

# Riverstone East Precinct (Stage 3)

Bushfire Assessment

Department of Planning and Environment

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# 1 Glossary

Abbreviation	Definition
ABCB	Australian Building Codes Board
APZ	Asset Protection Zones
AS	Australian Standard
BAL	Bushfire Attack Level
BCA	Building Code of Australia
BCC	Blacktown City Council
BFEMEP	Bushfire Emergency Management and Evacuation Plan
BFPL	Bush Fire Prone Land
BFSA	Bush Fire Safety Authority
DA	Development Application
DCP	Development Control Plan
EP&A Act	NSW Environmental Planning and Assessment Act 1979
FFDI	Forest Fire Danger Index
ILP	Indicative Layout Plan
K	Kelvin – measure of flame temperature
kW/m <sup>2</sup>	Kilowatts per metre squared
LGA	Local Government Area
NASH	National Association of Steel-framed Housing
NCC	National Construction Code
NSW	New South Wales
NWGA	North West Growth Area
PBP	Planning for Bush Fire Protection
PCT	Plant Community Type
RFS	Rural Fire Service
RHRP	Rouse Hill Regional Park
SEPP	State Environmental Planning Policy
SFPP	Special Fire Protection Purpose

# 1

## Executive Summary



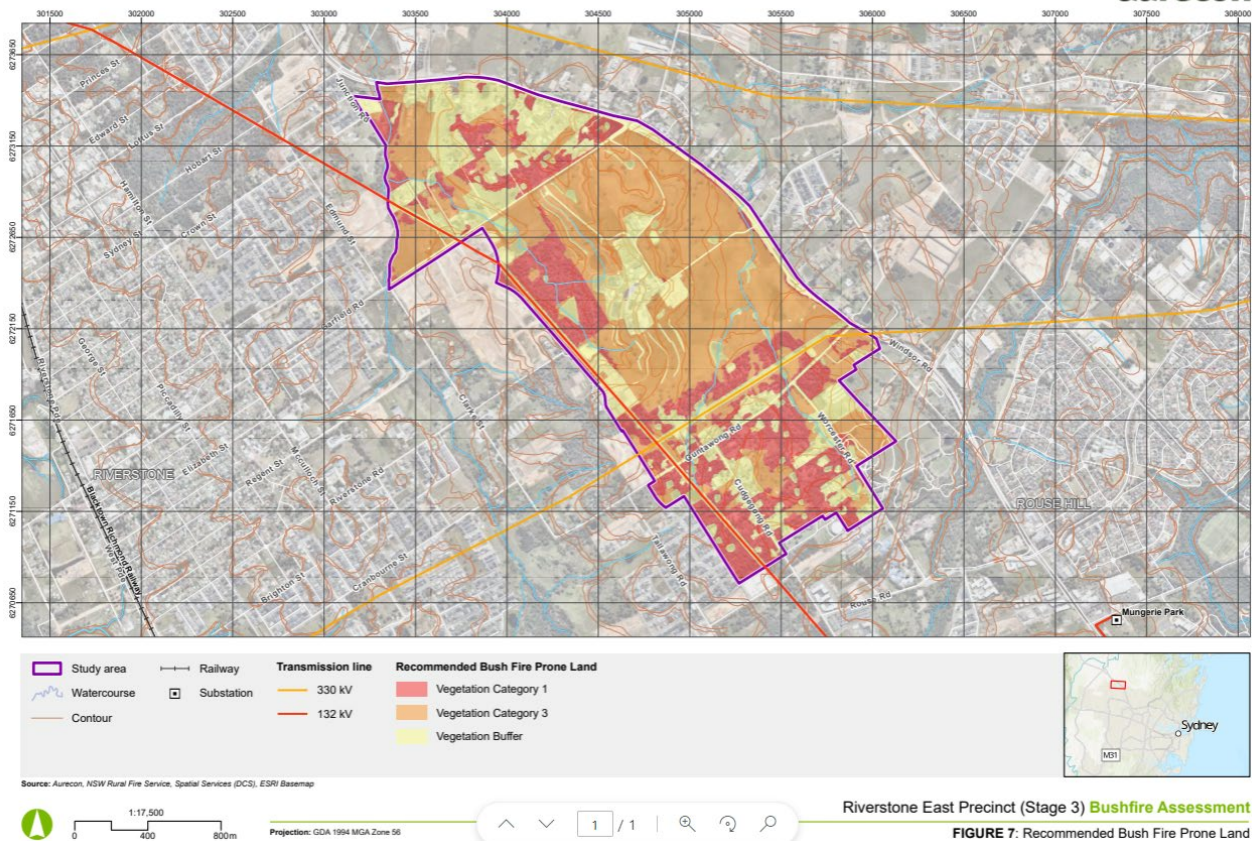
## 2 Executive Summary

### Overview

- i. The Department of Planning and Environment (the Department) is progressing investigations into the potential rezoning of the remaining portion of the Riverstone East Precinct (the Precinct) of the North West Growth Area (NWGA), nominally identified as Stage 3, in collaboration with Blacktown City Council (BCC).
- ii. Aurecon have been engaged to prepare a Bushfire Assessment (this Assessment) to inform the development of the Indicative Layout Plan (ILP) for the Precinct.

### Key findings

- iii. Aerial imagery and NSW Plant Community Type (PCT) mapping shows a range of vegetation communities present across the Precinct, more extensive than the Bush Fire Prone Land (BFPL) currently mapped. Parts of the vegetation present may be removed as part of the redevelopment of the Precinct, however developing an updated BFPL map based on current vegetation extent is important for informing the future urban development planned for the Precinct.
- iv. Development Applications for development on BFPL must include a bush fire assessment report. This report must demonstrate that the proposal satisfies the requirements of PBP (NSW RFS, 2019). All applications must meet the Aim and Objectives of PBP (NSW RFS, 2019).
- v. The draft Stage 3 Riverstone East ILP includes development of areas and removal of vegetation currently mapped as BFPL. However, it also includes a range of nature positive opportunities which will provide for environmental, recreational, and aesthetic benefits. This includes the revegetation of the riparian corridors, retention of a proportion of existing vegetation areas and potential expansion of Rouse Hill Regional Park (RHRP). The retention of vegetated areas within the draft ILP will trigger the provisions of PBP (NSW RFS, 2019) to be applied to all future development adjoining and within BFPL.
- vi. The NSW RFS Guide for Bush Fire Prone Land Mapping (Version 5) (NSW RFS, 2015) provides the state-wide methodology and detail for mapping BFPL as required under section 10.3 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The recommended BFPL mapping has been prepared in accordance with these requirements. **(Figure E1)**
- vii. A site investigation was completed to verify bushfire risk factors (i.e. unmanaged vegetation with the potential to re-establish and slope characteristics) and validate areas which potentially may be BFPL. It was determined that 94.58ha of the Precinct is BFPL Vegetation Category 1 (generally areas of forest and woodlands), 63ha is BFPL Vegetation Category 3 (unmanaged grassland) and 119.66ha BFPL buffer. Urban development in areas mapped as BFPL or within the BFPL buffer is required to comply with Planning for Bush Fire Protection (PBP) (NSW Rural Fire Service (NSW RFS) 2019).
- viii. Indicative Asset Protection Zone (APZ) mapping, based on the updated BFPL mapping and draft ILP, was also prepared to assist in lot layout and design.



Riverstone East Precinct (Stage 3) Bushfire Assessment  
 FIGURE 7: Recommended Bush Fire Prone Land

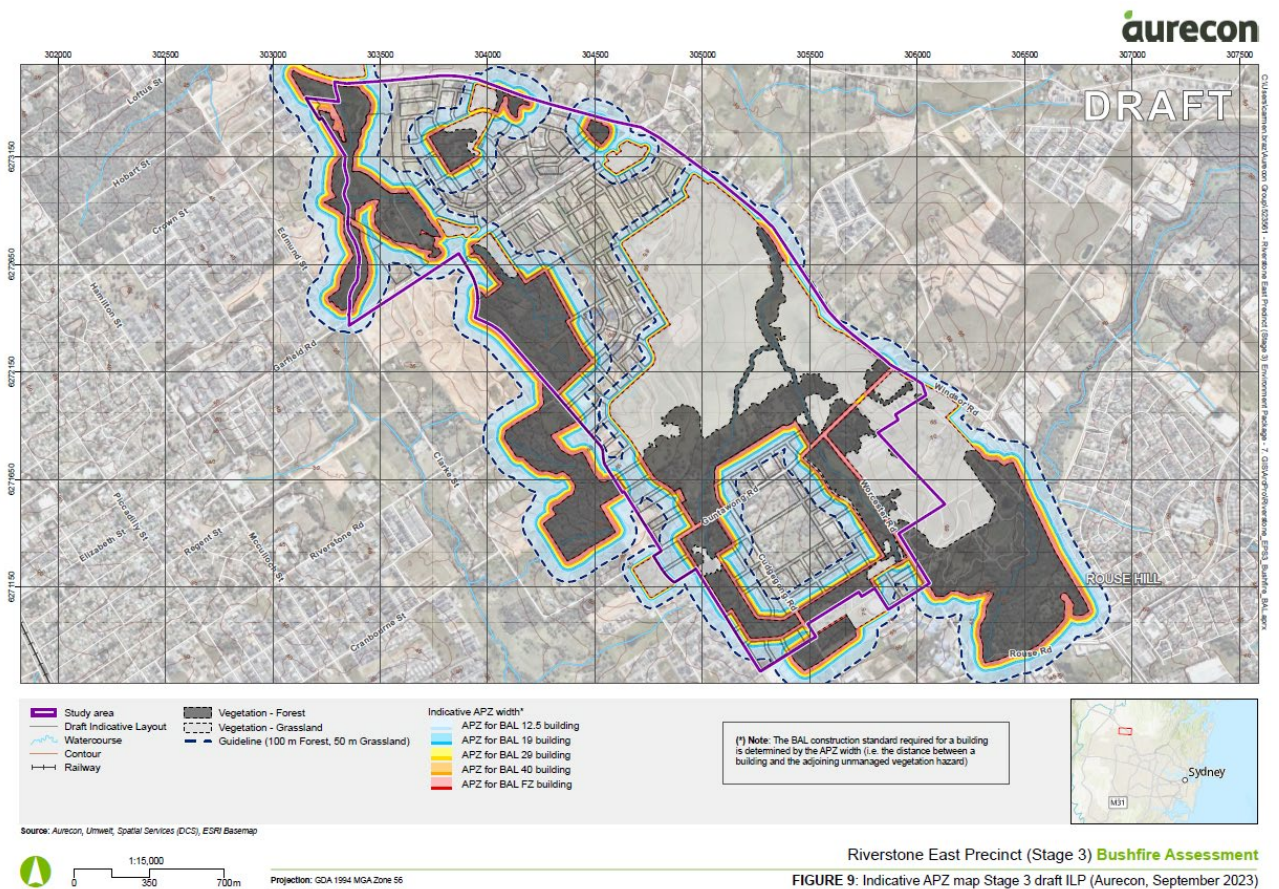
Figure E1 – Recommended Bushfire Prone Land Mapping (Aurecon, September 2023)

- ix. The PBP (NSW RFS, 2019) provides the basis for development on BFPL in NSW to enable new buildings and occupants’ protection from bushfire risks, provide for a defensible managed space around structures, offer enhanced mitigation measures for special fire protection purpose developments (such as short-stay accommodation, childcare and schools), opportunities for emergency access and egress, and reduce the risk in the provision of services. It is confirmed that:
  - All schools and community centres within the Precinct are located approximately within 100 metres of areas to be left as unmanaged vegetation as seen in the draft ILP, which would be categorised as BFPL. Appropriate mitigation measures will apply in accordance with the PBP (2019) at the Development Application stage.
  - The balance of urban development proposed as part of the draft ILP pertaining to the Precinct is able to meet the aims and objectives of PBP and is considered acceptable.
- x. The BAL Assessment Map (Figure E2) was prepared in accordance with AS3959:2018 using CSIRO’s Spark BAL mapping tool and is shown in Figure 9 Indicative APZ map for Riverstone East Stage 3 draft ILP. It shows that:
  - The potential school in the south (south of Guntawong Road) would sit comfortably outside of any BAL zones.
  - Parts of the potential school in the northern part of the Precinct and both community centres would be positioned within the BAL-FZ and BAL-40. As all three of these buildings would be is imperative that they reside in no higher than a BAL-12.5. This elevated BAL rating is a consequence of the proposed retention of existing native vegetation (noting this is located on Certified land and can be readily removed). An option to reduce the BAL rating is to maintain these areas adjoining SFPPs as managed land through maintaining the tree cover but maintaining mostly lawns as groundcover.
  - Majority of the planned residential development would reside in BAL-29 and lower areas, yet there are small margins along the perimeters of many of the residential zones that appear to be positioned in BAL-40. Consequently, these margins would need to be brought down to BAL-29 or below areas to satisfy provisions of the National Construction Code. This could be



achieved by managing lawns under canopy vegetation that is elevating the BAL level, or setting back buildings further so that they fall within BAL-29. Roads, carparks, footpaths and other non-NCC building types can be located in BAL-FZ or BAL-40.

- Areas which are potentially most constrained include the residential development at the southern end of the Precinct adjoining land reserved for Open Space. As noted above the option here exists to retain the tree canopy and partially manage vegetation adjoining these lots. This could be as tree covered parklands and managed areas, such lawns, walking tracks and cycleways, to extend the managed footprint under the canopy. Managing part of the Open Space closest to these lots would reduce the BAL40 and BAL-FZ levels which may apply to adjoining building footprints on affected lots.
- For the majority of lots within the Precinct it appears BAL-FZ and BAL-40 only extends across the roadway and associated footpath and may only partially fall within the street setback of some affected lots.



Riverstone East Precinct (Stage 3) Bushfire Assessment  
 FIGURE 9: Indicative APZ map Stage 3 draft ILP (Aurecon, September 2023)

Figure E2 – Indicative APZ Map (Aurecon, August 2023)

## Key Recommendations

### Strategic Planning

- APZs should not be permitted within areas of vegetation that are planned to be retained or regenerated for biodiversity and riparian protection, and consequently, APZs should also be established within the allotment being developed, and not on adjoining lots. APZs can include perimeter roads.
- All access roads should be designed and constructed in accordance with the PBP (NSW RFS, 2019), including providing a perimeter road between development and retained vegetation to provide a fuel free area adjacent to the hazard, with primary and secondary access to each development area, and designed and maintained to allow safe access and egress for emergency services vehicles and evacuating personnel.

- iii. The recommended BFPL map should be reviewed and endorsed by the Commissioner of the RFS in accordance with Section 10.3 of the *Environmental Planning and Assessment Act 1979*.
- iv. The BFPL mapping recommended in this Bushfire Assessment reflects the current site circumstances and it is recommended that this mapping be reviewed and updated once the Precinct has been developed.

### Future Development and Subdivision

- i. Most urban development in areas mapped as BFPL or within the BFPL buffer is required to comply with Planning for Bush Fire Protection (PBP) (NSW Rural Fire Service (NSW RFS) 2019). In developing a lot or multiple lots, the current BFPL and associated risks must be considered. This includes the provision of asset protection zones (APZs), bushfire construction standards for the buildings, access and the provisions of services. This will be regulated through the current provisions in the Blacktown City Council Growth Centre Precincts Development Control Plan 2010 (Growth Centres DCP, amended March 2022).
- ii. The Growth Centres DCP includes controls relating to Bushfire hazard management for urban development (at the Development Application stage). The existing and current controls of the DCP are adequate for transferral of bushfire planning provisions pertaining to future development of the Riverstone East (Stage 3) Precinct.
- iii. As most of the Precinct is classified in the recommended mapping as either BFPL or BFPL buffer, future development of the Precinct will be located in areas containing BFPL where PBP (NSW 2019) applies. Each stage of development therefore must include:
  - a. suitable APZs
  - b. building construction to a compliant BAL
  - c. provision of emergency accesses and egress (including perimeter roads to separate vegetation hazards from development), and
  - d. provision of services (including water supply).
- iv. With respect to the above, carrying out of some development (other than those prescribed under section 4.14 of the EP&A Act) on BFPL must include a bush fire assessment report which demonstrate that the proposal satisfies the requirements of PBP (NSW RFS, 2019). All applications must meet the aims, objectives and provisions of PBP (NSW RFS, 2019).
- v. Future proposed staging of development does not remove the requirements which apply in relation to BFPL that is currently present at the time that each development is proposed. In accordance with the Growth Centres DCP, temporary APZs will be required where development is proposed on allotments next to undeveloped land that presents a bushfire hazard. Once the adjacent stage of development is undertaken, the temporary APZ will no longer be required and shall cease. This should be implemented through a Section 88B Instrument pertaining to relevant land to which BFPL mapping applies.
- vi. Performance criteria and acceptable solutions for utilities (water supply, electricity, and gas) are to be maintained in accordance with PBP requirements (NSW RFS, 2019) in the development of the Riverstone East Stage 3 Precinct.

# 3 Introduction

## 3.1 Site context

The Department is progressing investigations into the potential rezoning of the remaining portion of the Riverstone East Precinct of the NWGA, nominally identified as Stage 3, in collaboration with BCC.

The Precinct, located within Blacktown local government area (Figure 1), is generally bound by Windsor Road to the northeast, lands designated for RHRP in the east including the developing lands within the Tallawong Station Precinct to the south, the developing Riverstone East Stage 1 and 2 lands to the west, and First Ponds Creek in the northwest. Planning for the Precinct includes Lots 1 and 2 DP 218794 Junction Road to the north-western corner and sites owned by Burns Pet Food and A J Bush and Sons. Riverstone is surrounded by NWGA precincts in the Blacktown, Hills Shire and Hawkesbury local government areas. The Precinct covers approximately 174 hectares (excluding RHRP).

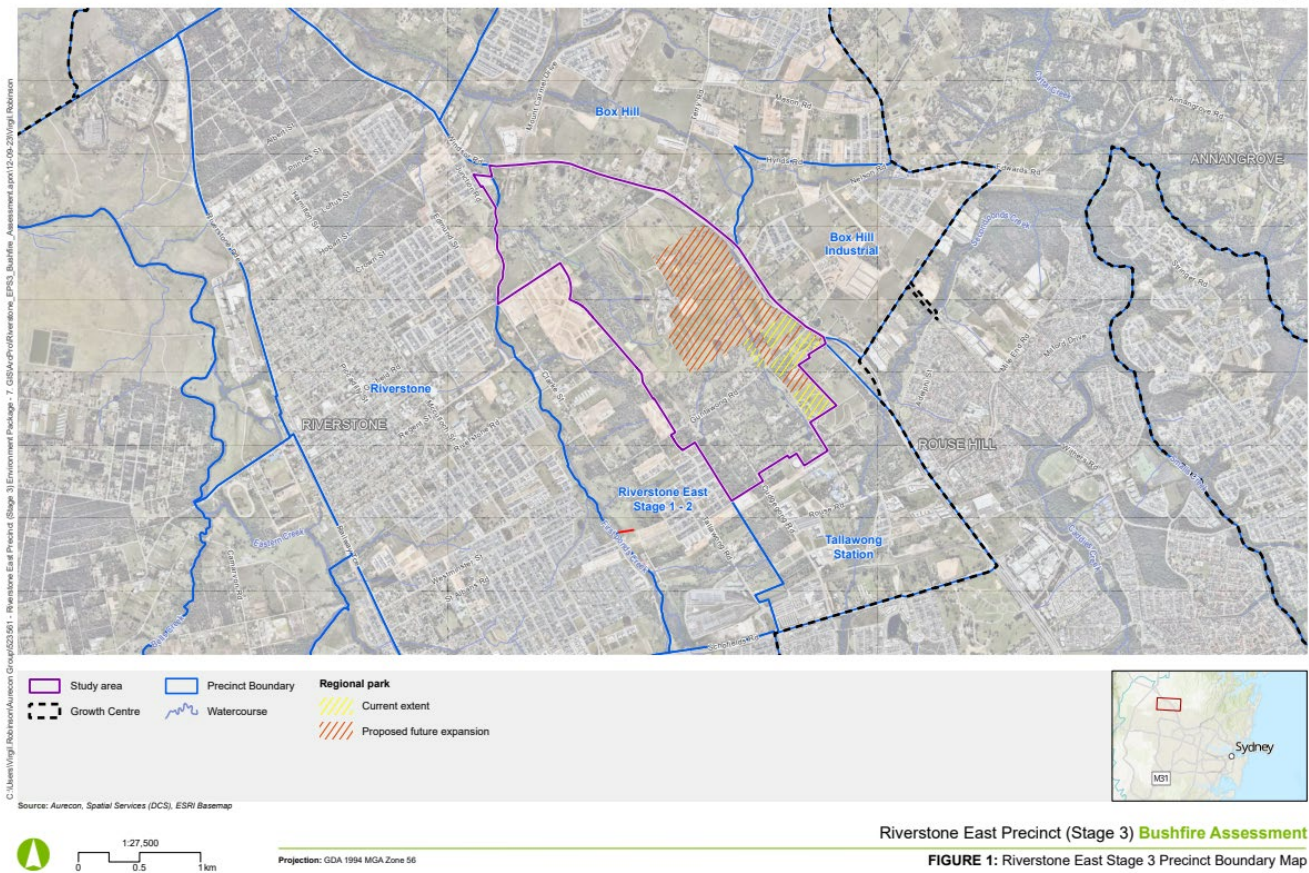


Figure 1 – Riverstone East Stage 3 Precinct Boundary Map (Aurecon, August 2023)

### 3.2 Background

The Planning Minister released the Riverstone East Precinct for planning in August 2013. This will be the final stage of planning for the Riverstone East Precinct, building on the planning undertaken for Stages 1 and 2, which were rezoned in 2016. Preliminary urban design and technical analysis was undertaken for the Stage 3 area in conjunction with Stages 1 and 2. This body of work remains relevant to precinct planning for Stage 3.

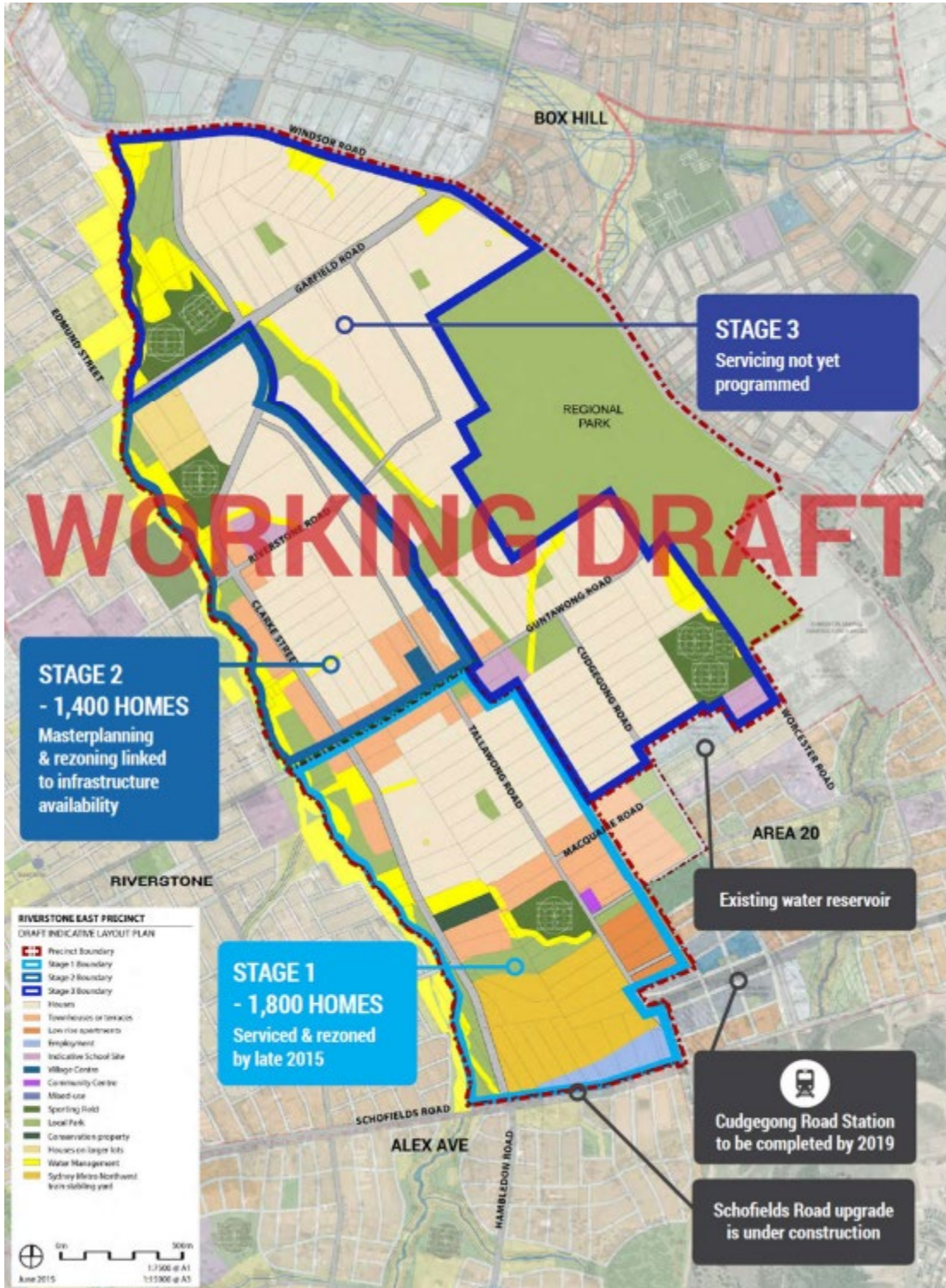


Figure 2 – Draft Indicative Layout Plan for Stage 3 of the Riverstone East Precinct (the Department, 2016)

### 3.3 Purpose of this Bushfire Assessment

The objectives of this Bushfire Assessment are to:

- Undertake a Bushfire Assessment of the Precinct in the context of the draft ILP consistent with Section 9.1(2) Direction 4.4 'Planning for Bushfire Protection' of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and Clause 44 of the *Rural Fires Regulation 2008*.
- Prepare recommendations for updated BFPL mapping for the Precinct based on current bush fire risk, in accordance with NSW RFS guidelines (*Guide for bush fire prone land mapping – Version 5b – November 2015*).
- Assess the draft ILP against the requirements identified in *Planning for Bush Fire Protection* (PBP) (New South Wales Rural Fire Service ((NSW RFS), 2019) and prepare measures suitable for inclusion in a development control plan (DCP) to demonstrate how the Riverstone East Precinct can meet the aims and objectives of PBP. This element assesses potential bushfire risks and statutory requirements.
- Consider staging of development within the Precinct as where new development occurs adjacent existing bushland (even if it is proposed to be removed in the future), the required bushfire risk mitigation measures in *Planning for Bushfire Protection* (2019) apply.
- Review the implications of the draft ILP in terms of bushfire impact, including routes for bushfire evacuation and road widths for emergency vehicles and plant, and suggest modifications to the ILP to address bushfire management requirements.
- Prepare an indicative Asset Protection Zone (APZ) map for the draft ILP for Riverstone East Stage 3.
- Contribute towards the draft ILP and DCP throughout the precinct planning process.

### 3.4 Project methodology

The Bushfire Assessment involved the following key steps based on the requirements of the PBP (NSW RFS, 2019):

- Desktop assessment of existing documentation and guidelines, including analysis of vegetation, climate data, and contour data, and synthesise findings in a Gap Analysis to inform the development of the ILP and Enquiry by Design workshop.
- Enquiry by Design workshop with key stakeholders, including BCC, RFS, SES, and other technical specialists.
- Collaboration across the project team to respond to competing issues in the development of the draft ILP, including the conservation of riparian areas and remnant bushland and development yields.
- Field investigations assessing existing bushfire risk factors, including vegetation and slope to provide inputs to update BFPL mapping.
- Review of the draft ILP and advisement of bushfire management recommendations to inform further revisions and iterations.
- Assessment of bushfire risk factors against criteria outlined in the PBP (NSW RFS, 2019).
- Mapping of Precinct footprint, including spatial analysis and modelling of bushfire values including updated BFPL maps and APZ map (prepared in accordance with AS3959:2018),
- Identification of bushfire protection objectives and measures suitable for inclusion in the DCP.

### 3.5 Limitations

Vegetation is an important characteristic that influences fire behaviour, it can elevate fire risk and is the key element to determine if an area is bushfire prone and able to support a bushfire. Recognising this risk, BFPL are mapped and certified by the Commissioner of the NSW RFS under section 10.3 Bush Fire Prone Land of the EP&A Act. This BFPL map is the trigger for formally incorporating bushfire mitigation measures for all

development located within BFPL. Certain areas within the Precinct may be excluded from or not approved for development, based on the presence of BFPL.

Areas of vegetation nominated to be retained or to be regenerated within and adjoining the Precinct were nominated prior to the field validation of BFPL. Some areas could not be physically inspected due to access constraints to private property to confirm BFPL and previous reports, aerial imagery was therefore used to identify BFPL for a small proportion of the Precinct.

Indicative APZ guided by BAL mapping was based on vegetation proposed be retained and vegetation regeneration areas proposed based on the concept design in the draft ILP. This may include unmanaged vegetation identified in master planning for parklands or drainage feature revegetation. As the APZ mapping prepared for this project is based on an ILP concept design it must not be used for building design or certification and should be considered indicative only.

The Bushfire Assessment for the Precinct does not constitute a Bushfire Emergency Management and Evacuation Plan (BFEMEP). Development of a BFEMEP would be addressed separately (i.e at the Development Application stage) and should be consistent with *Development Planning: A guide to developing a bush fire emergency management and evacuation plan* (NSW RFS, 2014).

The measures identified in the Bushfire Assessment cannot guarantee that a building or structure would survive a bushfire event on every occasion. This is largely due to the degree of vegetation management within a site and adjoining lands, the unpredictable nature and behaviour of fire, and extreme weather conditions. The survivability of a building or structure is also dependent on a combination of measures such as landscaping, water supplies, access, building design and condition, and ongoing building maintenance.

## 4 Regulatory framework

### 4.1 Environmental Planning and Assessment Act 1979 and Environmental Planning and Assessment Regulation 2021

The EP&A Act and Regulation regulates the planning approval and environmental assessment process in NSW. The objectives of the EP&A Act are to:

- *Promote the social and economic welfare of the community and a better environment by the proper management, development, and conservation of the State's natural and other resources,*
- *Facilitate ecologically sustainable development by integrating relevant economic, environmental, and social considerations in decision-making about environmental planning and assessment,*
- *Promote the orderly and economic use and development of land,*
- *Promote the delivery and maintenance of affordable housing,*
- *Protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities, and their habitats,*
- *Promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage)*
- *Promote good design and amenity of the built environment,*
- *Promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants,*
- *Promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State,*
- *Provide increased opportunity for community participation in environmental planning and assessment.*

Consideration would be given to the aims of the EP&A Act through meeting bushfire protection requirements.

The identification of BFPL in NSW is required under the EP&A Act (Section 10.3).

Section 4.14 of the EP&A Act provides consultation and development consent requirements for development of certain bushfire prone land in urban release areas. Such development includes construction of dwellings. These provisions would be triggered at the Development Application (DA) stage (post endorsement of the ILP and any subsequent rezoning of the Precinct). The Section allows for emphasis on bush fire provisions during approval at the subdivision stage in urban release areas.

Section 9.1 of the EP&A Act provides Ministerial Directions that must be satisfied when preparing planning proposals (i.e. proposed rezoning). Specifically, Direction 4.3 Planning for Bushfire Protection applies to all local government areas when a relevant planning authority prepares a planning proposal that will affect, or is in proximity to, land mapped as bushfire prone land. A planning proposal for land to which this direction applies must:

- Have regard to Planning for Bushfire Protection 2019
- Introduce controls that avoid placing inappropriate developments in hazardous areas
- Ensure that bushfire hazard reduction is not prohibited within the APZ.

Furthermore, a planning proposal must, where development is proposed, comply with the following provisions, as appropriate:

- Provide an APZ incorporating at a minimum:
  - a) 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
  - b) an Outer Protection Area managed for hazard reduction and located on the bushland side of the perimeter road,

A planning proposal may be inconsistent with the terms of this direction only if the planning authority has obtained written advice from the Commissioner of the NSW Rural Fire Service to the effect that, notwithstanding the non-compliance, the NSW Rural Fire Service does not object to the progression of the planning proposal.

The Regulation provides additional requirements for development on bushfire prone land, including development excluded from bushfire prone land requirements (in reference to Section 4.14 of the EP&A Act) The Regulation also prescribes the document entitled PBP (NSW RFS, 2019, discussed below).

## 4.2 Rural Fires Act 1997

The *Rural Fires Act 1997* (Rural Fires Act) regulates the suppression and management of bushfires. The objectives of the *Rural Fires Act* are to provide for the:

- Prevention, mitigation, and suppression of bush and other fires in Local Government Areas (LGAs) (or parts of areas) and other parts of the State constituted as rural fire districts,
- Co-ordination of bush firefighting and bushfire prevention throughout the State,
- Protection of persons from injury or death arising from fires, and the protection of property from damage arising from fires, including protection of infrastructure and environmental, economic, cultural, agricultural and community assets from damage arising from fires,
- Protection of the environment by requiring certain activities referred to in paragraphs (a)-(c1) to be carried out having regard to the principles of ecologically sustainable development described in Section 6 (2) of the *Protection of the Environment Administration Act 1991*,
- Subdivisions on bush fire prone land to require a Bush Fire Safety Authority (BFSA) in accordance with section 100B of the Rural Fires Act.

The Rural Fires Act details duties and requirements regarding the NSW RFS, Neighbourhood Safer Places, Fire Trails, and Bush Fire Prevention. Section 63 of the Rural Fires Act details duties of public authorities and owners and occupiers of land to prevent bushfires. Under Section 63, it is the duty of a public authority

to take the notified steps (if any) and any other practicable steps to prevent the occurrence of bushfires on, and to reduce the danger of the spread of a bushfire on or from any land vested in or under its control or management, or any highway, road, street, land or thoroughfare, the maintenance of which is charged on the authority.

### 4.3 State Environmental Planning Policy (Precincts—Central River City) 2021

*The State Environmental Planning Policy (Precincts—Central River City) 2021* (Central River City SEPP) provides statutory development controls specific to planning for Precincts, including land use zones and principal development standards such as Floor Space Ratio (FSR), height of buildings and minimum subdivision lot sizes and other controls with the aim to control density, manage environmental impacts and provide for the orderly development of the Precinct.

The Central River City SEPP also includes site or precinct specific miscellaneous and additional local provisions, including bushfire hazard reduction works and preservation of trees and vegetation that may apply to future planning for the Precinct (i.e at the DA stage)

The Central River City SEPP is supported by maps to specify locations to which specific planning provisions may apply.

### 4.4 Guide for Bush Fire Prone Land Mapping Version 5 (NSW RFS, 2015)

The *Rural Fires and Environmental Assessment Legislation Amendment Act 2002* amended the Rural Fires Act and the EP&A Act to improve bush fire safety requirements. This included the requirement for BFPL mapping to identify areas with vegetation that could support a bushfire or be subject to a bushfire attack. The NSW BFPL map triggers requirements for consideration of bushfire protection measures under the *Planning for Bush Fire Protection: A guide for councils, planners, fire authorities and developers* (PBP) (NSW RFS, 2019) and *Australian Standard AS3959 Construction of Buildings in Bushfire-Prone Areas* (AS3959:2018) (Standards Australia, 2018).

The NSW RFS Guide for Bush Fire Prone Land Mapping (Version 5) (NSW RFS, 2015) provides the state-wide methodology and detail for mapping BFPL as required under section 10.3 of the EP&A Act.

### 4.5 Planning for Bushfire Protection: A guide for councils, planners, fire authorities and developers (NSW RFS, 2019)

The PBP (NSW RFS, 2019) provides the basis for development on BFPL in NSW. The PBP (NSW RFS, 2019) aims to:

- Afford buildings and their occupants' protection from exposure to a bushfire,
- Provide for a defensible space to be located around buildings,
- Provide appropriate separation between a hazard and buildings through an APZ which, in combination with other measures, prevents the likely fire spread to buildings,
- Provision of appropriate operational access and egress for emergency service personnel and occupants is available,
- Provide for ongoing management and maintenance of bushfire protection measures,
- Provisions of utility services are adequate to meet the needs of firefighters.

Bushfire protection strategies are based on the following principles:



- Control the types of development permissible in bushfire prone areas,
- Reduce the impact of radiant heat and direct flame contact by separating development from bushfire hazards,
- Reduce the vulnerability of buildings to ignition and fire spread from flames, radiation, and embers,
- Enable appropriate access and egress for the public and firefighters,
- Provide adequate water supplies for bushfire suppression operations,
- Focus on property preparedness, including emergency planning and property maintenance requirements, and
- Facilitate the maintenance of APZs, fire trails, access for firefighting, and on-site equipment for fire suppression.

Development Applications for development on BFPL must include a bush fire assessment report. This report must demonstrate that the proposal satisfies the requirements of PBP (NSW RFS, 2019). All applications must meet the Aim and Objectives of PBP (NSW RFS, 2019). Future proposed staging of development does not remove the requirements which apply in relation to BFPL that is currently present at the time that each development is proposed.

PBP (NSW RFS, 2019) uses a performance-based approach and identifies objectives and detailed performance criteria to satisfy desired outcomes and meet the Aim and Objectives. Ultimately, any performance-based approach must demonstrate that bush fire protection is afforded to a proposed development commensurate with the assessed level of bush fire risk and the characteristics of the occupants.

## 4.6 National Construction Code (Australian Building Codes Board (ABCB), 2019)

The *National Construction Code* (NCC) (ABCB, 2019) contains all the Performance Requirements for the construction of new buildings and new building work, comprising the Building Code of Australia (BCA) as Volumes 1 and 2, and the Plumbing Code of Australia as Volume 3. The BCA is applied through the *Environmental Planning and Assessment Act 1979* (EP&A Act) in NSW. The NCC covers performance requirements and provisions for the construction of buildings in bushfire prone areas. Provisions apply to buildings of Class 1, Class 2, Class 3, Class 4, Class 10, and buildings considered Special Fire Protection Purpose (SFPP). For buildings in designated BFPL areas, the NCC references the *Australian Standard 3959:2018 Construction of Buildings in Bush Fire Prone Areas* and the *National Association of Steel-framed Housing (NASH) Standard: Steel Framed Construction in Bushfire Areas 2014*. Any new development in the Riverstone East Stage 3 Precinct would need to conform with the NCC requirements.

## 4.7 Australian Standard AS3959 Construction of Buildings in Bushfire-Prone Areas (Standards Australia, 2018)

AS3959:2018 (Standards Australia, 2018) is applicable to construction activities on BFPL throughout Australia. Its requirements aim to improve the resistance of structures from ember attack, radiant heat loads and direct flame contact.

## 4.8 Blacktown City Council Growth Centre Precincts Development Control Plan 2010

The Blacktown City Council Growth Centre Precincts Development Control Plan 2010 (DCP) (amended March 2022) provides supplementary and detailed design guidance to the Central River City SEPP and pertains to growth precincts within the Blacktown LGA. BCC may grant consent to a proposal that does not

comply with the controls in the DCP, providing the intent of the controls is achieved. Similarly, BCC may grant consent to a proposal that varies from the ILP, where the variation is considered to be minor and the proposal remains generally consistent with the ILP. As such, each DA will be considered on its merits.

Relevant to this Bushfire Assessment, the DCP includes controls relating to Bushfire hazard management that would apply to future development of the Precinct once rezoned. These include:

- Consistency of any proposed subdivision with the PBP.
- Subject to detailed design at development application stage, the indicative location and widths of Asset Protection Zones (APZs) are to be provided generally in accordance with the Bushfire risk and asset Protection Zone requirements figure in the relevant Precinct Schedule
- APZ are to be located wholly within the Precinct and any riparian zone, may incorporate roads and may be used for open space and recreation, may include residential where the built form does not fall within an APZ and should be bound by a public or perimeter road.
- Vegetation outside core Riparian Protection Area, Native Vegetation Protection Areas and Existing Native Vegetation is to be designed and managed as a 'fuel reduced area'.
- Where an allotment fronts and partially incorporates an APZ it must have an appropriate depth to accommodate a dwelling with private open space and the minimum required APZ.
- Temporary APZs will be required where development is proposed on allotments next to undeveloped land that presents a bushfire hazard. Once the adjacent stage of development is undertaken, the temporary APZ will no longer be required and shall cease (implemented through a Section 88B Instrument).

The existing and current controls of the DCP are adequate for transferral of bushfire planning provisions pertaining to future development of the Riverstone East (Stage 3) Precinct.

# 5 Bush fire prone land mapping

## 5.1 Bush fire prone land mapping requirements

BFPL mapping is prepared through identification of unmanaged vegetation which is currently present within the Precinct. These are areas that are able to support a bushfire or be subject to a bushfire attack and are categorised into three vegetation classes:

- Vegetation Category 1 - Areas of forest, woodlands, heaths (tall and short), forested wetlands and timber plantations. This is the highest risk BFPL category.
- Vegetation Category 2 - Areas of rainforests and lower risk vegetation parcels. This is a lower risk than both Vegetation Category 1 and 3.
- Vegetation Category 3 – Areas of grasslands, freshwater wetlands, semi-arid woodlands, alpine complex and arid shrublands.
- Buffer area (100m for Category 1, and 30m for Category 2 and 3).

Exclusions include:

- Areas of Category 1 and 3 vegetation less than 1 hectare and more than 100m from other Category 1 and 3 vegetation
- Multiple areas <0.25 hectares and not within 30 metres of each other
- Strips of vegetation <20m wide (regardless of length) and not within 20m of other Category 1, 2 or 3 vegetation.

Low threat vegetation areas under Section 2.2.3.2 of AS3959:2018 are also not included as BFPL and are generally excluded following site assessment. Low threat vegetation includes areas such as golf courses, maintained public parks, sporting fields, and market gardens.

## 5.2 Desktop review of current BFPL and other relevant studies

The project provides the opportunity to update BFPL for the precinct to accommodate future development and potentially mitigate bush fire risks in design and construction. Due to the extent of proposed restored and planted vegetation, appropriate APZs and emergency access and egress will be necessary for future development of the Precinct.

Based on the above criteria BFPL maps have been prepared, however, there is variability between current BFPL mapping, previous characterisation of vegetation hazard for the locality (Eco Logical, 2015) and updated vegetation mapping (Umwelt, 2023). A desktop review of each is summarised below.

### 5.2.1 NSW Bush Fire Prone Land mapping (NSW RFS, 2020)

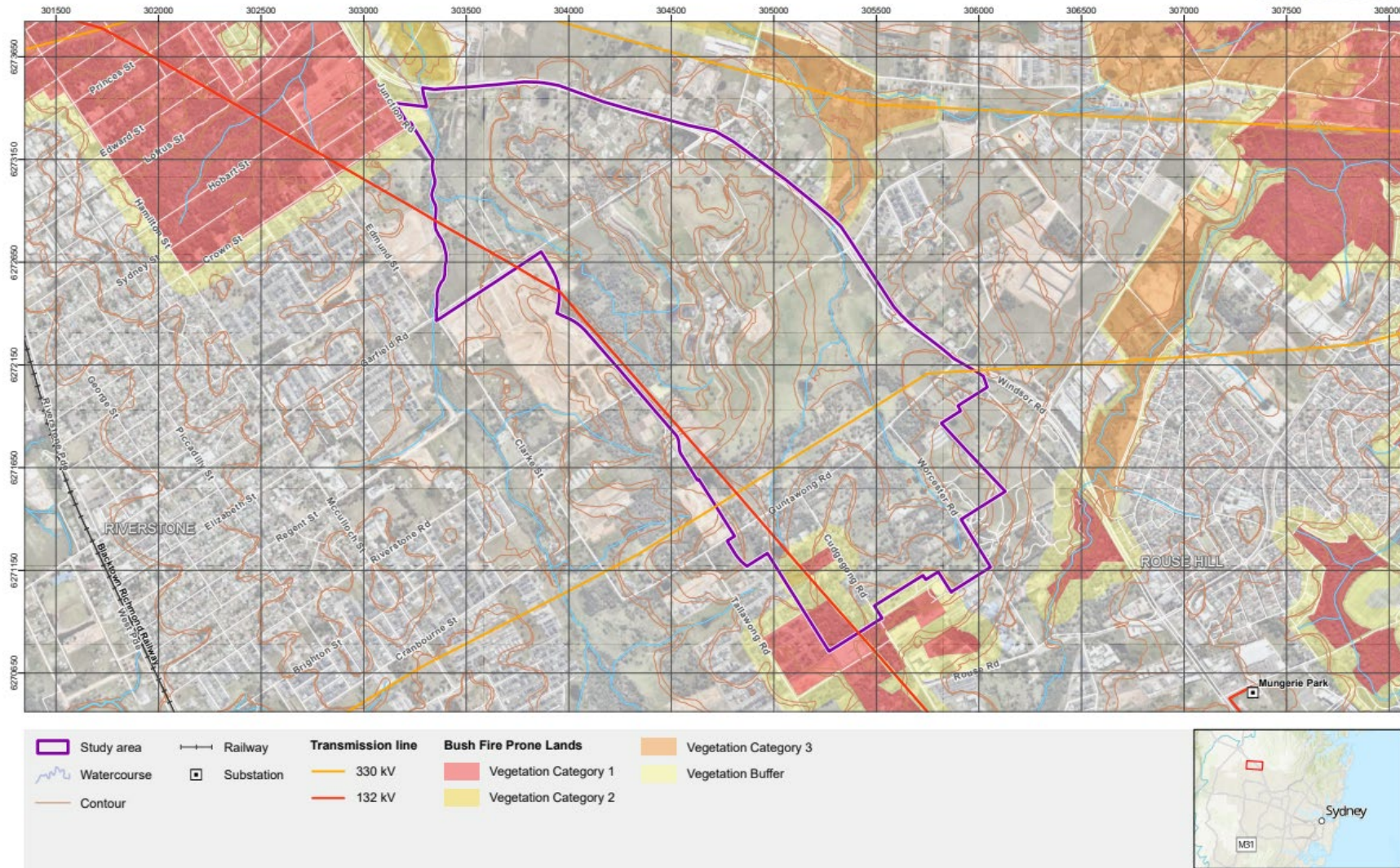
The current environment is predominantly rural residential (largely zoned RU4 – Primary Production Small Lots). The topography is undulating, with pockets of grassland, woodland, and forest type vegetation. Several creeks exist throughout the Precinct, including First Ponds Creek in the west, Killarney Chain of Ponds in the east, and associated tributaries. The site is bordered by Windsor Road on the north-east border and intersected by Garfield Road East and Schofields Road in the south.

The NSW BFPL mapping online portal (NSW RFS, 2020) displays areas that have been certified by the Commissioner of the NSW RFS as able to support a bushfire and mapped as BFPL. The NSW BFPL mapping online portal (NSW RFS, 2020) identifies that most of the Precinct is not assessed as BFPL (see **Figure 3**). The NSW BFPL mapping classifies areas in the southern end of the Precinct along the west of Natasha Parade from Sweet Street to Angove Street, as BFPL Category 1. The east of Natasha Parade opposite Angove Street is also categorised as BFPL Category 1 and 2. West of Junction Road, on the north-west boundary of the Precinct, some land is classified as BFPL Category 1.

NSW PCT vegetation mapping (**Figure 4**) also show various vegetation communities across the Precinct. Parts of the vegetation present may be removed as part of the redevelopment of the Precinct; however, retained vegetation may be mapped as BFPL. PCT mapping of the Precinct outlines numerous areas that appear to be BFPL Category 1 at a desktop level. Cumberland Shale Plains Woodland (PCT 3320) is mapped across:

- The southern end of the Precinct, up to approximately 500 metres north-west of Guntawong Road.
- Approximately 400 metres south of Garfield Road East on the western side of the Precinct.
- North of Garfield Road East with patchy distribution.

Cumberland Red Gum Riverflat Forest (PCT 4025) also occurs in small patches north and south of Garfield Road East. A definitive extent of vegetation to be retained as part of planning for the Precinct is critical to updating the BFPL maps.



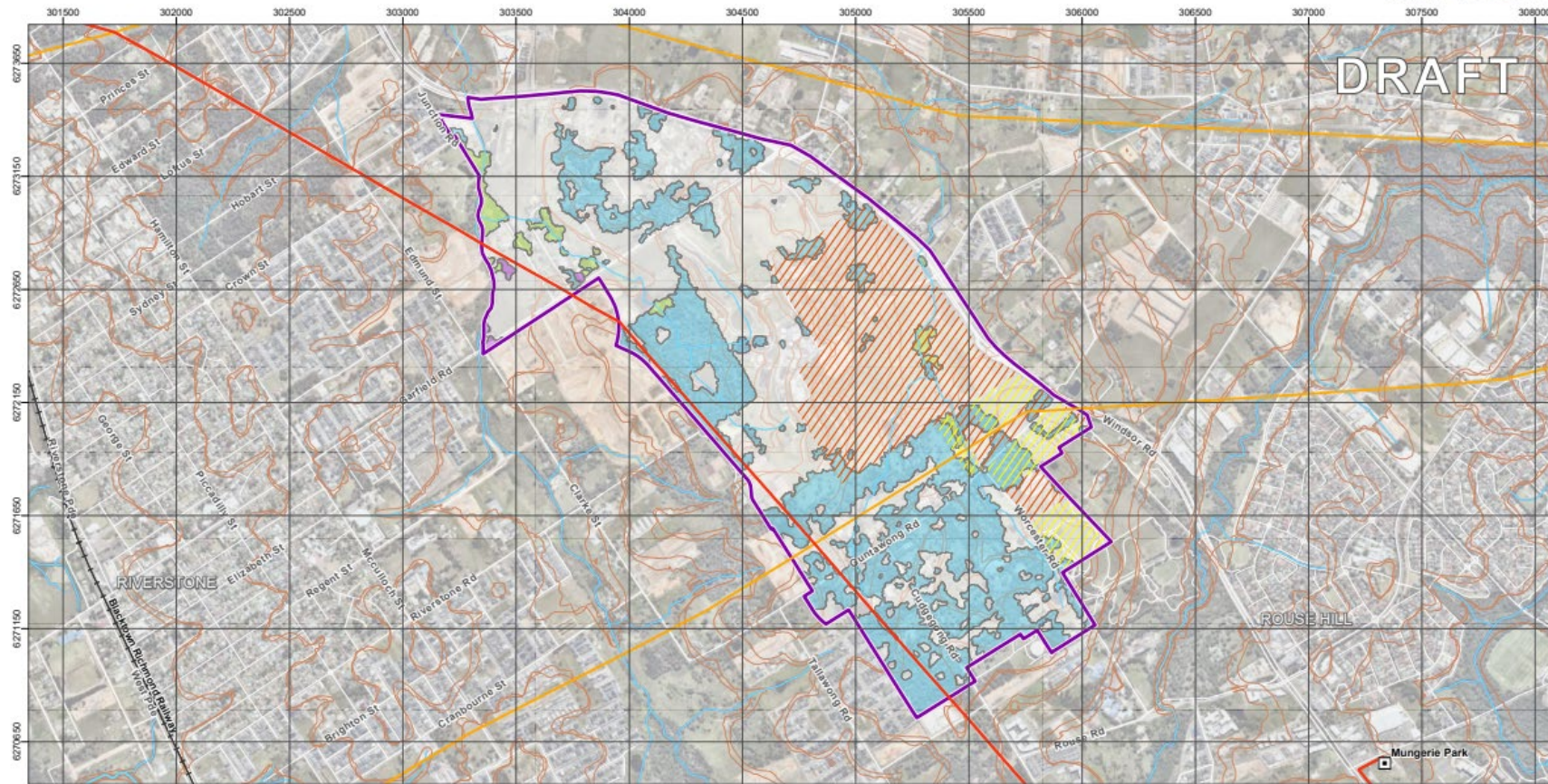
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Projection: GDA 1994 MGA Zone 56

Riverstone East Precinct (Stage 3) **Bushfire Assessment**

**FIGURE 3:** Existing Bush Fire Prone Land Mapping (NSW Rural Fire Service 2020)

Figure 3 - Existing Bush Fire Prone Land Mapping (NSW RFS, 2020)

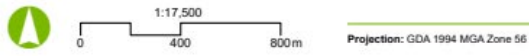


Study area	<b>NSW State Vegetation Type Map</b>	<b>Regional park</b>
Watercourse	Castlereagh Ironbark Forest (PCT 3448)	Current extent
Contour	Cumberland Red Gum Riverflat Forest (PCT 4025)	Proposed future expansion
Railway	Cumberland Shale Plains Woodland (PCT 3320)	
Substation	Not classified	
<b>Transmission line</b>		
330 kV		
132 kV		

Source: Aurecon, DPE, Spatial Services (DCS), ESRI Basemap



Note: Draft – this is not a bush fire prone lands map, must not be used for building construction design or certification and is yet to be ground truthed



Riverstone East Precinct (Stage 3) Bushfire Assessment

FIGURE 4: PCT Mapping

Figure 4 - PCT Mapping (Aurecon, May 2020)

## 5.2.2 Riverstone East Precinct Bushfire Assessment (Eco Logical, 2015)

The Riverstone East Precinct has been previously assessed by Eco Logical for the Department (2015) as part of earlier and broader precinct planning. The key Bushfire Assessment values within this report are identification of BFPL, slope, and vegetation. Vegetation was assessed as predominantly rural residential land dominated by exotic grassland, with pockets of Cumberland Plain Woodland, Alluvial Woodland, and Forest. The slope of the land was assessed as undulating between flat/ upslope to 18° downslope of development areas. Steeper areas typically occur along riparian corridors. The Eco Logical Bushfire Assessment (2015) identified vegetation to be retained (which would constitute BFPL) in the mapping of asset protection zones (**Figure 5**). The majority of this vegetation occurs along First Ponds Creek and other drainage lines. This differs to the NSW RFS BFPL mapping extents.

## 5.2.3 Biodiversity and Riparian Corridor Gap Analysis (Umwelt, August 2023)

The Biodiversity and Riparian Corridor Gap Analysis (Umwelt, August 2023) prepared for Riverstone East Stage 3 identifies areas of non-certified lands within the Precinct to include:

- Flood prone land along First Ponds Creek between Garfield Road East and Windsor Road.
- Area presently zoned for the expansion of RHRP.
- Parcels of land north of the current zoned boundary of Stage 2 of the RHRP.

Umwelt have indicated that non- bio certified land should not be developed or impacted upon unless required for essential infrastructure, therefore it is to be assumed for the purposes of this Gap Analysis, that the majority of vegetation will be retained in these locations, presenting a potential for bushfire risk.

Umwelt have also prepared Opportunities and Constraints mapping (**Figure 6**) based on Gap Analysis findings, which identifies areas:

- For retention of native vegetation,
- For riparian connectivity and extent of revegetation to facilitate this,
- Suitable for development,
- With very high, high and low biodiversity and/or riparian values,
- Special Provision (Regional Park) areas, which may involve future revegetation or retention of unkept grassland areas.

**Figure 4** was used as the most recent and relevant mapping for the field investigation undertaken on 5 and 6 July 2023.

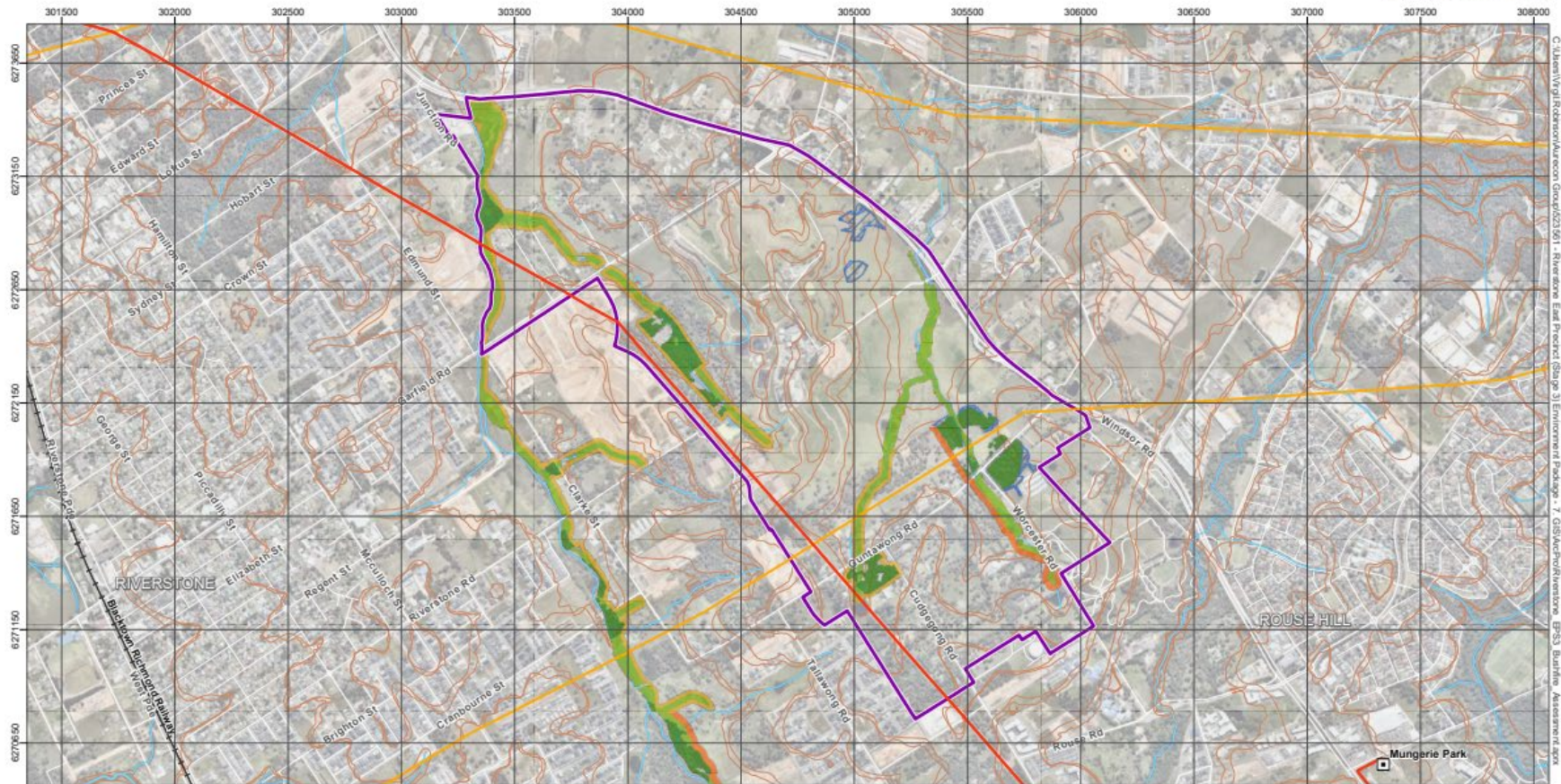
It is assumed that existing vegetation will be retained within the following land uses outlined in the draft ILP Concept Map (**Figure 8**):

- Natural Bushland
- Open Space (passive)
- Open Space (Environmental Conservation)
- Open Space (Junction Road and Associated Lands)
- Natural Green Infrastructure
- RHRP
- Connectors and Corridors

## 5.2.4 Summary

There is uncertainty about the type and extent of BFPL due to the variability between previous reporting, current BFPL mapping, current PCT mapping and future management intent (including vegetation retention and revegetation areas). BFPL has considerable influence on subdivision design and lot yield, and its review is essential for master planning. Therefore, field validation of vegetation is essential. This data informs updated BFPL mapping and subsequent APZ mapping for the site, which informs bushfire protection requirements recommended in a DCP. Refer to Section 5.3 for details of the field investigation conducted to ground truth the bush fire prone vegetation.





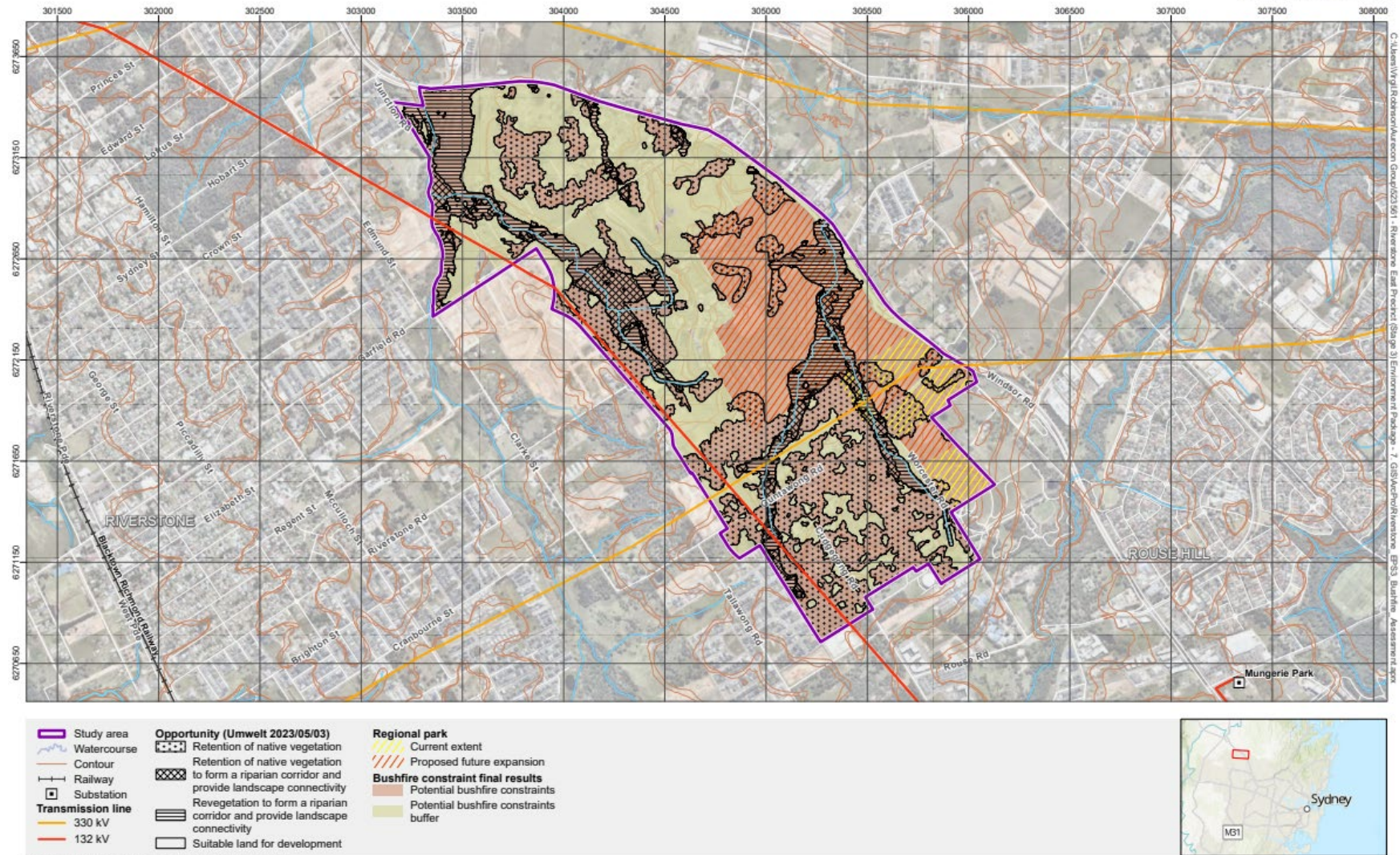
Source: Aurecon, ELA, Spatial Services (DCS), ESRI Basemap



Riverstone East Precinct (Stage 3) **Bushfire Assessment**

**FIGURE 5: Bush Fire Prone Land (Eco Logical Australia 2015)**

Figure 5 - Bush Fire Prone Land (Eco Logical 2015)



Riverstone East Precinct (Stage 3) **Bushfire Assessment**

**FIGURE 6: Bushfire Constraints Map**

Figure 6 - Bushfire Constraints Map (Aurecon and Umwelt, May 2023)

## 5.3 Field investigation

A visual field investigation was conducted by Dominic Adshead and Isabelle Andary-Geslin (Ecologists – Aurecon) on 5 and 6 July 2023 to ground truth the bushfire vegetation outlined in **Figure 4** and **Figure 6**.

Lot 1 DP1235169, Lot 2 DP554233, Lot 84 DP 208203, Lot 93 DP1287203, Lot 147 DP208203, Lot 150 DP 208203, Lot 155 DP 208203, and Lot 159 DP208203 were traversed on foot. The remainder of the assessment was conducted in a motor-vehicle along all publicly accessible roads within and along the boundary of the Precinct. Areas that were either private land or were not publicly accessible were not assessed in person.

The Precinct was assessed as per the BFPL mapping requirements outlined in section 4.1. This includes assessing the slope of the land under vegetation, and qualifying present vegetation as Vegetation Category 1, 2 or 3. Due to the rapid development of certain sections within the Precinct such as the western boundary, clearing is progressing at a faster rate than aerial imaging meaning BFPLs may change/have changed since the field investigation.

## 5.4 Recommended BFPL Map

As previously outlined under Sections 4.4 and 5.1, the Rural Fires and Environmental Assessment Legislation Amendment Act 2002 amended the Rural Fires Act and the EP&A Act to improve bush fire safety requirements. This included the requirement for BFPL mapping to identify areas with vegetation that could support a bushfire or be subject to a bushfire attack. The NSW BFPL map triggers requirements for consideration of bushfire protection measures under the Planning for Bush Fire Protection: A guide for councils, planners, fire authorities and developers (PBP) (NSW RFS, 2019) and Australian Standard AS3959 Construction of Buildings in Bushfire-Prone Areas (AS3959:2018) (Standards Australia, 2018).

The NSW RFS Guide for Bush Fire Prone Land Mapping (Version 5) (NSW RFS, 2015) provides the state-wide methodology and detail for mapping BFPL as required under section 10.3 of the EP&A Act. The recommended BFPL mapping has been prepared in accordance with these requirements.

The recommended BFPL map (Figure 7) shows that 94.58ha of the Precinct is BFPL Vegetation Category 1. This is generally areas of established unmanaged forest vegetation cover located within rural residential blocks (both established and vacant) located in southern parts of the precinct south and the immediate north of the 330kV transmission line. Additional areas of Vegetation Category 1 BFPL include a discrete area immediately west of the AJ Bush and Sons facility and north of a horticultural enterprise on the western Precinct boundary. Additional areas of Category 1 BFPL are located north of Garfield Road and are largely comprised of areas with a more scattered overstorey but with the potential to regenerate back into a forest.

Approximately 163.5ha of the Precinct is mapped as BFPL Vegetation Category 3 and consists of unmanaged grassland and includes areas subject to grazing (which fall under the unmanaged classification). The BFPL Vegetation Category 3 areas are primarily located within parts of Rouse Hill Regional Park (which may be periodically slashed) and the area identified as a future extension to Rouse Hill Regional Park (where re-establishment back to a forest cover may be problematic and a grassland ground cover is likely to persist for a considerable period).

Approximately 119.66ha of the precinct is mapped as BFPL buffer which comprises the remainder of the Precinct extent with the exception of 0.87ha classified a non BFPL.

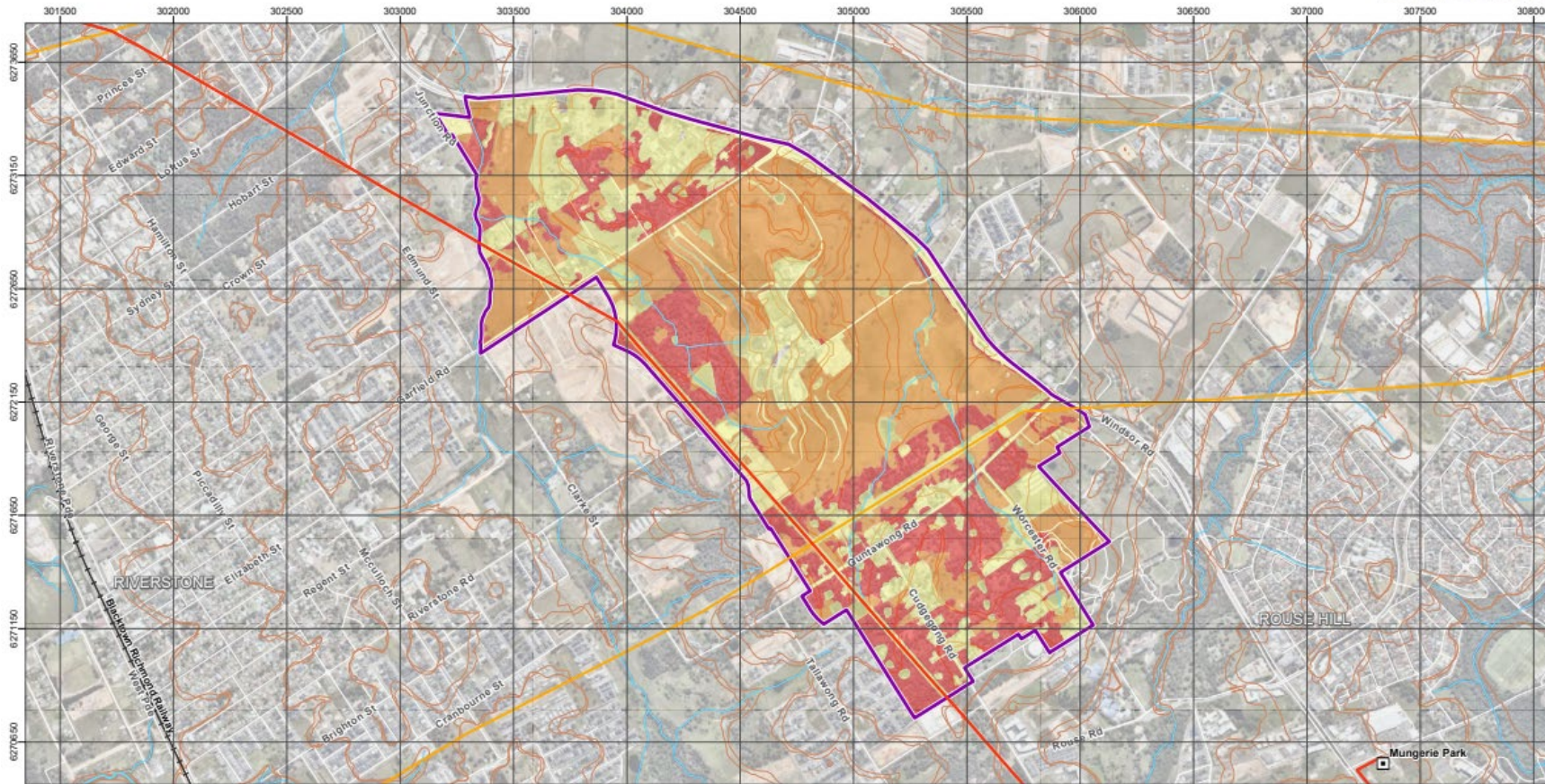
Urban development in areas mapped as BFPL or within the BFPL buffer is required to comply with Planning for Bush Fire Protection (PBP) (NSW Rural Fire Service (NSW RFS) 2019). In developing a lot or multiple lots the current BFPL and associated risks must be considered. This includes the provision of asset protection zones, bushfire construction standards for the buildings, access and the provisions of services. Future intent to develop an adjoining area which contains BFPL, as part of a staged development or otherwise, does not remove the requirement to address current risks from the BFPL which is present. This is requirement is specified in PBP (NSW RFS 2019).

As the majority of the Precinct is recommended to be mapped as either BFPL or BFPL buffer, the future development of the Precinct will be in areas containing BFPL. Therefore, each stage of development will be required to include suitable APZs at all stages of development, buildings must be constructed to a compliant

BAL, emergency accesses and egress must be provided including perimeter roads, and services (including water supply) must be established.

The recommended BFPL map should be reviewed and endorsed by the Commissioner of the RFS in accordance with Section 10.3 of the *EP&A Act*.

The BFPL mapping recommended in this Bushfire Assessment reflects the current site circumstances and it is recommended that this mapping be reviewed and updated once the Precinct has been developed.



Study area	Railway	330 kV	<b>Recommended Bush Fire Prone Land</b>
Watercourse	Substation	132 kV	Vegetation Category 1
Contour			Vegetation Category 3
			Vegetation Buffer

Source: Aurecon, NSW Rural Fire Service, Spatial Services (DCS), ESRI Basemap



Riverstone East Precinct (Stage 3) **Bushfire Assessment**

**FIGURE 7: Recommended Bush Fire Prone Land**

Figure 7 – Recommended Bush Fire Prone Land mapping (Aurecon, August 2023)

# 6 Riverstone East Stage 3 – Compliance with Planning for Bush Fire Protection

## 6.1 Description of the Proposed draft ILP

The proposed draft ILP (**Figure 8**) is comprised of the following land uses:

- Potential schools south of Guntawong Road and in the north, south of Garfield Road East.
- One community centre in the south below Guntawong Road and one community centre in the north below Garfield Road East.
- One church in the north above Garfield Road East.
- One sporting field area in the south below Guntawong Road and one sporting field area in the centre below Garfield Road East.
- Low, medium and high-density residential areas throughout the entire Precinct with the biggest exclusion being proposed Rouse Hill Regional Park extension.
- Open Space (including active, passive and bushland areas).

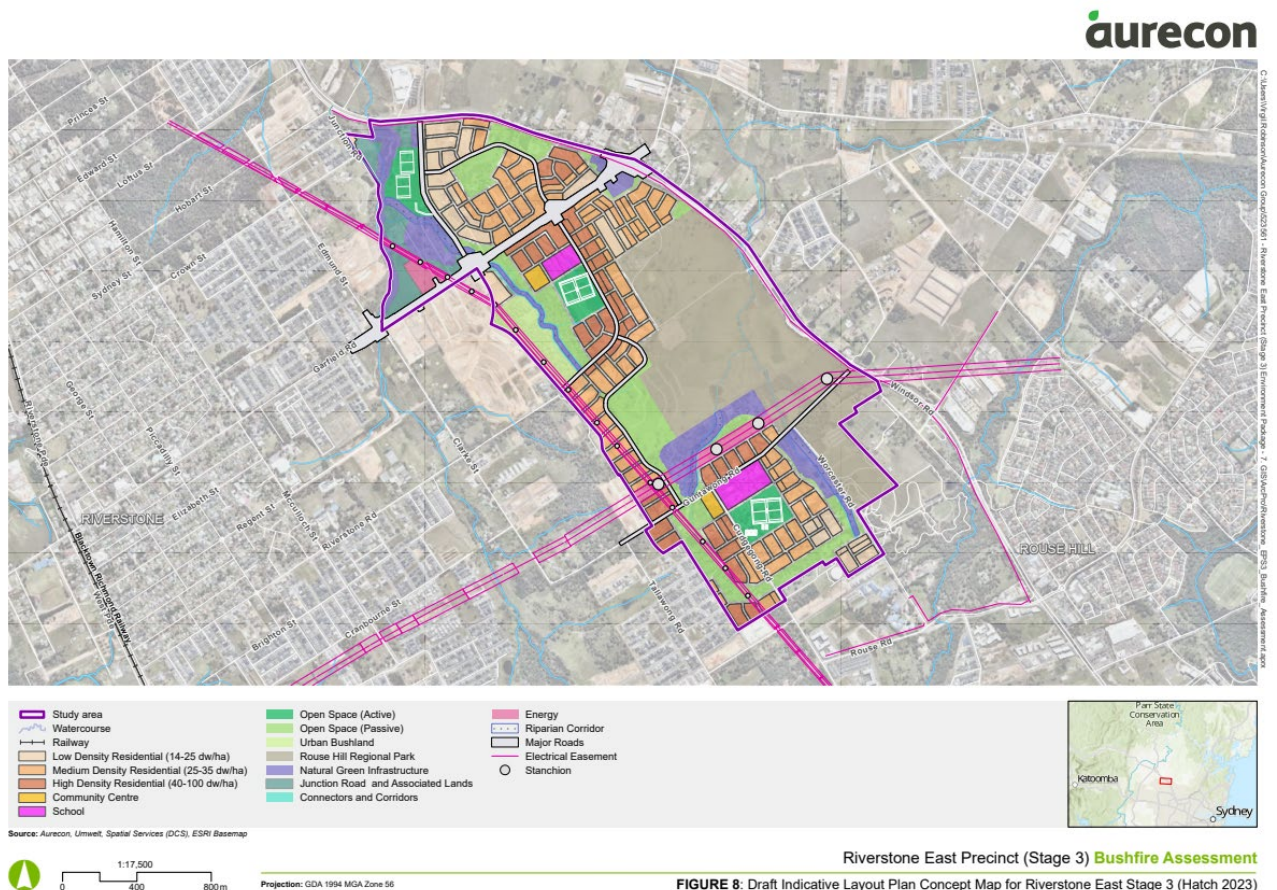


Figure 8 – Draft Indicative Layout Plan Concept Map for Riverstone East Stage 3 (Hatch Roberts Day, August 2023)

## 6.2 Managed and unmanaged vegetation hazard with the concept plan

The draft ILP for the Precinct (**Figure 8**) contains a small amount of managed vegetation identified as ‘open space active’. All other vegetated areas within the Precinct are unmanaged grassland (Category 3) and/or unmanaged vegetation (Category 1) identified as ‘open space passive’, ‘urban bushland’, ‘environmental conservation’, ‘non-certified vegetation’, ‘existing native vegetation (very high)’, ‘Rouse Hill Regional Park’, and ‘natural green infrastructure’.

RHRP is a large area of Category 1 and 3 vegetation that is being retained, along with a recommendation of expansion. The Statement of Management Intent for RHRP (NPWS, 2014) identifies vegetation re-establishment in priority riparian areas. These areas of unmanaged grassland and/or unmanaged vegetation would potentially have implications for:

- The sitting and density of residential land uses.
- Setbacks from vegetation for residential land uses.
- Perimeter roads for access layout to conduct active firefighting operations and hazard reduction activities.
- Provision of firefighting and fire prevention services.
- Proposed road and access layout.

## 6.3 Special Fire Protection Purpose Developments

A special fire protection purpose development (SFPP) is one which is occupied by people who are at-risk members of the community. In a bush fire event, these occupants may be more susceptible to the impacts of bush fire. Evacuating at-risk members of the community is more challenging because they may be physically or psychologically less able to relocate themselves or are unfamiliar with their surroundings (NSW RFS, 2019). Under the RF Act s.100B, a BFSFA from the NSW RFS is required for SFPP development. As such, an Integrated Development Approval may be required under s.4.46 of the EP&A Act. Schools, childcare facilities, or other SFPPs pursuant to Section 100B of the Rural Fires Act should be planned away from current and future bush or grass fire hazards, (generally at least 50 metres for Grassy Woodland Vegetation), subject to detailed investigations.

SFPPs identified within the area include:

- Two schools
- Two community centres
- One church

All schools and community centres within the Precinct are located approximately within 100 metres of areas to be left as unmanaged vegetation as seen in the ILP which would be categorised as BFPL.

The minimum distances for APZs for SFPP developments is based on <10kW m<sup>2</sup>, 1200k) and varies for forest and grassland, and effective slope class under the predominant vegetation formation, as shown in the **Table 1** below:

**Table 1 – Minimum distances for APZs – SFPP developments (PBP, 2019)**

Keith Vegetation Formation	Effective Slope				
	Up slopes and flat	>0°-5°	>5°-10°	>10°-15°	>15°-20°
	<b>Distance (m) from the asset to the predominant vegetation formation</b>				
<b>Rainforest</b>	38	47	57	69	81
<b>Grassland</b>	36	40	45	50	55

## 6.4 Compliance with Planning for Bush Fire Protection

All structures located on BFPL must satisfy the aims and objectives outlined in PBP (NSW RFS, 2019) for:

- Asset Protection Zones (APZ)
- Building construction requirements
- Access
- Water supply and services
- Plans and emergency procedures.

This section summarises how the draft ILP for Riverstone East Stage 3 complies with the aims and objectives of PBP (NSW RFS, 2019) for these elements.

### 6.4.1 Asset protection zone

#### APZ dimensions

An APZ is a bushfire protection measure, providing a buffer around assets, established from the earliest stages of construction, and maintained in perpetuity. APZs are designed and maintained to reduce fuel near assets, and to reduce the potential for damage from direct flame contact, smoke, radiant heat, and ember attack. The dimensions for APZs are designed in line with PBP requirements (NSW RFS, 2019), and are determined by surrounding vegetation type, slope, and the type of asset/development.

As identified in PBP (NSW RFS, 2019):

*Complying Development can be undertaken on lower risk BFPL up to and including BAL-29 where the appropriate construction requirements and all other relevant development standards have been met.*

The APZ dimensions for the Precinct are based on a BAL-29 separation distance (which equates to radiant heat levels not exceeding 29 kW/m<sup>2</sup>), as detailed in Section 6.

#### APZ Management

APZs must be maintained in accordance with the requirements identified in Appendix 4 of the PBP (NSW RFS, 2019). APZs should be in place prior to the bush fire season and maintained continuously throughout. The statutory Bush Fire Danger Period runs from 1 October to 31 March, subject to adjustments (NSW RFS, 2023a).

In accordance with PBP (NSW RFS, 2019) requirements, APZ management should meet the following criteria for trees, shrubs, and grasses (**Table 2**). Vegetation thinning may be required to adhere to the APZ requirements in **Table 2**, from the commencement of construction and in perpetuity.

Table 2 - General APZ maintenance requirements (NSW RFS 2019).

Vegetation Type	Inner Protection Area	Outer Protection Area
Trees	<ul style="list-style-type: none"> <li>■ Mature canopy maximum 15%</li> <li>■ Not touching or overhanging buildings</li> <li>■ Lower limbs minimum 2m high</li> <li>■ Canopies separated by 2 – 5m</li> </ul>	<ul style="list-style-type: none"> <li>■ Canopy cover maximum 30%</li> <li>■ Canopies separated by 2 – 5m</li> </ul>
Shrubs	<ul style="list-style-type: none"> <li>■ Large gaps in vegetation</li> <li>■ Not located under trees</li> <li>■ Maximum 10% of the ground cover</li> <li>■ Distanced from windows and doors by at least twice the height of the vegetation</li> </ul>	<ul style="list-style-type: none"> <li>■ Not form a continuous canopy</li> <li>■ Maximum 20% of the ground cover</li> </ul>



Vegetation Type	Inner Protection Area	Outer Protection Area
Grasses	<ul style="list-style-type: none"> <li>■ Maximum 100m height</li> <li>■ Leaves/debris removed</li> </ul>	<ul style="list-style-type: none"> <li>■ Maximum 100m height</li> <li>■ Leaves/debris removed</li> </ul>

## APZ requirements

APZs are required to be established for the Precinct in accordance with the PBP performance criteria and acceptable solutions (NSW RFS, 2019) (refer to **Table 3** below). Nominated APZs are based on a BAL-29 separation distance (see Section 6), except for any SFPP developments (which require a larger APZ based on radiant heat levels not exceeding 10 kW/m<sup>2</sup>). Buildings with a BAL-29 rating would be exposed to associated radiant heat levels exceeding 29 kW/m<sup>2</sup> (based on a flame temperature of 1090 Kelvin (K)). There are opportunities to utilise potential future infrastructure to provide APZs within BAL-29 separation distances, such as:

- Pathways, cycleways, and perimeter roads.
- Low threat managed vegetation areas i.e., golf courses, maintained public parks, sporting fields, and market gardens.

It must be noted that vegetation that is retained or regenerated is to be managed for biodiversity protection, and consequently, APZs should not be permitted within these areas. APZs should also be established within the allotment being developed, and not on adjoining lands.

**Table 3 - Performance criteria and acceptable solutions for APZs and Landscaping (NSW RFS, 2019).**

Performance Criteria	Acceptable Solution	Notes	Complies / Will comply
<b>Asset Protection Zone</b>			
Potential building footprints must not be exposed to radiant heat levels exceeding 29 kW/m <sup>2</sup> on each proposed lot (substations and construction compounds)	APZs are provided in accordance with Tables A1.12.2 and A1.12.3 based on the FFDI.		Yes
APZs are managed and maintained to prevent the spread of a fire towards the building.	APZs are managed in accordance with the requirements of Appendix 4 of PBP.		Yes
The APZs are provided in perpetuity	APZs are wholly within the boundaries of the development site.		Yes

Performance Criteria	Acceptable Solution	Notes	Complies / Will comply
APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimised.	APZs are located on lands with a slope less than 18 degrees.		Yes
Landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions.	Landscaping is in accordance with Appendix 4; and fencing is constructed in accordance with Chapter 7.6 of PBP.		Yes
<b>SFPP:</b> Potential building footprints must not be exposed to radiant heat levels exceeding 10 kW/m <sup>2</sup> for SFPP developments.	<b>SFPP:</b> The building is provided with an APZ in accordance with Table A1.12.1 in Appendix 1 of PBP.	<ul style="list-style-type: none"> <li>• Two schools</li> <li>• Two community centres</li> <li>• One church</li> </ul>	Yes
The APZs are provided in perpetuity	<b>SFPP:</b> Other structures located within the APZ need to be located further than 6 metres from the refuge building.	<ul style="list-style-type: none"> <li>• Two schools</li> <li>• Two community centres</li> <li>• One church</li> </ul>	Yes

## 6.4.2 Access and egress

In accordance with the PBP (NSW RFS, 2019), primary and secondary access routes should be provided for locations with buildings where people may work or where used for accommodation purposes. The Precinct should contain several existing primary and secondary access routes. Perimeter roads between bushland and planned urban areas can help provide more accessible operating conditions to defend life and property. In this regard, roads should be through roads as far as practicable.

All bushfire prone areas should have an alternate access or egress option. This is usually achieved by providing more than one public road into and out of an area. The need for an alternative road and its location depends on the bushfire risk, the density of the development, and the chances of the road being cut off by fire. All precincts within the site should allow for an alternative public access road. Windsor Road, for example, provides established north-south access along the eastern perimeter of the Precinct. As a major highway the risk of getting trapped in the event of a fire is greatly reduced and affords the opportunity to provide capacity for the evacuation of residents and workers responding to an emergency situation.

In accordance with the PBP (NSW RFS, 2019), access roads should have adequate capacity for firefighting vehicles, and firefighting vehicles should have safe all-weather access to hazards and assets. Access roads are designed to allow safe access and egress for emergency services vehicles and evacuating personnel. Primary and secondary roads are required to be in accordance with the criteria outlined in the PBP (NSW RFS, 2019) as shown below in **Table 4**:

Table 4 - Performance criteria and acceptable solutions for access routes.

Performance Criteria (NSW RFS, 2019)	Acceptable solutions (NSW RFS, 2019)	Access notes	Complies/ will comply
<b>General access requirements</b>			
Firefighting vehicles are provided with safe, all-weather access to structures	Property access roads are two-wheel drive, all-weather roads.		Yes
	Access is provided to all structures.		Yes
	Traffic management devices are constructed to not prohibit access by emergency services vehicles.		Yes
	Access roads must provide suitable turning areas in accordance with Appendix 3 of PBP.		Yes
	One way only public access roads are no less than 3.5 metres wide and have designated parking bays with hydrants located outside of these areas to ensure accessibility to reticulated water for fire suppression.		Yes
	Perimeter roads are provided for residential subdivisions of three or more allotments.		Yes
	Subdivisions of three or more allotments have more than one access in and out of the development.		Yes
	Traffic management devices are constructed to not prohibit access by emergency services vehicles.		Yes
	Maximum grade for sealed roads is 15°, and maximum average grade is 10° (or other gradient specified by road design standards).		Yes
	All roads are through roads, and where dead ends are unavoidable, the maximum length should be 200 m, minimum 12 m outer radius turning circle, with appropriate signage.		Yes
	Roll top curbing adjacent to the hazard.		Yes
	Secondary access each to an alternate point on the existing public road system, where access/egress is through forest, woodland, or heath vegetation.		Yes
	One way only 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.		N/A
The capacity of access roads is adequate for firefighting vehicles	Road surfaces and bridges/causeways adequate to carry up to 23 tonnes, load rating clearly marked.		Yes

Performance Criteria (NSW RFS, 2019)	Acceptable solutions (NSW RFS, 2019)	Access notes	Complies/ will comply
There is appropriate access to water supply	Hydrants are located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression.		Yes
	Hydrants are provided in accordance with the relevant clauses of Australian Standard 2419.1:2005 (AS2419.1:2005) <i>Fire hydrant installations - System design, installation, and commissioning</i> (Standards Australia, 2015a).		Yes
	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.	Static water supply is not proposed	N/A
Access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating as well as providing a safe operational environment for emergency service personnel during firefighting and emergency management on the interface	Two-way sealed roads.		Yes
	Minimum 8 m width carriageway.		Yes
	Appropriate parking areas and hydrant access (outside carriage way and parking, ideally opposite side of the road from the hazard).		Yes
	Hydrants are located clear of parking areas.		Yes
	Through roads, and linked to internal road system at minimum every 500 m.		Yes
	Curves of roads have a minimum inner radius of 6 m.		Yes
	The maximum grade road is 15° and average grade of not more than 10°.		Yes
	Road crossfall maximum 3°.		Yes
Access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating	Unobstructed vehicle clearance height minimum 4 m.		Yes
	Minimum 5.5 m width carriageway.		Yes
	Appropriate parking areas and hydrant access (outside carriage way and parking, ideally opposite side of the road from the hazard); hydrants located clear of parking areas.		Yes
	Through roads, and linked to internal road system at minimum every 500 m.		Yes
	Curves of roads have a minimum inner radius of 6 m.		Yes
	Road crossfall maximum 3°.		Yes
	Unobstructed vehicle clearance height minimum 4 m.		Yes

Performance Criteria (NSW RFS, 2019)	Acceptable solutions (NSW RFS, 2019)	Access notes	Complies/ will comply
<b>Property access</b>			
Firefighting vehicles can access the dwelling and exit the property safely	<p>There are no specific access requirements in an urban area where an unobstructed path (no greater than 70 m) is provided between the most distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70 kph) that supports the operational use of emergency firefighting vehicles.</p> <p>Or the following apply:</p> <ul style="list-style-type: none"> <li>■ minimum 4 m width carriageway,</li> <li>■ in forest, woodland and heath situations, rural property access roads have passing bays every 200 m that are 20 m long by 2 m wide, making a minimum trafficable width of 6 m at the passing bay,</li> <li>■ unobstructed vehicle clearance height minimum 4 m Road crossfall maximum 10° ,</li> <li>■ provide a suitable turning area in accordance with Appendix 3 of PBP (NSW RFS, 2019),</li> <li>■ curves of roads have a minimum inner radius of 6 m, minimal curves; the minimum distance between inner and outer curves is 6 m,</li> <li>■ maximum grade for sealed roads is 15°, and maximum grade for unsealed is 10° ,</li> <li>■ a development comprising more than three dwellings has access by dedication of a road and not by right of way.</li> </ul>	N/A. Development areas would have public road access points.	N/A

### 6.4.3 Water supply and services

Adequate water supply is to be maintained in accordance with PBP requirements (NSW RFS, 2019) in the development of the Precinct. Performance criteria and acceptable solutions for utilities (water supply, electricity, and gas) for the Precinct are extracted from PBP (NSW RFS, 2019) and outlined in **Table 5**.

Table 5 - Performance criteria and acceptable solutions for water, electricity, and gas (NSW RFS, 2019).

Performance Criteria	Acceptable solutions	Comments	Complies/ will comply
<b>Water services</b>			
Adequate water supplies for firefighting purposes	Reticulated water is to be provided to the development where available.		Yes
	A static water and hydrant supply is provided for non-reticulated developments or where reticulated water supply cannot be guaranteed.	Static water supply is not proposed	N/A

Performance Criteria	Acceptable solutions	Comments	Complies/ will comply
	Static water supplies shall comply with Table 5.3d in PBP.	Static water supply is not proposed	N/A
	A minimum of 10,000 L static water supply for firefighting purposes is provided for each occupied building where no reticulated water is available.	Static water supply is not proposed	N/A
Water supplies are located at regular intervals, and are accessible and reliable for firefighting operations	Fire hydrant, spacing, design and sizing complies with the relevant clauses of AS2419.1:2005 <i>Fire hydrant installations System design, installation, and commissioning</i> .		Yes
	Hydrants are not located within any road carriageway.		Yes
	Reticulated water supply to SFPPs uses a ring main system for areas with perimeter roads.		Yes
Flows and pressure are appropriate	Fire hydrant flows and pressures comply with the relevant clauses of AS2419.1:2005 <i>Fire hydrant installations System design, installation, and commissioning</i> .		Yes
Integrity of the water supply is maintained	All above-ground water service pipes are metal, including and up to any taps.	Static water supply is not proposed	N/A
	Above-ground water storage tanks shall be of concrete or metal.	Static water supply is not proposed	N/A
SFPP: Water supplies are adequate in areas where reticulated water is not available	A connection for firefighting purposes is located within the inner protection area of the APZ, or the non-hazard side, and is located away from the structure. A 65-mm Storz outlet with a ball valve is fitted to the outlet. Ball valve and pipes are adequate for water flow and are metal.	Static water supply is not proposed	N/A
	Supply pipes from tank to ball valve have the same bore size to ensure flow volume.	Static water supply is not proposed	N/A
	Underground tanks have an access hole of 200 mm to allow tankers to refill direct from the tank; and are clearly marked.	Static water supply is not proposed	N/A
	A hardened ground surface for truck access is supplied within 4 m of the access hole.	Static water supply is not proposed	N/A
	Raised tanks have their stands constructed from non-combustible material or bush fire-resisting timber.	Static water supply is not proposed	N/A
	Unobstructed access is provided at all times.	Static water supply is not proposed	N/A
	Tanks on the hazard side of a building are provided with adequate shielding for the protection of firefighters.	Static water supply is not proposed	N/A
	Where pumps are provided- minimum 5hp or 3kW petrol or diesel-powered pump and are shielded against bushfire attack. Any hose and reel for firefighting connected to the pump-19 mm internal diameter.	Static water supply is not proposed	N/A
	Fire hose reels are constructed in accordance with Australia/New Zealand Standard 1221:1997 (AS/NZS1221:1997) <i>Fire hose reels</i> and installed in accordance with the relevant clauses of Australian Standard 2441:2005 (AS2441:2005) <i>Installation of fire hose reels</i> (Standards Australia, 2005b).		Yes
Location of electricity	Where practicable, electrical transmission lines are underground.		Yes

Performance Criteria	Acceptable solutions	Comments	Complies/will comply
services limits the possibility of ignition of surrounding bush land or the fabric of buildings	Where overhead, electrical transmission lines are proposed as follows: <ul style="list-style-type: none"> <li>Lines are installed with short pole spacing of 30 metres, unless crossing gullies, gorges, or riparian area.</li> <li>No part of a tree is closer to a power line than the distance set out in <i>ISSC3 – Guideline for Managing Vegetation near Powerlines</i> (Resources and Energy NSW, 2016) for managing vegetation near power lines.</li> </ul>	Referring to distribution lines to buildings, not transmission lines. Relevant for entirety of the Precinct	Yes
<b>Gas services</b>			
Location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.	Reticulated or bottled gas is installed and maintained in accordance with Australia/New Zealand Standard 1596:2014 (AS/NZS1596:2014) <i>The storage and handling of LP Gas</i> , the requirements of relevant authorities, and metal piping is used.		Yes
	All fixed gas cylinders are kept clear of all flammable materials to a distance of 10 m and shielded on the hazard side.		Yes
	Connections to and from gas cylinders are metal.		Yes
	Polymer-sheathed flexible gas supply lines are not used.		Yes
	Above-ground gas service pipes are metal, including and up to any outlets.		Yes
	All gas cylinders need to be kept close to the building, safety valves are directed away from the building and at least 2m away from any combustible material, so they do not act as a catalyst to combustion		Yes

## 7 Indicative APZ informed by Bushfire Attack Level (BAL) map

The CSIRO Spark-BAL software application was used by Aurecon to calculate an indicative BAL for the ILP in accordance with AS3959:2018. The Spark application calculates heat flux using all required fields in the Australian Standard (Method 2) from two input layers: a land or vegetation classification map and a topography map, providing a spatial map output of the BAL level. BAL levels, as per Appendix G of AS3959:2018, are summarised as follows:

- **BAL-LOW** – insufficient risk to warrant specialised construction but risk may still be present.
- **BAL-12.5** – risk of ember attack. Heat flux exposure  $\leq 12.5 \text{ kW/m}^2$ .
- **BAL-19** – risk of ember attack and burning debris ignited by wind borne embers and a likelihood of exposure to radiant heat. Heat flux exposure  $\leq 19 \text{ kW/m}^2$ .
- **BAL-29** – increased risk of ember attack and burning debris ignited by wind borne embers and a likelihood of exposure to an increased level of radiant heat. Heat flux exposure  $\leq 29 \text{ kW/m}^2$ .
- **BAL-40** – a much increased risk of ember attack and burning debris ignited by wind borne embers and a likelihood of exposure to a high level of radiant heat and some likelihood of direct exposure to flames from the fire front. Heat flux exposure  $\leq 40 \text{ kW/m}^2$ .
- **BAL-FZ** – an extremely high risk of ember attack and burning debris ignited by wind borne embers and a likelihood of exposure to a high level of radiant heat and some likelihood of direct exposure to flames from the fire front. Heat flux exposure  $> 40 \text{ kW/m}^2$ .

In applying the software Aurecon used the program without adjustment to the variables.

Site inputs used for the indicative BAL calculation are:

- **FFDI:** 100 (NSW – Greater Hunter, Greater Sydney, Illawarra/Shoalhaven, Far South Coast and Southern Ranges fire weather districts)
- **Classified Vegetation:** Forest and Grassland
- **Slope Class:** Calculated from the digital elevation model (resampled to 1 m) in CSIRO BAL mapping tool).

### 7.1.1 Indicative APZ and BAL determination

Complying development in NSW (under the provisions of the *Stage Environmental Planning Policy, Exempt and Complying Development Codes 2008*) can only be undertaken on lower risk BFPL up to and including BAL-29 where the appropriate construction requirements and all other relevant development standards have been met. An indicative BAL-29 separation distance (between the structure and nearest BFPL) provides the basis for the placement of building development footprints and to avoid areas of BAL-40 and BAL-FZ. The separation area between the vegetation hazard and the development footprint is to be managed in accordance with APZ standards, but can include roads, footpaths, parking areas and other managed areas. As identified in Section 6.3 SFPP developments require much larger separation distances (see Table 1).

The Indicative APZ Map was prepared in accordance with AS3959:2018 using CSIRO's Spark BAL mapping tool and is shown in **Figure 9**. It shows that:

- Both schools would sit just within an appropriate APZ distance to comply with BAL-12.5 and potentially meet the <math>10\text{kW m}^2</math> radiant heat threshold required for SFPP developments.
- Both community centres and the church would be positioned in blocks that contain areas of APZ for BAL-40. As all three of these buildings would be SFPPs, it is imperative that they reside in no higher than an APZ for BAL-12.5 (<math>10\text{kW m}^2</math>). This extended distance is a consequence of the proposed retention of existing native vegetation (noting this is located on Certified land and can be readily removed). As there is sufficient space within these lots for buildings to be placed within areas of an APZ for BAL-12.5 and lower to meet the <math>10\text{kW m}^2</math> SFPP requirement. Another option to reduce the APZ width and consequently the BAL rating within the lot is to maintain lots adjoining SFPPs as managed land through permanently maintaining the tree cover and lawns as groundcover.
- Majority of the planned residential development would reside in an APZ for BAL-29 and lower areas, yet there are small margins along the perimeters of many of the residential zones that appear to be positioned in an APZ for BAL-40. Consequently, these margins would need to be brought to an APZ for BAL-29 or below to meet the deemed to satisfy provisions of the National Construction Code. This could be achieved by managing lawns under canopy vegetation that is elevating the required APZ width, or setting back buildings further so that they fall within the APZ for BAL-29. Roads, carparks, footpaths and other non-NCC building types can be located in APZs for BAL-FZ or BAL-40.
- Areas which are potentially most constrained include the medium and high-density development at the southern end of the Precinct adjoining land reserved for Open Space (passive). As noted above the option here exists to retain the tree canopy and partially manage vegetation adjoining these lots. This could be as tree covered parklands and managed areas, such lawns, walking tracks and cycleways, to extend the managed footprint under the canopy. Managing part of the Open Space closest to these lots would reduce the APZ width and required construction standards which may apply to adjoining building footprints on affected lots.

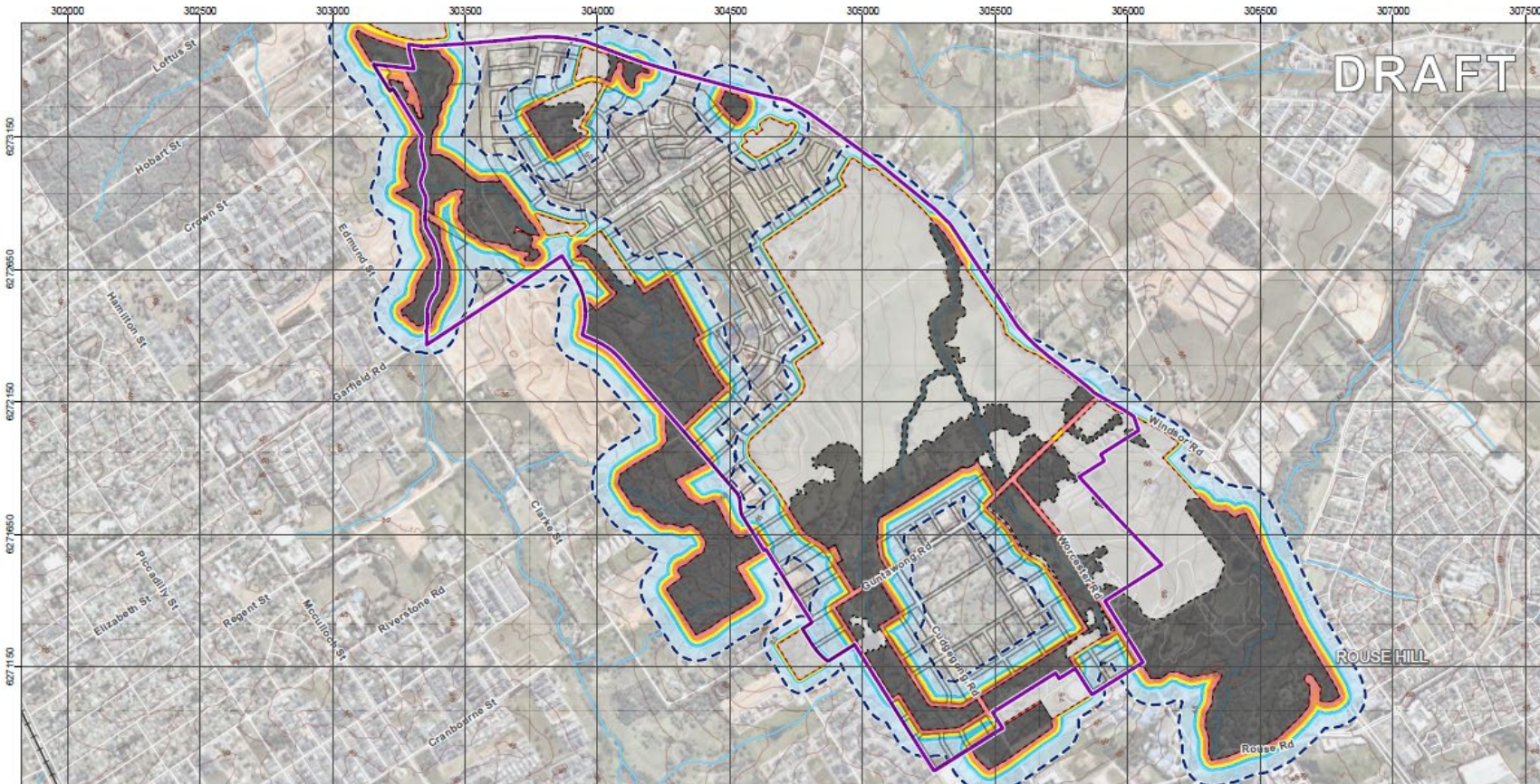
In summary for the majority of lots within the Precinct it appears that the APZ for BAL-FZ and BAL-40 only extend across the roadway and associated footpath, and may only partially fall within the street setback of some affected lots. The northern community centre can accommodate an APZ distance which is permissible for a SFPP development (ie less than BAL-12.5). A reduction in APZ distance can be achieved



by maintaining the ground cover in some areas of Open Space adjoining potentially affected lots as managed lawn parkland areas and/or including walking tracks and cycleways (while maintaining the overstorey tree canopy).

As identified in Section 5.4, future intent to develop an adjoining area which contains BFPL, as part of a staged development or otherwise, does not remove the requirement to address current risks from the BFPL including APZ width and BAL.

It is recommended that APZs are maintained in perpetuity around the perimeter of each lot adjoining BFPL with its APZ width corresponding to the building BAL construction standard (as per Table 2.4 of AS3959:2018), maintained free of fine fuels (vegetation, leaves and grass <6mm diameter).



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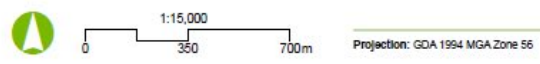
Client: Aurecon Pty Ltd (Aurecon Group) 023361 - Riverstone East Precinct (Stage 3) Environmental Package - 7 GISM-Provisioning ES&I Building BAL map

- Study area
  - Draft Indicative Layout
  - Watercourse
  - Contour
  - Railway
  - Vegetation - Forest
  - Vegetation - Grassland
  - Guideline (100 m Forest, 50 m Grassland)
- Indicative APZ width\*
- APZ for BAL 12.5 building
  - APZ for BAL 19 building
  - APZ for BAL 29 building
  - APZ for BAL 40 building
  - APZ for BAL FZ building

(\*) Note: The BAL construction standard required for a building is determined by the APZ width (i.e. the distance between a building and the adjoining unmanaged vegetation hazard)



Sources: Aurecon, Umwelt, Spatial Services (DCS), ESRI Basemap



Riverstone East Precinct (Stage 3) **Bushfire Assessment**

FIGURE 9: Indicative APZ map Stage 3 draft ILP (Aurecon, September 2023)

Figure 9 Indicative APZ map Stage 3 draft ILP (Aurecon, September 2023)”

# 8 Recommendations

A summary of the recommendations from this Bushfire Assessment are provided as follows:

## Strategic Planning

- i. APZs should not be permitted within areas of vegetation that are planned to be retained or regenerated for biodiversity and riparian protection, and consequently, APZs should also be established within the allotment being developed, and not on adjoining lots. APZs can include perimeter roads.
- ii. All access roads should be designed and constructed in accordance with the PBP (NSW RFS, 2019), including providing a perimeter road between development and retained vegetation to provide a fuel free area adjacent to the hazard, with primary and secondary access to each development area, and designed and maintained to allow safe access and egress for emergency services vehicles and evacuating personnel.
- iii. The recommended BFPL map should be reviewed and endorsed by the Commissioner of the RFS in accordance with Section 10.3 of the *Environmental Planning and Assessment Act 1979*.
- iv. The BFPL mapping recommended in this Bushfire Assessment reflects the current site circumstances and it is recommended that this mapping be reviewed and updated once the Precinct has been developed.

## Future Development and Subdivision

- viii. Most urban development in areas mapped as BFPL or within the BFPL buffer is required to comply with Planning for Bush Fire Protection (PBP) (NSW Rural Fire Service (NSW RFS) 2019). In developing a lot or multiple lots, the current BFPL and associated risks must be considered. This includes the provision of asset protection zones (APZs), bushfire construction standards for the buildings, access and the provisions of services. This will be regulated through the current provisions in the Blacktown City Council Growth Centre Precincts Development Control Plan 2010 (Growth Centres DCP, amended March 2022).
- ix. The Growth Centres DCP includes controls relating to Bushfire hazard management for urban development (at the Development Application stage). The existing and current controls of the DCP are adequate for transferral of bushfire planning provisions pertaining to future development of the Riverstone East (Stage 3) Precinct.
- x. As most of the Precinct is classified in the recommended mapping as either BFPL or BFPL buffer, future development of the Precinct will be located in areas containing BFPL where PBP (NSW 2019) applies. Each stage of development therefore must include:
  - a. suitable APZs
  - b. building construction to a compliant BAL
  - c. provision of emergency accesses and egress (including perimeter roads to separate vegetation hazards from development), and
  - d. provision of services (including water supply).
- xi. With respect to the above, carrying out of some development (other than those prescribed under section 4.14 of the EP&A Act) on BFPL must include a bush fire assessment report which demonstrate that the proposal satisfies the requirements of PBP (NSW RFS, 2019). All applications must meet the aims, objectives and provisions of PBP (NSW RFS, 2019).
- xii. Future proposed staging of development does not remove the requirements which apply in relation to BFPL that is currently present at the time that each development is proposed. In accordance with the Growth Centres DCP, temporary APZs will be required where development is proposed on allotments next to undeveloped land that presents a bushfire hazard. Once the adjacent stage of development is undertaken, the temporary APZ will no longer be required and shall cease. This

should be implemented through a Section 88B Instrument pertaining to relevant land to which BFPL mapping applies.

- xiii. Performance criteria and acceptable solutions for utilities (water supply, electricity, and gas) are to be maintained in accordance with PBP requirements (NSW RFS, 2019) in the development of the Riverstone East Stage 3 Precinct.

## 9 Conclusion

This report constitutes a Bushfire Assessment for Riverstone East Stage 3. This Bushfire Assessment considers a range of existing risk factors associated with the site, including BFPL mapping, APZ mapping, vegetation, as well as construction and maintenance requirements, including APZs, SFPPs, access, water supply and services. This report is a preliminary investigation to assess management within the proposed development areas consistent with NSW bushfire planning guidelines.

## 10 References

- Australian Building Codes Board, 2019, NCC–National Construction Code Series, Building Code of Australia Class 1 and Class 10 Buildings, Vol 2. Canberra, Act.
- National Parks and Wildlife Service 2014, *The Statement of Management Intent for Rouse Hill Regional Park*, Office of Environment and Heritage, viewed 2 August 2023, <<https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Parks-reserves-and-protected-areas/Parks-statement-of-management-intent/rouse-hill-regional-park-statement-of-management-intent-140217.pdf>>.
- NSW Rural Fire Service 2020, *NSW Bush Fire Prone Land*, retrieved July 2023, <[https://geo.seed.nsw.gov.au/Public\\_Viewer/index.html?viewer=Public\\_Viewer&locale=en-AU&runWorkflow=AppendLayerCatalog&CatalogLayer=SEED\\_Catalog.336.NSW%20Bush%20Fire%20Prone%20Lands](https://geo.seed.nsw.gov.au/Public_Viewer/index.html?viewer=Public_Viewer&locale=en-AU&runWorkflow=AppendLayerCatalog&CatalogLayer=SEED_Catalog.336.NSW%20Bush%20Fire%20Prone%20Lands)>.
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