

Bush Fire Assessment Report

Planning Proposal

Leppington Town Centre

Reference Number: 211490

Prepared For:
Camden Council

2nd August 2021



Prepared By:
**Building Code & Bushfire
Hazard Solutions Pty Limited**

Tel: (02) 9457 6530

PO Box 124
Berowra NSW 2081
ABN 19 057 337 774

www.bushfirehazardsolutions.com.au

DRAFT



Contents

	<u>Page No.</u>
Copyright and Disclosure	2
List of Abbreviations	3
Executive Summary	4 - 5
1.0 Introduction	6
2.0 Purpose of Report	6
3.0 Scope of Report	6
4.0 Investigation Boundary, BPLM, Current ILP & Draft ILP	7 - 9
5.0 Bushfire Assessment	10 - 31
6.0 Conclusion	32
7.0 Annexure	33
- List of referenced documents and attachments	
- Attachments	

COVER NOTE

Please note that where the Indicative Layout Plan (ILP) is illustrated and referenced in this study that the ILP has since been updated. The latest version of the ILP can be found in the Draft Schedule 2 Leppington Town Centre Development Control Plan (Figure 3, p.22).

DRAFT

Copyright:

Where agreed to by Building Code and Bushfire Hazard solutions Pty. Ltd, this report may only be copied, distributed or forwarded to other parties in its original format. No part of this document including any wording, images, or graphics can be modified, changed or altered in any way without the express permission of Building Code and Bushfire Hazard Solutions Pty. Ltd. (Copyright Act 1968).

Where this document is found to have been used or altered in any way without the express permission of Building Code and Bushfire Hazard Solutions Pty. Ltd. including any wording, images, or graphics, Building Code and Bushfire Hazard Solutions Pty. Ltd. will not be held liable for any incidental or consequential loss or damages, financial or otherwise resulting from the use of the modified document. Building Code & Bushfire Hazard Solutions Pty. Ltd. will if it considers it necessary, seek to advise third parties including authorities of such illegal use or modifications.

Legal status:

This report has been prepared as a submission document in support of a Planning Proposal and in instances may rely upon information provided by a number of external sources including Councils, State Government Agencies and it is assumed that the information provided was accurate at the time. This report cannot be relied upon for commencement of works or construction until such time as it has been endorsed or otherwise included within the consent conditions issued by Council as part of the future DA determination.

4.14 applications (under the Environmental Planning and Assessment Act 1979) and all infill development applications may be referred by Council to the NSW Rural Fire Service for review and concurrence during the DA process. S100B applications under the Rural Fires Act 1997 (subdivisions and Special Fire Protection Purpose Developments), Flame Zone determinations and Alternate Solutions must be referred by Council to the NSW Rural Fire Service for review and receipt of a Bushfire Safety Authority (BSA) or other such recommended conditions from the NSW Rural Fire Service before the consent can be granted.

The onus is on the applicant to cross reference this document with any conditions of consent following development approval. Building Code & Bushfire Hazard Solutions can review and cross reference these documents however the onus is on the applicant to provide them to us and request this review – Building Code and Bushfire Hazard Solutions Pty. Ltd. is not in a position to track every application and we rely upon the applicant to undertake this role as project co-ordinator.

Where any discrepancy between this document and the development approval or the NSW Rural Fire Service requirements is found, the conditions of consent always take precedence until such time as an application to review, amend or vary these conditions is approved.

Disclaimer:

This report has been prepared with due care and diligence by Building Code and Bushfire Hazard Solutions Pty. Ltd and the statements and opinions contained in this report are given in good faith and in the belief on reasonable grounds that such statements and opinions are correct and not misleading bearing in mind the necessary limitations noted in previous paragraphs.

Further, no responsibility is accepted by Building Code and Bushfire Hazard Solutions Pty. Ltd. or any of its officers or employees for any errors, including errors in data which is supplied by a third party, or which Building Code and Bushfire Hazard Solutions Pty. Ltd. is required to estimate, or omissions howsoever arising in the preparation of this report, provided that this will not absolve Building Code and Bushfire Hazard Solutions Pty. Ltd. from liability arising from an opinion expressed recklessly or in bad faith.

Any representation, statement of opinion, or advice expressed or implied in this document is made in good faith on the basis that Building Code and Bushfire Hazard Solutions Pty. Ltd. employees and / or agents are not liable (whether by reason of negligence, lack of care or any other reason) to any person, company or their agents for any damage or loss whatsoever which has occurred or may occur in relation to that person taking or not taking (as the case may be) action in respect of any representation, statement or advice referred to above.

Version Control				
Version	Date	Author	Reviewed by	Details
1	02/08/2021	Stuart McMonnies BPAD Accreditation No. 9400	David McMonnies BPAD Accreditation No. 2354	Draft Report
1	21/04/2022	Stuart McMonnies BPAD Accreditation No. 9400		Final Release

List of Abbreviations:

APZ	Asset Protection Zone
AS3959	Australian Standard 3959 – 2018
BAL	Bushfire Attack Level
BPMs	Bushfire Protection Measures
BPLM	Bush Fire Prone Land Map
DA	Development Application
EP&A Act	Environmental Planning and Assessment Act - 1979
FRNSW	Fire & Rescue NSW
ILP	Indicative Layout Plan
IPA	Inner Protection Area
NCC	National Construction Code
NP	National Park
NSP	Neighbourhood Safer Places
OPA	Outer Protection Area
PBP	Planning for Bush Fire Protection – 2019
ROW	Right of Way
RF Act	Rural Fires Act - 1997
RFS	NSW Rural Fire Service
SBFS	Strategic Bush Fire Study
SEPP	State Environmental Planning Policy
SFPP	Special Fire Protection Purpose
SWS	Static Water Supply

Executive Summary

Building Code and Bushfire Hazard Solution P/L has been commissioned by Camden Council to prepare an independent Bushfire Assessment Report for a Planning Proposal for the Leppington Town Centre.

The Leppington Town Centre investigation area is located within the South West Growth Area and more specifically captures the former 'Leppington Major Centre' of the Austral and Leppington North Precincts.

The Leppington Town Centre investigation area is partly within Camden Local Government Area and partly within Liverpool Local Government Area.

The 'Leppington Major Centre' was rezoned from rural to urban land uses in 2013. This application seeks to rezone the land to deliver approximately 10,500 dwellings as well as additional uses and open space by 2041 to support this strategic centre.

The investigation area is depicted on Liverpool and Camden Council's Bushfire Prone Land Map as containing Category 1, 2 and 3 Vegetation and their associated buffer zones and is therefore considered 'bushfire prone'.

In relation to this planning proposal Liverpool and Camden Council's are required to apply section 9.1(2) of the *Environmental Planning and Assessment Act 1979*. Direction 4.4 Planning for Bushfire Protection identifies matters for consideration for proposals that affect or are in proximity to land mapped as bushfire prone. Under these directions the following objectives apply:

- i. to protect life, property and the environment from bush fire, by discouraging the establishment of incompatible land uses in bush fire prone areas; and*
- ii. to encourage sound management of bush fire prone areas.*

Under Direction 4.4, consultation must occur with the Commissioner of the NSW Rural Fire Service, which as part of this consultation process a Bushfire Assessment Report is required to be submitted to demonstrate compliance with the s9.1(2) Directions and Planning for Bush Fire Protection.

A Strategic Bush Fire Study in accordance with Chapter 4 of Planning for Bush Fire Protection 2019 (PBP) has been undertaken and concluded the proposal is appropriate in the bushfire hazard context.

In addition to the Strategic Bush Fire Study an assessment of the proposed land zoning against the specific Bushfire Protection Measures of PBP has concluded that future Development Applications have the capacity to satisfy this document.

A key recommendation out of this assessment is that where possible the carriageway of Local Streets adjacent to the riparian corridors should be increased to 8 metres to satisfy the acceptable solutions of PBP.

Alternatively other access options should be considered to provide interface access for attending fire services. These alternate options could include service/ fire trails within the adjacent managed open space. These trails could also be utilised as pedestrian / cycle links.

A key consideration for Planning Proposals in bushfire prone areas is limiting or excluding incompatible development commensurate with the level of risk. In this regard the investigation area is considered to have a low bushfire risk when considering the characteristics of the vegetation and the fragmentation to larger hazards in the broader landscape.

It is of our opinion that the proposal satisfies the s9.1(2) Directions and has the capacity to satisfy all relevant specifications and requirements of Planning for Bush Fire Protection 2019.

DRAFT

1.0 Introduction

Building Code and Bushfire Hazard Solution P/L has been commissioned by Camden Council to prepare an independent Bushfire Assessment Report for a Planning Proposal for the Leppington Town Centre.

The investigation area (Figure 01) is located within the South West Growth Area and more specifically captures the former 'Leppington Major Centre' of the Austral and Leppington North Precincts.

The Planning Proposal seeks to modified the land zoning to deliver approximately 10,500 dwellings as well as additional uses and open space by 2041 to support this strategic centre

The investigation area is depicted on Liverpool and Camden Council's Bushfire Prone Land Map as containing Category 1, 2 and 3 Vegetation and their associated buffer zones and is therefore considered 'bushfire prone'.

In relation to this Planning Proposal Liverpool and Camden Council's are required to apply section 9.1(2) of the Environmental Planning and Assessment Act 1979. Direction 4.4 Planning for Bushfire Protection identifies matters for consideration for proposals that affect or are in proximity to land mapped as bushfire prone. Under these directions the following objectives apply:

- i. to protect life, property and the environment from bush fire, by discouraging the establishment of incompatible land uses in bush fire prone areas; and*
- ii. to encourage sound management of bush fire prone areas.*

The proposal must demonstrate compliance with the s9.1(2) Directions and the relevant specification and requirements of Planning for Bush Fire Protection 2019 (PBP).

The application of PBP requires satisfactory demonstration of the aim and objectives and the specific objectives and bushfire protection measures relevant to the type of development.

In this instance the proposal relates to a Planning Proposal to facilitate a future residential and mixed use development and therefore in addition to the aim and objectives detailed in Chapter 1 'Introduction' the proposal must satisfy Chapter 4 'Strategic Planning' of PBP.

The bushfire protection measures detailed in Chapter 5-8 of PBP have also been considered for the future Residential, Special Fire Protection Purpose and Commercial / Industrial development.

2.0 Purpose of Report

The purpose of this Bushfire Assessment Report is to provide an independent bushfire assessment together with appropriate recommendations for bushfire mitigation measures considered necessary having regard to development within a designated 'bushfire prone' area.

3.0 Scope of this Report

The scope of this report is limited to providing a bushfire assessment and recommendations for the investigation area. Where reference has been made to the surrounding lands, this report does not purport to directly assess those lands; rather it may discuss bushfire impact and/or progression through those lands and possible bushfire impact to the investigation area.

4.0 Investigation Boundary, BPLM, Current ILP & Draft ILP

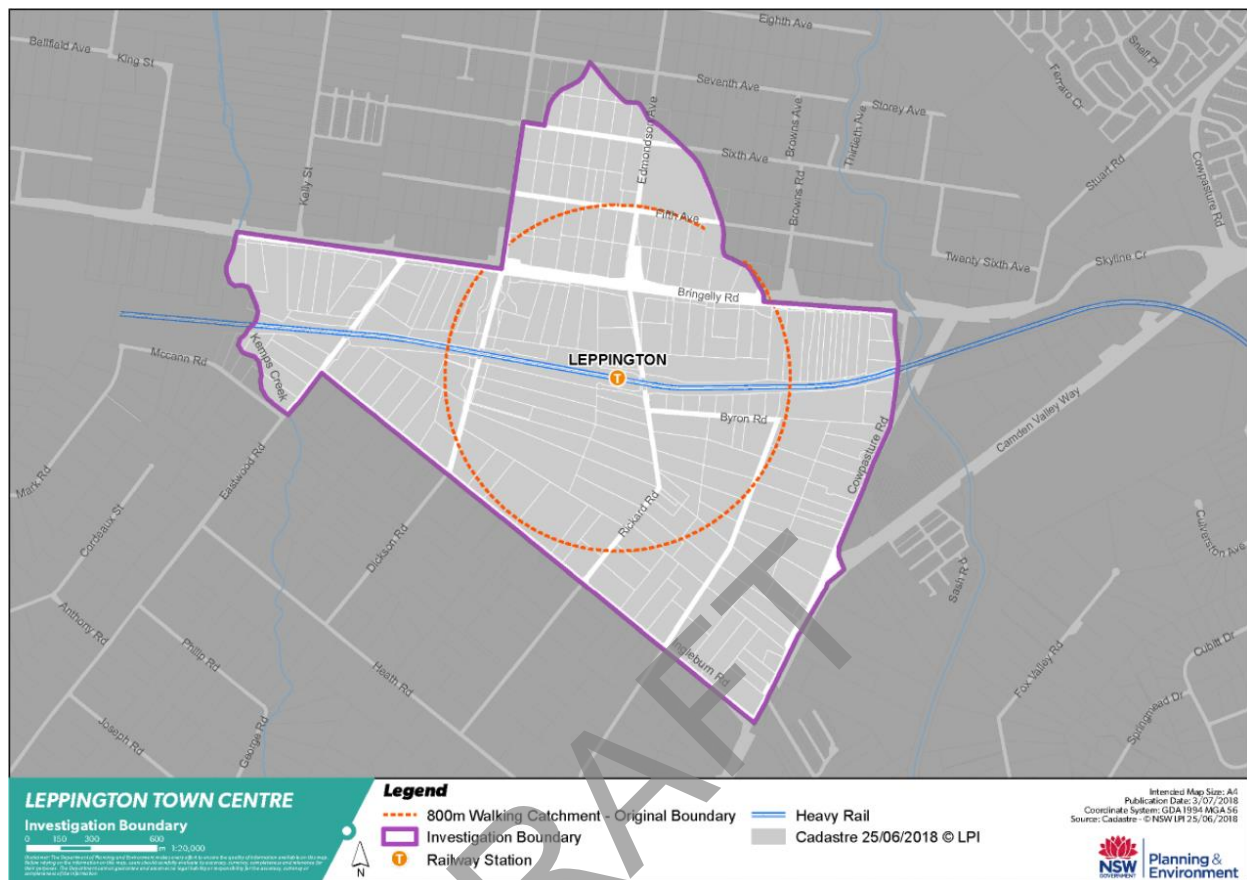


Figure 01: Leppington Town Centre Investigation Boundary

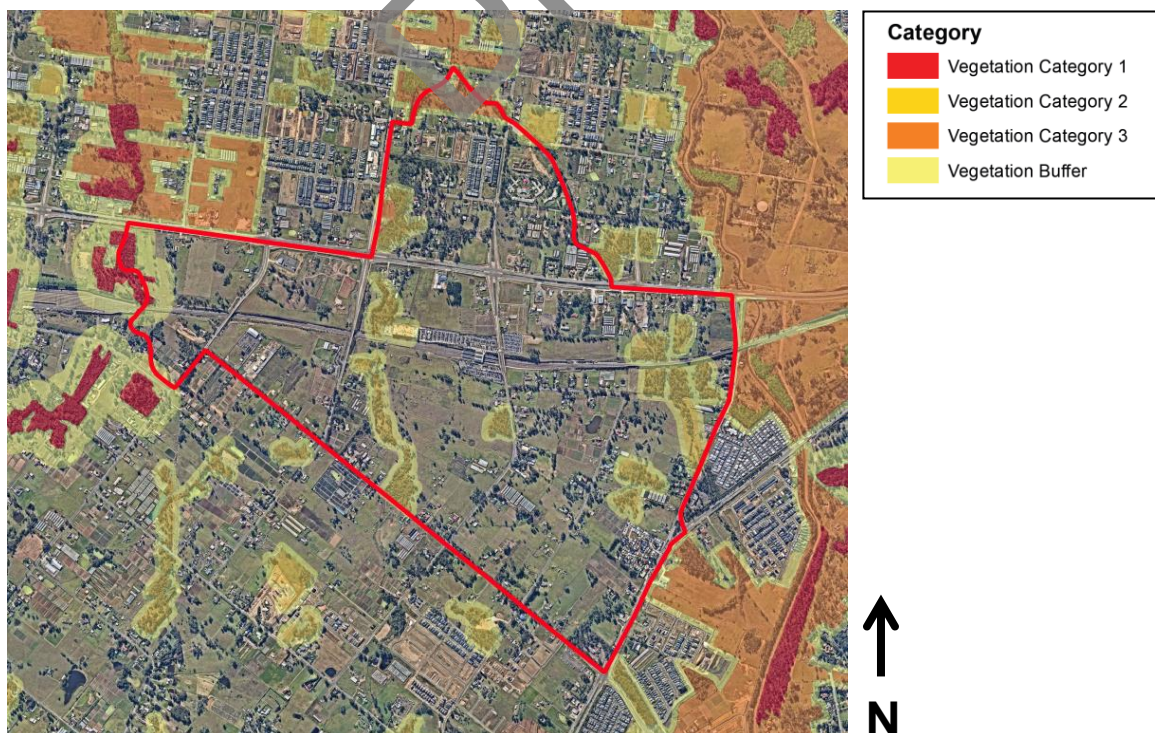


Figure 02: Extract from Council's Bushfire Prone Land Map

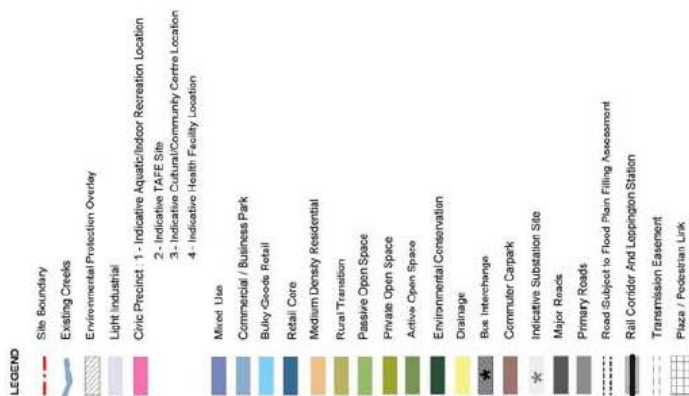
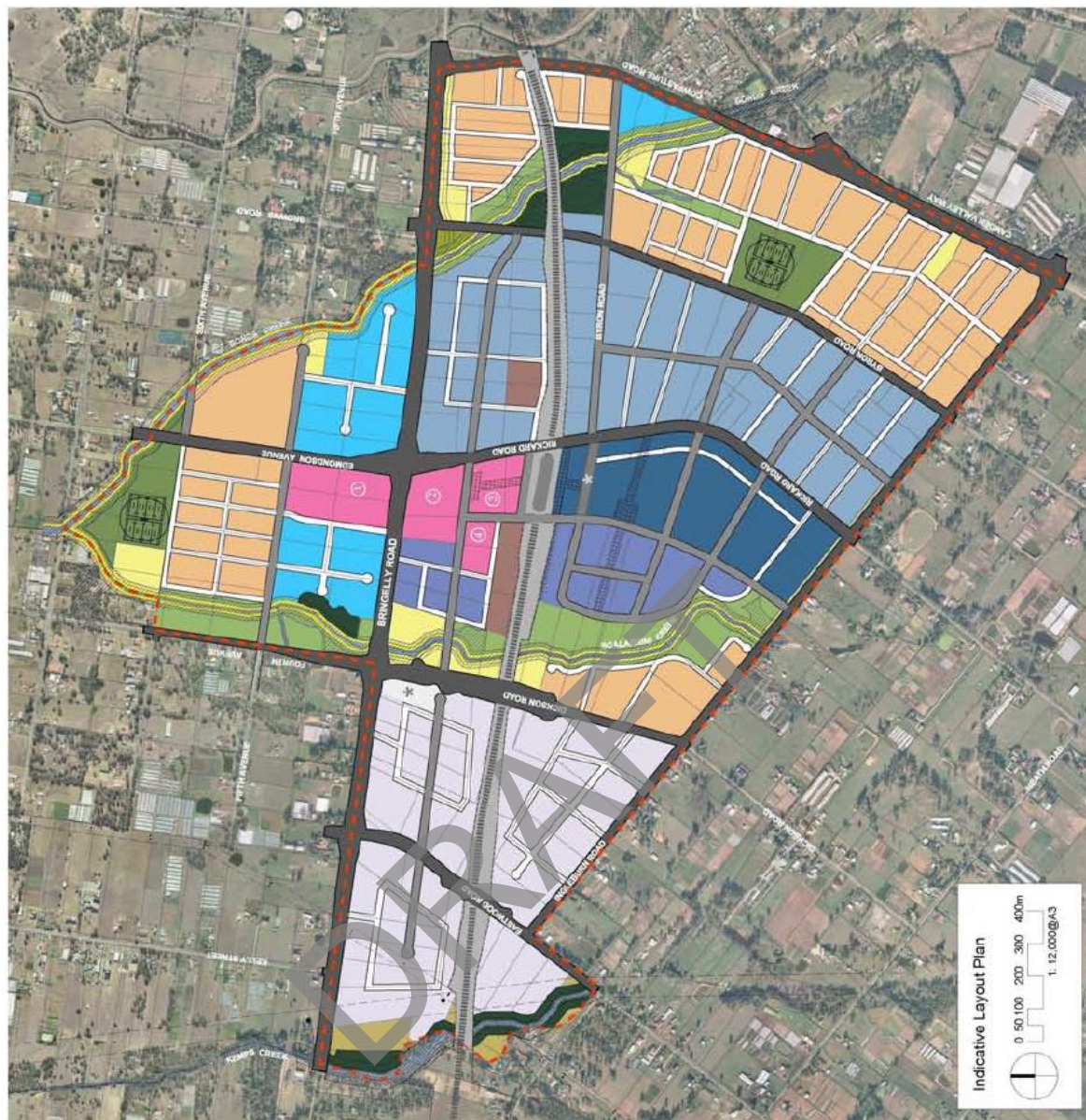


Figure 03: Extract from the current Indicative Layout Plan



5.0 Bushfire Assessment

5.01 Preface

Properties considered to be affected by possible bushfire impact are determined from the local Bushfire Prone Land Map as prepared by Council and/or the Rural Fire Service. All development within affected areas is subject to the application of the relevant specifications and requirements of 'Planning for Bush Fire Protection - 2019' (PBP).

PBP formally adopted on the 1st March 2020 provides for the protection of property and life (including fire-fighters and emergency service personnel) from bushfire impact.

In this instance the investigation area is depicted on Council's Bushfire Prone Land Map as containing Category 1, 2 and 3 Vegetation and their associated buffer zones. The investigation area is therefore considered to be 'bushfire prone'.

When preparing a Planning Proposal s9.1(2) of the EP&A Act is required to be applied. Direction 4.4 'Planning for Bushfire Protection' of the s9.1(2) Direction, applies when a Council prepares a draft LEP that affects, or is in proximity to, land mapped as bushfire prone. Under these directions the following objectives apply:

- i. to protect life, property and the environment from bush fire hazards, by discouraging the establishment of incompatible land uses in bush fire prone areas; and
- ii. to encourage sound management of bush fire prone areas.

Under direction 4.4 the Commissioner of the NSW RFS must be consulted and any comments taken into account. As part of the consultation process with the NSW RFS, a bush fire assessment is required to be submitted to demonstrate compliance with the s9.1(2) Directions and PBP.

Consideration must be given to limiting or excluding incompatible development in bushfire affected areas commensurate with the level of risk. A key principle to ensure this is that future development is designed and sited capable of complying with PBP.

The NSW Rural Fire Service also encourages the application of zones that limit or exclude inappropriate development in bushfire prone areas where:

- *the development area is exposed to a high bush fire risk and should be avoided;*
- *the development is likely to be difficult to evacuate during a bush fire due to its siting in the landscape, access limitations, fire history and/or size and scale;*
- *the development will adversely effect other bush fire protection strategies or place existing development at increased risk;*
- *the development is within an area of high bush fire risk where density of existing development may cause evacuation issues for both existing and new occupants; and*
- *the development has environmental constraints to the area which cannot be overcome.*

We provide the following assessment in consideration of the above and Planning for Bush Fire Protection 2019 to highlight the suitability of the Leppington Town Centre and the relevant bushfire protection measures.

5.02 Strategic Bush Fire Study

Planning proposals which relate to bushfire prone properties require the preparation of a Strategic Bush Fire Study. The Strategic Bush Fire Study (SBFS) provides opportunity to assess the broader landscape and ultimately assesses whether the new zone and proceeding development is appropriate in the bushfire hazard context.

The broad principles which apply to the SBFS analysis are:

- ensuring land is suitable for development in the context of bush fire risk;
- ensuring new development on BFPL will comply with PBP;
- minimising reliance on performance-based solutions;
- providing adequate infrastructure associated with emergency evacuation and firefighting operations; and
- facilitating appropriate ongoing land management practices.

Once the strategic assessment has been addressed in the SBFS, an assessment of whether the future land uses can comply with the aim and objectives and specific bushfire protection measures of PBP must then be carried out. The assessment against PBP is addressed in section 5.03 of this report.

The following assessment details the components in Table 4.2.1 of PBP which must be addressed in a SBFS.

Bushfire Landscape Assessment

The Bushfire Landscape Assessment component considers the likelihood of a bushfire, its potential severity and intensity and the potential impact on life and property in the context of the broader surrounding landscape.

Location

The investigation area is identified on the Leppington Town Centre Investigation Boundary Plan included as Figure 01 herein.

The Leppington Town Centre investigation area is located within the South West Growth Area and more specifically captures the former 'Leppington Major Centre' of the Austral and Leppington North Precincts.

The Leppington Town Centre investigation area is partly within Camden Local Government Area and partly within Liverpool Local Government Area, within Bringelly Road being the dividing boundary.

The investigation area is centred on the newly constructed Leppington Railway Station

Vegetation

The vegetation structure, connectivity and attributes are fundamental contributors to bushfire behaviour and its movement through the landscape.

As part of this assessment we have considered the potential bushfire runs that currently exist into the investigation area, as well as the potential fire behaviour and impacts following the delivery of the South West Growth Centre in accordance with the available ILPs.

Historically the primary use of the investigation area and broader landscape has been for agriculture purposes, including the cultivation of arable crops and breeding and raising of livestock. These farming practices and other anthropological disturbances have resulted in degraded or fragmented vegetation.

In more recent times higher density development consistent with the ILPs has also contributed to vegetation removal.

To assess the potential fire runs into the investigation area we have considered all existing vegetation within 500 metres (Figure 05). The vegetation within this assessment area was found to be fragmented, not providing opportunity for significant fire runs.

The vegetation along Kemps Creek to the northwest of the investigation area provides the greatest opportunity for a sustained fire run, however still remains fragmented and in areas constricted.

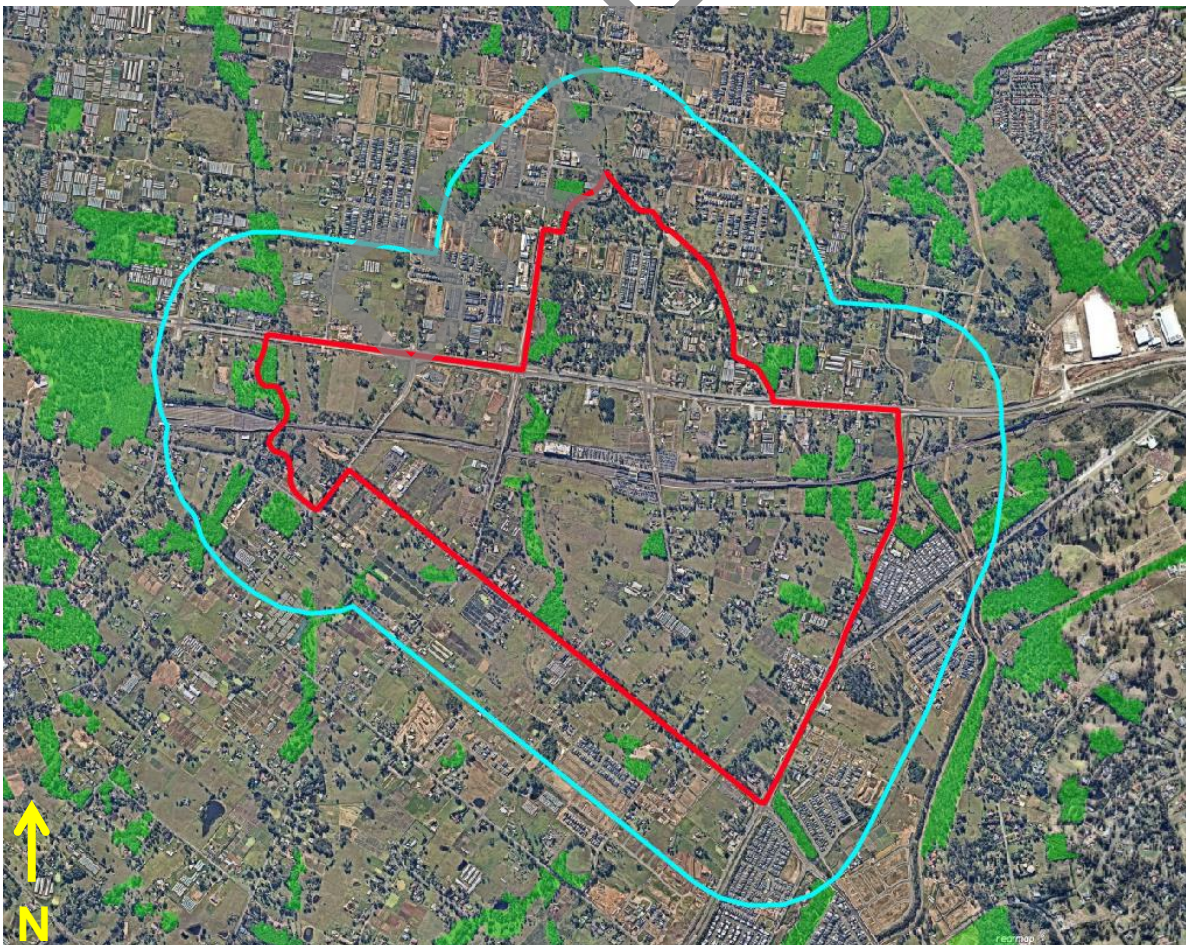


Figure 05: Aerial for of the subject area showing investigation area (red outline), 500m buffer (blue outline) and existing bushfire hazards (green shade)

The vegetation within the investigation area was currently largely found to comprise of grazed pastures, crops and some small prominent vegetation along the existing watercourses.

As part of the assessment of the potential fire behaviour and impacts we have considered land captured by the 'Environmental Protection Overlay' and 'Riparian' layers on the Indicative Layout Plans for the adjacent Precincts and any retained or proposed vegetated areas within the investigation area.

In relation to the investigation area this assessment has allowed for the retention and rehabilitation of the 'Riparian' areas as nominated on the draft Indicative Layout Plan. In addition the areas nominated as 'Existing Trees / Vegetation' on the Bonds Creek Corridor Concept – North outside the riparian area have also been considered for retention.

We have assumed all other land within the investigation area will either be developed, maintained to the standard of an Asset Protection Zone or considered Low Threat Vegetation in accordance with A1.10 of PBP.

The existing vegetation within the investigation area is mapped as being predominately Grey Box – Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin (PCT 849). This plant community type relates to Cumberland Plain Woodland, a listed Critically Endangered Ecological Community under both the *Environment Protection and Biodiversity Conservation Act* 1999 and the *Biodiversity Conservation Act* 2016.

The only other vegetation community within this investigation area is a narrow band of Forest Red Gum – Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion (PCT 835) along Scalabrini Creek.

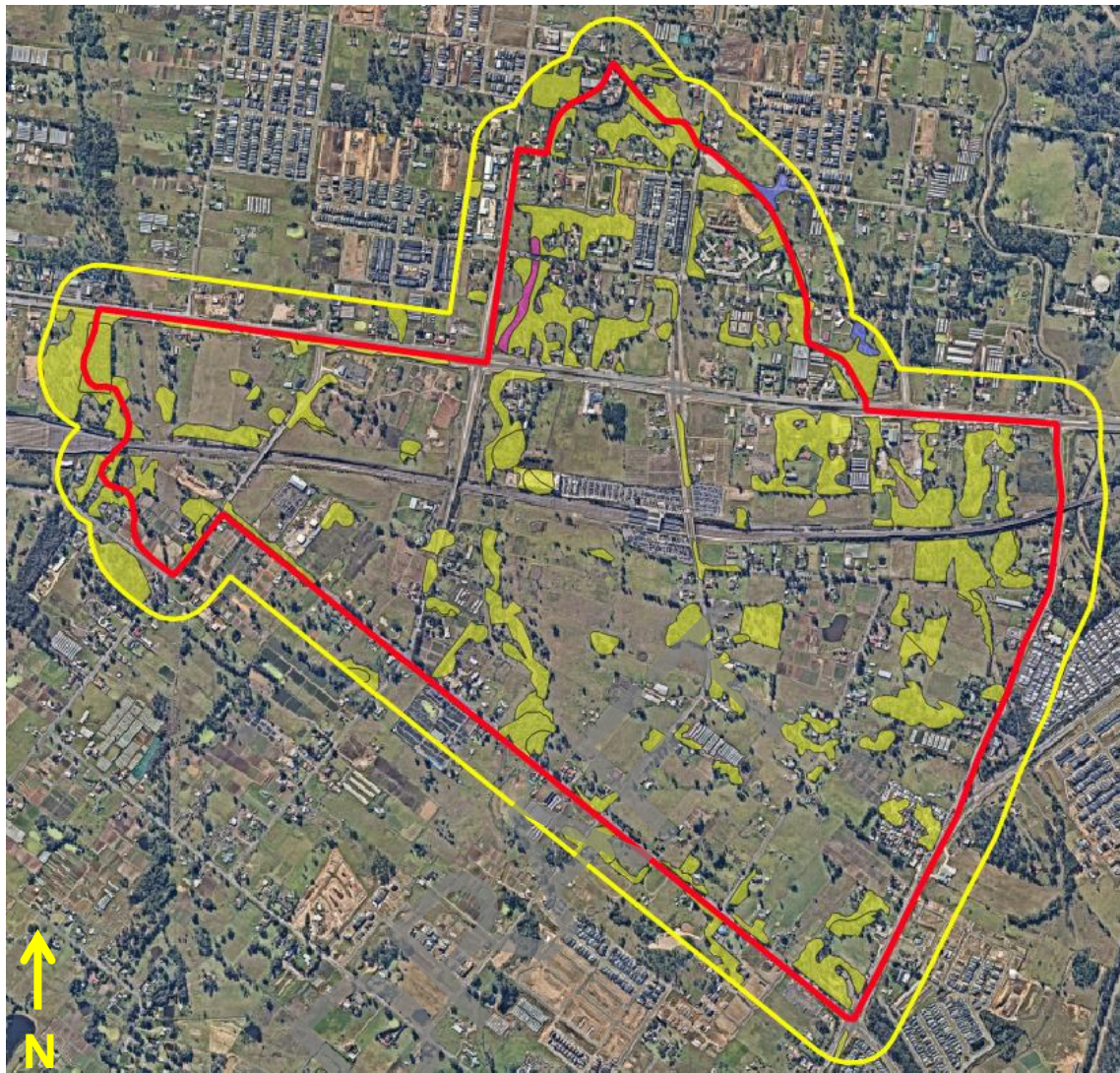
The following vegetation parameters were adopted for this assessment:

Plant Community Type	Formation	Class	Surface and Elevation Fuel Load*	Overall Fuel Load (including bark and canopy)*
Grey Box – Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin (PCT 849)	Grassy Woodland	Coastal Valley Grassy Woodland	10 t/ha	18.07 t/ha
Forest Red Gum – Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion (PCT 835)	Forested Wetland	Coastal Floodplain Wetlands	8.2 t/ha	15.1 t/ha

* Fuel loads from NSW Rural Fire Service publication Comprehensive Vegetation Fuel Loads (2019)

In consideration of the significance and dominance of Cumberland Plain Woodland throughout the investigation area it has been considered this would be the target community for any revegetation / rehabilitation along the 'Riparian' areas.

In accordance with A1.11.1 'Simplified Approach' of PBP sections of the riparian corridor along Scalabrini Creek which provide a less than 50 metre fire run has been considered remnant and had a rainforest structure applied to determine the APZs.



- Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion
- Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion
- Unclassified

Figure 06: Vegetation mapping of the investigation area (red outline)
and 140 metre buffer (yellow outline)
Source: Camden and Liverpool Council's

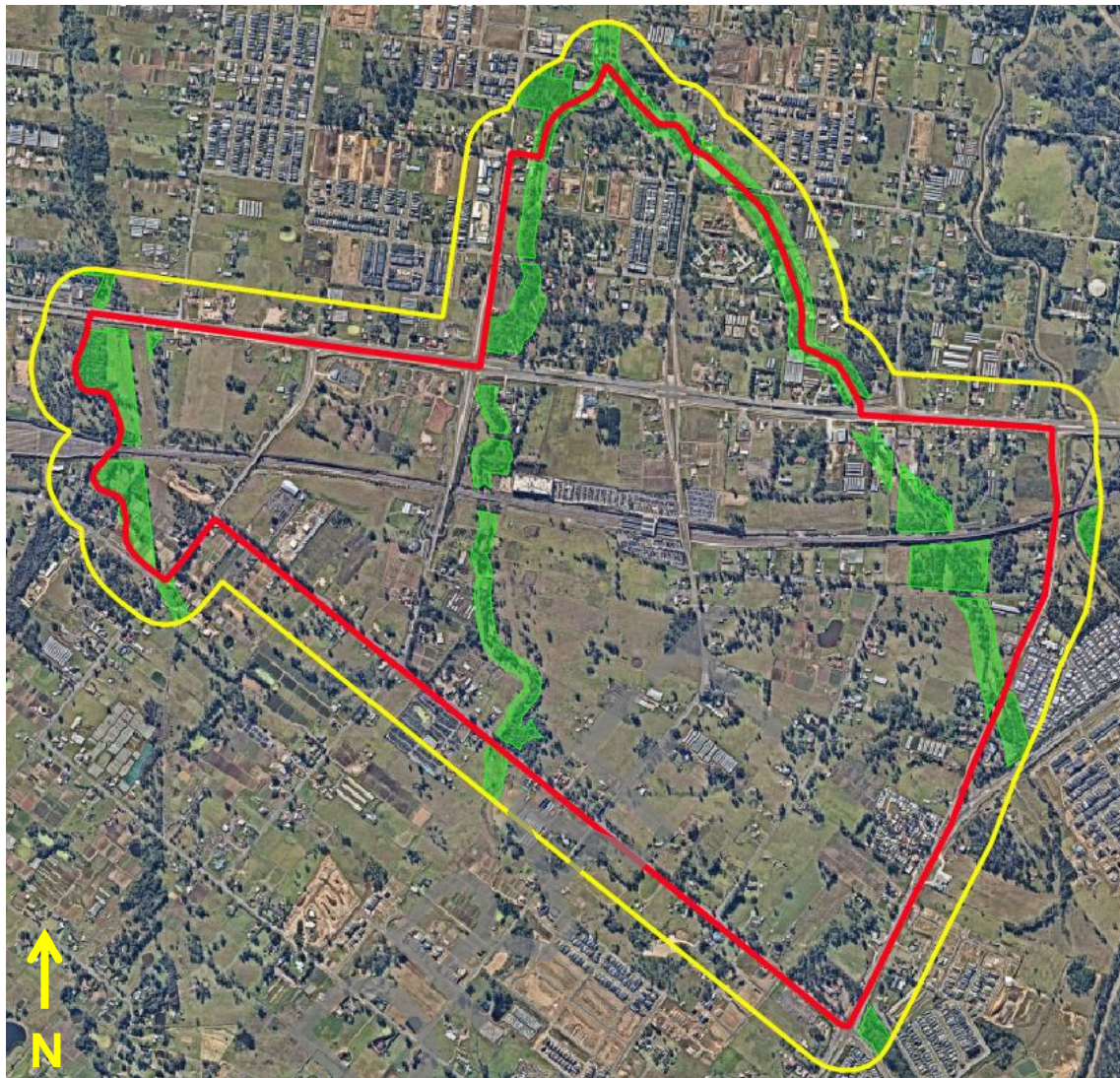


Figure 07: Bushfire hazard post-delivery of the Indicative Layout Plans
Investigation area (red outline), 140 metre buffer (yellow outline)
and bushfire hazard (green shade)

Slope and Topography

The slope of the land under the classified vegetation has a direct influence on the forward rate of spread, fire intensity and radiant heat exposure. The effective slope is considered to be the slope under the classified vegetation which will most significantly influence bushfire behaviour toward the development site.

The slope that would **most significantly** influence bushfire impact was determined using 1 metre LiDar contour mapping of the subject area.

Generally the investigation area was found to be located on relatively flat ground with some minor undulations adjacent watercourses and infrastructure (railway and roads).

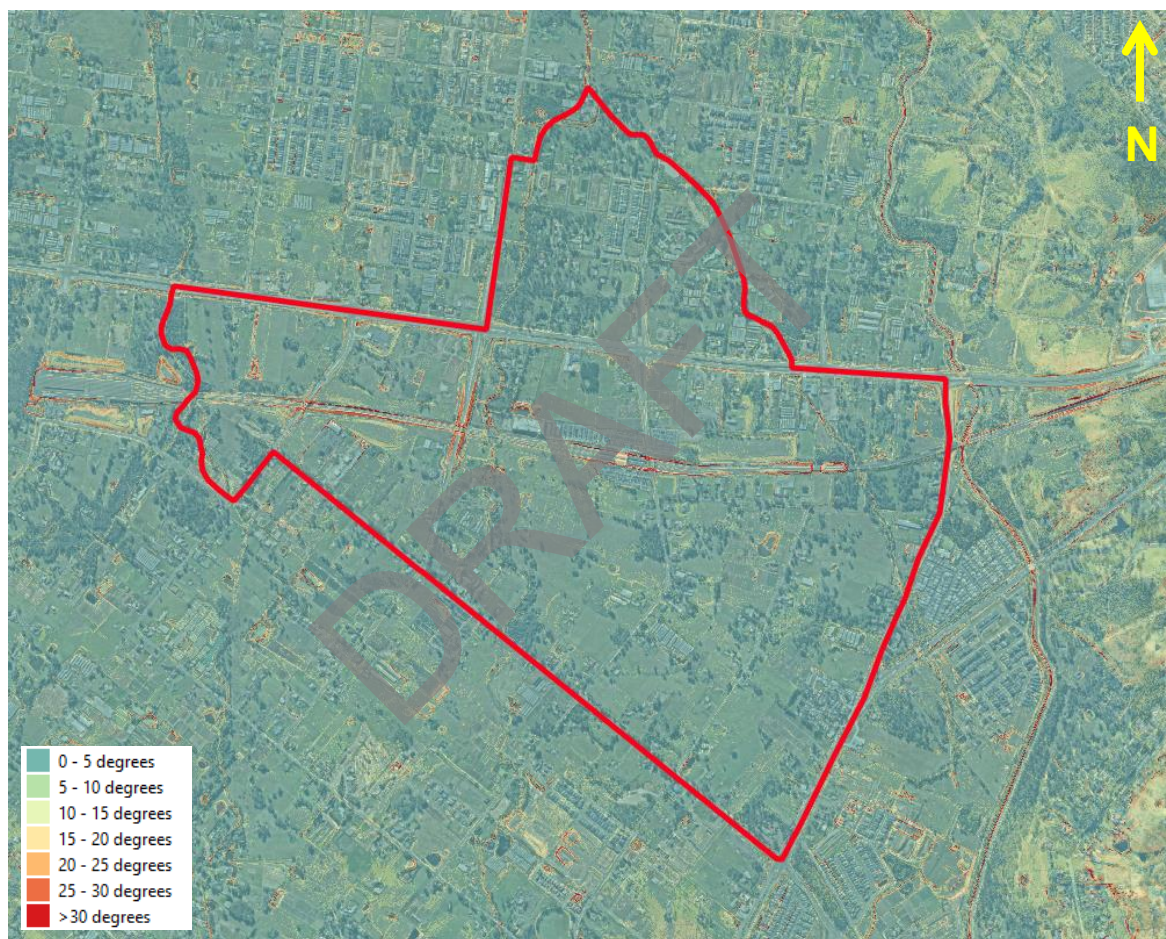


Figure 08: Slope within investigation area (red outline) and surrounding lands

Fire Weather

All development which attracts an Asset Protection Zone under PBP requires the identification of the relevant Fire Danger Index (FDI). The FDI required to be used for development assessment purposes is based on the local government boundaries, being Liverpool and Camden Council's in this instance.

In accordance with the NSW Rural Fire Service publication 'NSW Local Government Areas FDI' (2017) Liverpool and Camden Council's are located within the Greater Sydney Region Fire Weather District which attracts a Fire Danger Index (FDI) of 100 for bushfire planning purposes.

Previous Bushfire History

There are areas within NSW that have significant fire history and are recognised as known fire paths. In a planning context it is important to identify these locations and ensure incompatible development is not proposed.

In this instance there have been no recorded wildfires or hazard reductions within the investigation area or neighbouring properties (source NPWS Fire History dataset).

The closest recorded wildfire was found to be the Yarrunga Road fire (2007) which at its closest point was located approximately >3.7 kilometres to the northeast of the investigation area. It has been observed that much of the area which was impacted by the fire has been developed.

Larger wildfires have been recorded >8.5 kilometres to the northwest and southeast of the investigation area.

The investigation area is therefore not considered to be within a known fire path. Furthermore in consideration of the previous bushfire history the likelihood of a bushfire occurring within the immediate area is considered unlikely.

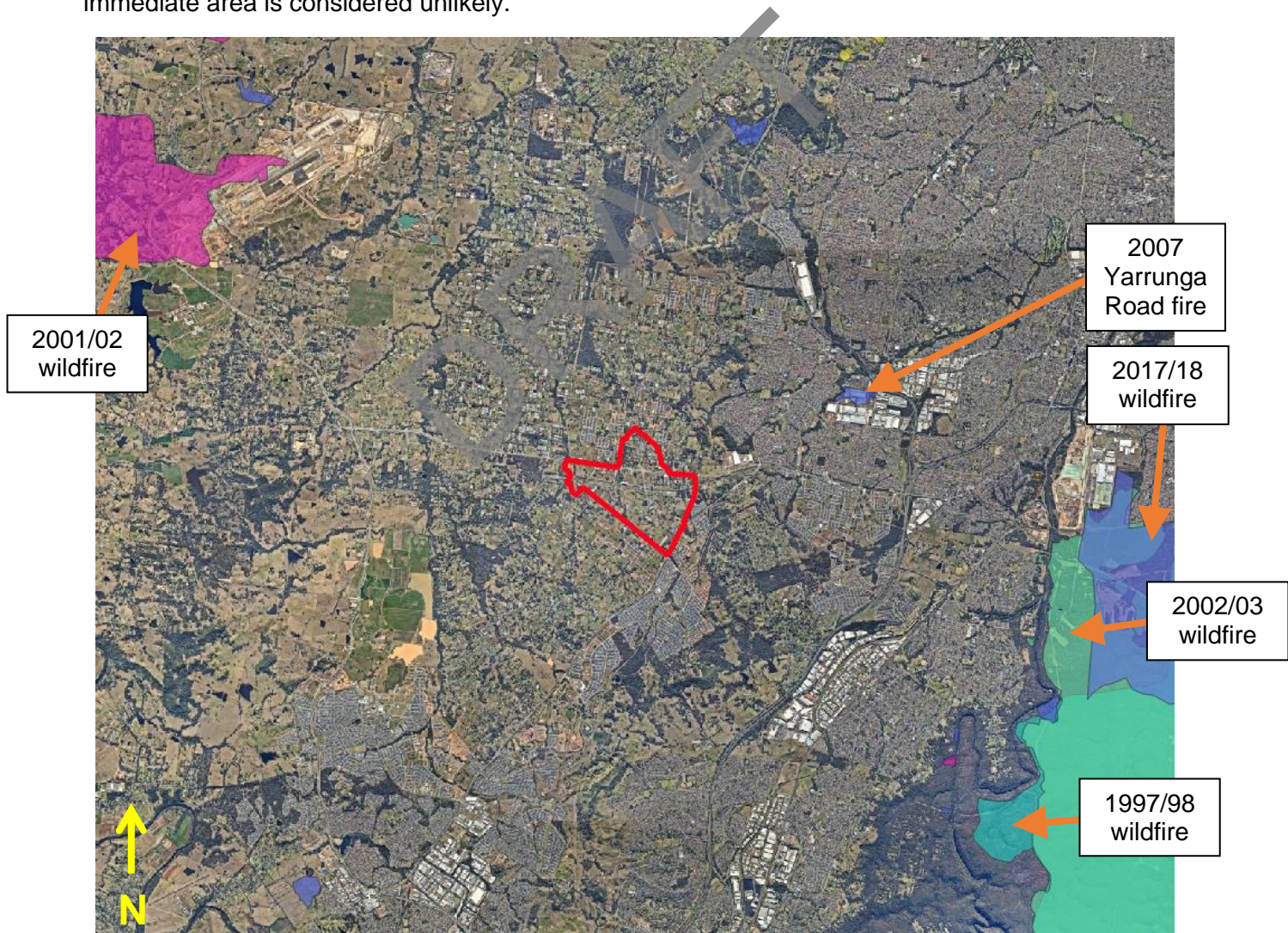


Figure 09: Aerial view of the subject area
Investigation area (red outline)

Potential Fire Behaviour

The most significant bushfire threat to the investigation is currently considered to be from the northwest along Kemps Creek. While this vegetation provides the greatest opportunity for a sustained fire run, it remains fragmented and in areas constricted.

The proposed 'Riparian' areas within the investigation area will present the greatest threat post-delivery of the ILPs. This vegetation will also be fragmented due to the presence of roads, including Bringelly Road, and railway corridor.

In applying the parameters described in this section and the accepted assessment methodology described in PBP bushfire design modelling indicates the following potential outputs:

Bushfire Behaviour	Output
Flame Length	13.15 metres
Rate of Spread	1.69 km/h
Fire Intensity	15,819 kW/m

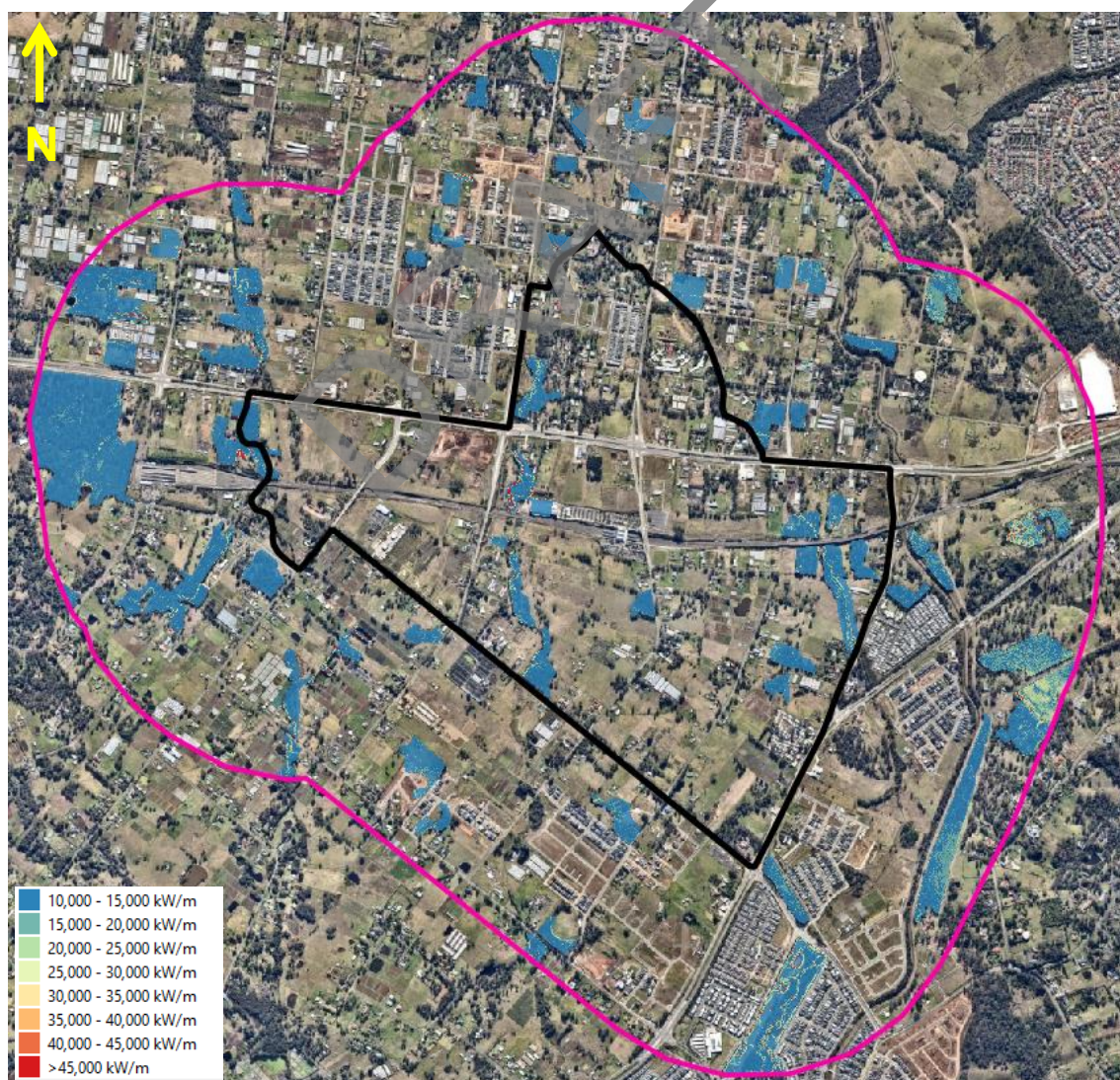


Figure 10: Fire intensity mapping of the existing broader landscape

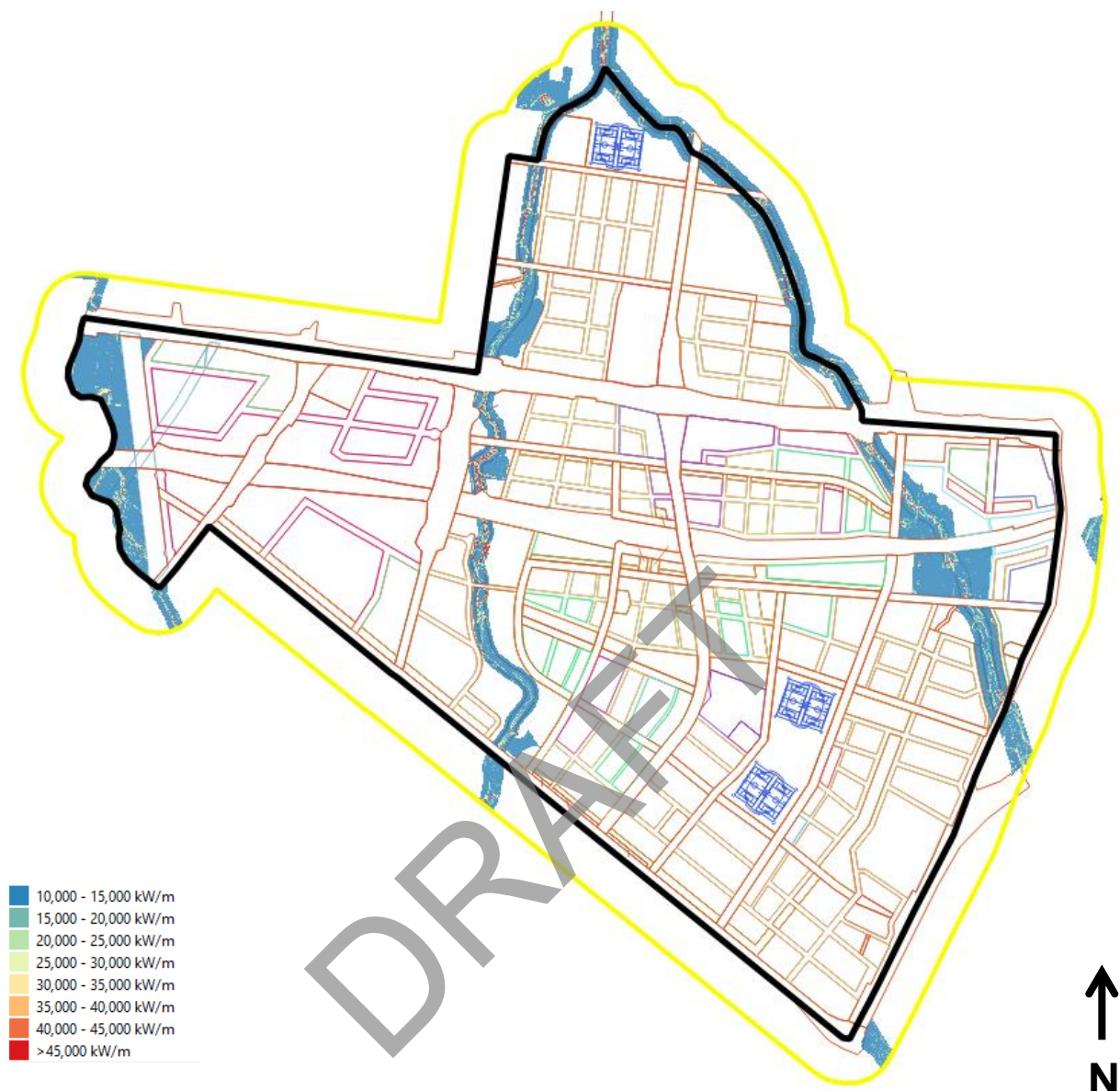


Figure 11: Fire intensity mapping of the investigation area post-delivery of ILP
Investigation area (black outline) and 140 metre buffer (yellow outline)

Access & Suppression

Access for attending fire services to undertake early suppression is a key factor in whether a fire has the opportunity to develop into a quasi-steady state at which point the opportunity to control / extinguish the fire becomes far more challenging.

Where good access is available it provides opportunity to control / extinguish a fire in its growth phase before developing further and consequently becoming more difficult to conduct direct attacks.

In this particular instance comprehensive access will be available to the bushfire hazards via the existing and proposed road network. The access design results in numerous breaks in the vegetation along the 'Riparian' areas providing excellent control lines and opportunity to contain a bushfire.

In consideration of the comprehensive access and its exposure to the public the identification and subsequent early extinguishment of a bushfire within the investigation area is considered likely.

Land Use Assessment

The Land Use Assessment identifies the most appropriate locations in the investigation area for the proposed land uses.

In this instance the proposal provides a mix of land uses including open space, commercial, light industrial, medium and high density residential and mixed use. In a bushfire planning context the various land uses present different risk profiles and as such are assessed differently under Planning for Bush Fire Protection.

Special Fire Protection Purpose (SFPP):

SFPP development is one which is occupied by people who are considered to be at-risk members of the community. In a bushfire event, these occupants may be more susceptible to the impacts of bush fire.

SFPP consequently attract the highest Bushfire Protection Measures commensurate to the risk profile. Most notably SFPP development, attracts large minimum required Asset Protection Zones, which in instances can preclude future development.

Many of the proposed land uses permit with consent, amongst other uses, a listed SFPP development. In this regard a SFPP Asset Protection Zone overlay (attachment 01) has been prepared to depict the minimum required for SFPP development.

While the APZ Overlay identifies some impact to land which permits SFPP development, SFPP development is not the exclusive permitted use for these lands and therefore reclassification is not considered warranted.

SFPP development is defined under section 100B of the *Rural Fires Act 1997* as:

- (a) a school,
- (b) a child care centre,
- (c) a hospital (including a hospital for the mentally ill or mentally disordered),
- (d) a hotel, motel or other tourist accommodation,
- (e) a building wholly or principally used as a home or other establishment for mentally incapacitated persons,
- (f) seniors housing within the meaning of *State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004*,
- (g) a group home within the meaning of *State Environmental Planning Policy No 9—Group Homes*,
- (h) a retirement village,
- (i) any other purpose prescribed by the regulations.

Buildings used for public assembly which have a floor area of greater than 500m² are also treated technically as SFPP development due to the evacuation challenges presented by large numbers of occupants.

Residential:

Residential development (increased density, subdivision, multi-storey buildings etc) presents the next highest risk profile and accordingly also attracts minimum required Asset Protection Zones. In this regard a Residential Asset Protection Zone overlay (attachment 02) has been prepared to depict the minimum required for residential development.

Residential buildings exceeding three storeys in height are considered to be multi-storey and attract added considerations under PBP.

Minor impacts of the APZs on the proposed residential land uses was also observed. The most significant impact being a 3-4 metre incursion to proposed R3: Medium Density Residential land adjacent Bonds Creek (see Figure 12).



Figure 12: Extract from the Residential APZ Overlay showing most significant impact

Commercial and Industrial:

Commercial and Industrial development (excluding SFPP, hazardous industries or that which includes a managers residence) is considered to have the lowest risk profile of a built environment.

The National Construction Code (NCC) does not provide for any bush fire specific performance requirements for Class 5 to 8 structures and as such Australian Standard 3959 'Construction of buildings in bushfire-prone areas' does not apply as a set of 'deemed to satisfy' provisions.

Whilst bushfire is not captured in the NCC for Class 5-8 buildings, the following objectives will be applied in relation to access, water and services, and emergency and evacuation planning under PBP:

- to provide safe access to/from the public road system for firefighters providing property protection during a bush fire and for occupant egress for evacuation;
- to provide adequate services of water for the protection of buildings during and after the passage of bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building;

- to provide suitable emergency and evacuation (and relocation) arrangements for occupants of the development; and
- consideration of storage of hazardous materials away from the hazard wherever possible.

In addition to the above the infill residential development provisions detailed in Chapter 7 of PBP are also applied as the base for a package of measures any future commercial or industrial development. This includes the application of the residential APZs shown in (attachment 02).

All proposed commercial and industrial land uses can achieve compliance with the residential APZs.

Hazardous Industry:

Hazardous industries by their very nature are considered to be hazardous, either due to an increased likelihood to start fires or their susceptibility to bushfire impact. Hazardous industries include but are not limited to:

- power generating works
- sawmills
- junk yards
- liquid fuel depots
- hazardous industries/storage
- chemical industries/storage
- service stations
- ammunition storage/manufacture
- fireworks manufacture/storage.

In a bushfire planning context hazardous industries should be avoided from bushfire prone land. In this regard the attached Bushfire Prone Land Overlay (attachment 03) depicts the extent of bushfire-prone land following the execution of the ILP.

There is a pathway to have hazardous industries considered / approved on bushfire prone land however this would involve extensive consultation with the NSW Rural Fire Service and the preparation of a detailed performance-based solution / Bushfire Design Brief.

Land Use:

The proposed Indicative Layout Plan locates the community centre, health hub and education district (including existing school) centrally within the precinct and away from the bushfire hazards.

The riparian areas, which present the bushfire threat, are generally framed by managed open space and roads. These managed areas and roads provide a defensible space for fire services and maximise the land use when applying the Asset Protection Zones.

In consideration of the landscape study and risk profiles we are of the opinion the proposed land uses are appropriate.

Access and Egress

It is important to assess the capacity of both the existing and proposed road networks both within and external to the investigation area to deal with evacuating residents and responding emergency services.

In this instance the proposed 'Riparian' areas will present the greatest threat post-delivery of the ILPs. These corridor will be fragmented due to the presence of various infrastructure and development and subsequently will not support broad scale fire events.

There must be sufficient time for residents / occupants to safely evacuate and reasonable threat posed for emergency services to order / encourage the evacuation of an area.

In consideration of the characteristics of the bushfire threat, inclusive of size and rate of spread and the fact future development will comply with current bushfire planning controls, inclusive of construction standards, it is considered unlikely emergency services would order / encourage the evacuation of the investigation area.

It is acknowledged that future residents may choose to evacuate / relocate from the area based on their own individual risk assessment.

The draft ILP provides numerous evacuation routes and ample opportunity to relocate from the area.

Comprehensive access will be available to the bushfire hazards for attending fire services via the existing and proposed road network. The access design results in numerous breaks in the vegetation along the 'Riparian' areas providing excellent control lines and opportunity to contain a bushfire.

Importantly, it must be acknowledged that the proposed draft ILP provides an improved access outcome compared to the current Leppington Major Centre ILP, with a removal of many dead-end roads and inclusion of more through roads and increased interface access to the 'Riparian' areas.

The access and egress routes are considered acceptable.



Figure 12: Extract of the current Leppington Major Centre road hierarchy

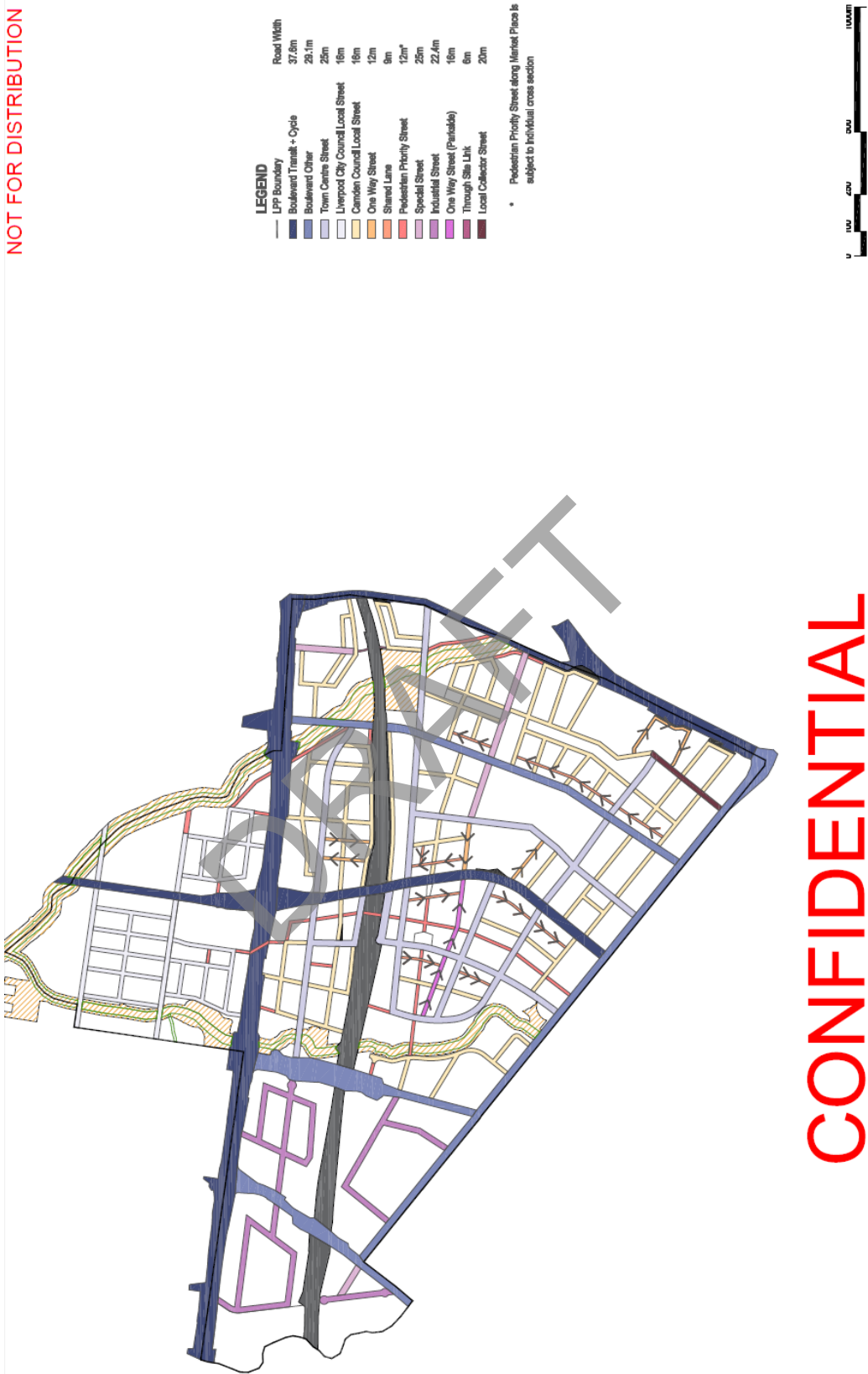


Figure 13: Extract of the proposed Road Typology Map

CONFIDENTIAL

Emergency Services

In some circumstances the scale of a planning proposal warrants a need to include provisions for a new fire station.

The investigation area is located within a NSW Rural Fire Service area, with a station (Leppington Rural Fire Brigade) located along Ingleburn Road within the investigation area.

The Austral Rural Fire Brigade station is also located less than a kilometre to the north of the investigation area, along Ninth Avenue.

The NSW Rural Fire Service are also supported by NSW Fire & Rescue which have station less than 1.7 kilometres to the east at Horningsea Park.

In consideration of the threat posed to the investigation area the existing fire service coverage is considered acceptable.

Infrastructure

An assessment of the issues associated with infrastructure and utilities must be undertaken. This assessment is to include the ability of the reticulated water system to deal with a major bushfire event in terms of pressures, flows and spacing of hydrants.

There are hydrants available along the existing public roads within the investigation area. The capabilities of the broader hydrant network is the responsibility of Sydney Water.

The sizing, spacing and pressures of any future hydrant system must comply with AS2419.1-2005.

The investigation area contains high voltage electrical transmission lines in the western portion. These lines will not be altered or redirected as part of this proposal.

5.03 Planning for Bush Fire Protection

As the strategic issues have been satisfactorily addressed in the SBFS, an assessment of compliance with PBP is required. This section addresses the future developments capacity to comply with the relevant specifications and requirements of PBP.

The application of PBP requires satisfactory demonstration of the aim and objectives and the specific objectives and bushfire protection measures relevant to the type of development. The bushfire protection measures detailed in Chapter 5-8 of PBP have been considered for the future Residential, Special Fire Protection Purpose and Commercial / Industrial development.

The following table details the aim and objectives of *Planning for Bush Fire Protection 2019* and the proposals ability to comply.

Aim / Objective	Comment
<p><i>The aim of PBP is to provide for the protection of human life and minimise impacts on property from the threat of bush fire, while having due regard to development potential, site characteristics and protection of the environment.</i></p>	<p>With the inclusion of the recommendations made herein it is of our opinion that the aim of PBP has been satisfied.</p>
<p><i>(i) afford buildings and their occupants protection from exposure to a bush fire;</i></p>	<p>The proposed land uses can support the minimum required Asset Protection Zones for residential and SFPP development.</p> <p>In conjunction with the application of the relevant Bushfire Attack Level under Australian Standard 3959 'Construction of buildings in bushfire-prone areas' future buildings and their occupants will be afforded protection from exposure to a bushfire.</p>
<p><i>(ii) provide for a defensible space to be located around buildings;</i></p>	<p>The riparian areas, which present the bushfire threat, are generally framed by managed open space and roads. These managed areas and roads provide a defensible space for fire services and logical fire-fighting platforms.</p>
<p><i>(iii) provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings;</i></p>	<p>The application of the minimum required APZs in conjunction with the relevant Bushfire Attack Level for the future buildings will prevent the likely fire spread to buildings.</p>

Aim / Objective	Comment
<i>(iv) ensure that appropriate operational access and egress for emergency service personnel and occupants is available;</i>	<p>The investigation area has several and will provide additional connection points to the broader road network.</p> <p>Comprehensive access will be available to the bushfire hazards for attending fire services via the existing and proposed road network. The access design results in numerous breaks in the vegetation along the 'Riparian' areas providing excellent control lines and opportunity to contain a bushfire.</p> <p>Importantly, it must be acknowledged that the proposed draft ILP provides an improved access outcome compared to the current Leppington Major Centre ILP, with a removal of many dead-end roads and inclusion of more through roads and increased interface access to the 'Riparian' areas.</p> <p>It should also be noted that following the delivery of the Indicative Layout Plan much of the precinct will not be considered 'bushfire prone'.</p>
<i>(v) provide for ongoing management and maintenance of bush fire protection measures, (BPMs); and</i>	<p>The open space land created as part of this proposal will be subject to a management plan of the respective Council.</p> <p>The specific bush fire protection measures of the future developments will be addressed within the submission documents of those developments.</p>
<i>(vi) ensure that utility services are adequate to meet the needs of firefighters.</i>	<p>There are hydrants available along the existing public roads within the investigation area. The capabilities of the broader hydrant network is the responsibility of Sydney Water.</p> <p>The sizing, spacing and pressures of any future hydrant system must comply with AS2419.1-2005.</p> <p>These hydrants are considered to be the logical water supply for fire services undertaking hazard reduction and / or fire suppression activities.</p>

It is therefore of our opinion that the proposal can satisfactorily comply with the aim and objectives of *Planning for Bush Fire Protection 2019*.

Asset Protection Zones

Asset Protection Zones (APZs) for Special Fire Protection Purpose (SFPP) developments are determined from Table A1.12.1 of Planning for Bush Fire Protection 2019 (PBP) or bushfire design modelling achieving a radiant heat impact of no more than 10 kW/m² at a building footprint.

The minimum required Asset Protection Zones for the future SFPP development were determined from Table A1.12.1 of PBP and are depicted on the attached SFPP APZ Overlay (attachment 01).

APZs for residential subdivision and increased density are determined from Table A1.12.2 of Planning for Bush Fire Protection 2019 (PBP) or bushfire design modelling achieving a radiant heat impact of no more than 29 kW/m² at a building footprint.

The minimum required Asset Protection Zones for the future residential development were determined from Table A1.12.2 of PBP and are depicted on the attached Residential APZ Overlay (attachment 02).

The available APZs consist of the land entirely within the investigation area (including roads and active open space).

The draft ILP has the capacity to comply with the minimum required Asset Protection Zones as detailed in PBP.

Fire Fighting Water Supply

There are hydrants available along the existing public roads within the investigation area.

The sizing, spacing and pressures of any future hydrant system must comply with AS2419.1-2005.

The draft ILP has the capacity to comply with the Water Supply requirements as detailed in PBP.

Access

Planning for Bush Fire Protection addresses design considerations for internal roads (public roads) for properties determined to be bushfire prone. In a bush fire prone area, the purpose of the road system is to:

- provide firefighters with access to structures, allowing more efficient use of firefighting resources;
- provide evacuation routes for firefighters and the public; and
- provide access to areas of bush fire hazard for firefighting and hazard mitigation purposes.

The draft ILP includes perimeter access adjacent the riparian corridors and utilises through roads throughout the design, satisfying the preferred design option. The design includes numerous evacuation routes for fire-fighters and the public.

The access design also results in numerous breaks in the vegetation along the riparian corridors providing excellent control lines and opportunity to contain a bushfire.

Chapters 5-8 of PBP detail performance criteria and acceptable solutions for access arrangements, relevant to the development type.

We have reviewed the cross sections for each of the road types and found that all but the 'One way street' and 'One way street adjacent to park' satisfy the minimum carriageway for Non-Perimeter Roads.

As shown on Figure 14 all one-way roads will not be located on bushfire prone land post-delivery of the ILP nor will they be relied upon by emergency services seeking to access the bushfire hazards. The carriageway of the 'One way street' and 'One way street adjacent to park' are therefore considered acceptable.

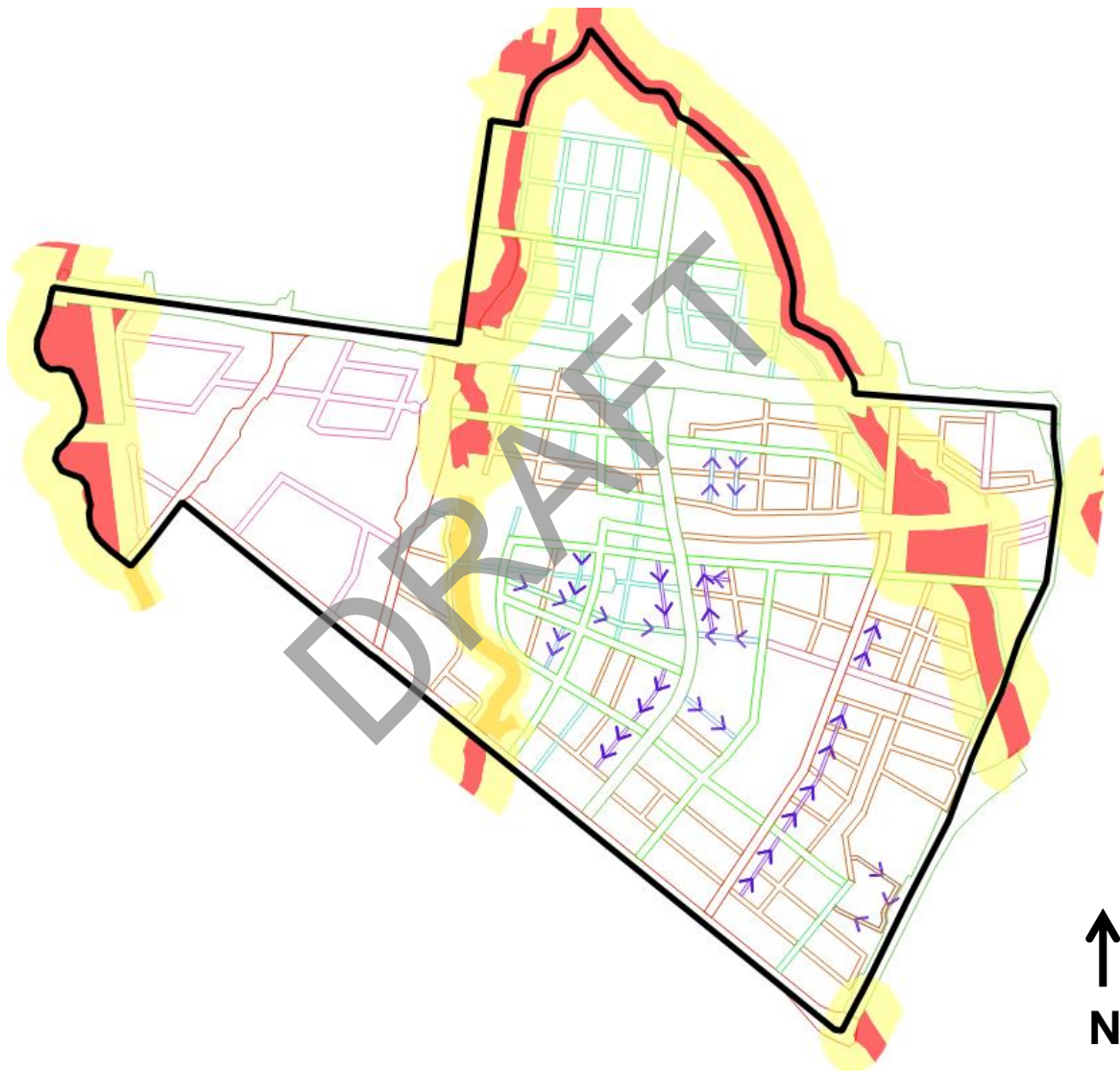


Figure 14: Bushfire prone land post-delivery of ILP overlay with road system, including one-way roads (blue arrows)

The roads adjacent the riparian corridors are primary 'Local Streets' which currently provide a 5.6 metre carriageway within designated parking outside this carriageway. Roads adjacent to the riparian corridors will be considered Perimeter Roads and to satisfy the acceptable solutions of PBP must provide a minimum carriageway of 8 metres.

Where possible the carriageway of Local Streets adjacent to the riparian corridors should be increased to 8 metres.

Alternatively other access options should be considered to provide interface access for attending fire services. These alternate options could include service/ fire trails within the adjacent managed open space. These trails could also be utilised as pedestrian / cycle links.

We are satisfied that the proposed road system has the capacity to comply with the requirements for Access under PBP.

DRAFT

6.0 Conclusion

Building Code and Bushfire Hazard Solution P/L has been commissioned by Camden Council to prepare an independent Bushfire Assessment Report for a Planning Proposal for the Leppington Town Centre.

The Leppington Town Centre investigation area is partly within Camden Local Government Area and partly within Liverpool Local Government Area.

The investigation area is depicted on Liverpool and Camden Council's Bushfire Prone Land Map as containing Category 1, 2 and 3 Vegetation and their associated buffer zones and is therefore considered 'bushfire prone'.

We are satisfied that the investigation area and draft Indicative Layout Plan has the capacity to comply with the relevant specifications and requirements of Planning for Bush Fire Protection 2019.

Furthermore we are satisfied that the draft Indicative Layout Plan, in combination with the bushfire protection measures discussed herein will not result in areas that are difficult to evacuate, create control difficulties during a bushfire or adversely affect other bush fire protection strategies or place existing development at increased risk.

We are therefore in support of the Planning Proposal.

Should you have any enquiries regarding this project please contact me at our office.

Prepared by
Building Code & Bushfire Hazard Solutions P/L



Stuart McMonnies

Manager Bushfire Section
G. D. Design in Bushfire Prone Areas.
Certificate IV Fire Technology
Fire Protection Association of Australia BPAD – L3 Accredited Practitioner
Certification number – BPAD9400



7.0 Annexure 01

List of Referenced Documents

Camden Council (2021). Draft Indicative Layout Plan (amendment no. 15, dated 14.01.2021).

Camden Council (2021). Road Typology Map (amendment no. 15, dated 14.01.2021).

Camden Council (undated). Road Cross Sections

ELVIS -Elevation -Foundation Spatial Data. Elevation.fsdf.org.au. Available at: <http://elevation.fsdf.org.au/>

Environmental Planning and Assessment Act 1979

NSW Department of Planning and Environment (2016). Camden Council Growth Centre Precincts Development Control Plan

NSW Department of Planning and Environment (2019). Liverpool Council Growth Centre Precincts Development Control Plan

NSW Department of Planning and Environment (2019). *Planning Portal*. Accessed at: <https://www.planningportal.nsw.gov.au/>

NSW Rural Fire Service (2019). *Planning for Bushfire Protection. A Guide for Councils, Planners, Fire Authorities and Developers*.

Rural Fires Act 1997

Rural Fires Regulations 2013

Rural Fire Service NSW (2005). *Standards for Asset Protection Zones*

Rural Fire Service (2019). *Comprehensive Vegetation Fuel Loads*

Rural Fire Service (2017). *NSW Local Government Areas FDI*

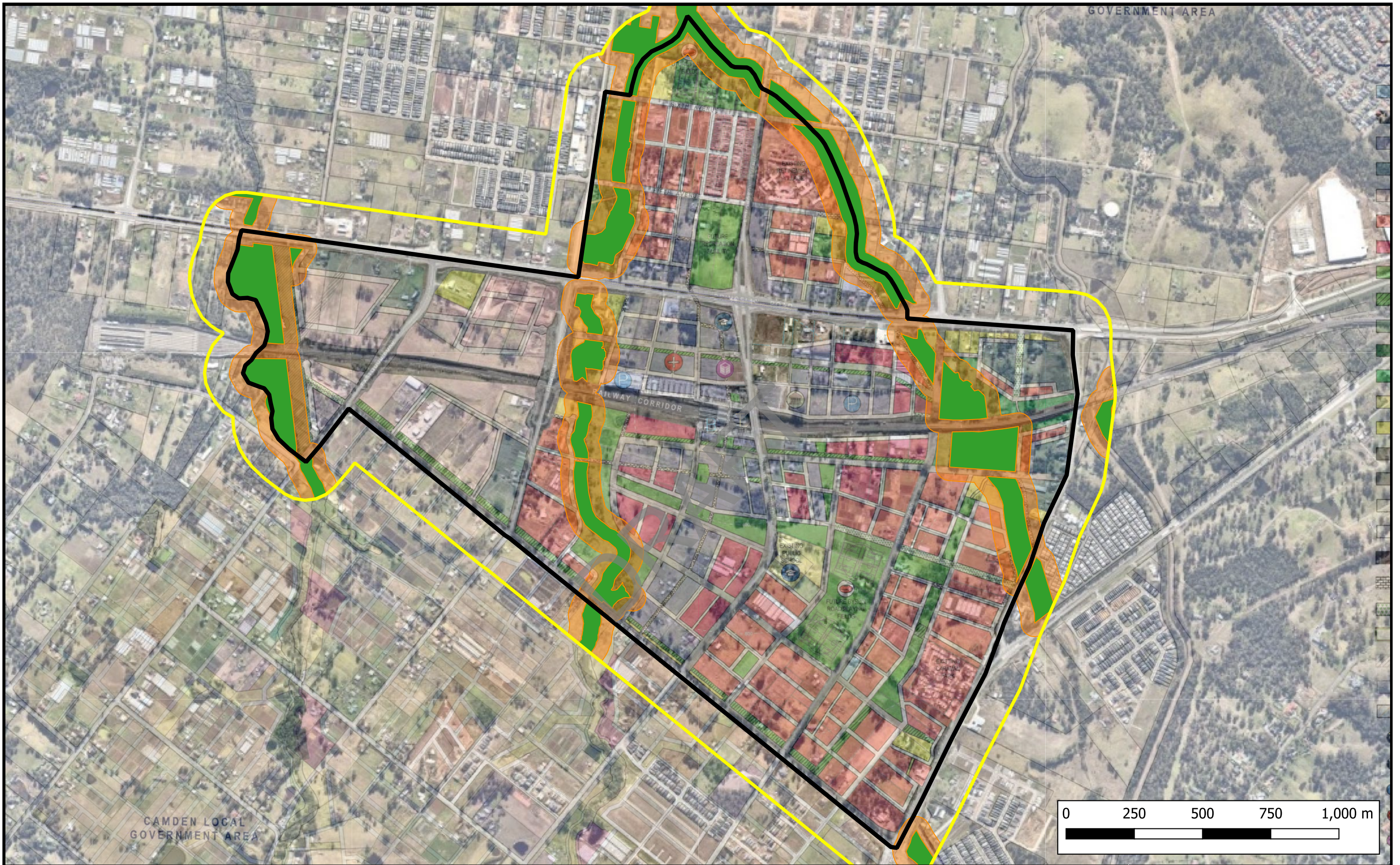
Standards Australia (2018). *AS3959 Construction of buildings in bushfire-prone areas*.

Acknowledgements to:

Geoscience Australia
Nearmap
Camden Council (vegetation mapping)
Liverpool City Council (vegetation mapping)

Attachments

Attachment 01:	Special Fire Protection Fire Asset Protection Zone Overlay
Attachment 02:	Residential Asset Protection Zone Overlay
Attachment 03:	Bushfire Prone Land Overlay



Building Code & Bushfire Hazard Solutions

(Pty. Limited) ABN 19 057 337 774
PO Box 124, Berowra NSW 2081
Telephone: (02) 9457 6530
www.bushfirehazardsolutions.com.au

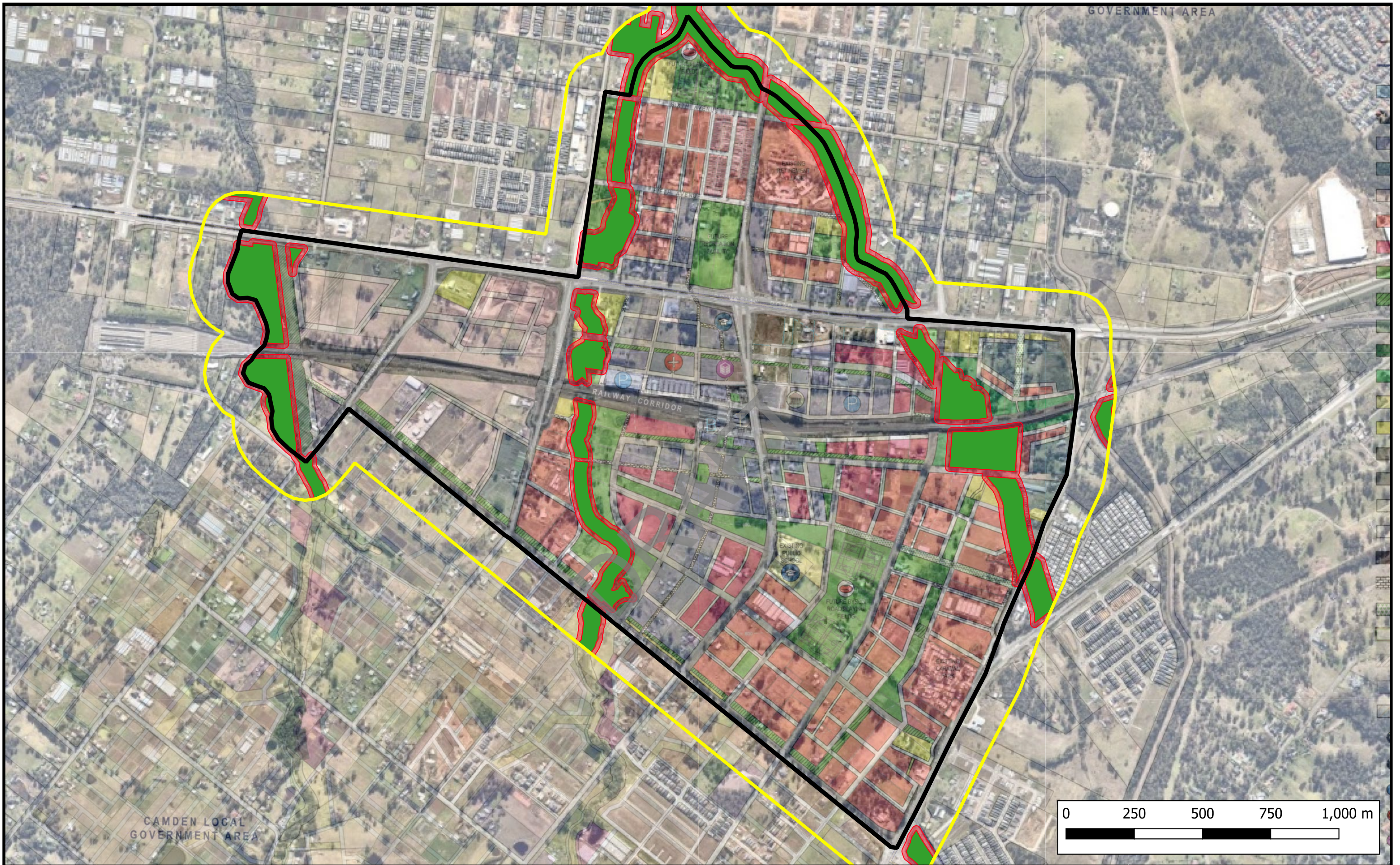


Legend

- 10 kW APZ
- Bushfire Hazard
- Investigation Area
- 140 metre Assessment Area

Special Fire Protection Purpose APZ Overlay

BCBHS Ref: 211490
Drawn by: AM
Dated: 02/08/2021
Issue: 1
Client: Camden City Council
Address: Leppington Town Centre



**Building Code &
Bushfire Hazard Solutions**

(Pty. Limited) ABN 19 057 337 774
PO Box 124, Berowra NSW 2081
Telephone: (02) 9457 6530
www.bushfirehazardsolutions.com.au

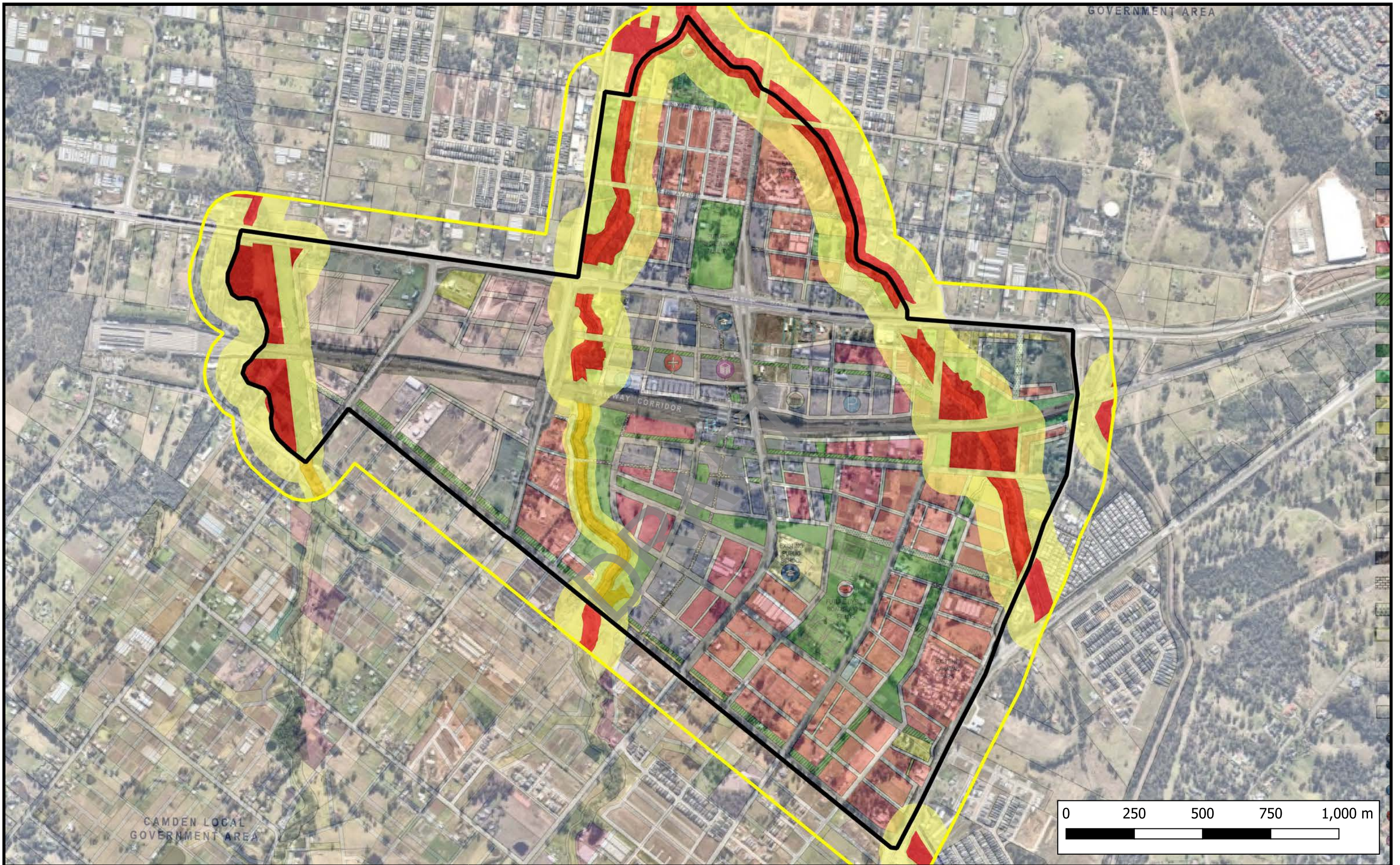


Legend

-  29 kW APZ
-  140 metre Assessment Area
-  Bushfire Hazard
-  Investigation Area

**Residential
APZ Overlay**

BCBHS Ref: 211490
Drawn by: AM
Dated: 02/08/2021
Issue: 1
Client: Camden City Council
Address: Leppington Town Centre



**Building Code &
Bushfire Hazard Solutions**

(Pty. Limited) ABN 19 057 337 774
PO Box 124, Berowra NSW 2081
Telephone: (02) 9457 6530
www.bushfirehazardsolutions.com.au



Legend

- Bushfire Prone Land Map
- Category 1 Vegetation
- Category 2 Vegetation
- Vegetation Buffer Zone
- 140 metre Assessment Area
- Investigation Area

**Bushfire Prone
Land Map**

BCBHS Ref: 211490
Drawn by: AM
Dated: 02/08/2021
Issue: 1
Client: Camden City Council
Address: Leppington Town Centre