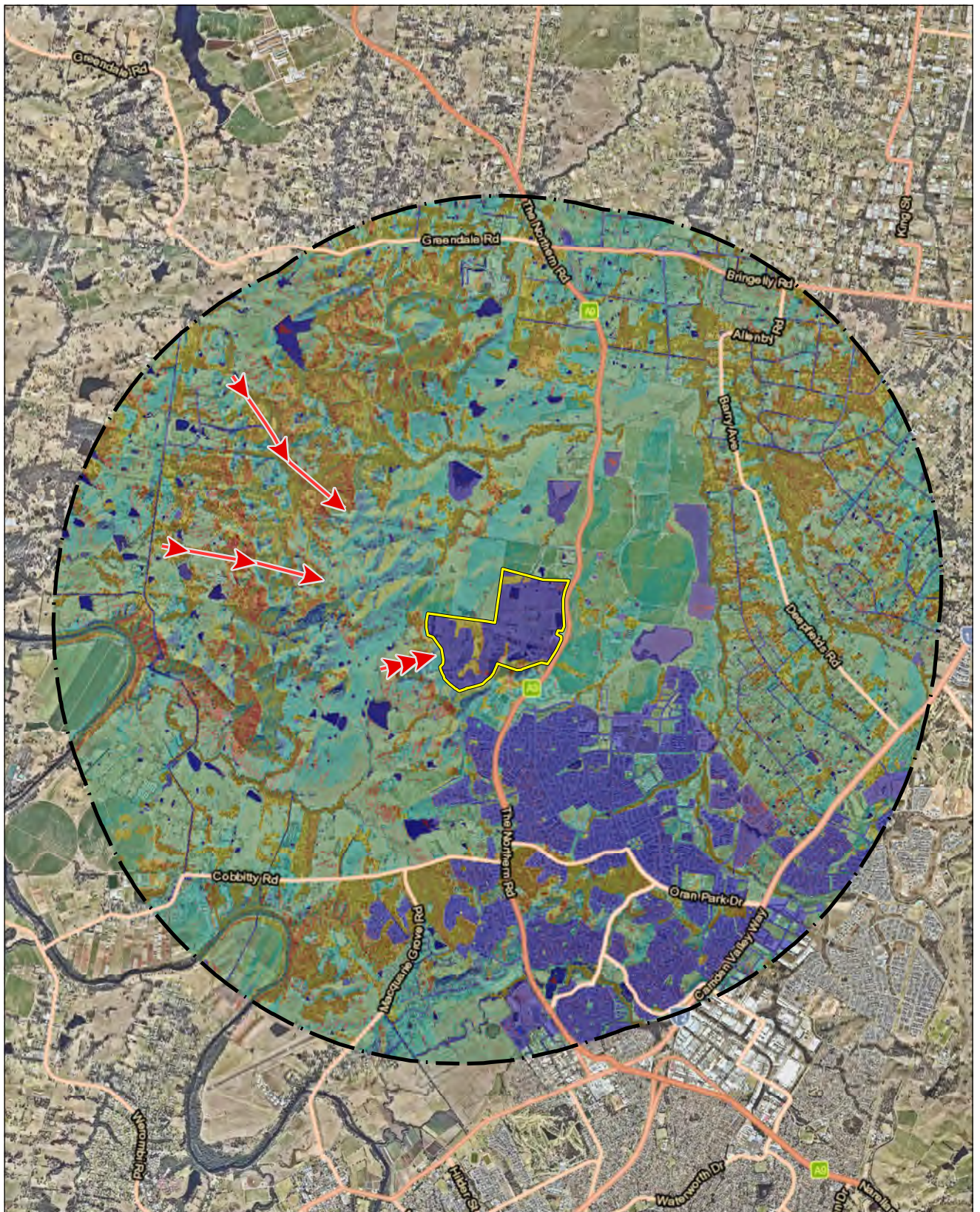


Kilometers

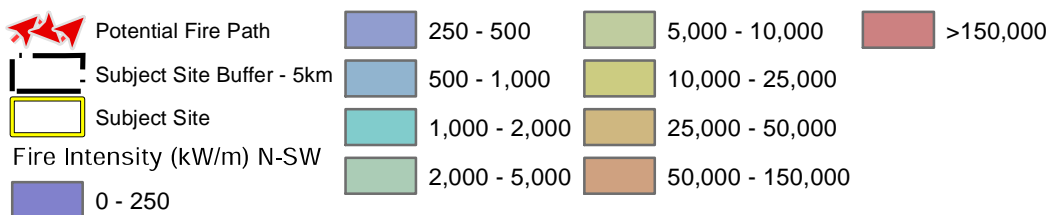
Figure 9: Fire Intensity kW/m

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap



Legend



Date: 8/12/2022

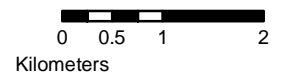


Figure 10: Potential Fire Scenarios

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

3 Land use assessment

3.1 Risk profiles

The risk of a bushfire igniting, spreading and causing damage to future development at the subject site has been assessed following the outcomes of the preceding Section 2 - Bushfire Landscape Assessment. The subject site has been divided into two broad risk profiles 'medium' and 'low' based on the same methodology used by NSW Rural Fire Service (BFCC 2008) in developing bushfire risk management plans across NSW.

As detailed in Section 3, considerations for the determination of the risk profiles include fire intensity mapping (a product of vegetation, topography and fire weather), fire history and potential fire attack scenarios. The risk profiles for the subject site are mapped on Figure 11.

Figure 11 shows that there are no areas of high risk within the subject site. This is primarily due to the predominance of grassland immediately adjacent the site and woodland on upslopes.

The land within 100 m of the south-western and southern boundaries of the subject site are classified medium risk as these areas will be deemed bushfire prone and could be subject to bushfire attack from these directions (refer to Section 2.5 - Potential fire scenarios). The remainder of the subject site, including the riparian corridors, are classified as low risk. The low risk area will be greater than 100 m away from external influences and the riparian corridor will not be large enough to sustain a landscape-wide fire.

Most noteworthy of Figure 11 is the absence of high risk. This allows greater flexibility with the land use decision making, allowing complete reliance on the accepted bushfire protection measures stipulated by PBP to provide a safe environment for all types and density of development.

3.2 Land use recommendations

The proposed zoning is shown on the Draft ILP included as Figure 12. The risk profiling (Section 3.1 and Figure 11) did not constrain zoning decisions. Despite this, the most vulnerable zones at the subject site (medium density residential, the school site and local centre) are proposed within areas of low risk rather than medium risk.

Areas mapped as medium risk were deemed acceptable for residential development (low density and environmental living) providing bushfire protection measures compliant with PBP can be accommodated within the design. Measures include APZ and adequate access for evacuation of residents and response of emergency authorities.



Imagery: © Nearmap

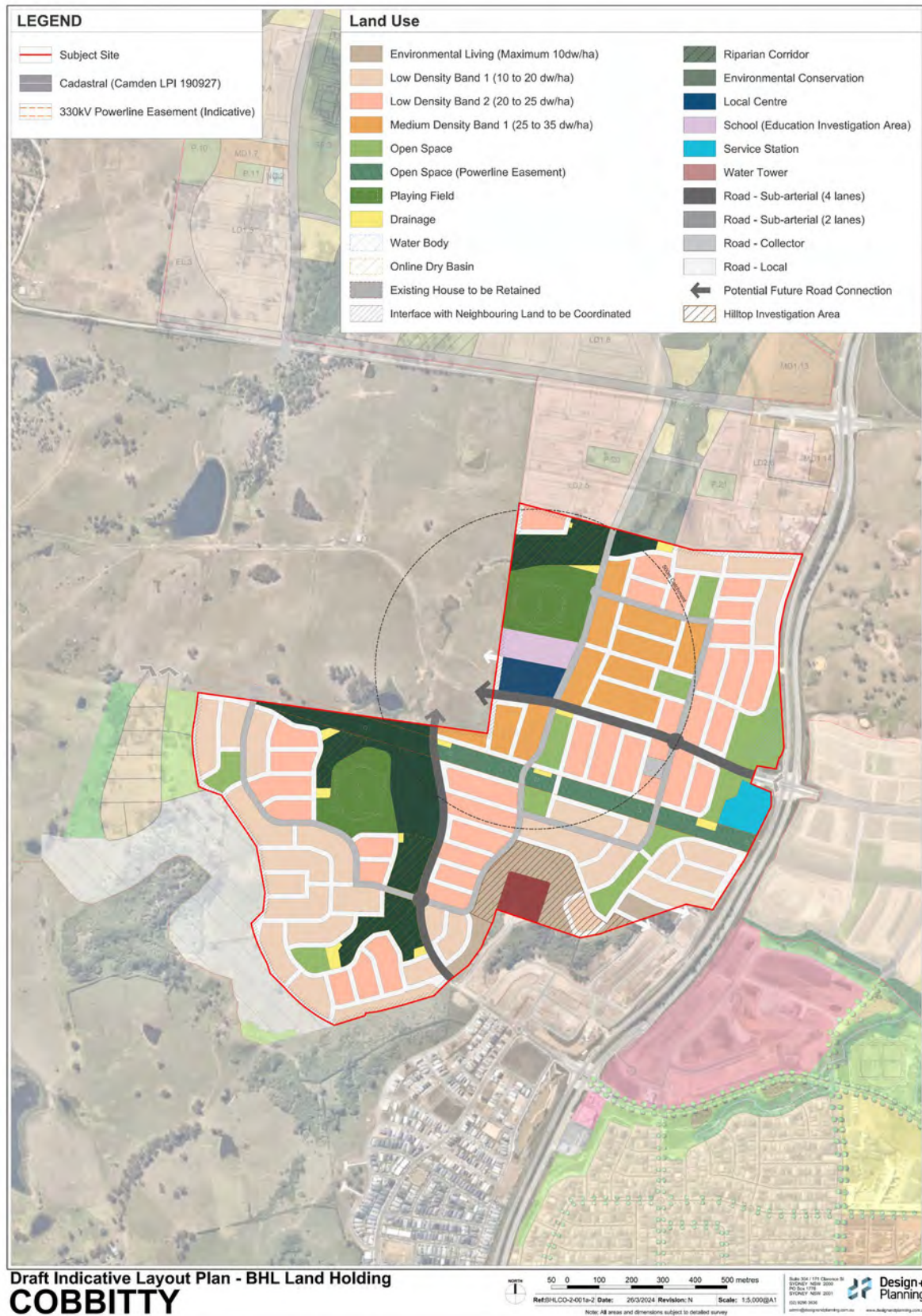


Figure 12: Proposed land use zones

3.3 Asset Protection Zones (APZ)

Using the vegetation and slope information presented in Sections 2.1 and 2.2, APZs have been determined for residential development and Special Fire Protection Purpose (SFPP) development and accommodated within the site where required. APZs are compliant with the Acceptable Solutions as listed in PBP Tables A1.12.2 and A1.12.1, respectively.

Specific APZ locations and dimensions are detailed in Table 3. The APZ constraints are shown on Figure 13.

The purpose of the APZ layer at the rezoning stage is to demonstrate that compliant APZs can be accommodated within the design. The final APZ dimension will be dependent on the final subdivision layout that will be subject to further detailed planning and analysis at the subdivision application stage. Changes in subdivision layout and patterns of vegetation may occur to which the future APZ will need to reflect.

The Draft ILP has been designed to accommodate the required APZ dimensions between building envelopes and identified bushfire hazards. The hazards include woodland (and associated African Olive) along the ridgeline to the south, woodland to be created within riparian corridors, and grassland adjoining the subject site.

Specific comments regarding the APZ assessment are:

- Riparian corridors: It has been assumed that the entire corridor will be reinstated with woodland vegetation under the guidance of a Vegetation Management Plan (VMP). The APZ has been buffered from the edge of the corridor as shown on the Draft ILP, however the final positioning and dimension of the APZ is subject to change depending on the inclusion of managed open space along the outside edge of corridors or changes to the levels within the corridors, for example.
- Hilltop Investigation Area: This zone adjoins the Sydney Water site on the southern boundary and involves steep areas of woodland and African Olive leading up to the ridgeline. It is proposed to rezone this area C4 Environmental Living to potentially allow large lots to span between the street and the site boundary. The urban design for the Hilltop Investigation Area is not included in the rezoning proposal as additional investigation is required to formulate a layout that can accommodate the steep slopes, retention of vegetation, and associated APZ. It can be advised that the likely APZ dimension between a dwelling within future large lots and retained vegetation would be 12 m based on a vegetation classification of 'woodland' and effective slope of 'upslope/flat'

All APZs and lands within the subject site (with the exception of riparian corridors and woodland conservation areas) are to be maintained to the standard of an Inner Protection Area (IPA) as described within Appendix A4.1.1 of PBP.

Table 3: APZ determination

Location (Figure 13)	Vegetation ¹	Slope ²	APZ ³
A	Grassland	Upslope	10 m
B	Grassland	Downslope 0-5°	12 m
C	Woodland	Downslope 0-5°	16 m
D	Woodland	Downslope 0-5°	16 m
E	Grassland	Downslope 0-5°	12 m
I	Woodland	Upslope	12 m
J	Grassland	Upslope	10 m
K	Woodland	Upslope	12 m
L	Woodland	Downslope 0-5°	16 m
M	Grassland	Upslope	10 m
N	Woodland	Downslope 0-5°	16 m
O	Woodland	Downslope 5-10°	20 m
P	Woodland	Downslope 0-5°	16 m
Q	Grassland	Downslope 0-5°	12 m
R (school site)	Grassland	Downslope 0-5°	40 m
Hilltop Investigation Area	Woodland	Upslope	12 m

¹ Predominant vegetation classification over 140 m from developable area.

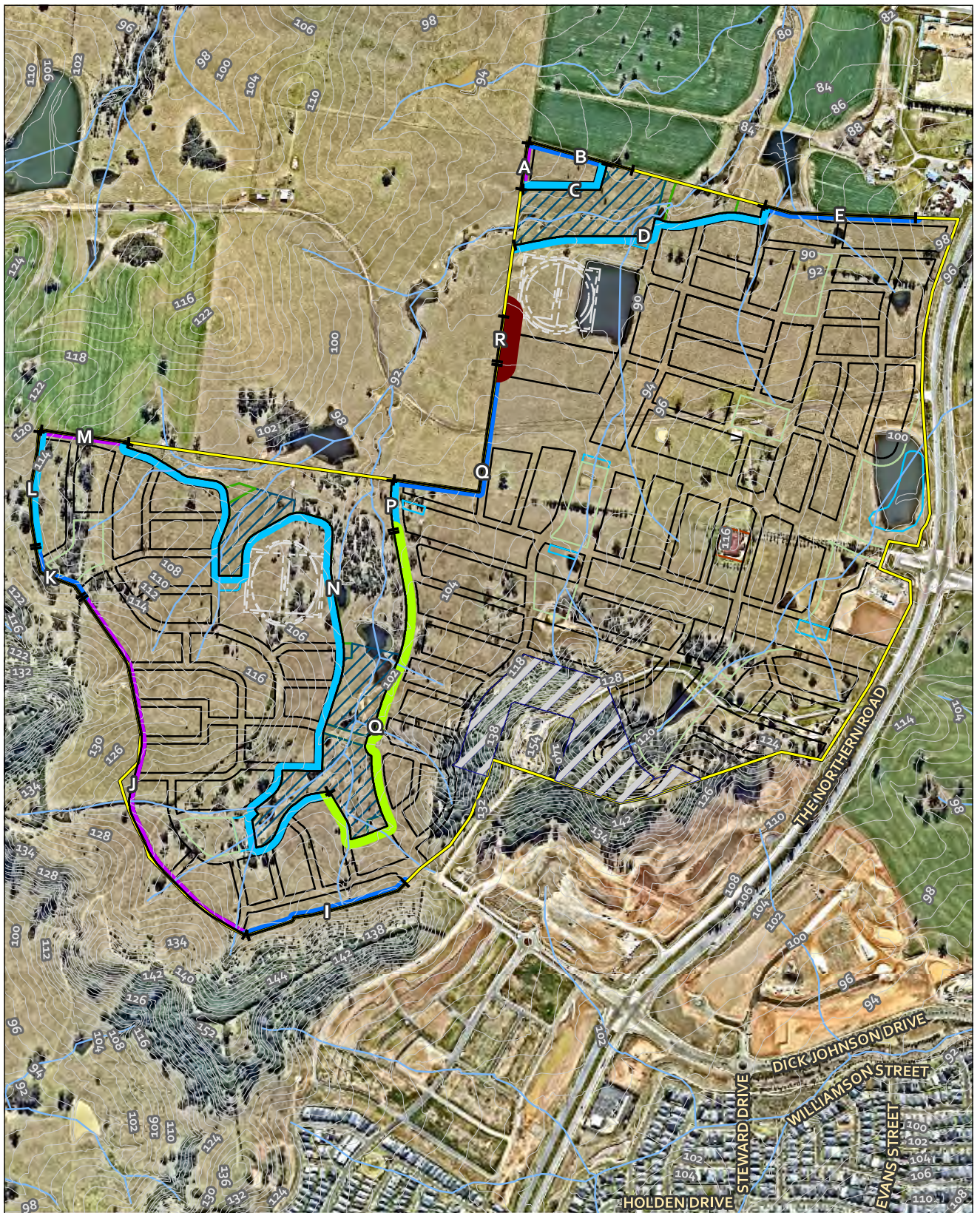
² Effective slope class assessed over 100 m from developable area where the bushfire hazard occurs.

³ Asset Protection Zone (APZ) as required by PBP Table A1.12.2 (residential development) and PBP Table A1.12.1 (school site).

3.4 Construction standards for future buildings

Buildings proposed within bushfire prone land are required to be assessed to ascertain the Bushfire Attack Level (BAL) in order to design and construct the building in compliance with the corresponding suite of construction specifications listed within Australian Standard AS 3959-2018 *Construction of buildings in bushfire prone areas* (SAI Global 2009). Such an assessment does not occur until the development application stage.

Based on the minimum APZ dimensions listed in Table 3 and shown on Figure 13, those residential buildings closest to the hazard will have a maximum rating of BAL-29.



Legend

- Interface
- Hilltop Investigation Area
- Subject Site
- Asset Protection Zone - Residential**
 - Asset Protection Zone - 10m
 - Asset Protection Zone - 12m
 - Asset Protection Zone - 16m
 - Asset Protection Zone - 20m
 - Asset Protection Zone - 30m
 - Asset Protection Zone - 40m - SFPP

Figure 13: Asset Protection Zone



Date: 3/04/2024

0 125 250 500
Metres

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

4 Access and emergency services

The proposed rezoning will facilitate new uses and introduce improvements to access, infrastructure and emergency services for the area, ensuring an adequate level of bushfire protection for the new uses.

4.1 Access and evacuation

PBP requires an access design that enables safe evacuation away from an area whilst facilitating adequate emergency and operational response. All bushfire prone areas should have an alternate access or egress option depending on the bushfire risk, the density of the development, and the chances of the road being severed by fire for a prolonged period.

Access into and egress out of the subject site will be available to the east and south as shown on Figure 14. An additional access point north into Lowes Creek Maryland Precinct is available, and future access points are proposed through adjoining land to the north-west.

The multiple access points in alternate directions will ensure safe evacuation and operational response. The road layout as shown on the Draft ILP (Figure 14) provides a logical pattern allowing direct thoroughfare to the access points.



Legend

- | | | | |
|--|-------------------|--|---------------|
| | Basin | | Retained Lot |
| | Online Dry Basin | | Playing Field |
| | Site Plan | | Access |
| | Open Space | | Subject Site |
| | Riparian Corridor | | |



Date: 26/03/2024

0 100 200 400
Metres

Figure 14: Access and Evacuation

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

4.2 Road design

The road design is to comply with the PBP Acceptable Solutions for public roads in bushfire prone areas as required by PBP Table 5.3b. The requirements are repeated below.

Perimeter roads have been provided where these can be achieved. Locations where public perimeter road access is not achievable is where lots back onto the steep ridgeline adjacent the southern boundary of the subject site. A compliant public perimeter road cannot be achieved at this location due to the steep gradient of the land precluding road construction. This approach is consistent with recent subdivision approval on the southern side of the ridgeline within the 'Oxley Ridge' development.

PBP design standards for roads servicing residential development:

- *Property access roads are two-wheel drive, all weather roads.*
- *Perimeter roads are provided for residential subdivisions of three or more allotments.*
- *Subdivisions of three or more allotments have more than one access in or out of the development.*
- *Traffic management devices are constructed to not prohibit access by emergency service vehicles.*
- *Maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient.*
- *All roads are through roads;*
- *Dead end roads are not recommended, but if unavoidable, are not more than 200 metres in length, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end.*
- *Where kerb and guttering is provided on perimeter roads, roll top kerbing should be used to the hazard side of the road.*
- *Where access/egress can only be achieved through forest, woodland or heath vegetation, secondary access shall be provided to an alternate point on the existing public road system.*
- *One way public access roads are no less than 3.5 m wide and have designated parking bays with hydrants located outside of these areas to ensure accessibility to reticulated water for fire suppression.*
- *The capacity of perimeter and non-perimeter road surfaces and any bridges and causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes); Bridges/causeways to clearly indicate load rating.*
- *Hydrants are located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression.*

- *Hydrants are provided in accordance with the relevant clauses of AS 2419.1:2005 – Fire hydrant installations: System design, installation and commissioning.*
- *There is suitable access for a Category 1 fire appliance to within 4 m of the static water supply where no reticulated supply is available.*
- *Perimeter roads:*
 - *are two-way sealed roads;*
 - *8 m carriageway width kerb to kerb;*
 - *parking is provided outside of the carriageway width;*
 - *hydrants are located clear of parking reserves;*
 - *are through roads, and these are linked to the internal road system at an interval of no greater than 500 m;*
 - *curves of roads have a minimum inner radius of 6 m;*
 - *the maximum road grade is 15° and average grade of not more than 10°;*
 - *the road crossfall does not exceed 3°;*
 - *a minimum vertical clearance of 4 m to any overhanging obstruction, including tree branches, is provided.*
- *Non-perimeter roads:*
 - *Minimum 5.5 m carriageway width kerb to kerb;*
 - *parking is provided outside of the carriageway width;*
 - *hydrants are located clear of parking areas;*
 - *roads are through roads, and these are linked to the internal road system at an interval of no greater than 500 m;*
 - *curves of roads have a minimum inner radius of 6 m;*
 - *the road crossfall does not exceed 3°;*
 - *a minimum vertical clearance of 4 m to any overhanging obstructions, including tree branches, is provided.*

4.3 Emergency services

Increasing development in the South Creek West Release Area will increase demand on emergency services, fire-fighting infrastructure and operational capability. A review of the existing emergency services surrounding the site revealed that there are five fire stations within 10 km of the proposed access point to the subject site off The Northern Road. These are:

- Fire & Rescue NSW Narellan Fire Station (8 km);
- Narellan Rural Fire Brigade (11 km);
- Cobbitty Rural Fire Brigade (8 km);
- Bringelly Rural Fire Brigade (6 km); and
- Catherine Field Rural Fire Brigade (10 km).

Additional stations will be considered under strategic emergency management planning in collaboration with emergency service organisations for the wider South Creek West Release Area facilitated by DPIE.

4.4 Infrastructure

Future development at the site will need to meet the applicable infrastructure requirements of PBP. The general requirements for development are discussed below and are considered achievable for this site.

4.4.1 Water

To comply with PBP, future development should be serviced by a reticulated water supply. Fire hydrant spacing, sizing and pressures should comply with Australian Standard *AS 2419.1 – 2021 Fire hydrant installations – Part 1: System design, installation and commissioning*.

4.4.2 Electricity and gas

It is expected that future electricity supply to the site will be underground and therefore compliant with PBP.

Reticulated gas is to be installed and maintained in accordance with Australian Standard *AS/NZS 1596:2014 The storage and handling of LP Gas* and the requirements of relevant authorities. The PBP acceptable solution requirements for these services are expected to be achievable for future development.

5 Ministerial directions compliance

This section summarises how compliance with Section 9.1(2) Direction 4.3 – ‘Planning for Bush Fire Protection’ (*Environmental Planning and Assessment Act 1979*) is achieved. The response to requirements is set out below following the structure of Direction 4.3.

5.1 Direction 4.3 Objectives

Objective 1

“To protect life, property and the environment from bushfire hazards, by discouraging the establishment of incompatible land uses in bushfire prone areas”

The intention of the objective is to avoid a development outcome that is faced by or poses a risk that cannot be managed to an acceptable level. The land use assessment at Section 3 demonstrates that future development at the site will be faced by a risk that can be managed to an acceptable level by implementing the Acceptable Solutions of PBP therefore making it compatible with the surrounding environment.

It is concluded that the proposed land use is not considered incompatible with the surrounding bushfire prone area. Compliant APZs coupled with adequate access designed to address the bushfire risk produces a use not incompatible with the surrounding environment.

Objective 2

“To encourage sound management of bushfire prone areas”

The bushfire protection measures recommended throughout this report demonstrate sound management of the subject land for residential use.

5.2 Direction 4.3 Provisions

Provision 1

“have regard to Planning for Bush Fire Protection”

Sections 3 and 4 address the provisions of *Planning for Bush Fire Protection* relating to rezoning proposals.

Provision 2

“introduce controls that avoid placing inappropriate developments in hazardous areas”

The proposed rezoning is not considered inappropriate for the level of bushfire hazard in the area (refer to Section 3.1 and 3.2). Controls (bushfire protection measures) will be set in place to ensure compliance with PBP (refer to Section 3.3 and 4). The zone for a service station is located adjacent The Northern Road in the east of the subject site and will not be within 100 m of a woodland hazard or within 50 m of a grassland hazard.

Provision 3

“ensure that bushfire hazard reduction is not prohibited within the asset protection zone”

Proposed APZs will be contained wholly within road reserves and private lots that will be routinely managed. APZs will not be placed into environmentally sensitive lands such as riparian corridors or conserved woodland areas.

Provision 4

“provide an asset protection zone incorporating at a minimum:

- an Inner Protection Area bounded by a perimeter road or reserve which circumscribes the hazard side of the land intended for development and has a building line consistent with the incorporation of an APZ, within the property, and,
- an Outer Protection Area managed for hazard reduction and located on the bushland side of the perimeter road”

APZs will be provided to comply with the distances prescribed by PBP as detailed in Section 3.3. Perimeter roads have been provided where required and achievable.

Provision 5

“for infill development (that is development within an already subdivided area), where an appropriate APZ cannot be achieved, provide for an appropriate performance standard, in consultation with the NSW Rural Fire Service. If the provisions of the draft LEP permit Special Fire Protection Purposes (as defined under Section 100B of the Rural Fires Act 1997), the APZ provisions must be complied with”

The proposal does not involve infill development. Section 3.3 details APZs compliant with the Acceptable Solutions of *Planning for Bush Fire Protection 2019*.

Provision 6

“contain provisions for two-way access roads which links to perimeter roads and/or to fire trail networks”

The ILP features two-way roads and a compliant road layout. More detail on the proposed access is detailed in Sections 4.1 and 4.2.

Provision 7

“contain provisions for adequate water supply for fire-fighting purposes”

Section 4.4 states the requirements for a reticulated water supply and hydrant installation.

Provision 8

“minimise the perimeter of the area of land interfacing the hazard which may be developed”

The perimeter of the subject site, including internal riparian area, is uniform in nature so as to reduce ‘pinch-points’, intrusions or otherwise extended hazard interface areas that could become problematic for evacuation or operational response.

Provision 9

“introduce controls on the placement of combustible materials in the Inner Protection Area”

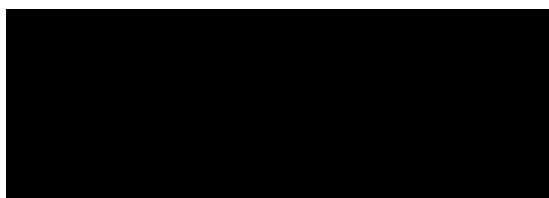
Section 3.3 states that APZs are to be maintained to comply with Appendix A4.1.1 of PBP.

6 Conclusion

This Strategic Bushfire Study has been prepared in accordance with Section 4.2 of the RFS document *Planning for Bush Fire Protection 2019* (NSW RFS 2019) and addresses the requirements for assessment of rezoning proposals involving bushfire prone land, namely Section 4.2 of *Planning for Bush Fire Protection 2019* and the *Environmental Planning and Assessment Act 1979* Section 9.1(2) Ministerial Direction 4.3 – ‘Planning for Bush Fire Protection’.

The South Creek West Cobbitty Sub Precinct 5 Draft ILP has been developed via an iterative process involving strategic analysis, constraints assessment and consultation with bushfire protection requirements in mind. Risk profiling based on bushfire landscape analysis has resulted in an unconstrained development environment with no high risk areas identified. Areas identified medium risk are adjacent boundary locations and provide for low density residential development with appropriate bushfire protection provisions such as APZs and adequate access. Medium density residential development and more vulnerable uses such as the school, local centre and service station sites are within areas identified as low risk, which typifies most of the subject site.

As demonstrated by this study, the proposal to rezone the subject site satisfies EP&A Act s.9.1(2) Direction 4.3 – ‘Planning for Bush Fire Protection’ and *Planning for Bush Fire Protection 2019*. The proposal is not considered incompatible with the surrounding environment and bushfire risk.



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