

Strategic Bushfire Study

Planning Proposal for Ingham North Appin

Prepared for
Ingham Property Group



Version 1.9

26 September 2024

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1. Glossary

This section defines those core terms and concepts which are adopted throughout the body of this report.

Term	Definition
Asset Protection Zone (APZ)	A fuel-reduced area surrounding a built asset or structure which provides a buffer zone between a bushfire hazard and an asset. The APZ includes a defensible space within which firefighting operations can be carried out. The size of the required APZ varies with slope, vegetation and FFDI.
Bushfire	A general term used to describe fire in vegetation, includes grass fire.
Bushfire attack mechanisms	The various ways in which a bushfire can impact upon people and property and cause loss or damage. These mechanisms include flame contact, radiant heat exposure, ember attack, fire wind and smoke.
Bushfire Attack Level (BAL)	A means of measuring the severity of a building's potential exposure to ember attack, radiant heat, and direct flame contact. The BAL is used as the basis for establishing the requirements for construction to improve protection of building elements and to articulate bushfire risk.
Bushfire Design Requirements	A separate (Attachment 17) design document to assist the master planning with requirements and specifications to provide compliance with PBP 2019.
Bushfire prone land (BPL)	An area of land that can support a bushfire or is likely to be subject to bushfire attack, as designated on a bushfire prone land map.
Bushfire Hazard	Any vegetation that has the potential to threaten lives, property, or the environment.

Bushfire Strategic Study (SBS)	Provides the opportunity to assess whether new development is appropriate in the bushfire hazard context.
Bushfire Threat	Potential bushfire exposure of an asset due to the proximity and type of a hazard and the slope on which the hazard is situated.
Hazard	A hazard is any source of potential harm or a situation with a potential to cause loss. A hazard is therefore the source of risk.
Likelihood	The chance of an event occurring. Likelihood may be represented as a statistical probability (such as an annual exceedance probability), or whether this is not possible, it can be represented qualitatively using measures such as 'likely', 'possible' and 'rare'.
Managed land	Land that has vegetation removed or maintained to a level that limits the spread and impact of bushfire. This may include developed land (residential, commercial, or industrial), roads, golf course fairways, playgrounds, sports fields, vineyards, orchards, cultivated ornamental gardens and commercial nurseries. Most common will be gardens and lawns within curtilage of buildings. These areas are managed to meet the requirements of an APZ.
Mitigation	The lessening or minimizing of the adverse impacts of a bushfire event. The adverse impacts of bushfire cannot be prevented fully, but their scale or severity can be substantially lessened by various strategies and actions. Mitigation measures include engineering techniques, retrofitting and hazard-resistant construction as well as on ground works to manage fuel and separate assets from bushland.
Planning for Bushfire Protection 2019 (PBP)	NSW Rural Fire Service publication effective from 1 March 2020 which is applicable to all new development on bushfire prone land in NSW.

Resilience	The ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management. UNDRR 2017
Risk	The degree of risk presented by that interaction will depend on the likelihood and consequence of the bushfire occurring. Risk may be defined as the chance of something happening, in a specified period of time that will have an impact on objectives. It is measured in terms of consequences and likelihood.
Risk assessment	A systematic process of evaluating the potential risks that may be involved in a projected activity or undertaking, having regard to factors of likelihood, consequence, vulnerability, and tolerability.
Risk-based land use planning	The strategic consideration of natural hazard risk and mitigation in informing strategic land use planning activities.

2. North Appin: Ingham Planning Proposal

2.1. Overview

This Planning Proposal (**PP**) has been prepared by Urbis Pty Ltd on behalf of Ingham Property Group (**the proponent**) and seeks to amend *State Environment Environmental Planning Policy (Precincts - Western Parkland City)* (**WCP SEPP**).

The Planning Proposal seeks to rezone the site comprising of approximately 301 hectares of land in the North Appin Precinct which forms part of the Greater Macarthur Growth Area (**GMGA**). The NSW Government Department of Planning, Housing and Infrastructure (**DPHI**) has identified the site to deliver approximately 3,000 new homes and secure and implement a koala corridor along Ousedale Creek.

The proposal seeks to achieve this vision by amending *State Environmental Planning Policy (Precincts – Western Parkland City) 2021* (**WCP SEPP**) with a new Appendix to include the site and rezone the land based on an aligned Draft Structure Plan, to the following:

- UD Urban Development
- C2 Conservation.

The land to which this Proposal relates is 345 Appin Road, Appin. The site is accessed via Appin Road and located within the North Appin Precinct. It is more broadly situated in the GMGA within southwest Sydney. Much of the site is located within the Wollondilly local government area (**LGA**), with a small northwest portion located in the Campbelltown LGA.

The site is irregular in shape and can be characterised as predominantly cleared pastoral land that has access to natural assets and corridors. The key features of the site are summarised in the table below.

2.2. Site Description

The land to which this Planning Proposal relates to is 345 Appin Road, Appin. The site is accessed via Appin Road and is located within the North Appin Precinct. It is more broadly situated in the GMGA within southwest Sydney. The majority of the site is located with the Wollondilly local government area (LGA), while a small northwest portion is located in the Campbelltown LGA.

The site is irregular in shape and can be characterised as predominantly cleared pastoral land that has access to significant natural assets and corridors. The key features of the site are summarised in the table below.

Table 1: Site description

Feature	Description
Street Address	345 Appin Road, Appin, NSW
Legal Description	Lot 105 in Deposited Plan 1188670
Site Area	300.8 hectares
Site frontage	~1km frontage to Appin Road
Easements and Restrictions	The site is bisected north-south by three utility easements: ▪ Electrical for 66kV/330kV power lines ▪ Water easement for 1,200mm trunk water main ▪ Gas easement containing the Eastern Gas Pipeline.
Site Topography	The site has a range of topographical features from a large level area along the eastern edge, which then slopes down towards the Nepean River as the site extends west.
Vegetation	The site is largely cleared. However, the periphery along the west is heavily vegetated. The vegetation is comprised of Cumberland Plain Woodland which aligns with the streams and creeks that converge along the site's western boundary and feed into the Nepean River. The remainder of the site is largely unencumbered by Cumberland Plain Woodland.
Bushfire	The site is affected by bushfire, largely associated with the protected Cumberland Plain Conservation corridors to the south and west site boundaries.
Existing Services and Utilities	▪ Potable water: There is an existing 125mm main running along Appin Road as well as the 1,200mm Trillity main that burdens the site. ▪ Electrical: There are existing electrical feeds along Appin Road as well as the 66kV/330kV feeder lines that burden the site.

Feature	Description
	- Wastewater: Currently wastewater servicing is available via extension of the existing trunk main located on Appin Road that provides connectivity to the Glenfield wastewater treatment plant. - Telecommunications: 4G coverage, with 5G coverage over eastern portion of site. NBN fibre connectivity is available via the nearest Fibre Access Point at the corner of Armstrong and Appin Roads. - Gas: Gas servicing is yet to be determined.
Hydrology	The overland flow path associated with the 1 in 100 chance per year flood event is largely limited within the watercourse gorges given they are generally deep. The western portion of the site is characterised by creeks and waterways that flow into the Nepean River further to the west.
Heritage	The site is bordered by European Heritage to its west. Specifically, the Upper Canal System associated with the Upper Nepean scheme. The Upper Canal System is listed on the State Heritage Register (No. 1373) and as item I16 under Schedule 5 of the <i>Wollondilly Local Environment Plan 2011 (WLEP 2011)</i>. Four extant Aboriginal Heritage sites, registered on the Aboriginal Heritage Information Management System (AHIMS) are located to the west and south of the site and are associated with Ousedale Creek.

Updates to Structure Plan September 2024

- Location of the school and local centre moved southwards
- Amendments to internal collector road network particularly the east-west orientation
- Identification of primary collector road
- Identification of location of low and medium density residential development
- Inclusion of more detail on the extent of recreation areas and local parks
- Inclusion of portions of the easements within the C2 Environmental Conservation zone
- Notation of stormwater infrastructure.

2.3. Existing Development and Uses

The site is mostly cleared of any built structures. A sealed east-west road traverses through the centre of the site, providing the site with access to Appin Road.

Historically, on the site, Inghams Enterprises ran the largest broiler chicken operation in the southern hemisphere from the 1970s through until the early 2000s. The pads for the poultry sheds and associated structures are still visible through aerial imagery.

Following the decommissioning of the broiler operation, the site was converted into a cattle breeding operation in 2018. Some minor fencing structures associated with the cattle operation can be seen across the site. A number of small farm dams also sporadically characterise some of the eastern portion of the site towards Appin Road.

The western boundary of the site is also partly bounded by the Upper Canal System associated with the Upper Nepean Scheme. The Upper Canal System is of historic significance and is associated with Edward Moriarty and 1880s Sydney Water Supply and Upper Nepean Scheme.

2.4. Site context

2.4.1. Regional Context

The site is located on the Metropolitan fringe of southwest Sydney, within one of the regions key greenfield planning areas. The majority of the site is located in Wollondilly LGA, with a small northwest portion extending into Campbelltown LGA.

The site is approximately 73km southwest of Sydney CBD and 60km southwest of Parramatta CBD. The site is also in proximity to the Campbelltown-Macarthur Metropolitan Cluster, approximately 15km to the north, as well as approximately 35km south of the Aerotropolis and Western Sydney Airport. The Campbelltown-Macarthur Metropolitan Cluster is developing into one of southwest Sydney's key health and education centres and has the potential to accommodate 31,000 jobs by 2036, while the Aerotropolis is anticipated to provide the potential for 100,000 jobs once fully developed.

Greater MacArthur Growth Area

The GMGA was established in 2019 through an amendment to *State Environmental Planning Policy (Sydney Region Growth Centres) 2006*, now *State Environmental Planning Policy (Precincts – Western Parkland City) 2021*. The WCP SEPP establishes the strategic framework for the precinct planning and

development of southwest Sydney and builds on the northwest and southwest growth areas established in 2006 through the Western Sydney Growth Areas program. The GMGA intends to build on the critical role of the Campbelltown-Macarthur Metropolitan Cluster, by providing new jobs and homes for the residents of southwest Sydney.

The GMGA is divided into 12 precincts, which are being progressively rezoned under the Precincts SEPP to accommodate future urban development, new housing, employment, transport and social infrastructure. The GMGA Structure Plan provides an indicative plan for the how area will evolve and identifies urban capable land, various centres, employment lands, open space and flood affected land.

North Appin Precinct

North Appin is one of the 12 precincts established within the GMGA and is situated in between the Gilead and West Appin Precincts. It is located adjacent to the existing Appin township and will form a natural extension of the town once fully developed. The Precinct is allocated to deliver 5,000 new dwellings (or 15,000 new residents) supported by a local centre, transport connections and open space. The IPG site is allocated to deliver approximately 3,000 new dwellings within this Precinct.

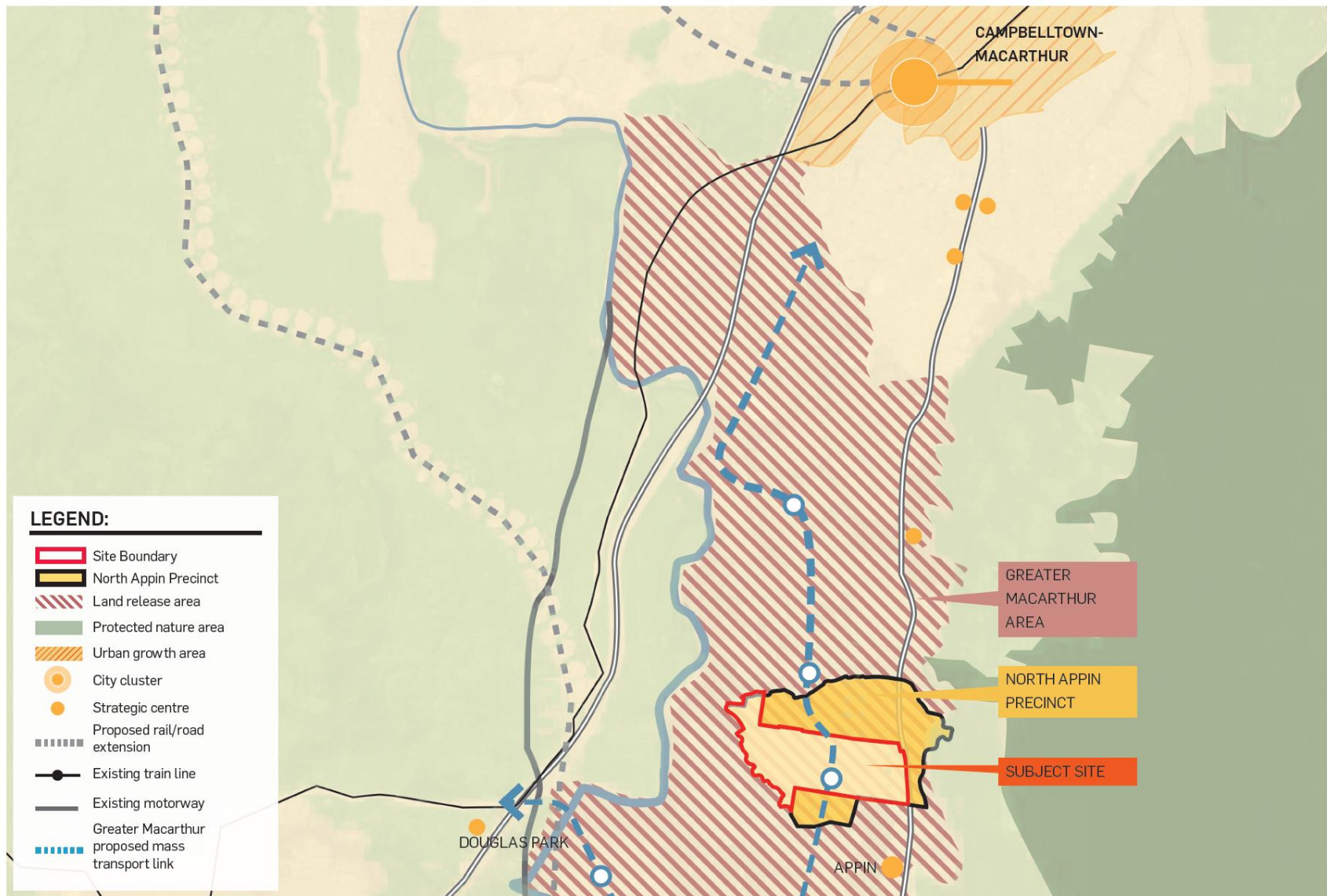


Figure 1: Subject site within Region (per Urbis)

2.4.2. Local Context

The site is largely surrounded by existing rural and agricultural activities, with the Appin township, an existing rural local centre, located to the south. The site is surrounded by the following:

- **North:** Rural and agricultural land, that is bisected by the east-west flowing Mallaty Creek, a tributary of the Nepean River, beyond which is land currently subject to the Gilead Stage 2 rezoning. Approximately 15km further north is the Campbelltown-Macarthur Metropolitan Cluster, a major employment, health and education hub.
- **East:** Appin Road bounds the site to the east and serves as the main connector road for the region. Further east is dense bushland followed by Georges Rives and the Wedderburn Airstrip.
- **South:** Located to the immediate southwest along the site's boundary is Ousedale Creek, another tributary of the Nepean River. Immediately south along Brian Road is also the Macarthur Motorcycle Complex. The Brian Road alignment will ultimately be developed as the east-west connector between Appin Road and the GM Transit Corridor. Along Appin Road to the immediate southeast is the existing rural Appin township which consists primarily of low-density residential land uses, supported by local retail, business services and Appin Public School. Further south is rural and agricultural land currently subject to the Appin (part) (Precinct) rezoning.
- **West:** The western boundary is partly bounded by the heritage listed water supply infrastructure associated with the Upper Nepean Scheme. Further west is the Nepean River and further agricultural and rural land.

Biodiversity

The site and surrounding context are partly characterised by various ecological communities, riparian and biodiversity corridors. Along the southwestern site boundary is the Ousedale Creek riparian corridor, which the Cumberland Plain Conservation Plan 2022 (CPCP) identifies as areas of native vegetation for conservation as well as a corridor for the movement of koalas. These areas of native vegetation are partly comprised of Cumberland Plain Woodland.

3. The site in bushfire risk management context

Blackash Bushfire Consulting has been engaged by Ingham, to provide a Strategic Bushfire Study (SBS) to support the Planning Proposal (PP) for the rezoning of 300.8 ha of rural land to the west of Appin Road that form part of the North Appin Precinct. The site is located on the western side of Appin Road approximately 1.5 km north of the existing Appin town area and 6.0 km from Rosemeadow which is currently the most southern part of the larger Campbelltown urban area. The site is legally known as Lot 105 DP 1188670 and the address is 345 Appin Road, Appin.

The site forms part of the overall GMGA referred to in the DPHI publication *Guide to the Greater Macarthur Growth Area* (November 2022 - GGMGA). This document refers to this site and adjoining lands as North Appin precinct, which is listed as one of three “state assessed planning proposals” to be fast tracked (p. 27). Since the update to the Greater Macarthur 2040 Interim Plan, the area of the Ousedale Creek Koala Corridor (Corridor E) has been finalised and this runs along the southern side of the site.

The DPHI publication *Strategic Bushfire Study – Greater Macarthur Growth Area: Land Release Area* (SBS – GMGA) identifies the North Appin Precinct (including the site) as a precinct that, subject to detailed bushfire protection measures, is suitable for future development and is not excluded by the NSW Rural Fire Service (RFS) criteria as “inappropriate development”.

The site is currently a mix of cleared land previously used for rural production and existing bushland in varying condition. Approximately 59.5ha of bushland will be retained and rezoned to C2 Conservation purposes including part of the important Ousedale Creek Koala Corridor E which is in place to support Koala habitat. The site topography is generally sloping from the east to the west with several drainage lines which sharply drop away into the riparian areas of Ousedale Creek and Mallaty Creek. The site includes only the IPG land, however makes reference to surrounding land and the GMGA planning framework.

Figure 2 shows the site location and Figure 3 shows the site in relation to the overall Greater Macarthur Structure Plan - Land Release Area (GMSP). Figure 4 shows the context of the IPG land within the wider North Appin Precinct.

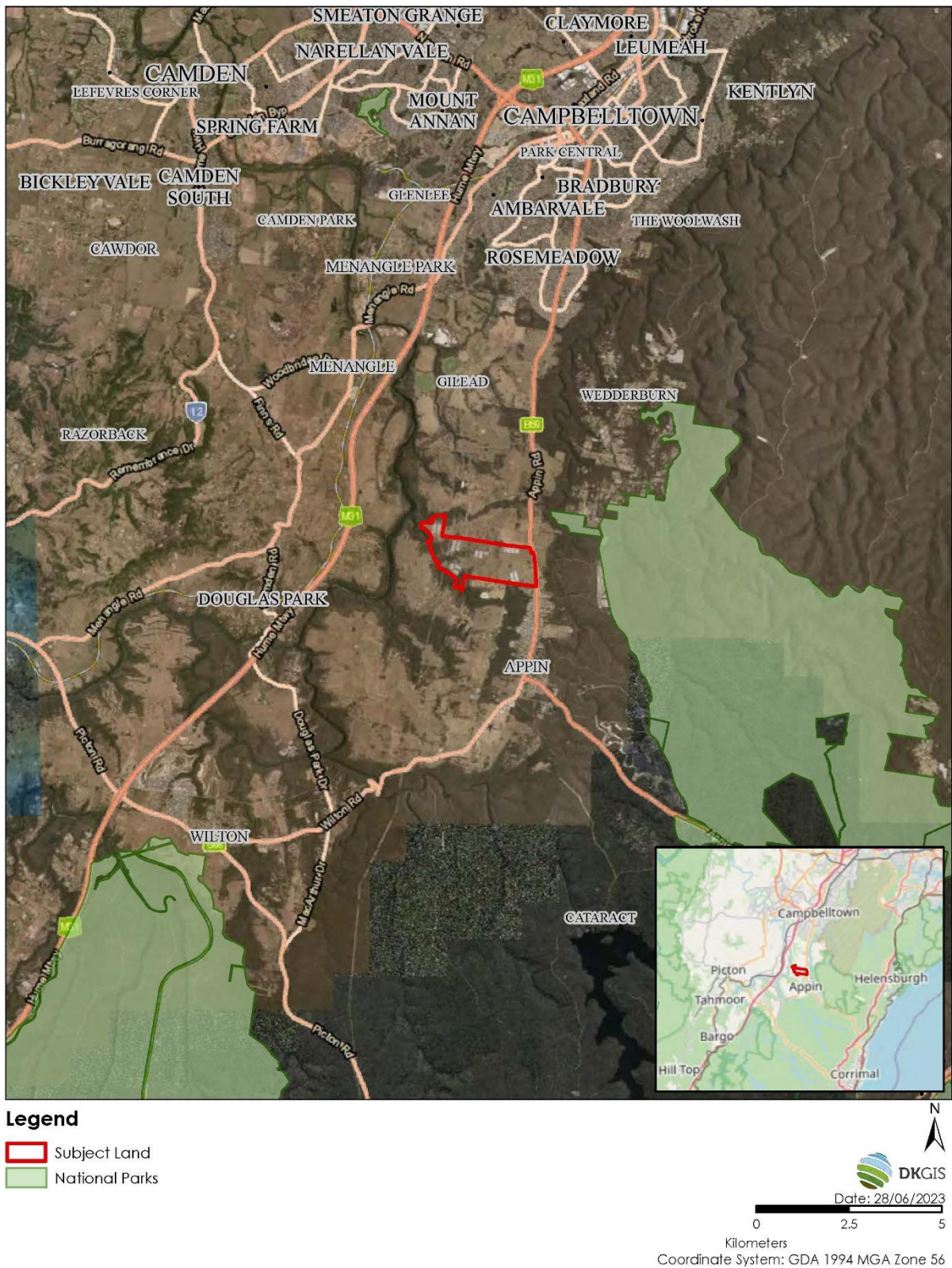


Figure 2: Location

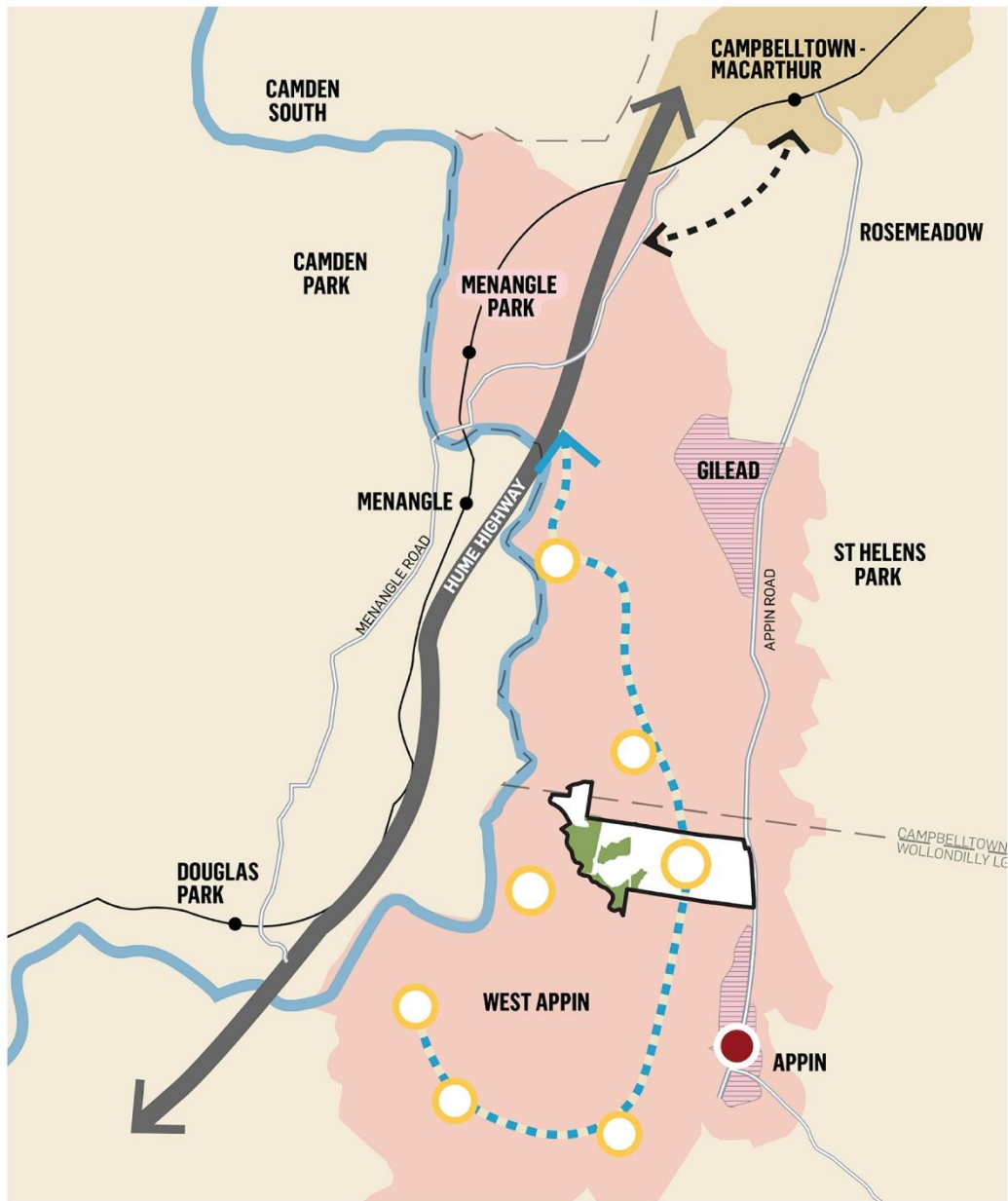


Figure 5 Retail Demand Analysis

RETAIL FACILITIES

Site Boundary

Existing Local Centre

Proposed Local Centre

Transport Corridor

Campbelltown - Macarthur

Prepared by Urbis for Ingham Property Group 25

Figure 3: Site in relation to Greater Macarthur Structure Plan (Land Release Area)

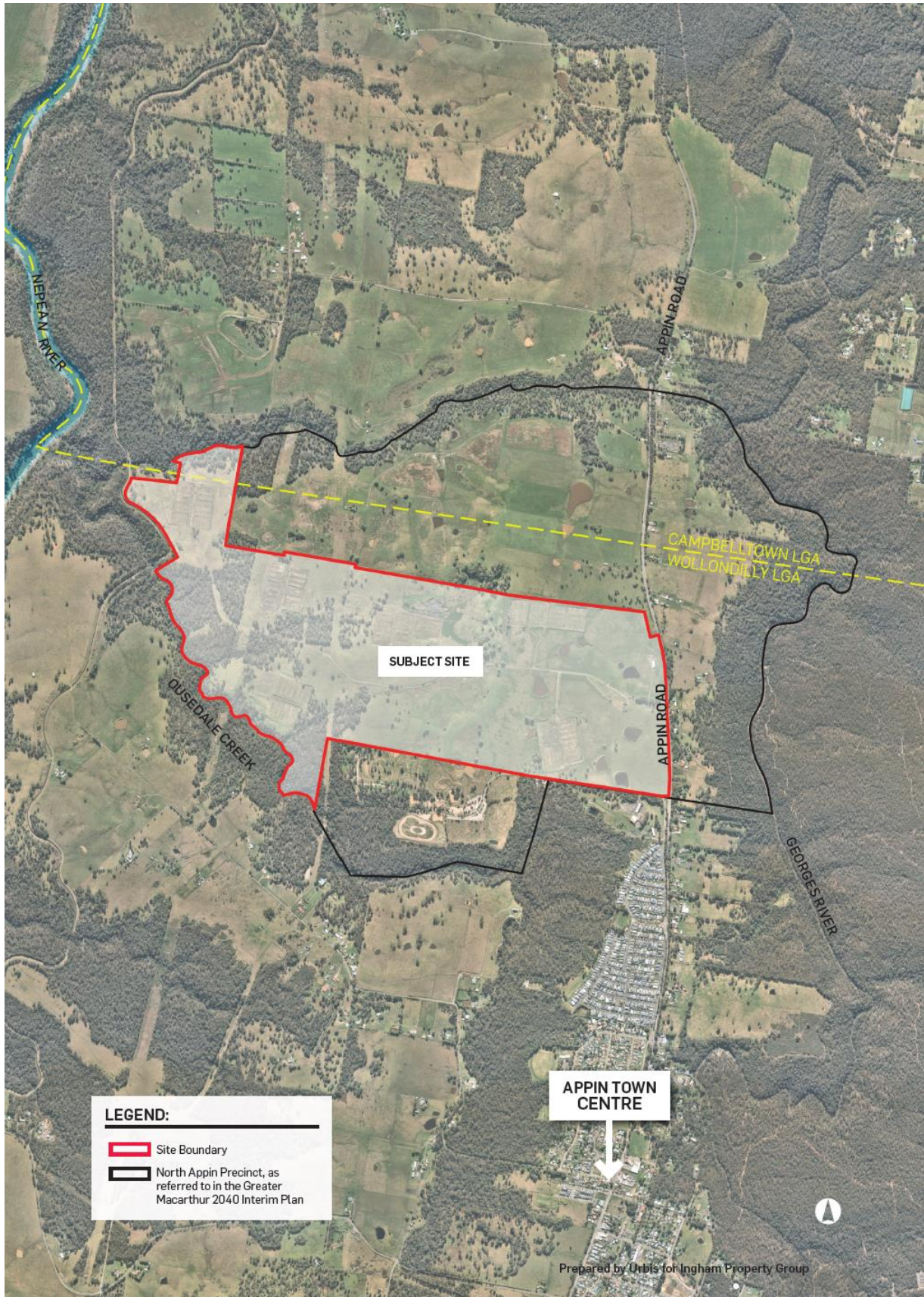


Figure 4: Site in context with other North Appin Precinct lands

The site context at a landscape scale is that of an area with a long history of agricultural uses and more recently, increasing urban development. As the GMGA continues to develop the bushfire prone land will continue to be fragmented by future development. The terrain to the north, west and southwest is generally moderately undulating with the exception being the small incised valleys associated with the major creeks and the Nepean River. The SBS – GMGA will be discussed in more detail below, however it is very clear that the North Appin Precinct as a whole complies with the strategic planning principles and is not considered an “inappropriate development” exclusion area.

Agricultural land to the north of the site forms part of the North Appin Precinct and whilst the outline of the future road pattern is considered in this report, this land is not formally part of this PP. This land is cleared with the exception of the riparian areas around Mallaty Creek. There is no landscape scale fire risk presented from the north due to the significant clearing, fragmented bushland and the overall expansion of the urban footprint extending south from Gilead.

To the east there is Appin Road which is currently a two-lane sealed road of generally 12m carriageway and shoulder width within a generally 25m wide road reserve. Land to the east of the road has been cleared for agriculture and rural residential purposes to a width of between 165-400m, before a corridor of bushland of approximately the same width leading down to the Georges River, with that bushland then extending into a very large bushland complex being Dharawal National Park and the extended water catchment area. The GMGA documentation show the cleared lands east of Appin Road will be “avoided land” and form part of the long term Cumberland Plain Conservation Plan. Ultimately this means the area will be rehabilitated to native forest. Landscape scale fires are possible in this very large expanse of bushland to the east, however typically landscape scale fires are driven from the northwest and by southerly changes, with extreme bushfire behaviour rarely linked to easterly winds. This bushland is not expected to have a significant landscape scale fire impact on the IPG site. The expanded Appin Road Corridor will provide a substantial break in the landscape, and future subdivision will require a suite of Bushfire Protection Measures (including detailed APZ within the site, construction standards, landscape planning etc) that will manage the bushfire risk at subdivision stage.

To the south and southwest the Ousedale Creek Koala Corridor - Corridor E will be retained and rehabilitated to provide an ongoing habitat link. This will mean substantial rehabilitation of the Macarthur Motorcycle Club land and the Appin Greyhound Track. South of Corridor E, there is the existing urban development of Appin, and the cleared agricultural land which makes up the Appin Precinct in the GMGA. Further to the south is the Wilton Growth Area providing additional increasing development buffering from landscape scale fires. There is no landscape scale fire risk presented from the south due to the significant existing clearing, fragmented bushland and the overall expansion of the urban footprint extending north and west from Appin related to the Appin (Part) Precinct PP.

To the west Corridor E continues along Ousedale Creek and the habitat corridor. The creek connects into the wider Nepean River riparian corridor which is generally between 300-500m wide. West of the river the land is currently cleared for rural uses and is in turn subject to investigation for future urban development as part of the GMGA. The landscape is further fragmented by the M1 Hume Motorway Corridor, the main southern rail line and Menangle Road. The area between the Nepean River and the M1 Hume Motorway has been referred to as the Moreton Park Road Enterprise area in some planning studies, and this area is being investigated for future employment land uses.

Along approximately 650m of the western boundary the land is cleared and maintained for the infrastructure associated with the Water NSW asset known as the Upper Canal. Water NSW is the State owned corporation responsible for managing bulk water supply, and operates under the *Water NSW Act 2014* and associated Regulation. The Upper Canal is a State Heritage listed asset and part of the Sydney water supply system that delivers raw water from the southern dams (Cataract, Cordeaux, Avon & Nepean Dams) to the Prospect Reservoir and treatment Plant. The importance of the asset cannot be overstated as it is responsible for delivery of over 20% of the raw water supply to greater Sydney. *Specific Guidelines for Development Adjacent to the Upper Canal and Warragamba Pipelines* (Feb 2020) govern development adjacent and adjoining the corridor. The pipeline, canal and tunnels are 'critical infrastructure' and there is a permanent ongoing maintenance regime within and adjacent to the Upper Canal corridor, including the service roads and bridges and the pipelines over Mallaty Creek and Ousedale Creek.

This entire corridor is subject to continual maintenance for vegetation, erosion, stormwater management, and access to protect both the heritage values of the infrastructure and the importance to the Sydney water system. The Upper Canal runs directly along the western boundary for approximately 650m, and otherwise generally parallels the Nepean River, with the canal piped to cross the creek lines and additional bridges built for vehicles. A key feature is the entire Upper Canal corridor is accessible by heavy plant and vehicles, and therefore easily accommodates Medium Rigid RFS vehicles. The Upper Canal very substantially fragments the landscape west of the site and east of the Nepean River gorge, and the ongoing maintenance arrangements are unique. The cleared and maintained corridor created by the Upper Canal varies between 30-50m wide generally. This section of adjoining land is considered 'managed land' with respect to bushfire risk. Figures 5 and 6 show the location of the Upper Canal in relation to the site.



Figure 5: Water NSW Upper Canal corridor in relation to site



345 Appin Road Appin 2560

Lot/Section/Plan no: 105/-/DP1188670

Council: CAMPBELLTOWN CITY COUNCIL, WOLLONDILLY SHIRE COUNCIL

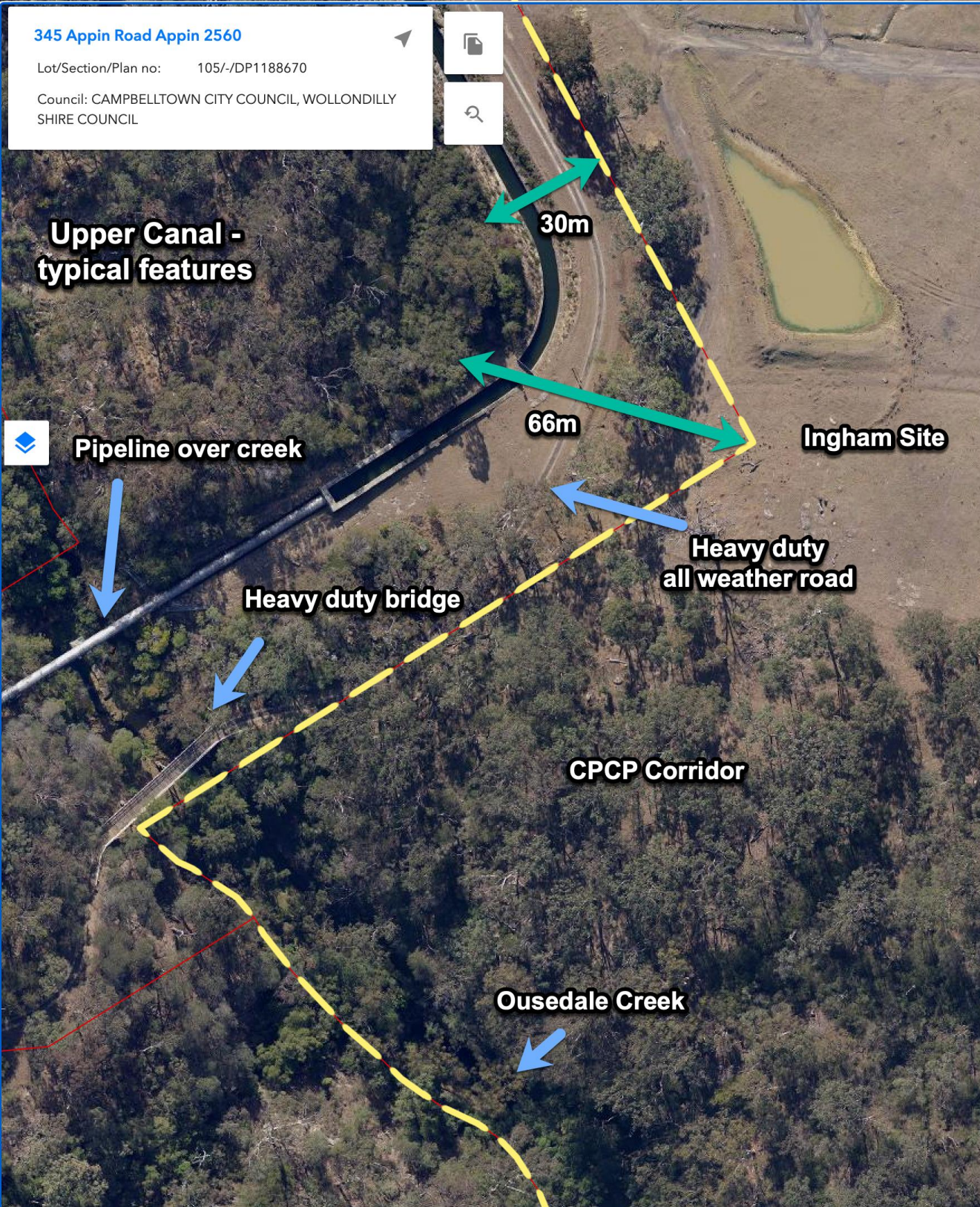


Figure 6: Upper Canal corridor in close context to site

There is no landscape scale fire risk presented from the west due to the predominant grassland vegetation with multiple significant interruptions, significant existing clearing, generally fragmented bushland and the overall expansion of the urban footprint extending north from Douglas Park and south from Menangle.

The study area is predominantly zoned under the Wollondilly Local Environmental Plan (LEP) 2011 as RU2 – Rural Landscape, with a small part of the site to the northwest zoned RU2 under the Campbelltown LEP 2015.

The study area is well located with the main arterial road (Appin Road) located on the eastern boundary of the site, providing access to local shopping and facilities to the south at Appin and a direct route to the wider Macarthur urban area to the north.

Future transport options outlined in the GMSP include the Greater Macarthur transit corridor which will be a minimum four lane arterial road (and busway) running north-south through the site, and providing a bypass to the current Appin township, and the OSO2 Corridor shown as running along the western side of the Appin (part) Precinct land and providing a future local link to the M1 Hume Motorway. These links are clearly shown in the most current GMSP and provide further future access and egress options. Specific timings for construction are yet unknown, however these transport links are integral to the overall GMGA planning and will be incorporated as rezonings and subsequent development applications proceed.

BLACKASH

DRAFT STRUCTURE PLAN

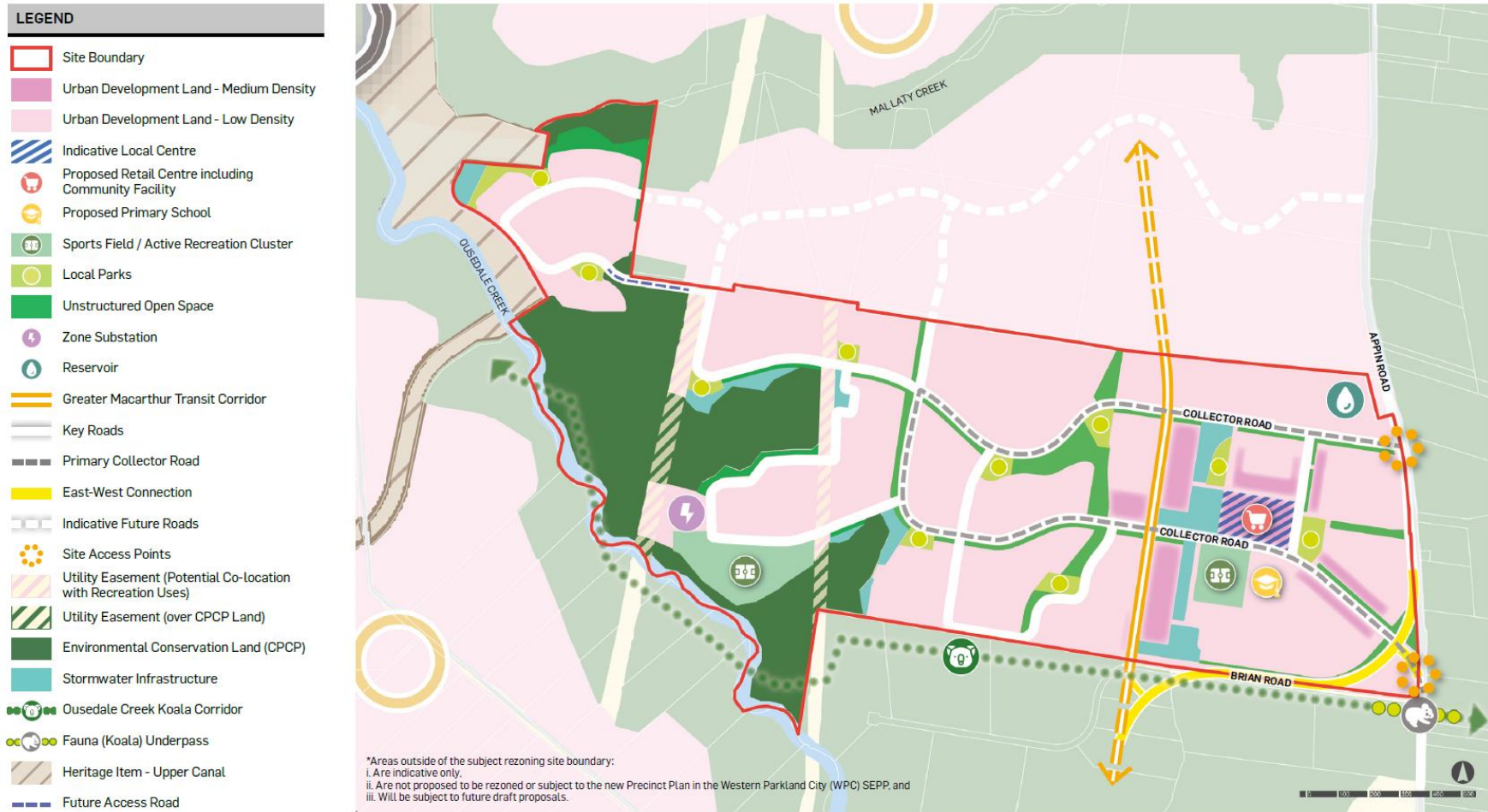


Figure 7: Draft Structure Plan – per Urbis

The Draft Structure Plan (DSP) is at Figure 7 and this Planning Proposal seeks to change the existing zoning to facilitate the combination of urban development opportunities and conservation outcomes shown in the DSP. The intended outcomes of the Planning Proposal are:

1. To permit residential subdivision with a range of housing types and ancillary public infrastructure (e.g. school, parks, fields);
2. To ensure that future development is carried out in a manner that will integrate with the adjoining existing and adjoining future uses with respect to vehicular access and traffic;
3. To ensure that the environmental constraints can be managed in a sustainable manner without limiting the development potential of the site and adjoining properties;
4. To protect and preserve areas of high conservation value to be zoned C2 Conservation and add to these areas with land to be restored as part of the overall CPCP; and
5. To protect human life and minimise impacts on property from the threat of bushfire.

The site is on Bushfire Prone Land (BPL). The Planning Proposal has been designed to meet the bushfire requirements within the *Environmental Planning and Assessment Act, 1979* (EPA Act), specifically Direction 4.4 *Planning for Bush Fire Protection* which applies to Planning Proposals that affect, or are in close proximity to, land mapped as BPL. This report demonstrates compliance with the NSW Rural Fire Service (RFS) document *Planning for Bushfire Protection 2019* (PBP).

4. Credentials

This assessment has been prepared by David Lemcke and Lew Short from Blackash Bushfire Consulting. Current Curriculum Vitae are at Appendix 2.

David Lemcke is a Senior Planner & Bushfire Specialist who is an active senior RFS volunteer, with over 20 years in the service, having been a field officer for 14 years, with incident management experience at local level and he has held multiple brigade Executive roles. Dave is an experienced planner with over 20 years experience in local government holding numerous qualifications including a Master of Environmental Planning and Advanced Diploma of Public Safety (Emergency Management).

Lew Short is the Principal at Blackash Bushfire Consulting (FPAA BPAD-A Certified Practitioner No. BPD-PA-16373) who is recognised by the RFS as qualified in bushfire risk assessment and has been accredited by the Fire Protection Association of Australia as a Level 3 BPAD qualified consultant.

Lew established and led the Community Resilience Group for the RFS. His areas of responsibility included land use planning, community engagement, education, vulnerable communities, bunkers, Neighbourhood Safer Places, business systems and projects, social media, integrated risk management and environmental management. He was responsible for the establishment, management and leadership of the development assessment function for the RFS at a State level where he was responsible for the assessment of over 80,000 development applications in Bush Fire Prone Areas.

Lew holds several qualifications including undergraduate and post graduate level in environmental management and specialising in bushfire management. Lew is an active Crew Leader with Ku-ring-gai Rural Fire Brigade and has significant operational experience.

Both Lew and David are experts in the bushfire field and can interpret and apply legislation, policy and bushfire requirements while drawing on extensive professional expertise and operational experience.

5. Approach to the Bushfire Strategic Study

The Planning Proposal and design of the site meets the deemed to satisfy requirements of PBP. No alternative solutions or performance-based assessment are required for any part of this assessment.

The strategic planning process provides the opportunity to determine if the site complies with the legislative requirements pertaining to safety and potential risk to life and the capability of the site to comply with various bushfire objectives. This report uses a conservative approach that demonstrates the proposal can meet the legislative and planning requirements. The fundamental issue being tested in this rezoning application, is the determination of the suitability of the site for rezoning, considering bushfire safety and for the ability of future development to comply with PBP. Figure 3 shows the GMGA Structure Plan for future rezoning on and surrounding the site. This application follows the precedent established by recent rezoning and the advanced planning work for sites to the north and south, and the focus on providing much needed housing and associated infrastructure. This is in line with the National Housing Accord announced by the federal government (25 October 2022) which is pledging to address the housing supply and affordability crisis by targeting to build one million well-located homes over five years starting 2024.

Pending approval, detailed information building on this PP Draft Structure Plan will be provided in subsequent development applications. This PP provides opportunity for the plan-making authority and referral agencies to flag areas of concern and to determine the suitability of the proposal for rezoning.

In a bushfire context, strategic land use planning must ensure that future land uses are in appropriate locations to minimise the risk to life and property from bushfire attack. The broad principles which apply to the analysis, and which are demonstrated in this report are¹:

- ensuring land is suitable for development in the context of bushfire risk and broader environmental impacts
- ensuring new development on BPL will comply with the minimum requirements of PBP
- minimising reliance on performance-based solutions
- providing adequate infrastructure associated with emergency evacuation and firefighting operations
- facilitating appropriate ongoing land management practices.

¹ Planning for Bushfire Protection 2019 p. 34

This report will demonstrate that the Planning Proposal affords utilisation of the site for the proposed residential subdivision that is able to meet the acceptable solutions of PBP.

6. Strategic Planning for Bushfires

Land use planning is widely recognised as an important measure for limiting future vulnerabilities and losses in areas of new development and a critical element for building disaster resilient communities.

The physical design and layout of communities and settlements are central to the many functions that sustain the social, economic and environmental support systems for the community. Land use planning provides the opportunity to manage new growth and residual risk resulting from new development by complying with legislation and standards, limiting or modifying the location of new development and influencing its layout. This can limit both the impacts of new development on natural systems, ecosystem services and hazards and the flow on impacts on the existing community, as well as limiting the impacts that natural hazards can have on new development and its users.

The strategic planning system is particularly important in contributing to the creation of resilient, safe and sustainable communities that are in keeping with the policy and intent of government.

The *National Strategy for Disaster Resilience* (2011)² recognises that strategic planning is essential in creating safer and sustainable communities. In keeping with the policy and intent of government at all levels. Priority outcomes of Section 3.6 include:

- *All levels of decision making in land use planning and building control systems take into account information on risks to the social, built, economic and natural environments.*

This SBS has been completed having regard to the following Commonwealth documents:

- *National Strategy for Disaster Resilience* (2011)
- *Land Use Planning for Disaster Resilient Communities* (2020)
- *National Disaster Risk Reduction Framework* (2018)

² NSDR <https://www.homeaffairs.gov.au/emergency/files/national-strategy-disaster-resilience.pdf>

Comprehensive consideration of bushfires and risks in the NSW planning system needs sound understanding of the landscape context and risks, as well as clarity on risk management principles and on the approach to strategic planning and development controls that will adequately mitigate identified risks. Where there are competing policy objectives, such as biodiversity conservation and fuel reduction, an agreed methodology or guidance is critical. As such, planning decisions must be based on the best available evidence and rigorous merits-based assessment to ensure that new development - people, homes and businesses are not exposed to unacceptable risk from bushfire. The framework provided within PBP provides the minimum requirements for new development within bushfire prone areas.

The importance of sound land use planning has been recognised in most significant bushfire inquiries, including Natural Disasters in Australia which noted that land use planning that considers natural hazard risks is the single most important mitigation measure in preventing future disaster losses in areas of new development, and that planning, and development controls must be effective, to ensure that inappropriate developments do not occur³. The application of legislation, policy, and guidelines provides one of the most effective means of bushfire planning to ensure future developments are resilient and capable of protecting life.

This report focuses on disaster resilience which means planners, hazard leaders, emergency managers and other built environment professionals can contribute to:

- understanding and anticipating bushfire risks before they happen and developing more resilient land use and built form tailored to address bushfire risks
- minimising the increase in risks to people and disruptions to social and economic functions when a disaster strikes by ensuring compliance with state requirements for new development in Bushfire Prone Areas.

This report uses the balanced approach provided within NSW for new development in Bushfire Prone Areas (BPA) that recognises the need to protect human life and provide safe operating environments for fire and emergency services, while having due regard to the environmental impacts, development potential of land and the need to cater for growing populations.

³ Ellis, S et al (2004) National Inquiry on Bushfire Mitigation and Management (p.92)

7. Strategic Bushfire Study – Greater Macarthur Growth Area

The SBS-GMGA is referred to as “the study”. In this section – all figures and page references refer to the study document unless otherwise stated. The study was produced for the NSW DPHI in 2021 to evaluate the then current Indicative Land Use Plan for the Land Release Area of the Greater Macarthur Growth Area against the RFS strategic planning criteria outlined in Chapter 4 of PBP.

7.1. The study – Executive Summary

The study concludes in part that the GMGA “*is not exposed to a significantly high bushfire risk*” (p.5). This is based on:

- the overall landscape context;
- the partial ‘sheltering’ of the GMGA from bushfires by existing and increasing development;
- lesser hazard types adjoining much of the GMGA (grasslands to the west);
- discontinuity of fuel and significant impedances to fire spread to and within the GMGA;
- lack of historical precedence of fire spread to the GMGA suggesting low likelihood;
- bushfire weather analysis showing a significantly reduced risk from the south and east; and
- bushfire spread and intensity modelling not indicating a risk beyond which the bushfire protection measures in PBP are founded.

The study makes a number of assumptions within the assessment approach (p. 28). This includes that development areas are fully developed and therefore present no ultimate bushfire risk. It is noted, and Blackash concurs, that careful development staging will be required to manage development until full development is achieved. Specifically, the study assesses the residual risk after implementation of Bushfire Protection Measures (BPM), and aligns with the risk acceptability adopted by PBP, that is, that greater than zero risk is acceptable. Managing the risk to life is the primary goal, with mitigation of the risk using the suite of BPM detailed in PBP underpinning this process. The study assumes detailed assessment through the development process including the current PP and future staged development.

7.2. The study – Bushfire Risk Context

The study recognises the fragmentation of the vegetation and predominance of grassland vegetation to the northwest and west, except for the incised riparian areas containing forest vegetation, and the forest to the east and maps the post development vegetation (Figure 8). This demonstrates the significant sheltering impact of future development and the small areas of convoluted vegetation adjacent to the site.

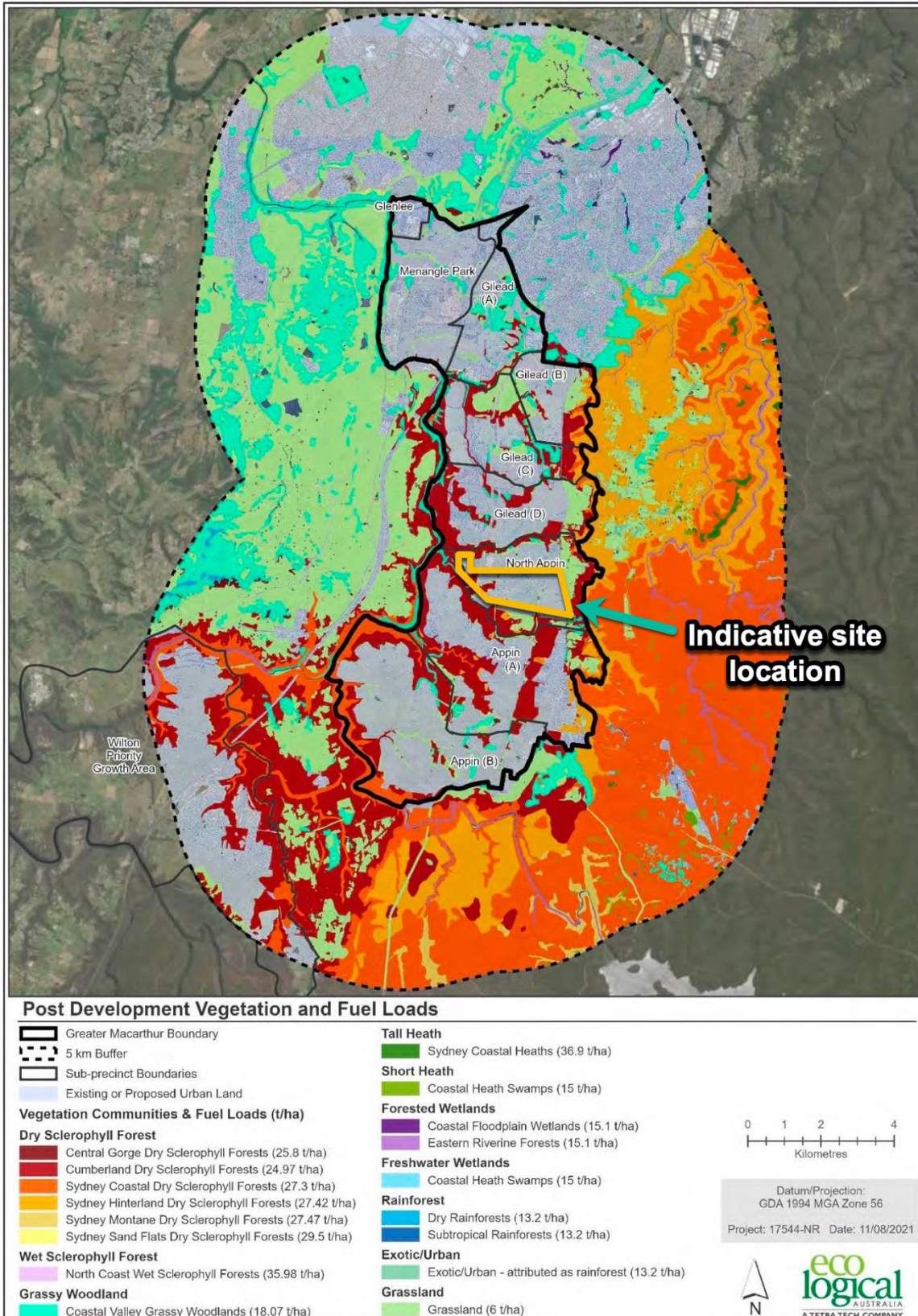


Figure 16: Vegetation Formations and Potential Climax Fuel Loads

Figure 8: SBS - GMGA - Post development vegetation and fuel loads (Figure 16 p. 30)

Each of the precincts within the GMGA are identified within the study and an indicative 'Bushfire Planning Focus Area' placed on each of the precinct maps. This is a 100m buffer from what was shown to be the retained and/or restored vegetation and is shown as the brown outline on the precinct map below (Figure 9).

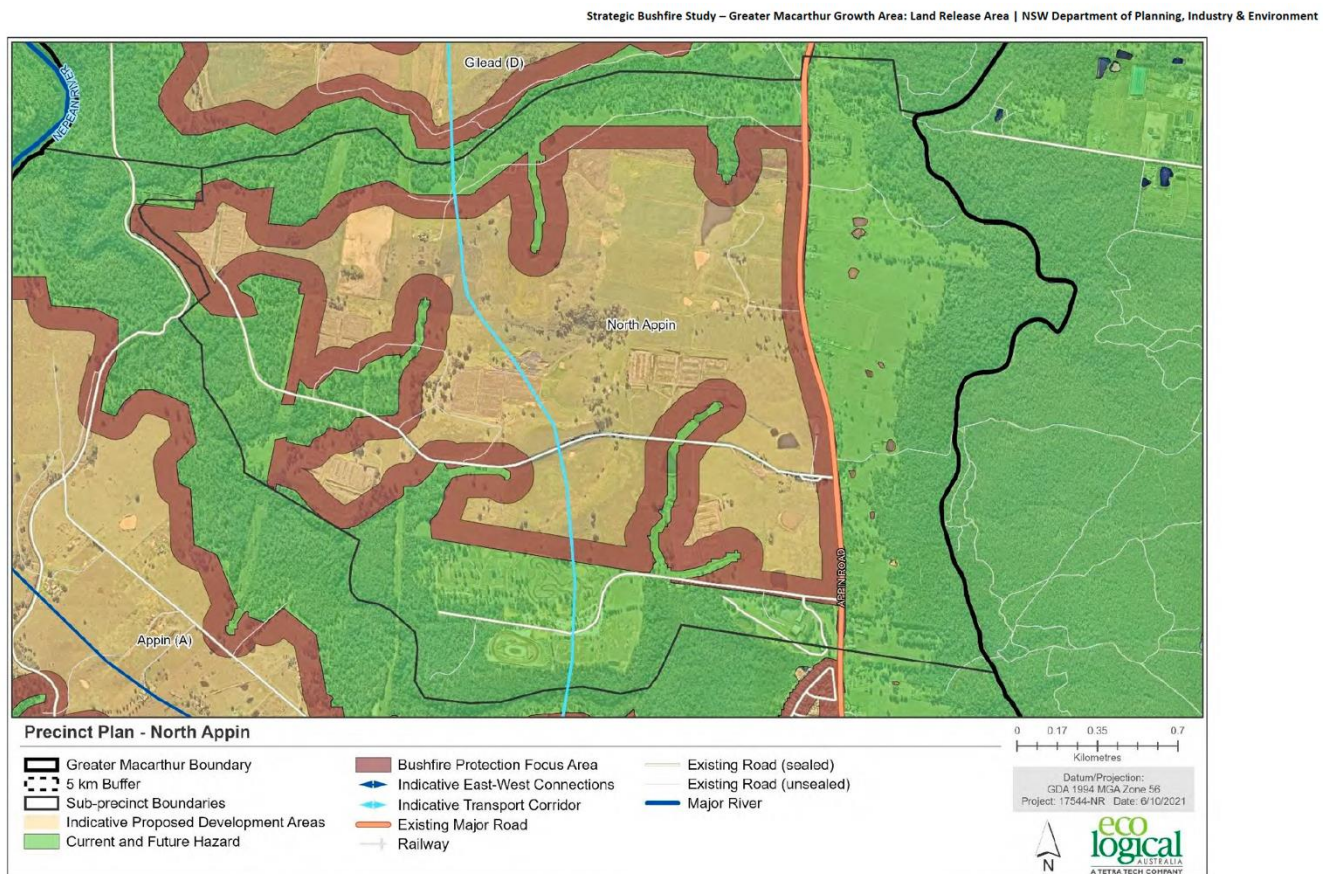


Figure 12: North Appin Precinct

Figure 9: North Appin Precinct map from the study (p. 21)

The study references the local Bushfire Risk Management Plans (BRMP) that focus on bushfires driven by northwest to southwest winds as the most significant threat. An analysis of bushfire weather from different aspects is undertaken and compares the historical Forest Fire Danger Index (FFDI) to the PBP standard for the Greater Sydney Region and Illawarra/Shoalhaven Fire Weather Districts which is set at 100 (p. 29-32). The outcome of the analysis is that the worst fires driven by winds from the southwest to the north have historically had FFDI that exceed the standard FFDI 100 used by PBP, and that fire weather from the north through to the southwest have historically had maximum FFDI considerably less than 100 (Figure 10).

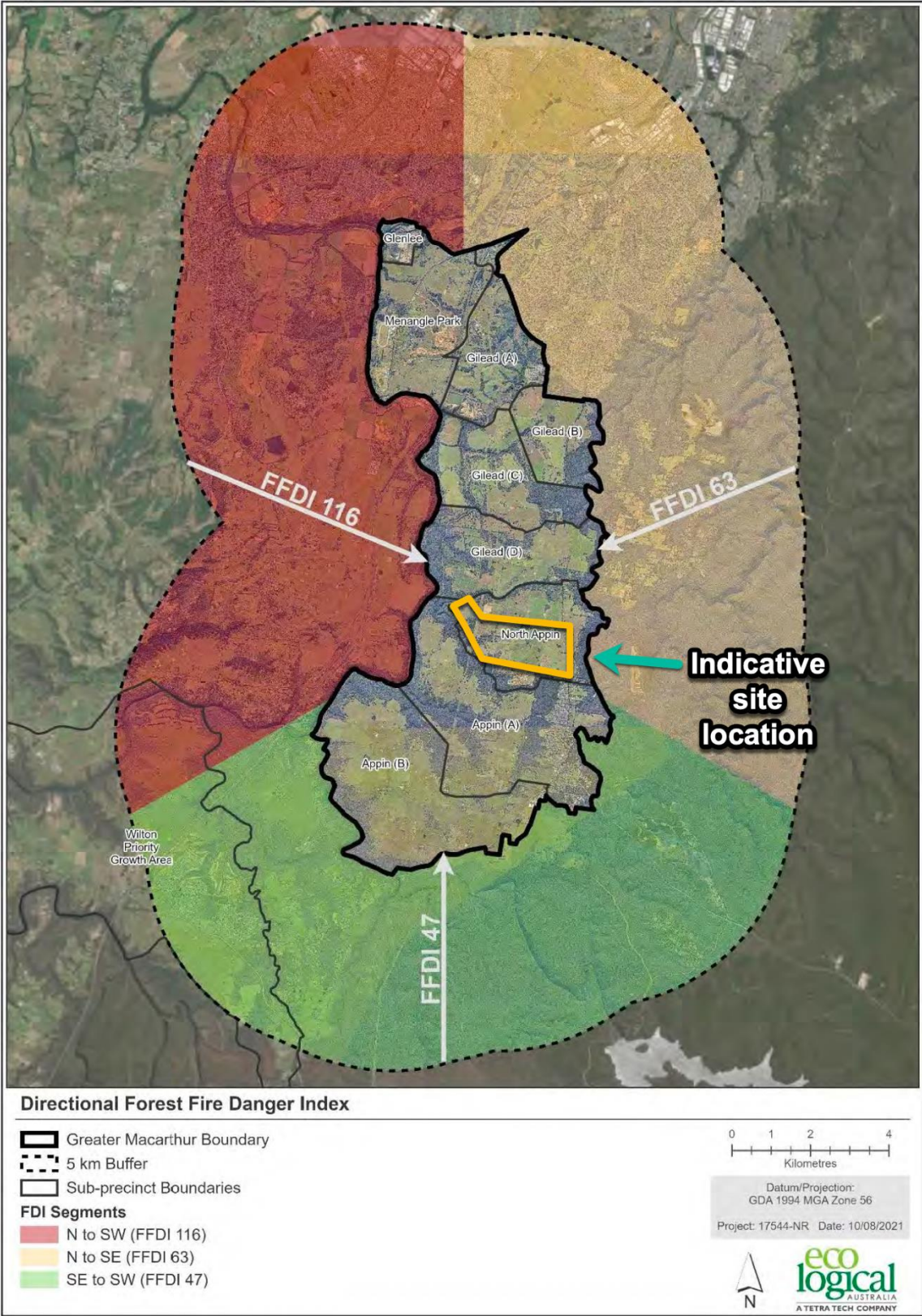


Figure 18: Bushfire Weather Analysis and FFDI Sectors for the Study Area

Figure 10: Summary of maximum historical FFDI related to wind direction (Figure 18 p. 32)

The study then considers the bushfire history since 1963 in the wider area, showing that bushfires of a scale to be mapped have rarely been recorded on the site or from the north through to the northwest and west of the site even though this is the aspect where the fire weather is the highest risk. This likely reflects the rural nature of the land with predominantly grassland vegetation, the fragmentation of the vegetation by roads and rail line, good firefighting access, relatively high local population, significant RFS presence with 22 brigades shown across the wider area, and the constant occupation of the area for agricultural purposes. Figure 11 is an extract from the ePlanning Spatial Viewer showing the location of local RFS brigades. Whilst the study explicitly considers not relying on emergency response it seems clear that the large number of RFS resources (and additional Fire + Rescue NSW brigades) have played a role in limiting the size, spread and frequency of bushfires in the wider area.

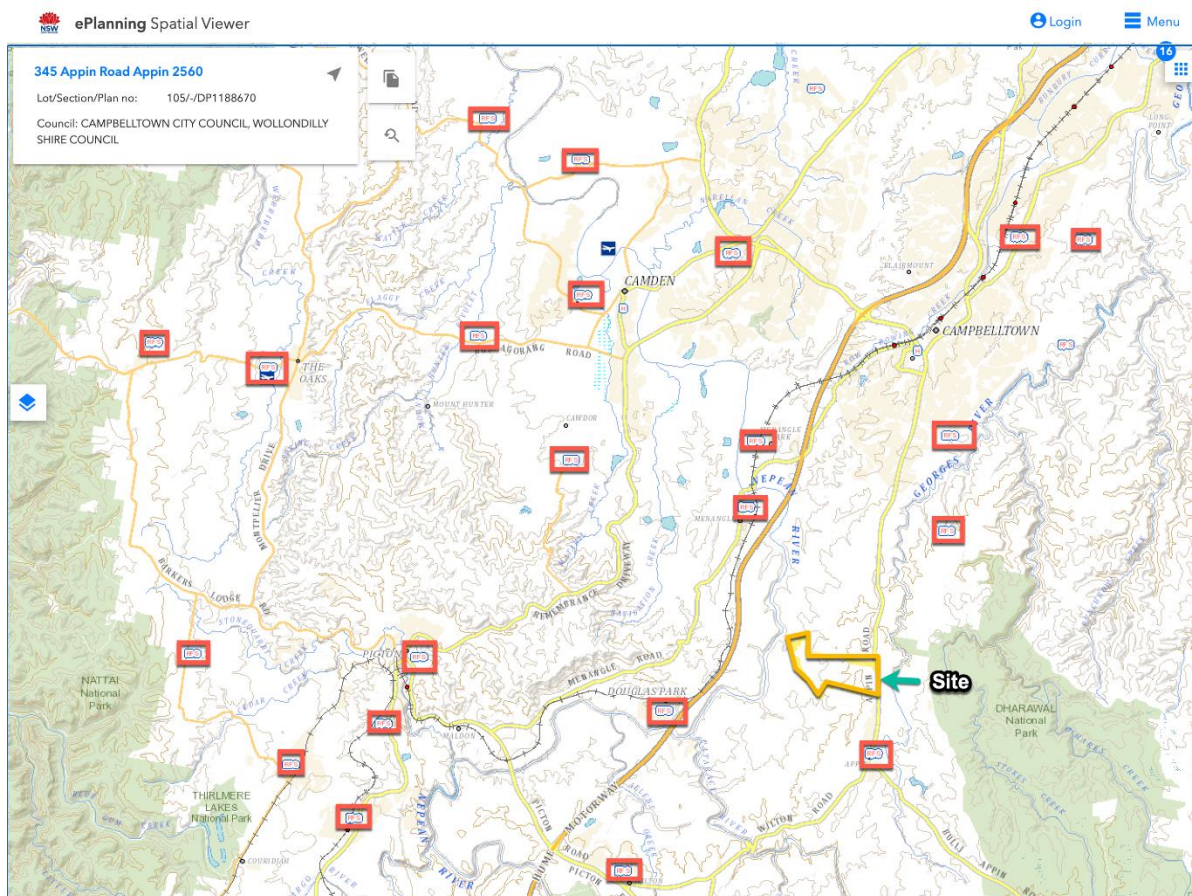


Figure 11: Extract from ePlanning Spatial Viewer highlighting RFS resources in the wider area

Conversely there have been many fires likely starting on the eastern side of the site and driven by north to southwest winds into the extensive forest areas of the water catchment and national park to the east. The evidence suggests that any fires starting to the east area are likely to have been driven by lower FFDI conditions and have been stopped at or near Appin Road at the interface of the forest and rural areas. Figure 12 shows the pattern of historical fires mapped, and Figure 13 shows the frequency of fires.

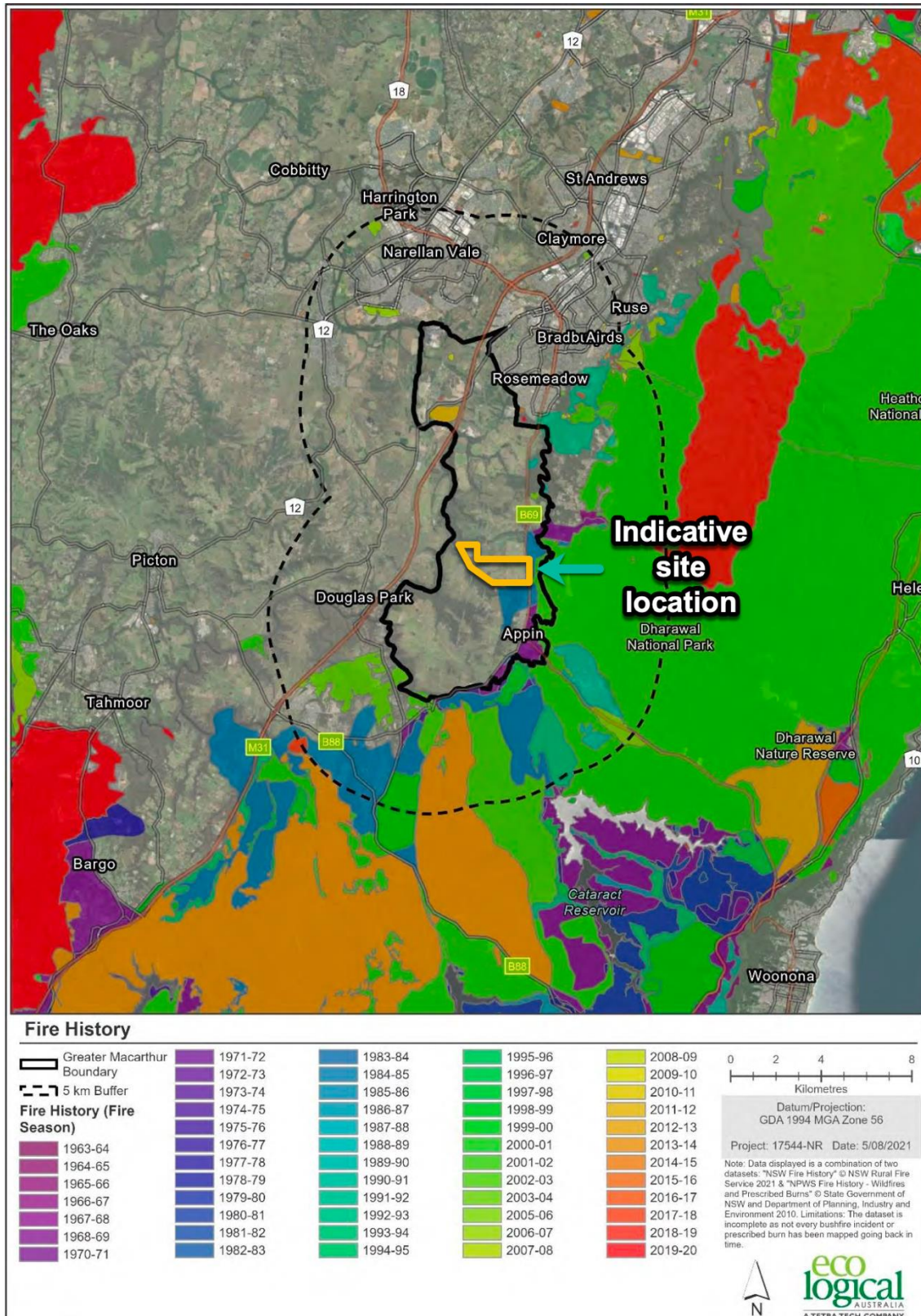


Figure 19: Wildfire History

Figure 12: Wildfire history (Figure 19 p. 34)

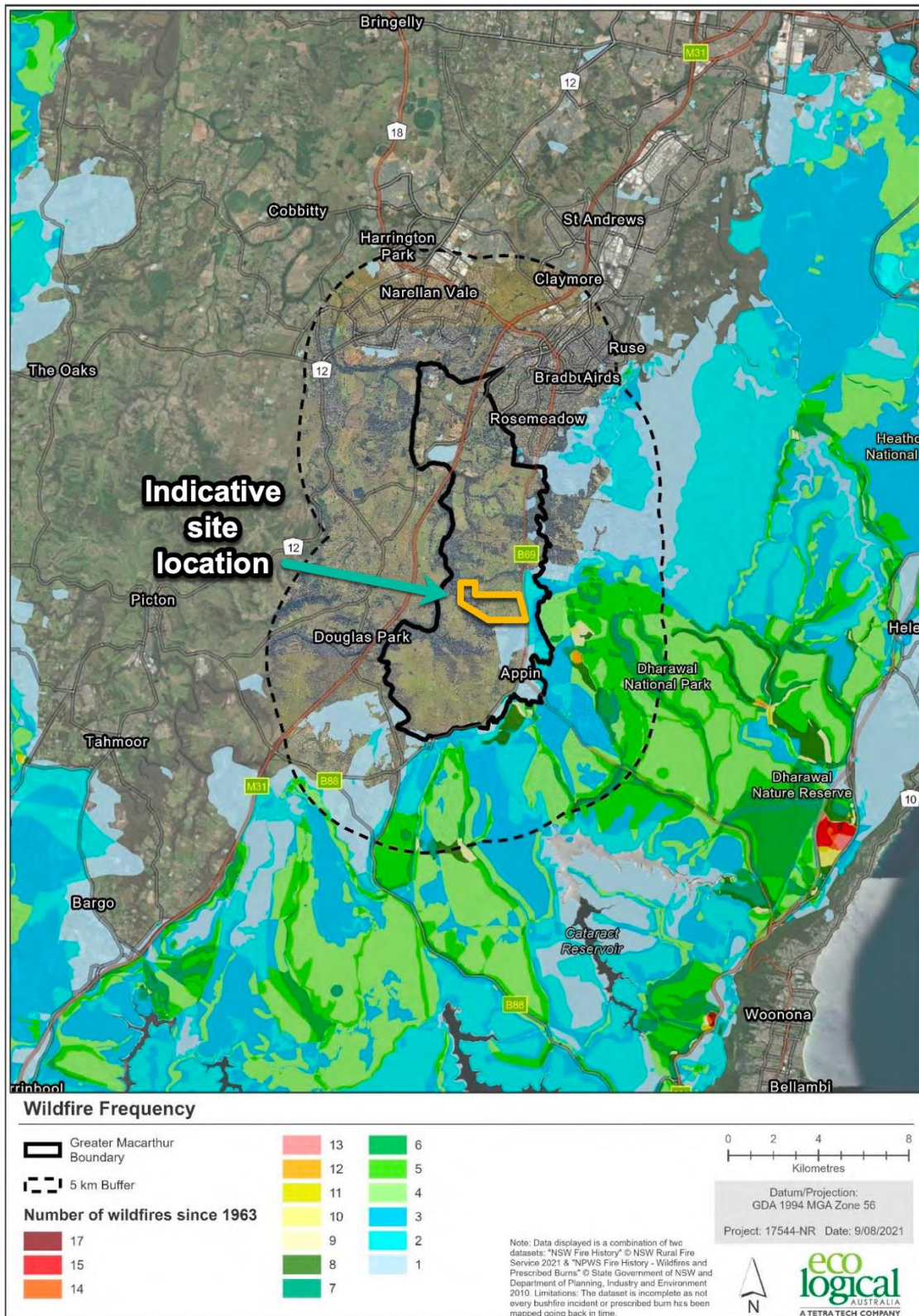


Figure 20: Wildfire Frequency

Figure 13: Fire frequency (Figure 20 p.35)

The study next considers probable bushfire ignition and spread scenarios. The study does not model all scenarios and again considers the combination of fuel types, weather, fuel continuity, terrain and fire suppression. This is related back to the previous evidence of past bushfire records. The study provides an analysis of key ignition and spread scenarios. The conclusion is that the likelihood of bushfires impacting on the post development urban areas of the GMGA range from Very Low to Moderate. (Figure 14).

Table 1: Analysis of Key Bushfire Ignition and Spread Scenarios to Greater Macarthur

Ignition Source	Probable Locations	Potential Bushfire Spread & Impact Scenarios	Likelihood
Lightning Strike	Razorback Range to the west of the Growth Area	Spread to the east under high FFDI through predominately grassland and grassy woodland fuels, however with the potential to spread into the forested Nepean River valley. Potentially impacting the southern parts of the Growth Area at higher intensity.	Low
	Broad ridgelines within the Metropolitan Catchments area, Holsworthy defence estate, or conservation reserves	Spread to the north and west under low to moderate FFDI through predominately forest fuels with the potential to spread into the forested Georges River valley which forms the eastern boundary of the southern portion of the Growth Area. Potential bushfire attack in the Appin Road area (Gilead to Appin) and Wilton Road area at moderate to high intensity.	Very Low
Arson, Accidental Ignitions (e.g. cigarettes, dumped cars etc) and Fire Escapes (Pile Burns etc)	Eastern outskirts of Douglas Park and along Hume Motorway	Spread to the east under high FFDI through a mix of grassland and grassy woodland fuels on undulating land. Would need to cross over the Hume Motorway and other fuel interruptions to spread into forest fuels within the Nepean River valley, before potentially impacting the southern parts of the Growth Area at high intensity.	Low
	Eastern outskirts of Camden South and Menangle	Spread to the east under high FFDI through mostly grassland and grassy woodland fuels on undulating land. Potential to impact the northern parts of the Growth Area in the Menangle Park area or eastern and southern parts but would need to cross over the Hume Motorway and other fuel interruptions to do so.	Very Low
	St Helens Park	Spread to the west under moderate FFDI through predominately forest fuels within Georges River valley, which forms the eastern boundary of the Growth Area. Potential bushfire attack in the Appin Road area (Gilead to Appin) at moderate intensity.	Low
	Within the Growth Area	Ignition within retained vegetation within or around the Growth Area. Spread influenced by wind and weather conditions at the time. Given more severe bushfire weather is likely to be experienced from the western sectors, ignition in the western parts of the Growth Area and spread to the east carries the highest risk. However, given the narrow, fragmented and restricted nature of retained hazard, the bushfire spread of such an ignition would likely only have a limited extent.	Moderate

Figure 14: Analysis of key bushfire ignition and spread scenarios (Table 1 p. 37)

The study then looks at some limited fire spread and fire intensity modelling (recognising the difficulty of modelling every possible situation) and considers the impacts on evacuation from the individual precincts. The conclusions drawn from this high level modelling are essentially that detailed fire modelling in accordance with PBP requirements will be required at each stage of the development process for the individual precincts, as they move from PP to subdivision application. A number of key points are reinforced in the overall analysis of fire spread and intensity modelling that Blackash concurs with:

1. The vast majority of fuel to the northwest and west are grasslands. Wind driven bushfires may spread quickly, however these grass fires burn more quickly and have much shorter burn duration / residence times than forest fires. Grass fires also produce substantially less ember attack potential and are more affected by linear fire breaks in fuel such as roads and rail lines which aid effective bushfire suppression or reduction in spread. Grass fires impacting on transport routes are also less likely to lead to anything other than short road closures due to the reduced fuel loads and shorter fire residence times. The impact of the significant fire weather identified in Figure 9 is limited somewhat by this vegetation pattern and the existing breaks. These conclusions are supported by the clear fire history evidence shown in Figures 12 & 13.
2. The potential for bushfire to penetrate future development areas is significantly limited as the forest vegetation (existing and future) generally runs along the southern side of the site, with only small fingers hazard extending further into the development area. These narrow fingers of bushland along the riparian areas (particularly the western parts of Mallaty and Ousedale Creeks) follow relatively convoluted paths that make it less likely that fires have time to fully develop, and that due to the impact of wind on the fire most of the impact on future development is likely to be that of a lesser intensity flank fire rather than head fires being able to penetrate into the site. The Draft Structure Plan for the site further demonstrates how these fingers of hazard are edged with perimeter roads or sports fields and broken up with stormwater basins. This will be examined further in the next section of this report.
3. The existing suburbs and proposed development areas within GMGA and Wilton Growth Area (WGA) effectively provide an ultimate benefit of limiting bushfire spread and landscape scale fires.
4. There is potential for evacuation routes leaving the site to be impacted by fire on Appin Road. Again, a fire starting west of the GMGA and spreading with a northwest wind is the most likely to have an impact on evacuation routes as fires from the east will burn slower through forest and under less severe fire weather, however fire residence times may be

longer. It is unlikely that both evacuation to the north and to the south are cut simultaneously. Once the indicative north-south transit corridor is established the evacuation issues are significantly reduced as this corridor will be located away from any residual bushfire threat. The study also recognises the precincts are large enough to have capacity for onsite refuge. This relates to large 'interior' areas more than 100m from bushland, and that providing specific on-site refuge areas is best practice strategic planning to provide redundancy. North Appin precinct is identified as one of five where it is stated that careful precinct planning is required with regard to evacuation routes, timing and capacity.

5. The spread and intensity are variable across the GMGA study area and detailed modelling needs to be done at PP and subdivision stage to demonstrate compliance with PBP requirements.
6. The modelling done in the study does not indicate any part of the indicative proposed development area (including North Appin) should be excluded as inappropriate.

7.3. The study - Risk assessment and evaluation – North Appin Precinct

The study then undertakes a 'high level bushfire risk assessment' using a standard five factor model to describe likelihood and consequence for each of the precincts, with the risk rating arrived at by multiplying the scores (Figure 15). This risk rating is of the unmitigated risk, not of the residual risk after applying bushfire protection measures. A higher rating signifies more detailed planning is needed.

Table 5: Likelihood Description

Likelihood Descriptor	Description
Almost certain (5)	The event is expected to occur
Likely (4)	The event will probably occur
Possibly (3)	The event might occur at some time
Unlikely (2)	The event could occur at some time
Rare (1)	The event may occur in exceptional circumstances

Table 6: Consequence Description

Consequence Descriptor	Description
Catastrophic (5)	Widespread death and injury, huge financial loss, irreversible widespread environmental damage
Major (4)	Extensive injury or limited death, major financial loss, irreversible local environmental damage
High (3)	Injury requiring medical treatment, high financial loss, Long-term environmental damage
Medium (2)	First aid, medium financial loss, Short-term environmental damage
Low (1)	No injuries, low financial loss, minor environmental impact

Table 7: Risk Rating

Level of risk	Risk rating
0 - 4	Insignificant
5 - 9	Minor
10 - 14	Moderate
15 - 19	Major
20 - 25	Extreme

Figure 15: Study risk assessment model descriptors (Per SBS – GMGA (p. 52-53))

Figure 16 below is the risk assessment output for the unmitigated risk as considered by the study with explanatory notes as to the rationale.

Precinct	Likelihood (A)	Consequence (B)	Risk Level (A x B)	Risk Rating
North Appin	4	4	16	Major

Notes
Exposed to hazard to the east and west, the later considered a higher risk direction for bushfire attack in terms of likelihood and consequence. Moderate amount of direct exposure to larger areas of bushfire hazard in the east and larger areas of retained vegetation along the northern and southern boundaries of this precinct. Narrow areas of hazard within riparian zones protrude into the precinct from the north and south in retained vegetation corridors, however some may conform to 'Low Hazard' in accord with PBP, which moderates the risk. Exposure to landscape fire risk is lessened by the nature of the connections and hazard within the study area, particularly to the higher risk direction of the west. To the west the hazard is predominately grassland and woodland, with forest vegetation generally restricted just to the Nepean River valley. The likelihood of fire spread to and penetration into the precinct is moderated by restricted bushfire prone vegetation (Figure 15), fuel discontinuity, increased visibility of ignitions (i.e. from Hume Motorway), and suppression opportunities. In addition, areas to the west of the Growth Area between the Nepean River and the Hume Motorway are identified as potential future employment lands (Figure 2), which if realised will significantly limit the spread of fire into the precinct and therefore reduce the risk exposure of the North Appin precinct. BPMs should be able to be adequately provided for this precinct. However, there may be reduced off-site evacuation options in some bushfire attack scenarios, due to the potential fire impact on off-site evacuation routes. Impact on all off-site evacuation routes is possible but is considered of low likelihood. There is good capacity for on-site refuge options to be provided. Conclusion/Recommendation: The bushfire risk is conservatively assessed as Major, based on exposure to hazard in both the east and west, protrusion of retained vegetation corridors and the potential for impact to off-site evacuation options. The likelihood of all off-site evacuation options being lost simultaneously is considered low, however this should be assessed in further detail at precinct planning stage. Precinct planning should be able to provide an appropriate combination of BPMs in accordance with PBP. However, evacuation route, timing and capacity needs to be planned very carefully for this precinct, along with on-site refuge capacity, for redundancy. Provision of on-site refuge capacity is strongly recommended.

Figure 16: Study risk rating for North Appin - unmitigated risk (adapted p. 56-57)

Given the fire history, fragmented broader landscape, permanently managed land on the western boundary (Upper Canal) and other factors discussed in the study, and the comparable issues when compared to surrounding precincts to the north and south it is arguable why this rating has been arrived at. There seems to be little to separate the combination of influences that make North Appin a higher

risk than the Appin A & B and Gilead C & D precincts - rated Moderate. It is acknowledged that this risk assessment is based on a high level assessment and this PP will provide greater detail to clarify the issues at the appropriate scale.

7.4. The study – Conclusions and Recommendations

The study conclusions are summarised as follows with respect to the North Appin Precinct:

- The GMGA does not have an extensive history of wildfire, however there are hazards surrounding the site and the North Appin Precinct.
- In comparison with other areas of NSW the GMGA is not considered to have a significantly high bushfire risk, particularly with regard to the large areas of land available outside the 'bushfire planning focus area' of 100m to bushfire hazard. The risk can be managed by applying the principles and bushfire protection measures in PBP.
- Off-site evacuation is considered a key issue and needs planning as well as on-site refuge locations for redundancy.
- Bushfire spread models demonstrate potential bushfire spread to the edges of the site and limited penetration via retained conservation lands. The bushfire spread modelling should be used conservatively and models do not provide defined estimates of the time needed to seek refuge or evacuate.
- Precincts with elevated (but not significantly high) bushfire risk include Gilead C & D, Appin A & B and North Appin. This finding is primarily in relation to difficulties with off-site evacuation due to impact on evacuation routes. All precincts are noted as having multiple options for off-site evacuation, on-site refuge, and ins-situ sheltering.
- Planning and development control needs to be carefully considered at each stage of the development process and comply with the principles of PBP. Special attention needs to be paid to staging and the planning of infrastructure.
- The level of residual risk after inclusion of bushfire protection measures in PBP is appropriate and the proposed indicative land use plan can meet the PBP strategic planning principles and requirements. Specifically, the principles, aims and objectives and acceptable solutions/performance solutions of PBP can be met or exceeded, without relying on emergency service response, nor a reliance on fuel management on adjoining lands.

8. Legislative Framework

The landuse planning framework as it relates to landuse planning and bushfire in NSW is embedded in the EP&A Act, the *Rural Fires Act 1997* (RF Act), *Rural Fires Regulation 2013* (RFR) which is articulated through PBP.

The GMGA Plan is a regional strategy. Section 4.3 of PBP (RFS 2019) prescribes the following expectations for regional strategies, which essentially involve preparation of a strategic bushfire study (this report) and consultation with the Rural Fire Service (RFS):

These strategies and plans should incorporate the bush fire strategic planning principles set out in section 4.1 while having regard for the priorities of state and local governments in identifying appropriate areas for growth.

The NSW RFS is a key stakeholder and should be consulted in the development of regional strategies and plans to ensure that appropriate strategies are developed and future conflicts do not occur.

8.1. Strategic Planning Phase

The EP&A Act sets out the laws under which planning in NSW takes place. The main parts of the EP&A Act that relate to development assessment and approval are Part 3 (Planning Instruments) and Part 4 (Development Assessment).

EP&A Act Section 9.1 provides for the Planning Minister to direct councils to apply certain standards (detailed in the Direction) when preparing Planning Proposals for consideration. These Directions cover a range of practice areas and carry legislative weight.

Planning Direction 4.4 *Planning for Bush Fire Protection* (Appendix 3) requires Council to consult with the Commissioner of the NSW Rural Fire Service when preparing a Planning Proposal and consider any comments made. Importantly, a Planning Proposal must:

- (a) have regard to Planning for Bush Fire Protection 2019*
- (b) introduce controls that avoid placing inappropriate developments in hazardous areas, and*
- (c) ensure that bushfire hazard reduction is not prohibited within the APZ.*

Chapter 4 of PBP controls Strategic Planning, and details what must be included in an SBS. The SBS must be considered by the Gateway authority, before any Planning Proposal to amend an LEP can be submitted to DPHI. The SBS will be considered by DPHI as part of the Gateway Determination. This determines whether the Planning Proposal should proceed further, or not, towards becoming an Environmental Planning Instrument (EPI).

EPIs are statutory plans made under Part 3 of the EP&A Act that guide development and land use. These plans include State Environmental Planning Policies (SEPPs) and Local Environmental Plans (LEPs). LEPs zone land and provide controls for a suitable range of permissible uses to be considered in more detail at the development assessment stage.

8.2. Development Assessment

Bushfire Prone Land (BPL) is designated in accordance with s.10.3 of the EP&A Act. BPL is land which can support a bushfire or is subject to bushfire attack, that has been identified and mapped by the local council and certified by the Commissioner of the RFS.

Integrated development, under Division 4.8 of the EP&A Act, is development requiring consent and one or more additional approvals. Section 4.46 of the EP&A Act requires a Bushfire Safety Authority (BSA) from the RFS under Section 100B of the RFA for residential and rural residential subdivision, or development of land for a Special Fire Protection Purpose (SFPP) on BPL. An application for a BFSA must address the extent to which the development complies with PBP.

A BFSA authorises development to the extent that it complies with PBP including requirements for Asset Protection Zones (APZ), construction standards, landscaping, provision of water supply & utilities, access, and emergency management arrangements in combination considered by the Commissioner necessary to protect persons, property or the environment from danger that may arise from a bushfire.

New residential or rural residential subdivision development needs to justify that the Planning Proposal results in development that can achieve a worst-case Bushfire Attack Level (BAL) of a maximum of BAL-29.

Building work on BPL must comply with the requirements of the *National Construction Code (NCC)*. Under the Deemed to Satisfy provisions of the NCC, building work on BPL must comply with Australian Standard 3959-2018 *Construction of buildings in bushfire-prone areas (AS 3959)* or the National

Association of Steel Framed Housing (2014) *Steel Framed Construction in Bushfire Areas* (NASH Standard).

8.3. General Obligations

All owners and land managers (both public and private) have a duty to prevent the occurrence and spread of bushfires on or from their land. This duty is legislated under Section 63 of the RFA.

Local risk mitigation is coordinated through Bushfire Risk Management Plans (BRMP). These guide programs to implement specific treatments. Treatments may include such things as hazard reduction burning, establishing and maintaining APZ, grazing, preparing pre-incident plans, establishing and maintaining fire trails and community engagement. These may be applied to public and private landowners and as notified steps carry the legislative weight of Section 63.

9. Planning for Bush Fire Protection 2019

The specific objective of this SBS is to assess the proposed development with the strategic assessment considerations in Chapter 4 of PBP. The SBS provides the opportunity to assess whether new development is appropriate in the bushfire hazard context at a strategic or landscape scale. It also provides the ability to assess the strategic implications of future development for bushfire mitigation and management. The SBS must first demonstrate the proposal complies with the overall Aim and Objectives of the document.

All new development on bushfire prone land must comply with PBP.

The **aim** of PBP (p. 10) is:

- *to provide for the protection of human life and minimise impacts on property from the threat of bushfire, while having due regard to development potential, site characteristics and protection of the environment.*

The **objectives** (PBP p. 10) are 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 which, in combination with other measures, prevent the likely fire spread to buildings
- Ensure that appropriate operational access and egress for emergency service personnel and occupants is available
- Provide for ongoing management and maintenance of Bushfire Protection Measures; and
- Ensure that utility services are adequate to meet the needs of firefighters

Chapter 4 of PBP articulates the regulatory framework for Planning Proposals in NSW, along with a series of assessment considerations that are required before a determination can be made regarding a Planning Proposal.

PBP Section 4.2 (in part, p. 34):

A Strategic Bush Fire Study must include, as a minimum, the components in Table 4.2.1.

Once these strategic issues have been addressed, an assessment of whether the proposal can comply with this document should be carried out. If the strategic issues cannot be resolved, then the proposal cannot comply with PBP and will not be supported by the NSW RFS.

Strategic planning will need to take account of the next level of detail required at Development Application (DA), but without needing to provide complete final project plans, or full assessments for each lot or development proposed. This is designed to provide flexibility for later project stages while progressing the rezoning to permit the new uses.

To achieve compliance with PBP at DA stage, proposals must comply with either the acceptable solutions or the performance criteria, or a combination of both. While PBP is a performance-based document, the RFS have determined minimum standards for new development (PBP p. 26 and within each performance criteria – p. 43-48 for residential subdivision and p. 55 -61 for SFPP development).

- For new residential development, potential building footprints must not be exposed to radiant heat levels exceeding 29 kW/m² on each proposed lot (calculated on a flame temperature of 1090 Kelvin); and
- SFPP developments, radiant heat levels of greater than 10kW/m² (calculated at flame temperature of 1200K) will not be experienced on any part of the building.

Some dispensations are provided for specific types of SFPP development such as camping, bed and breakfast/ farm stay, ecotourism, and manufactured home estates (PBP p. 55). Commercial, industrial, and “other” development must meet the aim and objectives of PBP.

9.1. Strategic Planning Compliance

PBP requires that Planning Proposals in bushfire prone areas require the preparation of a SBS. This SBS has been completed using the deemed to satisfy provisions within PBP. For strategic level assessment, this requirement relies on the application providing complying asset protection zones (APZ) for the proposed development, roads and access provisions and the provision of services (water, electricity and gas) that are able to meet PBP.

The SBS is a strategic level assessment, requiring a balance between providing sufficient information to determine the suitability of the site, without overly burdening proponents with detail to be managed / finalised at subsequent DA stage. PBP (p. 19) notes that:

The most important objective for strategic planning is to identify whether new development is appropriate subject to the identified bushfire risk on a landscape scale. An assessment of proposed land uses and potential for development to impact on existing infrastructure is also a key element of the strategic planning process in bushfire prone areas. Land use planning policies can be introduced to limit the number of people exposed to unacceptable risk.

Once development has been assessed as being appropriate in its bush fire prone context, it will need to be capable of complying with PBP. The ability of proposed land uses and associated future developments to comply with PBP will be assessed at the strategic planning stage. The expectation will be that the development will be able to comply with PBP at the DA stage.

The design team has considered and responded to the bushfire requirements within PBP. In a bushfire context, the design team has provided a Planning Proposal that ensures future residential lots are capable of being subdivided that are in appropriate locations to minimise the risk to life and property from bushfire attack. Future development will be able to comply with PBP at the DA stage.

The design team has incorporated the broad principles PBP (p. 34) for strategic planning into the Planning Proposal which apply to the risk assessment of an area which includes:

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

PBP also outlines exclusion of inappropriate development in bushfire prone areas which includes:

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

PBP requires that the SBS must include, as a minimum, the components identified in Table 4.2.1 of PBP – Bushfire Strategic Study (p.35) as shown in Figure 17.

ISSUE	DETAIL	ASSESSMENT CONSIDERATIONS
Bush fire landscape assessment	A bush fire landscape assessment considers the likelihood of a bush fire, its potential severity and intensity and the potential impact on life and property in the context of the broader surrounding landscape.	➤ The bush fire hazard in the surrounding area, including: ➤ Vegetation ➤ Topography ➤ Weather ➤ The potential fire behaviour that might be generated based on the above; ➤ Any history of bush fire in the area; ➤ Potential fire runs into the site and the intensity of such fire runs; and ➤ The difficulty in accessing and suppressing a fire, the continuity of bush fire hazards or the fragmentation of landscape fuels and the complexity of the associated terrain.
Land use assessment	The land use assessment will identify the most appropriate locations within the masterplan area or site layout for the proposed land uses.	➤ The risk profile of different areas of the development layout based on the above landscape study; ➤ The proposed land use zones and permitted uses; ➤ The most appropriate siting of different land uses based on risk profiles within the site (i.e. not locating development on ridge tops, SFPP development to be located in lower risk areas of the site); and ➤ The impact of the siting of these uses on APZ provision.
Access and egress	A study of the existing and proposed road networks both within and external to the masterplan area or site layout.	➤ The capacity for the proposed road network to deal with evacuating residents and responding emergency services, based on the existing and proposed community profile; ➤ The location of key access routes and direction of travel; and ➤ The potential for development to be isolated in the event of a bush fire.
Emergency services	An assessment of the future impact of new development on emergency services.	➤ Consideration of the increase in demand for emergency services responding to a bush fire emergency including the need for new stations/brigades; and ➤ Impact on the ability of emergency services to carry out fire suppression in a bush fire emergency.
Infrastructure	An assessment of the issues associated with infrastructure and utilities.	➤ The ability of the reticulated water system to deal with a major bush fire event in terms of pressures, flows, and spacing of hydrants; and ➤ Life safety issues associated with fire and proximity to high voltage power lines, natural gas supply lines etc.
Adjoining land	The impact of new development on adjoining landowners and their ability to undertake bush fire management.	➤ Consideration of the implications of a change in land use on adjoining land including increased pressure on BPMs through the implementation of Bush Fire Management Plans.

Figure 17: Requirements of a Bush Fire Strategic Study (PBP p. 35)

10. Bushfire Landscape Assessment - Context

10.1. Bushfire Prone Land

The site is identified as being within 'bushfire prone land' (see Figure 18) for the purposes of Section 10.3 of the EPA Act and the legislative requirements for development on BPL are applicable.

Bushfire Prone Land Maps (BPLM) provide a trigger for the development assessment provisions and consideration of sites that are bushfire prone. BPL is land that has been identified by council, which can support a bushfire or is subject to bushfire attack. The BPLM are prepared by local councils and certified by the Commissioner of the NSW RFS.

BPLM map vegetation hazards and provide a suitable buffer distance from that vegetation. They are an indication of potential bushfire attack only and are not a risk assessment of land.

The current Campbelltown BPLM is considered to reasonable accurately to identify land that is capable of sustaining a bushfire and areas that may be subject to bushfire attack. The Wollondilly BPLM has not been updated to include the Category 3 Grassland Vegetation. The maps show the site is affected by Category 1 (Forest) vegetation and associated buffer in the riparian areas, and it is noted that the site is also affected by Category 3 Grasslands across the remainder of the site.

The critical consideration here is that at the PP stage it is more important to consider the BPLM is based on the contemporary situation, rather than what will be the case as development occurs across the GMGA that will have a very large urban development component. The BPLM remains a simple trigger to indicate hazard to be considered during stages of the development process.

 Subject Land

Bushfire Prone Land

 Vegetation Category 1

 Vegetation Category 2

Vegetation Category 3

Vegetation Buffer



Date: 28/06/2023

Category	Number of People
Do not use the Internet	250
Use the Internet	250

Metres

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

المجلس الأعلى للدراسات والبحوث في جامعة القاهرة

10.2. Landscape Assessment – Scale Context

The bushfire landscape assessment 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. The broader landscape and the potential size or scale of a bushfire has been a key design response by the project team throughout the preparation of the Planning Proposal.

The likelihood of a bushfire, its severity and intensity, and the potential impact on life and property varies depending on where a site is located in the landscape. The site is subject to a range of environmental and historical influences features which provide the current urban form of the area, including bushfire, vegetation corridors, existing land uses, drainage and ecology/biodiversity values. The site is located within a landscape with significant areas of existing rural uses development on all aspects except to the east. As discussed in Section 7 of this report, the SBS - GMGA has undertaken substantial assessment of the landscape at a large scale including consideration of the future development pattern which is appropriately considered at Gateway stage rather than simply considering the current development pattern. This SBS report provides greater detail and a smaller scale consideration of the North Appin (part) Precinct specifically.

As explored in the SBS – GMGA, the significant fire weather threat is very clearly from the north through the west to the southwest, with substantially lower FFDI associated with weather impacts from the southwest through the east and to the north. This means significant fires starting in the south / east are much less likely to significantly impact the site due to significantly lower FFDI. In addition, the spread through forest vegetation tends to be slower than the grassland wind driven spread. This is significant as the site will have the full suite of BPM once developed including shelter in place options and limited need for evacuation undertaken hurriedly.

The threat from the west of the site under bad fire weather conditions is significant, however as discussed in Section 3, consideration of the highly fragmented landscape needs to include examination of the Upper Canal and its extensive ongoing management arrangements. The management regime for the Upper Canal includes close attention to the removal of vegetation for the purpose of maintaining the integrity of the structure, and permanent heavy plant and vehicle access for ongoing maintenance.

This PP must consider the ultimate development pattern that is foreseen by the GMGA. Over time as development proceeds most of the bushfire vegetation will become urban development with the retained vegetation predominantly riparian corridors of only 40-100 metres width that have perimeter roads providing both a buffer to development and access for firefighting. These riparian corridors are convoluted and have multiple changes of direction making it difficult for a fire to spread and develop as it would in more open conditions. Whilst these corridors will be able to sustain fire they will not have

sufficient vegetation for large fully developed fires to be carried into the planning proposal area. As all development will be staged, the subdivision application stage of the development process will manage bushfire risks at individual stages.

Two types of considerations are relevant in terms of assessing the bushfire hazard including:

- landscape scale hazard – where large expanses of bushland over tens to hundreds of hectares are located in immediate proximity to, and may traverse, urban periphery suburbs/townships
- localised hazard – which is most commonly presented by fragmented areas of vegetation larger than 1 hectare in size

These two types of hazard present different types of fire behaviour, fire intensity and potential rate of spread characteristics. The site is currently exposed to both landscape scale risk and localised bushfire risk. For the purposes of this strategic risk assessment however, the primary focus remains on localised hazard and risk only anticipating future development. This development may also include development in the area between the Nepean River and Menangle Road, which is currently under investigation for an expansion of urban development.

10.3. Assessment against adopted Bush Fire Risk Management Plans

The Macarthur and Wollondilly/Wingecaribee Bush Fire Management Committees (BFMCs) are made up of local representatives of emergency services, land managers and the relevant Councils. They are appointed to the respective BFMCs as they are considered the most expert bushfire management practitioners in their agencies in their respective local areas (note some individuals may be members of both BFMCs). Their role is to combine both expert knowledge of bushfire and emergency management, and local knowledge to develop plans and priorities for bushfire risk management actions for their respective local areas.

The BFMCS are responsible for producing the *Macarthur Bush Fire Risk Management Plan 2012* ⁴ and the *Wollondilly/Wingecaribee Bush Fire Risk Management Plan 2017*. ⁵ These Bush Fire Risk Management Plans (BFRMP) are legislatively required under the *Rural Fires Act 1997* (RFA) and are strategic documents that identify community assets at risk, rates the relative risks and set out a five-year program of coordinated multi-agency treatments to reduce the risk of bush fire to the assets. Treatments may include such things as mechanical hazard reduction (e.g., slashing, mowing), hazard reduction burning, grazing, community education and fire trail maintenance. The BFRMP uses a state-wide methodology to risk assess all assets across the state consistently.

The individual BFRMP will be analysed to determine the relative risk applied to the area by the respective BFMCS.

10.4. Macarthur Bush Fire Risk Management Plan Assessment

The Macarthur BFMCS area includes the Campbelltown, Liverpool and Camden Local Government Areas (LGA) and covers the southwestern Sydney corridor between the Georges and Nepean Rivers. The area covers a fast growing area with a mixture of rural and urban land.

The BFRMP (p.8-10) outlines the following relevant information for context:

Climate and bush fire season

The Macarthur BFMCS area of responsibility generally experiences a warm temperate climate, with high summer rainfalls between January and March, low relative humidity with little variation throughout the year, and predominant northwest to southerly winds in summer.

Local climatic conditions are influenced by topography and rainfall patterns reflect elevation and distance from the coast. The more eastern portions of the BFMCS area (Campbelltown East) area have traditionally higher rainfall patterns when compared to western areas (Luddenham, Bringelly, and Cobbitty).

⁴ https://www.rfs.nsw.gov.au/_data/assets/pdf_file/0017/2393/Macarthur-BFRMP.pdf

⁵ https://www.rfs.nsw.gov.au/_data/assets/pdf_file/0019/2485/Wollondilly-Wingecaribee-BFRMP.pdf

The warmest months are November to March, with May to August being the cooler, drier months. The greatest period of fire danger occurs after a dry winter and spring, before the onset of rain in summer. Occasional strong winds with cold fronts during summer can lead to extreme fire danger.

During the fire season, weather conditions of concern are hot, dry winds, particularly from the north-west, accompanied by temperatures above 30 degrees and low relative humidity. These conditions are sometimes followed by a rapid change producing strong southerly winds and high intensity storms, with concentrated periods of lightning with little rain. In most years, summer rainfall and slightly higher relative humidity in the latter months of summer generally characterises the end of the fire season.

Population and demographic information

The population of the Macarthur BFMC area in 2021 is approximately 531,000 people.

History of bushfire frequency and ignition cause

The Macarthur Bush Fire Management Committee (BFMC) area has on average 417 bushfires per year, of which annually 5 on average can be considered to be major fires. The BRMP provides examples of major fires from 1965 onwards, noting that each of the examples was a fire starting near Appin Road driven by northwest winds that pushed the fires east into the large, forested areas of the Dharawal National Park and the Woronora Catchment Area.

The main sources of ignition in the Macarthur BFMC area are described as the deliberate misuse of fire and arson.

The Macarthur BFRMP considers Human Settlement Assets at a broad scale of towns, suburbs, villages, or localities. The Planning Proposal site is not identified within the plan as part of any particular Human Settlement Asset, as it is currently undeveloped land see Figure 19.



Figure 19: Macarthur BFRMP extract - map display area 5

The site itself is unrated for bushfire risk. It is instructive to consider the ratings of various surrounding asset groups. An extract from the BFRMP Asset Register forms Figure 20 and shows the focus of high risk assets in the area is generally the interface residential assets to the east of Appin Road and within or adjoining large forested areas. The BRMP generally does not highlight areas to the west of Appin Road despite the weather threat, likely acknowledging the fractured landscape, lower threat vegetation and historical bushfire records and response capability.

Asset No	Asset Type	Asset Name	Asset Location (LGA)	Map No	Risk Rating
0	Human Settlement	Scattered Rural Properties MDA 1	Liverpool LGA (MDA1)	MDA 1	NA (Low)
0	Human Settlement	Scattered Rural Properties within MDA 5	Campbelltown LGA	MDA 5	3A (High)
7	Human Settlement	Interface NYMBOIDA CRS	Campbelltown LGA	MDA 4	1A (Extreme)
8	Human Settlement	Interface LEICHHARDT ST	Campbelltown LGA	MDA 4	1A (Extreme)
9	Human Settlement	Interface CURRAN AVE	Campbelltown LGA	MDA 4	1B (Extreme)
10	Human Settlement	Interface CANBERRA / RESERVE CRS	Campbelltown LGA	MDA 4	1B (Extreme)
11	Human Settlement	Interface LEUMEAH	Campbelltown LGA	MDA 4	1B (Extreme)
12	Human Settlement	Interface PLEASURE POINT	Liverpool LGA	MDA 4	1B (Extreme)
13	Human Settlement	Interface WEST WEDDERBURN	Campbelltown LGA	MDA 5	1B (Extreme)
14	Human Settlement	Watchtower Assembly	Liverpool LGA	MDA 6	1B (Extreme)
15	Cultural Heritage	Ingleburn Military Camp	Campbelltown LGA	MDA 6	1B (Extreme)
29	Human Settlement	Interface KENTLYN	Campbelltown LGA	MDA 4	2A (Very High)
46	Human Settlement	Interface EAST WEDDERBURN	Campbelltown LGA	MDA 5	2A (Very High)

Figure 20: Extracts from Macarthur BRMP Risk Register

The Risk Ratings drive whether there are specific treatments for the various Asset Groups. In this case there are no specific treatments associated with residential assets in or adjacent to the site. Figure 21 provides examples of treatments in the local area. These focus on fuel management in Strategic Fire Advantage Areas (SFAZ), community engagement and maintaining roadside vegetation to minimise ignition potential. The BRMP recognises the risk based on older style development locations, subdivision patterns and the lack of building construction standards prior to the introduction of PBP.

Asset Name and ID Number		Tx ID	Strategy	Strategy Description	Responsible Agencies			Year of Execution				
Interface WEST WEDDERBURN	13	82	Community Education	Implement Community Engagement Strategy	RFS		LGA	[1011]	[1112]	[1213]	[1314]	
		26	Hazard Reduction	Maintain SFAZ (28) (Bellbird North)	RFS		Private		[1112]		[1314]	
		174	Hazard Reduction	Maintain SFAZ (125) Wedderburn/O'Hares Rd	RFS		LGA		[1112]		[1314]	
		84	Ignition Management	Maintain Roadside Vegetation (Wedderburn)	LGA			[1011]	[1112]	[1213]	[1314]	[1415]
Interface EAST WEDDERBURN	46	123	Community Education	Implement Community Engagement Strategy	RFS		LGA	[1011]	[1112]	[1213]	[1314]	
		5	Hazard Reduction	Maintain SFAZ (75) (Katana Rd)	RFS		LGA; Private	[1011]		[1213]	[1314]	[1415]
		124	Hazard Reduction	Maintain SFAZ (116) (East Wedderburn)	DECC		RFS					

Figure 21: Extracts from Macarthur BRMP Treatment Register

It can be concluded that the Macarthur BFMC does not consider the site to be of excessive risk.

10.5. Wollondilly / Wingecaribee Bush Fire Risk Management Plan Assessment

The Wollondilly / Wingecaribee BFMC area includes Wollondilly and Wingecaribee LGAs and covers approximately 525,700 hectares. Land tenure and land use are critical for context, with the vast majority of the Wollondilly / Wingecaribee LGA (~65%) being forested bushland in public ownership as National Park, State Forest, and Council reserves. There is a wide variety of urban, rural residential and primary industry purposes across the BFMC area with bushland and extensive industry such as coal mining, power transmission and water supply infrastructure.

The BFRMP (p.9-10) outlines the following relevant information for context:

Climate and bush fire season

The typical climate in the Wollondilly/ Wingecaribee BFMC area is variable due to topographical and altitudinal differences. The low altitudinal areas north of the highlands experience a warm temperate climate with peak rainfall in the summer and autumn months. The bush fire season in this area is generally from August to December but can extend to March depending on the onset of summer rainfall. South of the highlands is considerably higher in altitude and experience a relatively cool temperate climate with predominantly summer rainfall and the bush fire season generally runs from October to March.

Prevailing weather conditions associated with the bush fire season in the Wollondilly/ Wingecaribee BFMC area usually coincide with strong southwest to northwest winds and influenced by drought and rainfall conditions. There are also frequently dry lightning storms occurring during the bush fire season.

Population and demographic information

The population of the Wollondilly/ Wingecaribee BFMC area is approximately 90,000 people. The major population centres are Bundanoon, Moss Vale, Bowral, Mittagong, Picton, The Oaks, Tahmoor, and Warragamba. The following issues have been identified within the Wollondilly/ Wingecaribee BFMC area as potentially impacting on the ability of certain sections of the community to prepare themselves for bush fire:

Residents of non-English background form a small percentage of the population and are generally dispersed throughout the Local Government Areas.

There are eighteen (18) villages and four (4) large towns that form part of an extensive urban interface with considerable bushland. This is compounded by a major state highway and the Sydney to Melbourne rail line traversing parallel to adjacent bushland interface. Tourism has a major effect on the local economy.

Close proximity to major urban centres of southwest Sydney and the Illawarra exposes the area to many land owners commuting in and out of the highlands. A significant number of land owners also do not reside within the boundaries of the BFMC area.

History of bushfire frequency and ignition cause

The Wollondilly/ Wingecarribee BFMC area has on average 400 bush and grass fires per year, of which a number can be considered to be major fires.

A number of major fires have started in the inhabited areas of the BFMC and travelled in an easterly direction impacting on catchments. Most other major fires have ignited in the west associated with storms and have coincided with extensive dry periods coupled with hot westerly winds.

The main sources of ignition in the Wollondilly/ Wingecarribee BFMC area are:

- Lightning strikes associated with typical summer storm weather patterns
- Arson including dumping of vehicles in bushland
- Pile burns escaping private residents properties

BFRMP references to the Planning Proposal site

The Planning Proposal site is identified as Asset No. 91 and Risk Rated as 2A - Very High. Other assets in the area are generally rated High to Medium to the east of the site, and Medium to Low on the western side of the Nepean River. The 2A - High Risk Rating considers the overall scope of the asset's importance to the local economy and the likelihood of having minimal staff occupation of the site. The assigned Treatments are Community Engagement and Hazard Reduction burning. As the site usage will be changed to urban uses with the benefit of a full suite of BPMs and the majority of the site cleared, it is considered this rating is of little relation to consideration of the future use. No Strategic Fire Advantage Zones (SFAZ) are shown to the north, south or west of the site, possibly relating to the lesser hazard posed by the grassland vegetation, and reflecting the minimal fire history discussed in Section 7.2 of this report.

Figure 22 shows an extract from the Appin Map sheet and Figure 23 contains an extract from the Risk Register with local Asset groups highlighted. Notably, the Appin Village residential area (Asset No. 347) immediately to the south of the site is rated 4 - Medium, and the Rural Properties Menangle (Asset No. 403) to the west of the site are rated 5 - Low.



Figure 22: Extract from Wollondilly / Wingecaribee BFRMP (Appin Map)

Map Ref No.	Asset type	Asset sub type	Asset name	Asset Location	Display area	Likelihood	Consequence	Risk	Priority	Treatment number
91	Economic	Commercial	Inghams Poultry Farms - Appin	Appin	Appin	Likely	Major	Very High	2A	133;134
92	Economic	Commercial	Poultry Farm - Yerrinbool	Yerrinbool	Alpine	Likely	Major	Very High	2A	40;150;52
263	Human Settlement	Other	NSP- Appin/ Main Street	Appin Road, Appin	Appin	Likely	Moderate	High	3A	275
264	Human Settlement	Other	NSP- Adjacent Bargo Hotel	225- 227 Great Southern Road, Bargo	Tahmoor	Likely	Moderate	High	3A	275
301	Human Settlement	Special Fire Protection	Durham Green Retirement Village	Menangle	The Oaks	Likely	Moderate	High	3A	274
310	Economic	Tourist and Recreational	Cataract Scout Camp	Baden Powell Drive, Appin	Appin	Almost certain	Minor	High	3D	280;282
347	Human Settlement	Residential	Appin Village	Appin	Appin	Possible	Moderate	Medium	4	133;134;303;307
348	Economic	Commercial	Maldon Industrial Estate	Picton Rd, Maldon	Tahmoor	Unlikely	Major	Medium	4	295;308
349	Human Settlement	Special Fire Protection	Queen Victoria Hospital	Thirlmere Way, Thirlmere	Tahmoor	Unlikely	Major	Medium	4	298
350	Economic	Infrastructure	Appin Sports Ground	Appin	Appin	Possible	Moderate	Medium	4	296
402	Human Settlement	Residential	Rural Properties Mount Hunter		The Oaks	Unlikely	Moderate	Low	NA	323
403	Human Settlement	Residential	Rural Properties Menangle		The Oaks	Unlikely	Moderate	Low	NA	274
404	Human Settlement	Residential	Camden Park Residential		The Oaks	Unlikely	Moderate	Low	NA	324
405	Human Settlement	Residential	Picton Residential	Picton	Tahmoor	Unlikely	Moderate	Low	NA	319
406	Economic	Infrastructure	330Kv East NS		Appin	Unlikely	Moderate	Low	NA	91

Figure 23: Extract from BFRMP Asset Register (Appendix 2)

It can be concluded that the Wollondilly / Wingecaribee BFMC does not consider the existing development adjoining and adjacent to the planning proposal area site to be of Extreme or Very High Risk. The Very High Risk judged for Asset Group No. 91 is no longer relevant and pertained to the previous intensive agricultural use and characteristics, rather than the future mixture of Urban, Conservation and Infrastructure uses with bushfire risk managed under the requirements of PBP.

10.6. Landscape Scale Assessment Tool (LSAT)

The *Victorian Planning Permit Applications Bushfire Management Overlay – Landscape Scale Threat Assessment* has been used as the framework to assess the broader landscape scale potential of bushfire affecting the site. This document is the only Australian contemporary Landscape Scale methodology with legislative weight. Blackash has expanded and modified the criteria to emphasise the priority of life safety, and the criticality of bushfire Emergency Management and Evacuation Planning as part of the risk assessment process.

The Blackash Landscape Scale Assessment Tool (LSAT) combines quantitative and qualitative techniques which are scaffolded by the *Landscape Scale Threat Assessment* and associated documentation. The approach is shown in Table 1 and uses elements of the Bayesian decision making model and Expert Judgment techniques backed by data. Bayesian decision making has been used where there is both objective and subjective data to analyse, and decisions need to be made on the probability of successful outcomes where there are high levels of uncertainty. Expert Judgement has been used in the assessment and determination of the landscape scale risk.

Blackash Expert Judgement (as outlined in Appendix 2) is applied consistent with the criteria used in the *National Construction Code (NCC)*⁶ Assessment Methods and NSW Land & Environment Court practice that calls up *Schedule 7 – Expert Witness Code of Conduct* in the *Uniform Civil Procedure Rules 2005*.⁷

⁶

https://www.abcb.gov.au/sites/default/files/resources/2021/UTNCC_Using_assessment_methods%20%281%29.pdf

⁷ <https://legislation.nsw.gov.au/view/html/inforce/current/sl-2005-0418#sch.7>

The LSAT provides information on the bushfire hazard more than 150 metres away from the site at a landscape scale. The broader landscape and the potential size or scale of a bushfire has been an important design response in the development of the Planning Proposal. The likelihood of a bushfire, its severity and intensity, and the potential impact on life and property varies depending on where a site is in the broader landscape. Landscape scale fires will place greater pressure on emergency response capability and will have a wider impact on roads and the length of time roads cannot be safely used. This will affect the likelihood of successful evacuations taking place across larger areas and may affect the ability of firefighting resources to be deployed. The broader landscape is shown in Figure 12. Multiple factors have been considered for the landscape scale assessment. Key considerations in our assessment have included:

- extent and continuity of vegetation
- topography
- prevailing winds
- the potential fire run and area that is likely to be impacted by the fire
- the impact on evacuation routes to safer places considering road networks, distances, and landscape factors
- the location and exposure of the development to bushfire
- the ability to seek bushfire shelter on site or at alternative locations
- the extent of neighbourhood-scale damage the bushfire may produce.

PBP refers to the Wollondilly and Campbelltown LGAs being in the Greater Sydney Region Fire Weather Districts respectively, and the appropriate maximum Forest Fire Danger Index (FFDI) to be applied in each LGA is FFDI 100.

Landscape scale fires are those that can span many kilometres or tens of kilometres, and that burn for days or weeks at a time. Typically, these fires can be many thousands of hectares in size with fire fronts many kilometres in length. On the east coast of Australia this scale of fire is only possible where there are very large areas of forested vegetation, typically National Parks and State Forests that also adjoin substantial areas of private bushland.

The landscape scale context is shown at Figure 24. The Planning Proposal site is within a landscape setting that is rapidly changing, and that already has a long history of vegetation modification for agriculture and infrastructure. The planning proposal must be considered in the context of the GMGA growth plan. This effectively results in a rezoning proposal that has urban development on 3 sides of the site, with only fragmented bushland and riparian corridors remaining.

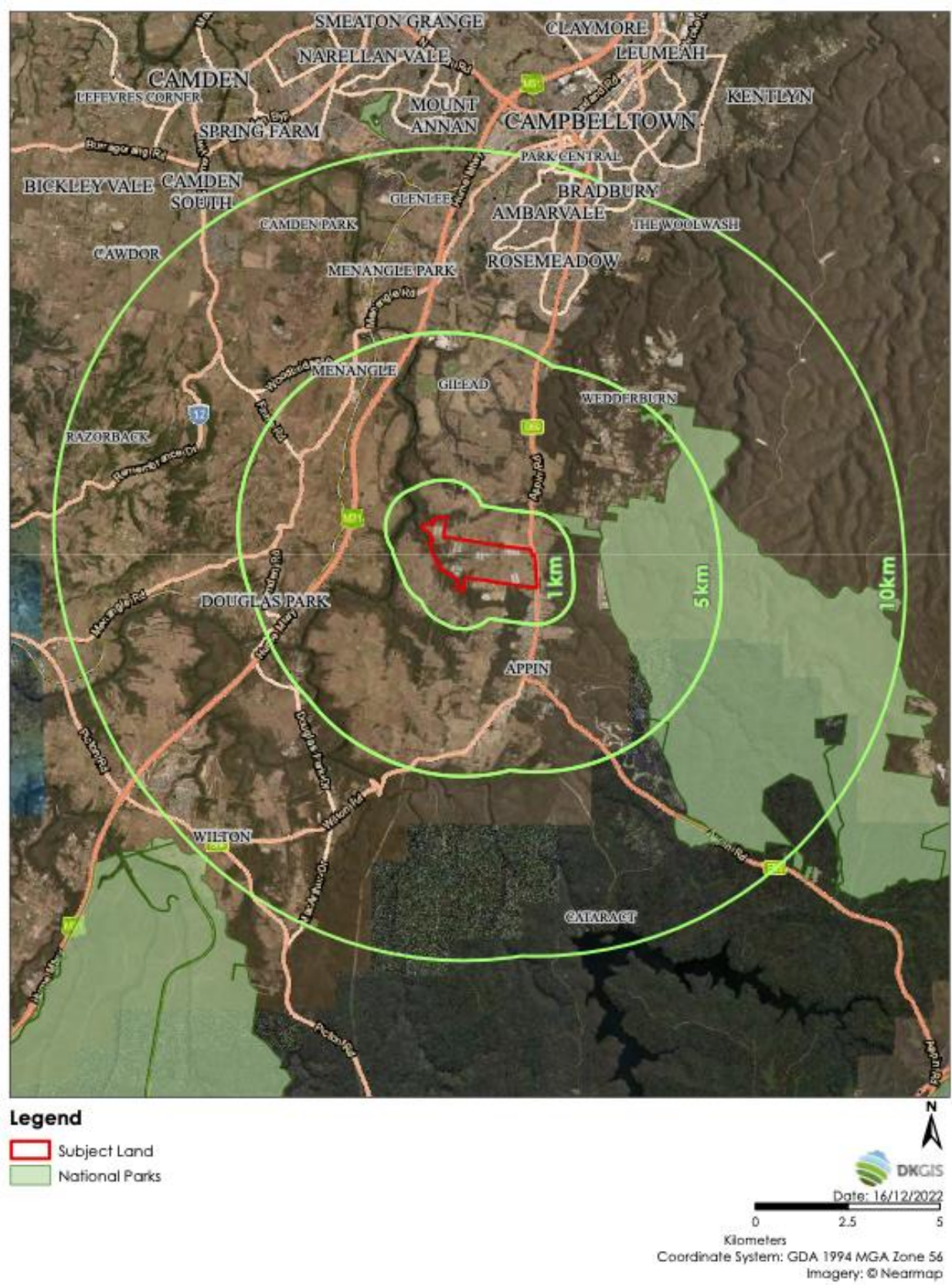


Figure 24: Planning proposal area in context for consideration of landscape scale fires

As the GMGA develops the areas of retained bushland will continue to reduce, and the fragmentation of the remaining bushland by roads and other infrastructure will continue. To the north, northwest and southwest where the fire weather is likely to be the most challenging there are significant breaks in the landscape through the Nepean River gorge, the gorges of the smaller creek lines, the M1 Hume Motorway, the Great Southern Rail Line, and other arterial and local roads such as Moreton Park Road. As the majority of the vegetation from these aspects is grassland, these breaks in the landscape play a very significant role in fragmenting vegetation and providing containment lines or slowing the advance of a bushfire. This is borne out by the fire history maps shown at Figures 12 & 13.

As discussed in Section 3 of this report, and shown in larger scale in Figures 5 & 6, there is a very significant 30-60m wide permanently managed linear fire break along the western boundary of the site formed by the Upper Canal and the management corridor. Figure 25 shows a typical section of the corridor and evidence of the significant and ongoing management to protect the canal. Almost all vegetation has been removed from the corridor and is permanently maintained in this condition. This unique heritage infrastructure exceeds the standards for APZ and provides a permanent linear fire break and firefighting access. This makes it very unlikely that an intense fire can directly impact the site from the west.

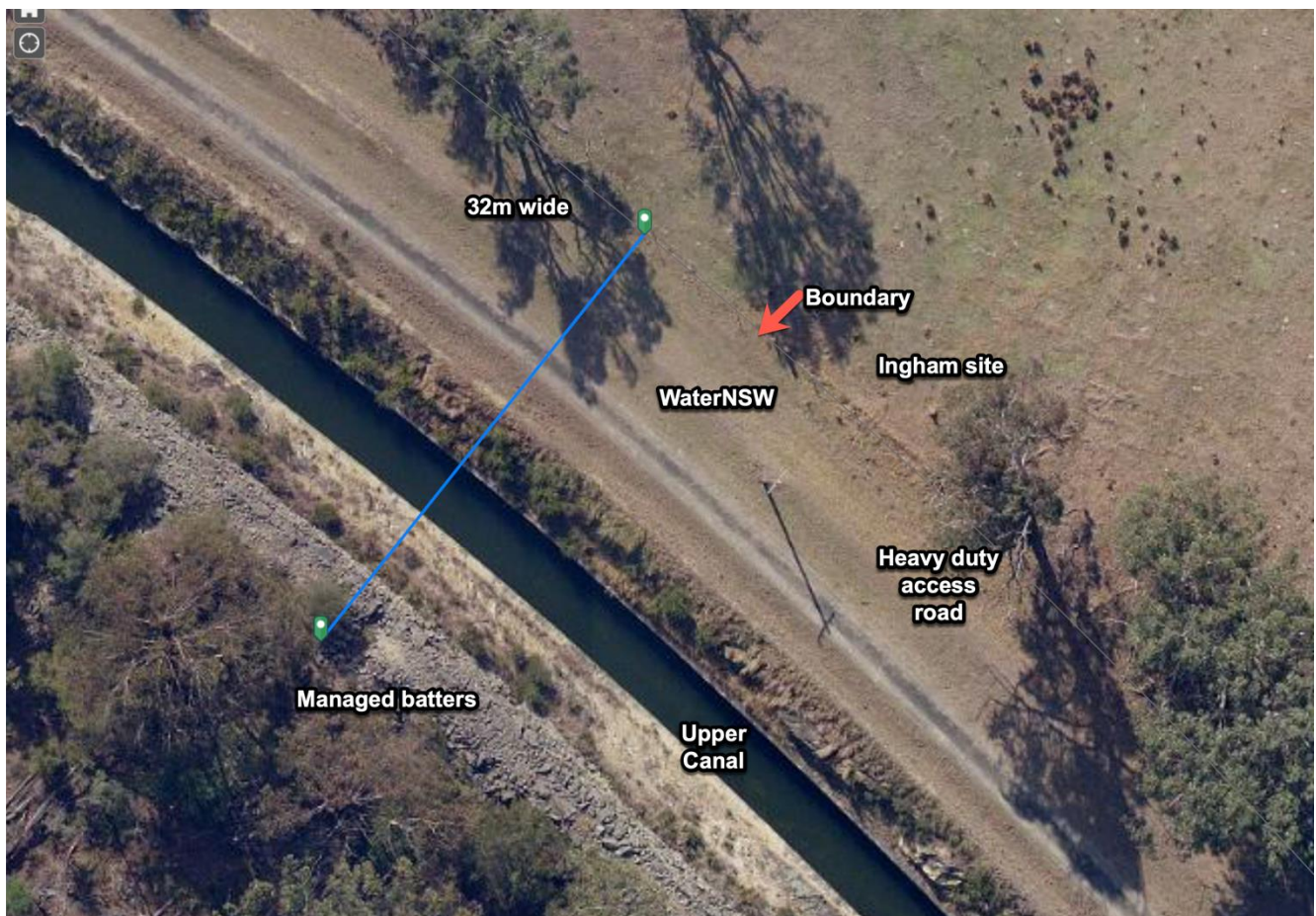


Figure 25: Upper Canal management corridor

Fires that start in the surrounding riparian corridors and the future CPCP corridor have runs that are only measured in a few hundred metres or less, are impacted by the convoluted (meandering) alignments of the creeks, and under many conditions will present flank fires to the future development rather than a more intense head fire. Fires starting in the very large, forested areas east of Appin Road will be either burning away from the site or will be driven by more benign weather conditions as per Figure 10.

These bushfires are not able to develop the size and intensity of a landscape scale fire that can cause neighbourhood scale destruction. These local scale fires may still be significant and can cause local damage, as wherever bushland is retained there will always be some residual risk to manage, however they will not result in widespread property destruction. Local scale fires tend to be noticed immediately by the public and called in to emergency services soon after ignition.

Due to the application of PBP requirements throughout the development process there will be good access for firefighting at the interface; and as seen in Figure 11 there are 22 RFS brigades and several Fire & Rescue NSW stations within approximately 5-30 minutes response time and therefore will be a high likelihood of a significant 'weight of attack' by firefighting services. Weight of attack refers to the number of firefighting resources that are likely to be immediately available to respond to a bushfire and a proxy for this can be used by considering the number of fire stations (Fire & Rescue and RFS) that are within a 20-30 minute response. Modern firefighting arrangements are also better coordinated than in previous decades, and have the use of more resources such as bulk water tankers, heavy plant (e.g. bulldozers and graders), helicopters and Large Air Tankers (LATS) much more readily available, and these enable a major addition to firefighting capabilities, especially on bad fire weather days.

All these characteristics mean that when such fires are ignited there is a relatively quick and effective response meaning that the fire is unlikely to grow to a significant scale. This is not to say that very difficult fire weather days or resources being used elsewhere don't have an impact, simply that there is a low likelihood of any significant fire impacting the study area, and such local fires are likely to be managed with local resources as part of normal emergency operations.

Taking the conservative approach required by PBP, all lots established must be capable of providing practical building envelopes so that future dwellings are built to withstand radiant heat levels of 29kW/m² or less. The planning proposal can accommodate such lots even where riparian and bushland vegetation is retained or improved on the site. Specific Bushfire Attack Levels (BAL) will inform the requirements for specific Asset Protection Zones (APZ) to be incorporated into the individual subdivision stages to ensure the RFS criteria are satisfied.

Overall Landscape Scale Assessment

The LSAT is heavily weighted to life safety and places significant emphasis on the ability for the future community to be able to shelter in place or evacuate safely, whilst emergency services can access the site at the same time. A shelter in place strategy is the primary method of emergency management for ensuring the life safety of the community.

Life safety is a key consideration when considering planning proposals and the concept of whether the site is suitable for development. All future development will be subject to additional detailed bushfire assessment during the development process, from subdivision stage and continuing to individual developments. This will ensure that the requirements of PBP can be met at each stage and will result in built form that meets the appropriate standards for each individual location.

Bushfire will only be able to approach the site through relatively small parcels of bushland to the north, west and south. The vegetated CPCP corridors approved in the PP to the north and south of the site are not considered a significant landscape scale threat given they are relatively narrow and often convoluted riparian corridors. This fragmented landscape pattern does not provide an opportunity for extreme bushfire behaviour associated with landscape scale fires to develop and combined with contemporary PBP standards, is highly unlikely to result in neighbourhood scale destruction.

The site is located on Appin Road which is the current arterial road between Appin and Campbelltown. This road will be upgraded as part of the ongoing development, and the Greater Macarthur transit corridor running north-south is planned as shown in DPHI planning documents for the GMGA including Figure 4. To the southwest an additional transport link is being planned on the Appin (part) Precinct Lands that will ultimately link the GMGA to the M1 Hume Motorway. The Brian Road alignment along the southern boundary of the site will ultimately be developed as the East-west connector between Appin Road and the GM Transit Corridor.

Appin Road has some history of being temporarily impacted by bushfire which may cause short term road closures, however these impacts from fast running fires from the northwest through to the southwest will be short duration events as those fires are predominantly grass fires with a short residence time. Fires from the east are likely to burn under more benign conditions (as discussed in Section 7 and shown in Figure 9) however are predominantly forest fires with longer residence times. As the North Appin Precinct and the GMGA continue to develop the reliance on Appin Road will be reduced by the development of alternative evacuation routes through the proposed transport corridors.

The ultimate development of the North Appin Precinct will result in a large urban area of approximately 350 ha with a north to south distance of approximately 1800m and east-west distance of over 2400m. This will provide a very significant urban area of 'managed land' that will not be capable of carrying a bushfire. All future residents will be capable of moving to an area more than 100m from bushland using local streets and will not have to evacuate the North Appin Precinct to find an immediate life safety refuge. This is demonstrated by Figure 9 taken from the SBS-GMGA and is shown indicatively below in Figure 26.

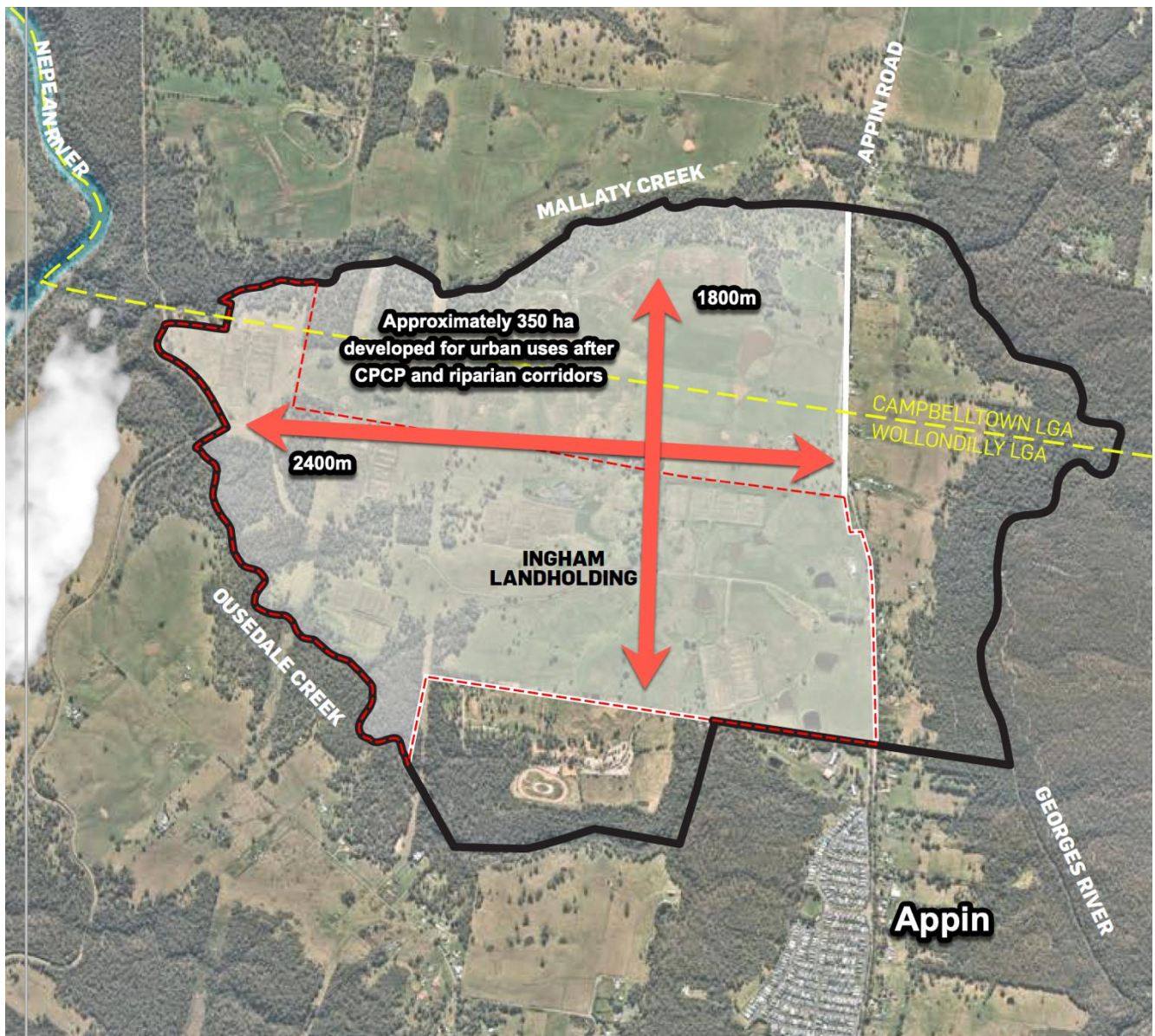


Figure 26: Scale of urban area at full development North Appin Precinct

Whilst the PP retains significant areas of bushland extending into the site, these are also highly fragmented against long fire runs, and will be ringed by suitable combinations of perimeter roads, stormwater infrastructure, sports fields, parks and formal APZ. As these fragmented areas of bushland will not be able to develop or maintain landscape scale fires the ultimate built form will be more than 100 metres from areas of extreme bushfire threat, as opposed to local scale bushfire threat. Once developed all lots in the future subdivisions will be serviced with reticulated water and as per Australian Standards the perimeter roads will have multiple hydrant points for firefighting access. There will be a number of significant water detention basins across the site to manage stormwater and these will also be constructed to provide additional firefighting water supplies.

Much of the ultimate urban development, including the proposed school site, will be more than 100m from any bushland and therefore not considered as bushfire prone land. This includes a proposed commercial area, ovals and school precinct located in the centre of the site, and surrounded by urban development constructed during early stages (1A, 1B & 2). Urban development will be subject to bushfire assessment and specific building standards as required by PBP and AS 3959:2018 (or contemporary documents as time passes) and will therefore offer suitable shelter from bushfire for individual dwellings ultimately approved within the PP site. This shelter in place approach, combined with quick and intuitive self-evacuation away from bushland to within the 350 ha developed area will provide immediate life safety for residents and will reduce the need or desire for evacuations from the site.

When the individual factors are scored, after consideration of the landscape context, the site design complying with PBP, and the large urban area, the overall Landscape Scale Threat for the site is assessed as **Moderate Risk**. The summary and weighted scores are presented in Table 2 below.

Table 2 Blackash Landscape Scale Assessment Tool – Ingham North Appin

Landscape Scale Assessment Tool					
Landscape scale bushfire risk factors					
Parameter	Low landscape scale threat	Moderate landscape scale threat	High landscape scale threat	Extreme landscape scale threat	
1. Surrounding Vegetation	Bushfire cannot directly approach the site as it is surrounded by urban development and non-mapped vegetation or managed land.	Bushfire can only approach from one aspect and the site is within a suburban, township or urban area considered managed land. Typically an island of bushfire vegetation within a wider urban development area or interface site impacted only by linear vegetation corridors of 100m width or less.	Bushfire can approach from more than one aspect and site is on the bushland-urban interface with the developed area considered as managed land. Typically contiguous bushfire vegetation with a typical fire run in any direction of 0.1-2.0 km distance.	Bushfire can approach from more than one aspect and/or fires have many hours or days to grow and develop before impacting and/or site is surrounded by significant unmanaged vegetation. Typically large areas of contiguous bushland with fire runs of more than 2 km possible.	High
2. Bushfire Behaviour	Extreme bushfire behaviour at the site is not possible given the broader landscape.	Extreme bushfire behaviour at the site is unlikely in this broader landscape due to combination of factors of vegetation type, vegetation fragmentation, aspect and topography.	Extreme bushfire behaviour at the site is likely in this broader landscape due to combination of factors of vegetation type, vegetation fragmentation, aspect and topography.	Extreme bushfire behaviour is very likely in this broader landscape due to combination of factors of vegetation type, vegetation fragmentation, aspect and topography.	Low
3. Impact of severe fire behaviour (FFDI 80 or 100 as relevant) coming onto site from wider fire catchment	There is little vegetation beyond 150 metres of the site (except grasslands and low-threat vegetation) and will not result in neighbourhood scale destruction of the site.	The type and extent of vegetation beyond 150m from the site may result in neighbourhood-scale destruction as it interacts with the bushfire hazard on and close to the site.	The type and extent of vegetation beyond 150m is likely to result in neighbourhood-scale destruction as it interacts with the bushfire hazard on and close to the site.	The type and extent of vegetation beyond 150m will result in neighbourhood-scale destruction as it interacts with the bushfire hazard on and close to the site.	Moderate
4. Vegetation Corridors	Vegetation within the site cannot enable fire to enter and move through the site by a continuous fire path from the primary fire source.	Vegetation within the site is unlikely to enable fire to enter and move through the site by a continuous fire path from the primary fire source.	Vegetation within the site may enable fire to enter and move through the site by a continuous fire path from the primary fire source.	Vegetation corridors on site provide for passage of fire to enter and move through the site from the primary fire source.	Low
5. Separation	Hazard separation between extreme bushfire hazard and buildings of greater than 100m. Extreme bushfire hazard does not include vegetated corridors of less than 100m width or grasslands.	Hazard separation between extreme bushfire hazard and buildings of 50-100m. Extreme bushfire hazard does not include vegetated corridors of less than 100m width or grasslands.	Hazard separation between extreme bushfire hazard and buildings of 20-50m. Extreme bushfire hazard does not include vegetated corridors of less than 100m width or grasslands.	Hazard separation between extreme bushfire hazard and buildings of <20m. Extreme bushfire hazard does not include vegetated corridors of less than 100m width or grasslands.	Moderate
6. Shelter	Immediate access is available to a place that provides shelter from bushfire. This includes existing or proposed buildings on site constructed in accordance with PBP and urban areas more than 100m from bushland hazard.	Access is readily available to a place that provides shelter from bushfire. This will often be the surrounding developed area. In the case of an eco-tourist facility it will be the designated bushfire refuge built in accordance with PBP requirements.	Access to a place that provides shelter from bushfire is not certain during a wildfire and existing buildings are not built to PBP standards.	Access to a place that provides shelter from bushfire is not possible during a wildfire.	Low
7. Evacuation	Multiple evacuation routes are available and unlikely to be impacted by fire.	Evacuation to alternate location that provides life safety refuge is <1km and can be completed by foot or vehicle.	Evacuation to alternate location that provides life safety refuge is 1km-10km.	Evacuation to alternate location that provides life safety refuge is > 10km.	Moderate
8. Isolation and emergency services	Seamless integration with existing settlement - no impact on evacuation or access for emergency services.	Short bushland pinch points that may carry fire across roads and restrict access briefly during passage of fire. Unlikely impact on evacuation or access for emergency services.	Short bushland pinch points that are likely to carry fire across roads and restrict access temporarily. Likely impact on evacuation or access for emergency services.	Large areas of bushland or multiple pinch points that are likely to carry fire across roads in forest areas and will block evacuation or emergency service access routes for extended time.	Moderate
9. Firefighting water supplies	Site is within urban area and has access to reticulated water supply OR site has dedicated firefighting water supply in accordance with PBP requirements.	Site is on the periphery of urban area and has access to reticulated water supply that may be more susceptible to interruption.	Site is outside urban area and relies on an on site water supply not in accordance with PBP.	Site is in an isolated area and relies on an on site water supply not in accordance with PBP.	Low
Overall Threat Rating			Moderate Risk	Total	150

Assessed at Forest Fire Danger Index of 100 as the design fire, using Method 1 in accordance with PBP 2019

The scoring system uses a multiplier for each Threat level based on a conservative life safety approach.

The scaled scores for each Threat assessment are totalled and final scores are placed within a range to produce the final Risk Rating

Conclusion regarding compliance with PBP 4.1 Strategic Principles:

The Strategic Bushfire Study – Greater Macarthur Growth Area (DPHI) concludes the North Appin Precinct is **suitable for development** in accordance with PBP. In particular, the analysis of historic bushfire data since 1963 shows very little impact of bushfire on the site, with the significant fires generally occurring to the east of Appin Road and driven away from the site under northwest winds. This study explicitly recognises that the Precinct will be increasingly 'sheltered' from major bushfires as the GMGA develops over the next decades.

The Blackash Landscape Scale Assessment Tool (LSAT) rates the Planning Proposal as **Moderate Risk**.

The Macarthur and Wollondilly / Wingecaribbee BRMP do not raise significant bushfire risk issues for the site and identify the existing Appin township as **Medium Risk** only, despite the historic development pattern and lack of planning and building standards for the majority of the town.

As a new development, the proposal can meet the acceptable solutions within PBP and presents a low risk of high consequence bushfire impacting the site. Staging the development pattern will be critical to ensuring bushfire risk management as the site develops over some years.

The Planning Proposal is next assessed against both the Aim and Objectives of PBP and will address in detail below the requirements of Chapter 4 – Strategic Planning, and the performance criteria for Residential and Rural Residential Subdivisions outlined in Chapter 5 of PBP.

The Planning Proposal will finally demonstrate it will be able to comply with PBP at the DA stage using the "acceptable solutions" when suitably conditioned.

The Planning Proposal has been analysed using multiple methods and geographic scales. The land is suitable for residential use with respect to bushfire protection. The landscape scale risk for the site overall is **Moderate**.

This Planning Proposal demonstrates it is consistent with Section 2.3 Strategic Planning (p. 19):

Strategic bush fire planning and studies are needed to avoid high risk areas, ensure that zoning is appropriate to allow for adequate emergency access, egress, and water supplies, and to ensure that future compliance with this document is achievable.

The following sections address the requirements of Chapter 4 Strategic Planning Table 4.2.1 of PBP (p. 35) as shown in Figure 17.

11. Bushfire Landscape Assessment

PBP provides a methodology to determine the bushfire threat and commensurate size of any Asset Protection Zone (APZ) that may be required to offset possible bushfire attack. These elements include the potential hazardous landscape that may affect the site and the effective slope within that hazardous vegetation. For new residential subdivision development, APZ requirements are based on providing practical building envelopes on lots that keep radiant heat levels at future buildings below 29kW/m².

The following assessment is prepared in accordance with Section 100B of the RFA, Section 44 of the *Rural Fires Regulation 2013* (RFR) and PBP. This assessment is based on the following resources:

- Planning for Bush Fire Protection (RFS, 2019);
- Campbelltown and Wollondilly Council Bush Fire Prone Land Maps;
- Aerial mapping; and
- Detailed GIS and site analysis.

The methodology used in this assessment is in accordance with PBP (p.80) and is outlined in the following sections.

11.1. Fire Danger Weather District

PBP requires a credible worst case bushfire weather scenario at a 1:50 year bushfire weather event. The Campbelltown and Wollondilly LGAs are in the Greater Sydney Region Fire Weather District, and the appropriate maximum Forest Fire Danger Index (FFDI) to be applied in each LGA is FFDI 100. The relevant acceptable solution for residential development in PBP is provided by Table A1.12.2 (p. 90).

11.2. Vegetation Assessment

Vegetation is the fundamental physical component of determining the bushfire behaviour. Vegetation, in broad terms provides the available fuel to be consumed by a bushfire. Fuel load and arrangement represents a considerable component in dictating to a large degree the behaviour of fire in terms of intensity, rate of spread and flame height, and typically relates to dead plant material less than 6mm thick, and live plant material thinner than 3mm.

Vegetation type, density and arrangement can further influence fire behaviour and intensity. Vertical and horizontal continuity is also a significant element. Thus, vegetation forms a key consideration within this report. The vegetation provides a basis for the determination for bushfire intensity mapping.

The vegetation assessment has been completed in accordance with PBP. The predominant Vegetation is classified by structure or formation using the system adopted by David Keith (2004) and by the general description using PBP.

Vegetation types give rise to radiant heat and fire behaviour characteristics. The predominant vegetation has been determined for the site over a distance of at least 140 metres in all directions from the proposed site boundary or key assets on the development site. Where a mix of vegetation types exist, the type providing the greater hazard is said to predominate.

The ultimate vegetation and urban uses pattern is shown as Figure 27 and the vegetation classification is shown in Figure 28 and is predominantly grassland to the north, and for the purposes of this assessment, all other aspects will be considered as forest. The GMGA requires substantial rehabilitation of the existing bushland on the site and within the Ousedale and Mallaty Creek riparian corridors. This is consistent with the requirements of the Cumberland Plain Conservation Plan. Areas such as the Macarthur Motorcycle Club which are currently mostly cleared and could be considered 'managed land' will be assessed as forest recognizing the desired future state of the CPCP.

Of further note are the critical infrastructure easements crossing the site from north to south. These will be considered as grasslands. Additionally, there is a 30-50m wide strip of managed land along the western boundary which is the Upper Canal. The vegetation in this area will be assessed as forest, even though a large area is in fact maintained to higher bushfire protection standards than an APZ, as Water NSW have advised they will not permit use of the canal in the APZ calculation. This results in a very conservative APZ assessment along the western boundary considering the well maintained condition of the Upper Canal management area – this results in much greater setbacks to future development than otherwise required.

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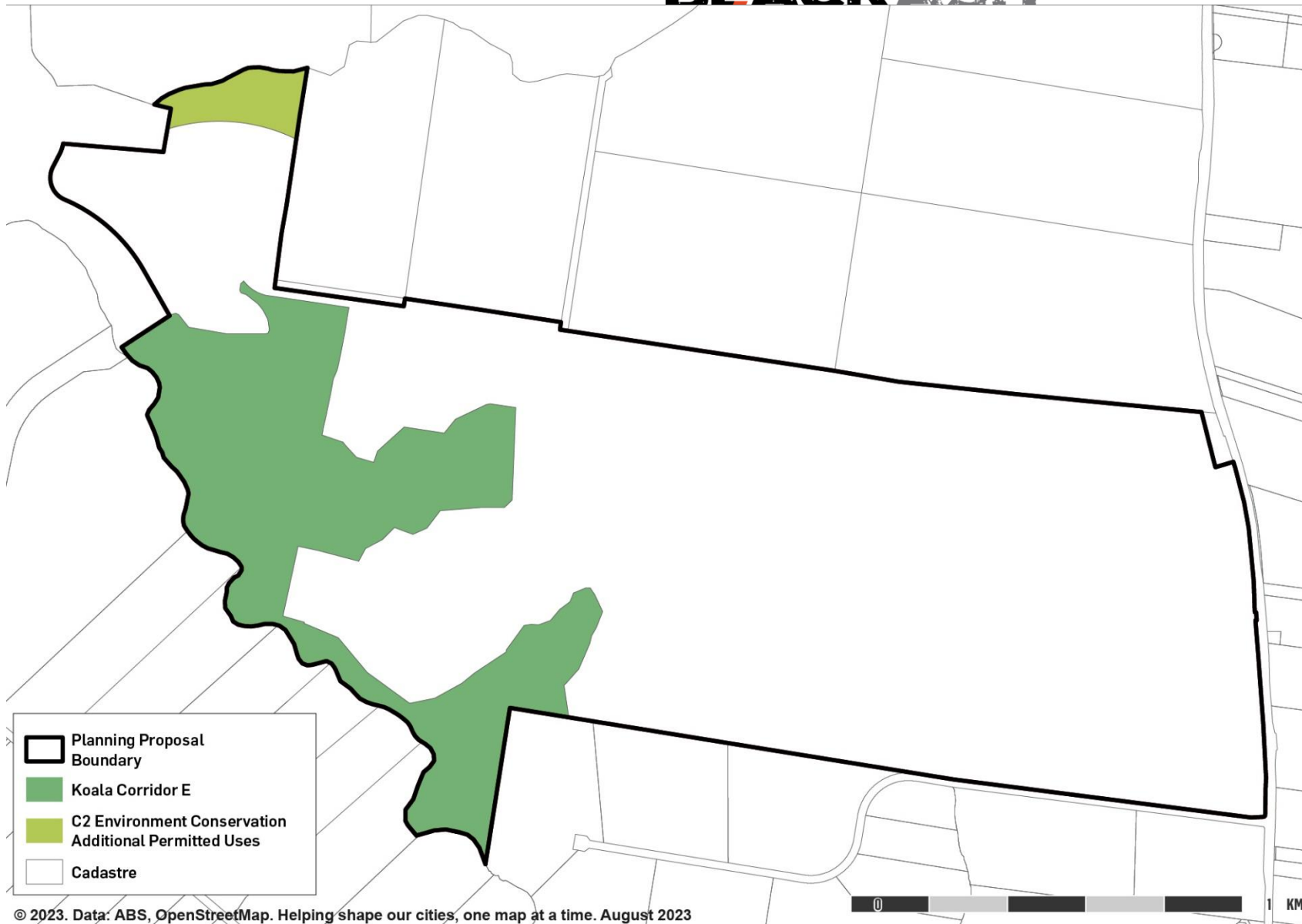


Figure 27: Ultimate land use split between urban and bushland land uses (per Urbis)



Figure 28: Slope and Vegetation mapping using Keith Classification

11.3. Slopes Influencing Bushfire Behavior

PBP requires assessment of slope. The slope of the land under the classified vegetation has a direct influence on the rate of fire spread, the intensity of the fire and the ultimate level of radiant heat flux. The effective slope is the slope of the ground under the hazard (vegetation). In identifying the effective slope, it may be found that there are a variety of slopes covering different distances within the vegetation. The effective slope is considered to be the slope under the vegetation which will most significantly influence the bushfire behaviour for each transect. This is usually the steepest slope.

The site has a large range of slopes, and as many of the conservation lands to be retained are based around drainage/riparian corridors there are some areas with substantial downslopes. For some of the riparian corridors it could be argued that the effective slope was flat given how short the distances across these are, with the slopes across a 100m transect reaching the bottom of the creek line and then rising up the other side for a more complicated effective slope. An example of this is provided for slope transects in precinct 12 on the western boundary and is shown as Figure 27. A conservative approach has been taken however and the steepest slope in the transect chosen to provide an additional safety margin for this PP to ensure it can be demonstrated the site can accommodate the proposed levels of development.

The effective slope of these areas is considered in relation to the slope ranges in PBP Table A1.12.2 (p. 90) which provides the minimum APZ distances for residential subdivision. Figure 27 shows an analysis of the current slopes across the planning proposal site; the impact of these slopes is incorporated into the design by influencing the location of stormwater infrastructure, managed parklands, sports fields, and roads.

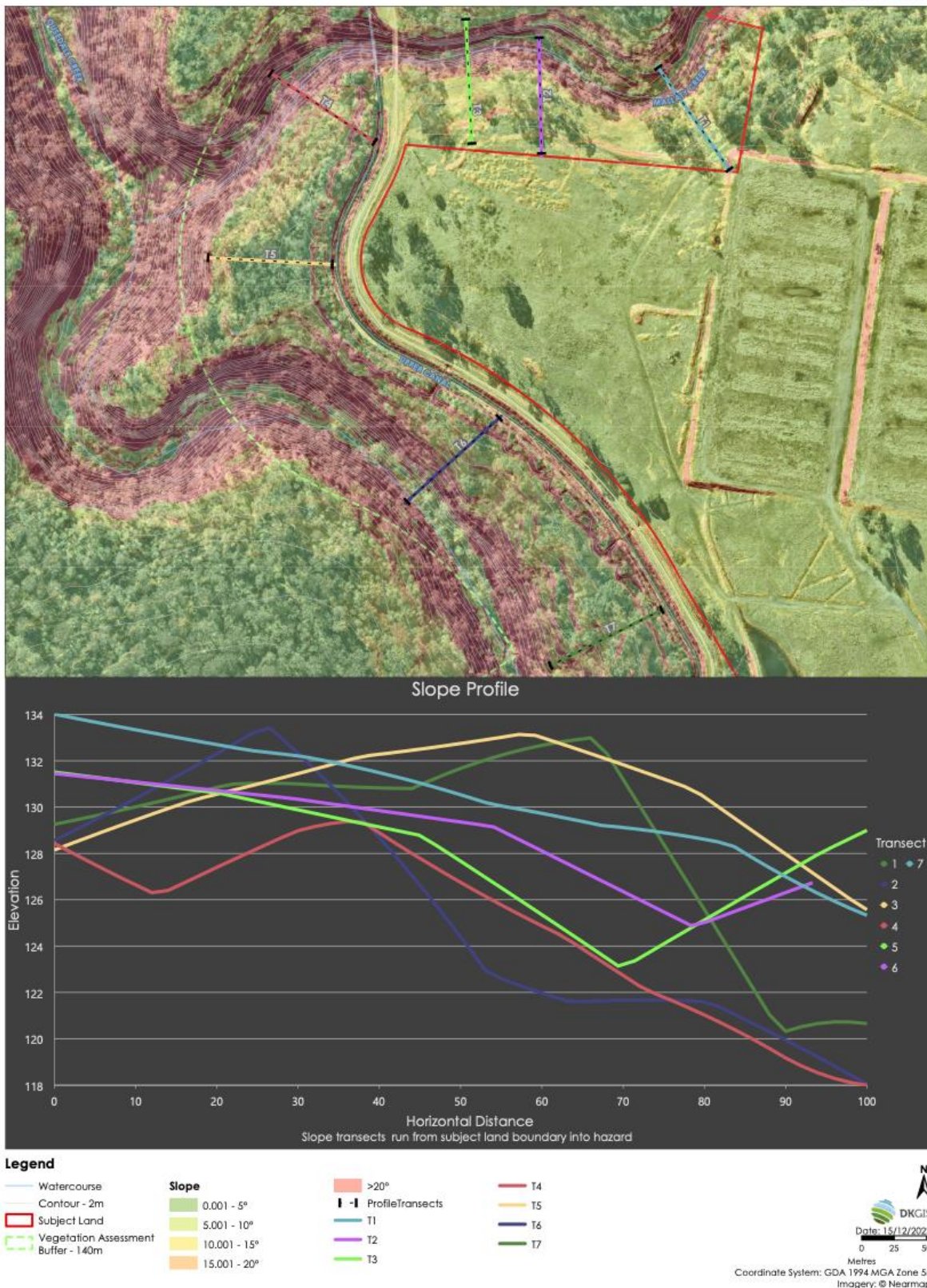


Figure 29: Slope transects and section demonstrating complicated slopes associated with riparian areas. A conservative approach using the maximum slope will be used for assessment.

11.4. The potential fire behaviour that might be generated based on vegetation and slope

The maximum potential fire behaviour is limited by the location and topography of the proposal site and design. This has been discussed at length in Sections 7 and 10 of this report. The conclusion is that all evidence supports the view that the potential of the most severe fire weather from the north through to the southwest, is strongly ameliorated by the grassland vegetation across this wider area, and the highly fragmented landscape. As clearly shown in the SBS – GMGA report, there is little evidence of significant fires impacting the site since reliable records have been kept since 1963 with Figures 12 & 13 clearly demonstrating this.

As discussed in Section 10, the retained vegetation for the CPCP to the southwest of the site can be expected to carry some significant local scale fire under bad fire weather conditions. The proposed design for the site shown in the Draft Structure Plan (Figure 6) has been designed to fragment this bushland by utilising the existing cleared areas near the south west boundary and the Ousedale Creek corridor for the location of community infrastructure including sports fields, providing a significant fragmentation of fire paths and a buffer for housing. This combines with the location of stormwater basins and the long maintained grassland easements for infrastructure to further break up the CPCP corridor at the least impact to the environment.

The prevailing bad fire weather from west and northwest winds and the likely impact of a typical southwest wind change, have the possibility of generating significant local scale fires, however these fire runs will be limited to only a few hundred metres and depending on particular conditions at the time there will be many areas that experience flank fires rather than head fires.

A critical factor to consider when considering potential fire behaviour is that any ignition of a wildfire will be seen and reported to firefighting authorities within a very short time as the area has significant urban development and the M1 Hume Motorway less than 2km to the west of the site. The short timeframe for detection will result in early response by emergency services which in many cases will assist in preventing a small early stage fire from developing into a fully developed fire, and will assist in providing adequate resources in a timely fashion.

11.5. Any history of bushfire in the area

Figures 12 & 13 clearly demonstrate that since 1963 there has been no significant fire activity impacting the site, despite significant fires occurring to the east.

Regardless of the limited fire history affecting the site, bushfires can occur at any time of the year. The Australasian Fire and Emergency Services Council (AFAC) Bushfires and Community Safety Position Paper (p. 3) outlines nationally agreed positions for the fire services which states that:

Bushfire loss can be reduced or avoided in some cases but cannot be entirely prevented. A balance needs to be struck between measures taken to reduce or avoid harm and loss due to bushfire, and the protection of other values.

The position paper (p. 3) recognises that

Bushfire is a normal part of Australia's natural environment, particularly in eucalypt forests and grasslands. However, the frequency and intensity of bushfires varies throughout the landscape and the seasons. Bushfires are a common occurrence during the drier periods of the year in most places.

And that

Bushfires of low or moderate intensity often pose little threat to life, property and community assets, but the potential for changes in wind direction can be a significant hazard. However, bushfires that burn in heavy fuels, steep terrain or on hot, dry and windy days often spread rapidly, crown in forests, produce powerful convection columns and create extensive spot fires ahead of the fire front, often making their control impossible until weather conditions moderate.

As the Fire Danger Rating reaches 'Extreme', bushfires are often described as 'firestorms' and become impossible to control. When the Fire Danger Rating approaches 'Catastrophic', the risk of serious injury or death to people in the path of a bushfire increases significantly, and many properties and other community infrastructure can become difficult or impossible to defend.

The NSW planning framework accepts this fundamental premise and PBP is based on credible worst-case fires (1:50 year event) affecting the site. These response to potential fires affecting the site are determined by the Bushfire Protection Measures contained within PBP. PBP does not seek to stop fires, rather, it recognises the fundamental risk of bushfire affecting new development and puts in place minimum requirements to provide a tolerable approach to risk management. The approach within PBP does not consider fire history and assumes a credible worst case fire weather event and maximum vegetation regardless of management intervention. As such, the provision of meeting the acceptable and performance-based criteria within PBP reflects a tolerable level of risk by the State.

11.6. Potential fire runs into the site and the intensity of such fire runs

As discussed above, potential fire runs into the site from the north and northwest of the site, are predominantly grass fires with the involvement of forest vegetation limited to the riparian corridors. These corridors have deep gorge / escarpment characteristics with significant downslope runs into the riparian area and large areas of exposed rock limiting vegetation in places. The Nepean River is a hard barrier to fire spread other than by ember throw as it is generally at least 75m wide. The creek lines are also convoluted with multiple changes of direction across the course of a wind driven fire path. The last 30-50m of topography along the western boundary is the almost flat area of the Upper Canal that exceeds the standards for an APZ Inner Protection Area in Appendix 4 of PBP (discussed previously).

The topography and gorges depth means the most likely fire spread scenario is multiple small fires started along the ridge tops and in the gorges initially by ember throw, with fires burning out discrete sections of this relatively small area, rather than a fire driven into steep forested country by a significant grass fire with a fully developed head fire. This type of fire is likely to be significantly less intense than the design fire for PBP with many areas impacted by flank fires rather than head fires. Figure 30 shows the convoluted riparian areas along the northwest and west boundaries of the site.



Figure 30: Convoluted and fragmented fire runs into western side of the site

Along the southwest and southern edges of the development area is the CPCP Koala Corridor. The area of the Macarthur Motorcycle Club is proposed for acquisition under the CPCP and will ultimately be revegetated to either Cumberland Plain Woodland or an appropriate forest type. For the purposes of this assessment a conservative approach is taken, and forest vegetation will be assumed. The CPCP outlines that the average minimum width for the Koala corridor will be 390-425m. A minimum width of 400m will be assumed for the conservation areas to the south. To the north of the site is the remainder of the North Appin Precinct in this area, which is under the ownership of one family. This is currently actively managed for agricultural uses and will be considered as grassland. A future PP will rezone most of this land for urban uses. Figure 30 provides context for the length of the fire runs into the developed areas.



Figure 31: Context for possible fire runs

Fires from the northwest are most likely to generally parallel the general boundary of the development and whilst there will likely be some lateral spread towards the developed areas this will be flank fires. As the vegetation (current and ultimately future) will be forest there is potential for a significant local scale fire, however there is no possibility of a landscape scale fire being generated along this corridor. As previously noted, (and shown in Figures 12 & 13) there are no recorded instances of such a fire along the Ousedale Creek corridor. Should the worst case occur and a southwesterly change occur whilst the fire has fully extended along the corridor it is clear that a substantial amount of the area will have been burnt already, and the fire runs resulting from the wind shift will be shorter than the full 400-1000m that are the theoretical maximum.

Only one area along the southern boundary is steeper than 10 degrees. This fire run is short rising less than 50m up from Ousedale Creek, and the land on the plateau above this is planned to contain sports fields, parklands and the zone substation along the perimeter of this area to provide a buffer to residential uses. The remainder of the slopes along the southern side of the development area vary from upslope to 10 degrees. The impact of Ousedale Creek is important in breaking up the impact of any fires in this area with fires starting in this area having to run downslope initially. There are two significant easements for electricity and gas supply lines of approximately 75m and 50m width that bisect the site from north to south. These easements have long been maintained (and will continue to be) in a heavily fuel reduced state, generally meeting APZ standards with the exception of significantly wet areas. These further fragment any future bushfires on the site.

The site cannot be impacted by landscape scale fires. The PP includes PBP compliant APZs and other measures that will allow fires to be managed onsite using the suite of Bushfire Protection Measures that will be established through future subdivision applications. All residential areas and critical access points will have perimeter roads and PBP compliant APZs for the FFDI 100 design fire.

The combination of bushland fragmentation, riparian slopes with significant downhill runs, flank fires in many situations, and surrounding development will work to reduce the scale and intensity of fire runs into the site.

11.7. The difficulty in accessing and suppressing a fire, the continuity of bushfire hazards or the fragmentation of landscape fuels and the complexity of associated terrain

As discussed above, there are no identified difficulties in accessing and suppressing the fires that could occur around or within the site as all future development areas will have perimeter roads, PBP compliant APZ, and reticulated water supplies. The vegetation is substantially fragmented and follows a somewhat convoluted riparian area with significant downslope fire runs to the south of

Ousedale Creek generally. No landscape scale fires can directly impact the site, and any large fires originating from outside the site have to progress through highly fragmented fire paths with fire spread into retained bushland corridors limited through the reduced ember attack associated with grassland fires. There are multiple route options for site entry for firefighting vehicles and as shown in Figure 11, 22 RFS brigades within 30 minutes response time. Except in the most extreme circumstances there are sufficient resources to manage local scale fires

The proposed future road network will be compliant with all PBP standards, all future development lots will meet the APZ standards outlined in Table A1.2.2 (p. 90) and there will be reticulated water throughout the site as well as numerous stormwater management facilities that can be designed to both provide additional buffer to bushfires and water supplies.

Where there are road pinch points bushfire management areas are proposed, and when detailed planning is undertaken for individual stages these locations (adjacent to riparian corridors) will be designed to provide stormwater management areas. The terrain whilst having a wide variety of slopes and aspects at the detailed scale is relatively simple overall and the vegetation types are largely consistent and result in bushfire behaviour that is well understood by local crews.

12. Land use assessment

12.1. The risk profile of different areas of the development layout

The risk profile of the development area is varied across the wider site, however as seen through the SBS-GMGA (Figure 8) and given the size of the fully developed North Appin Precinct as shown in Figure 26, the majority of the future development area will have lots more than 100m from bushland capable of carrying a bushfire and therefore have Low or no bushfire risk per PBP.

The combination of perimeter roads, APZ, reticulated water and the large urban area with multiple road or pedestrian options to retreat from bushfires whilst remaining in the precinct will significantly reduce the need for late stage evacuations. The most at risk portion of the site in the southwest sector of the Ousedale Creek corridor will be the location of sports fields and managed parklands. Planning for the commercial precinct, more sports fields and a future school site is well within the central portion of the site. The PBP compliant APZ that will be required at subdivision and individual site development stages will reflect the and manage the risk profiles within the site.

Appropriately designed lots (in accordance with PBP), and buildings constructed (in accordance with AS3959) and prepared properties may offer people options for sheltering during most bushfires, reducing the likelihood of bushfire-related injury and death. The nationally agreed position is that the safest option is to leave a bushfire prone area early on days with a Fire Danger Rating of Extreme or higher. There are multiple access and egress routes available across the site, and road pinch points will be managed through detailed design at later stages of development. The risk profile is best represented by compliance with PBP and the ability of the planning proposal to provide complying APZ.

Asset Protection Zones

For proposed new subdivision development, PBP requires that a minimum separation is provided in the form of APZ. The APZ is a fuel-reduced, physical separation between buildings and bushfire hazards. For residential developments, APZ requirements are based on keeping radiant heat levels at buildings below 29kW/m² as the maximum exposure on all sides of the building. For any SFPP developments, APZs have been based on 10kW of radiant heat.

A conservative approach has been taken and the site has sufficient room to provide compliant APZ and practical building envelopes for the entire site including the riparian corridors.

There is a range of APZ requirements across the site and these are shown in Figure 30. The entire proposal has been designed so that the acceptable solutions outlined in Chapter 5 of PBP can be achieved, and there is no reliance on performance solutions for the planning proposal.

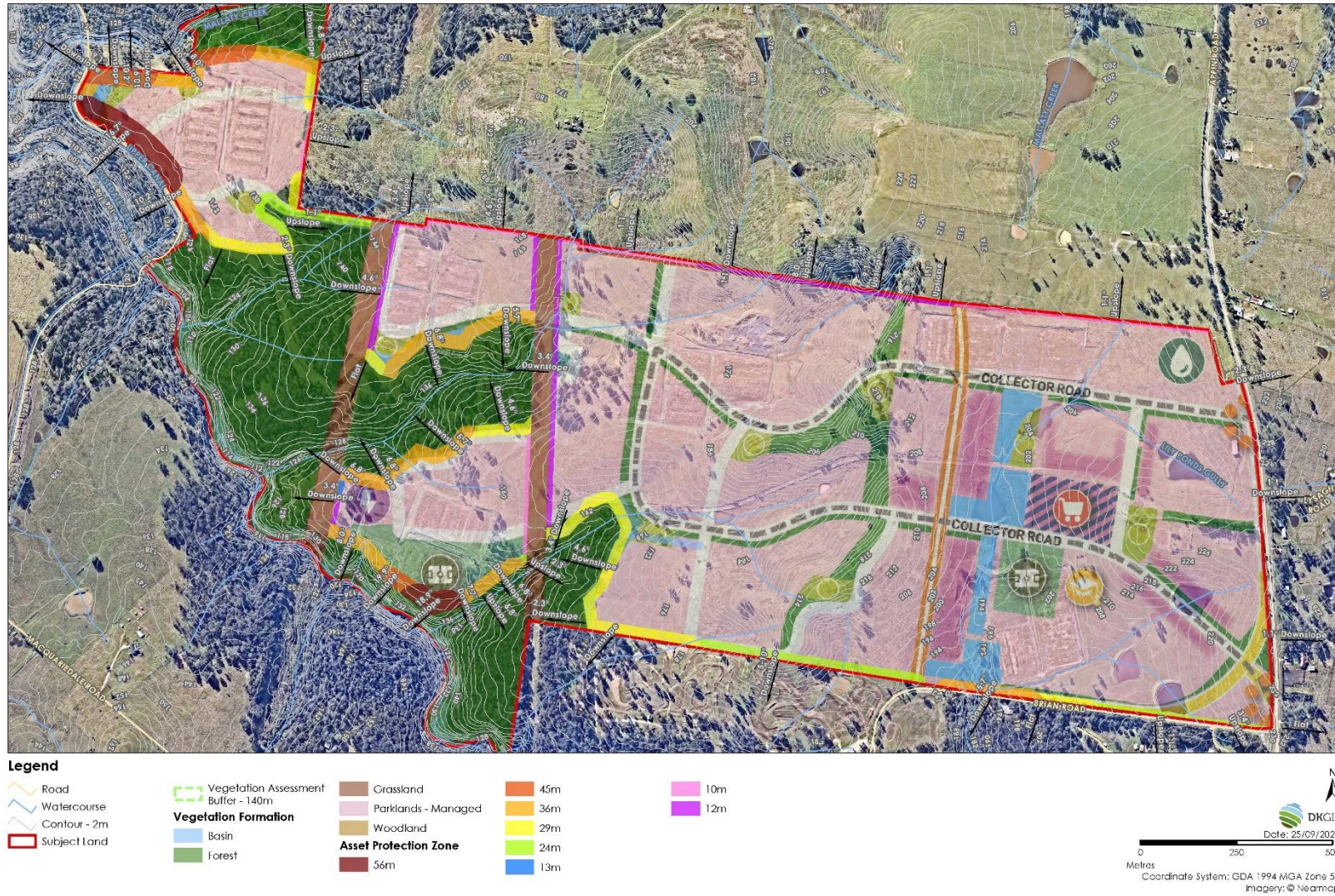


Figure 32: PBP compliant Asset Protection Zone requirements across the planning proposal

12.2. The proposed land use zones and permitted uses

The planning proposal responds to the site and considers bushfire constraints in detail, and the development will be a permitted use. This complies with PBP.

12.3. The most appropriate siting of different land uses based on risk profiles within the site

It has been demonstrated that the whole site is capable of meeting PBP requirements for residential subdivision with no significant risk profile differences when PBP standards can be met. The proposed commercial area and school site are well outside bushfire prone land. Sports fields, parks and stormwater basins are used as well as PBP compliant roads are used to provide further buffers to protect built assets.

12.4. The impact of the siting of these uses on APZ provision.

For proposed new residential development, PBP requires that a minimum separation is provided in the form of Asset Protection Zones (APZ). The APZ is a fuel-reduced, physical separation between buildings and bushfire hazards. The development layout will have perimeter roads and APZs around separating development from all bushland areas, and future lots will be compliant with PBP.

No APZs will be located within environmental conservation areas.

Indicative typical layouts for selected areas are shown below as Figure 32. Greater detail is provided during later stages of the process however this type of arrangement will be used for the appropriate APZ widths, incorporating various features such as stormwater basins, parklands, cycleways etc as appropriate in the respective locations. Relevant land use calculations are based on the APZ widths demonstrated in this report.

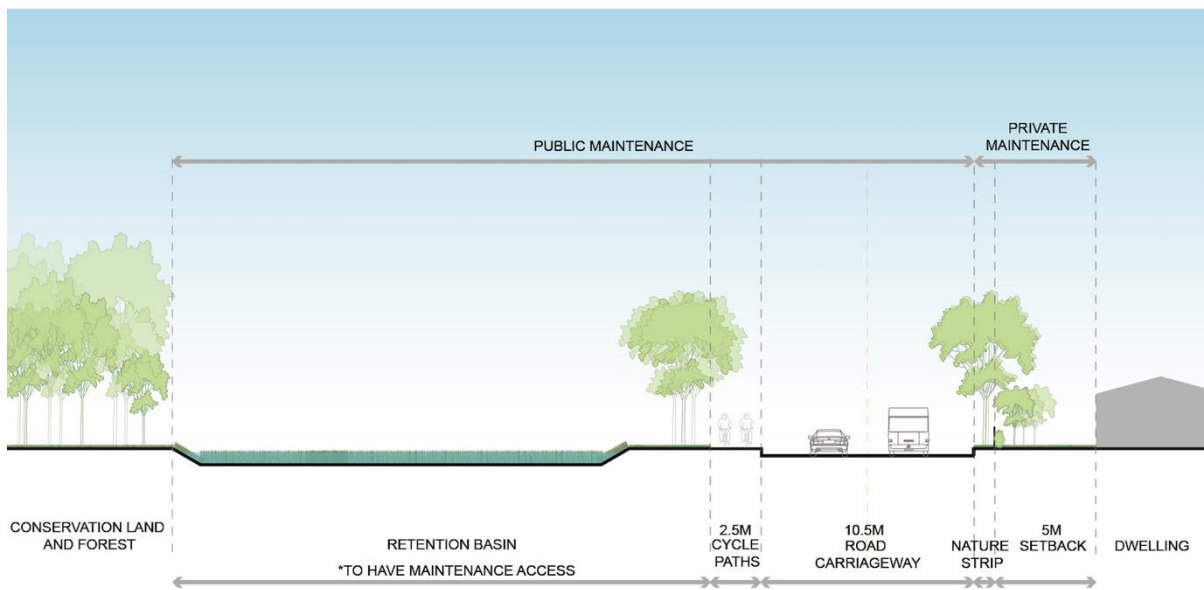
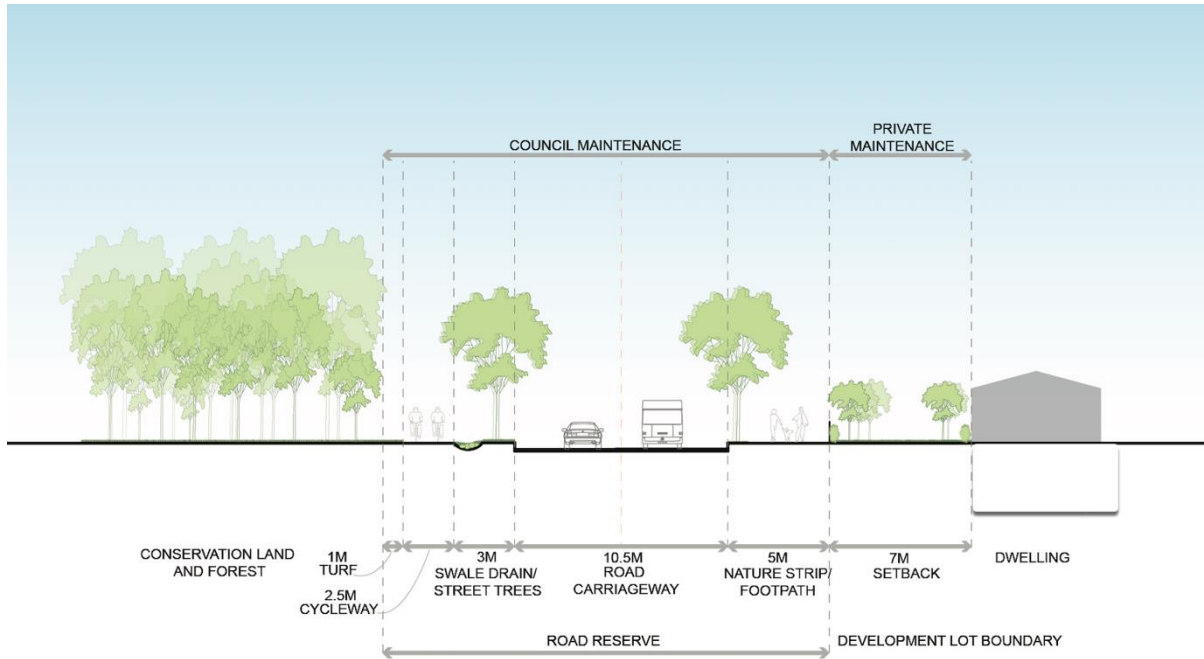


Figure 33: Typical indicative APZ layouts - all APZ located within urban development zone

13. Access and egress

13.1. The capacity for the proposed road network to deal with evacuating residents and responding emergency services, based on the existing and proposed community profile

The site will have multiple connections to the arterial and local road networks that service the region and are being developed across the wider GMGA. This enables the effective distribution of traffic from the site to the wider road network. The future lots will have direct access to local and collector roads. The local road network will be capable of servicing the volumes of traffic generated by the future subdivision including accommodating the evacuation of residents and concurrently the responding of emergency services. As discussed previously, the majority of the site at full development will be more than 100m from vegetation capable of carrying a bushfire, and this large urban area combined with a commercial, school and sports field located generally central in the precinct will greatly reduce the need for any evacuations during the time bushfires are impacting the site. Wider evacuation routes off site for those wishing to leave early on days of elevated fire weather are shown at Figure 34.

All perimeter roads will be built to PBP standards with minimum 8m kerb to kerb construction as shown in Figure 33. It is understood that as transport planning proceeds some of these roads may need to be wider to accommodate collector road traffic and the overall APZ composition surrounding the carriageway will be changed as required.

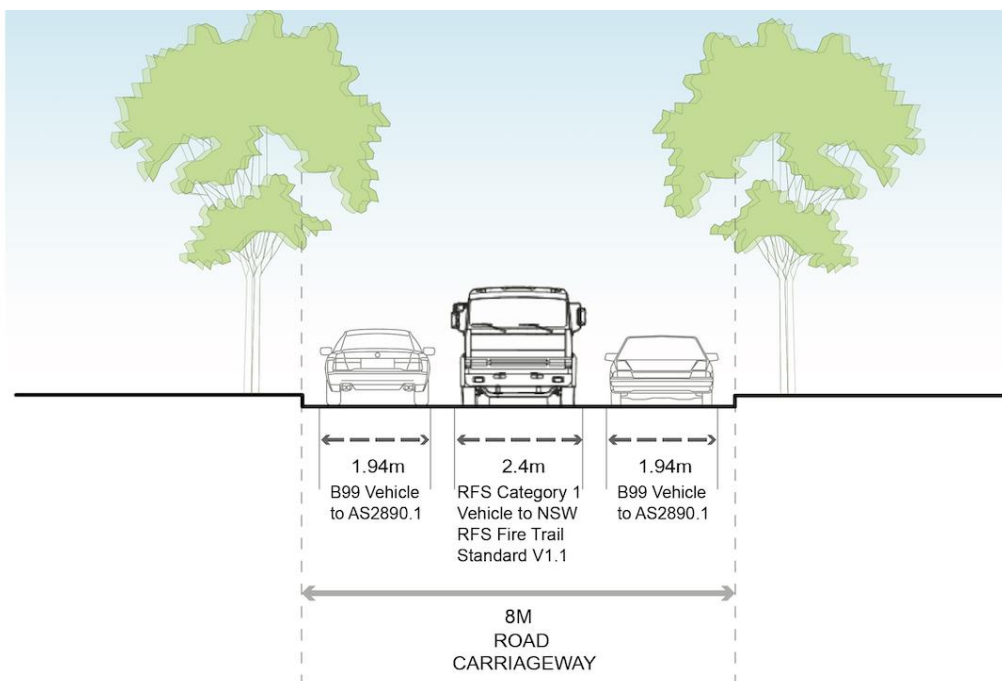
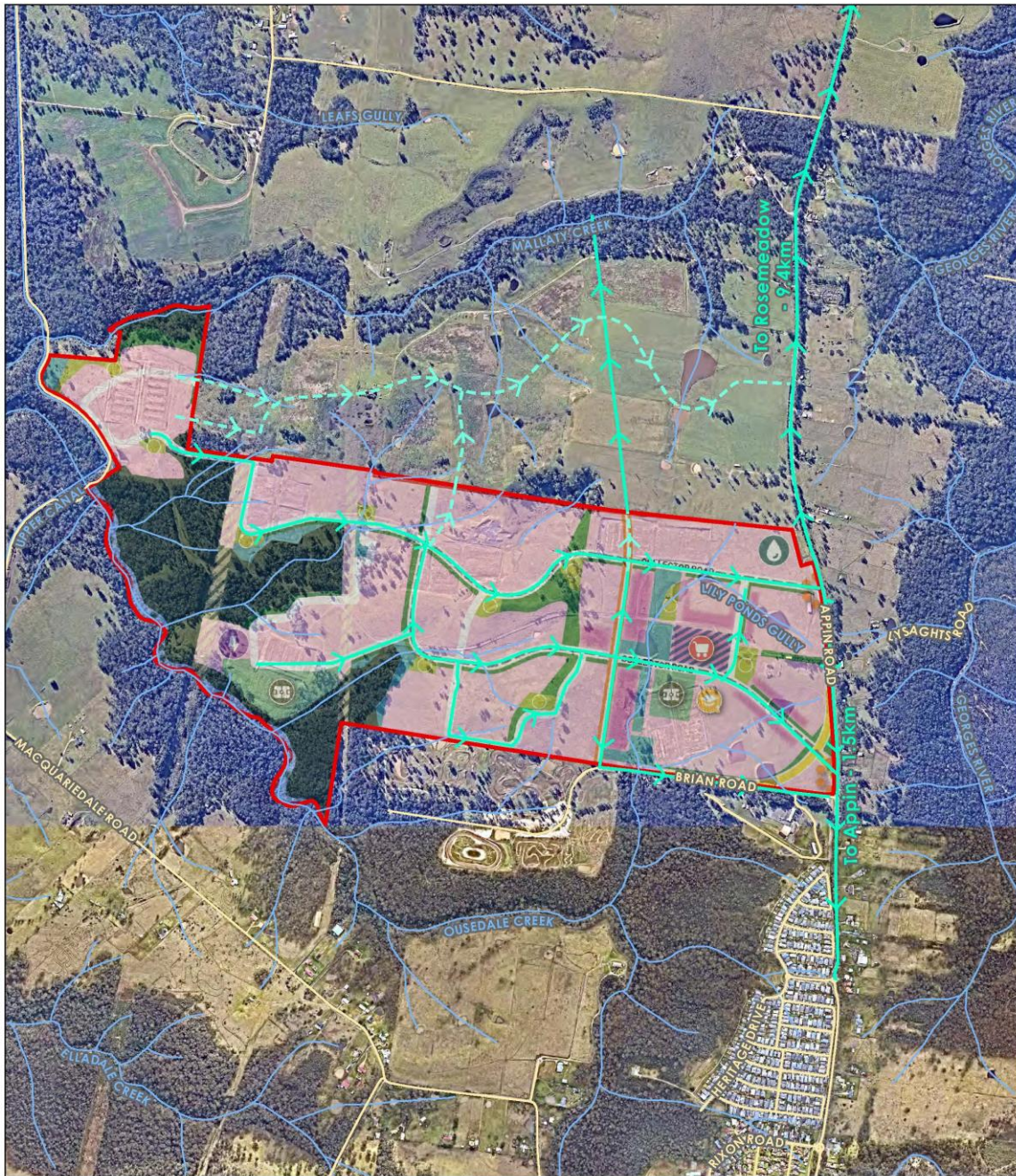


Figure 34: Typical 8m wide perimeter road set within the required APZ



Legend

- Evacuation Route
- Indicative Evacuation Route
- Road
- Watercourse
- Subject Land



Date: 25/09/2024

0 250 500

Metres

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Neamap

Figure 35: Wider evacuation routes to Campbelltown urban area and Appin

All roads will be compliant with PBP and there are multiple road connections with the existing road network. Sheltering in place with compliant APZ and future housing constructed to BAL-29 standard means there will likely be less traffic leaving the site and access for attending firefighters is less likely to be impacted. Suitable consent conditions at development stage can manage the details of most suitable landscaping, roll top kerbs, hydrant locations etc. The road network will meet the standards detailed in Chapter 5 and the planning proposal complies with PBP.

13.2. The location of key access routes and direction of travel

The national position of fire agencies is that *the safest action to protect life is for people to be away from the bushfire or threat of bushfire*⁸. This is underpinned by comprehensive emergency management arrangements and operational fire management systems that focus on the provision of information, advice, and warnings to assist communities to make informed decisions prior to the impact of bushfire and if necessary be out of Bushfire Prone Areas well before the impact of fire.

Within the NSW Bushfire planning system and PBP, there is a hierarchy of controls in place, from planning schemes to design and construction etc, to mitigate bushfire risk to communities. The BPM work in unison to enhance resilience by the provision of minimum standards for new development while reducing the vulnerability of negative impacts on occupants (including fire fighters) of these areas.

The design team recognises that a bushfire can be a difficult situation with smoke obscuring vision, stressed people more likely to make mistakes, and the likely influx of firefighting vehicles adding to traffic loads whilst people leave. The road network is capable of sustaining traffic flows in an emergency, this will be particularly the case when the north-south GM transit corridor servicing the wider GMGA is built. There are multiple access and egress routes throughout the area leading into the central urban area more than 100m from the bushland / urban interface that significantly reduces the need for evacuation via Appin Road, with the expectation that the future population will generally shelter in PBP compliant dwellings onsite or within the large urban area of the North Appin Precinct which will be approximately 343 ha at completion. It is noted that Brian Road along the south boundary will ultimately be developed as the East-west connector between Appin Road and the GM Transit Corridor.

⁸ Australasian Fire and Emergency Services Authorities Council. (2019) *Bushfires and Community Safety Position* (AFAC Publication No. 2028).

The area in the north western corner of the site has some capacity to become isolated during a significant bushfire, having bushland on 3 sides. To ensure this cannot be isolated, and that both egress of residents and access for firefighters can be maintained this will ultimately have a minimum of two access points. This will need to be staged with the adjoining land to the north, however as it is likely to be the last area developed a Development Control Plan (DCP) or similar will be established by this stage to coordinate orderly and economic development of the North Appin Precinct. This is shown on an extract of the draft Structure Plan as Figure 35.

The land to the north of the IPG site is not currently subject to a Planning Proposal (or subsequent subdivision application) and therefore it is unclear what the ultimate road layout and wider access patterns will be. The DSP has been produced based on key adopted planning documentation. The site forms part of the overall GMGA referred to in the DPHI publication Guide to the Greater Macarthur Growth Area (November 2022 - GGMGA). This document refers to this site and adjoining lands as part of the North Appin precinct, which is listed as one of three "state assessed planning proposals" to be fast tracked (p. 27). Since the update to the Greater Macarthur 2040 Interim Plan, the area of the Ousedale Creek Koala Corridor (Corridor E) has been finalised and this runs along the southern side of the site (shown as the green dotted line in Figure 35).

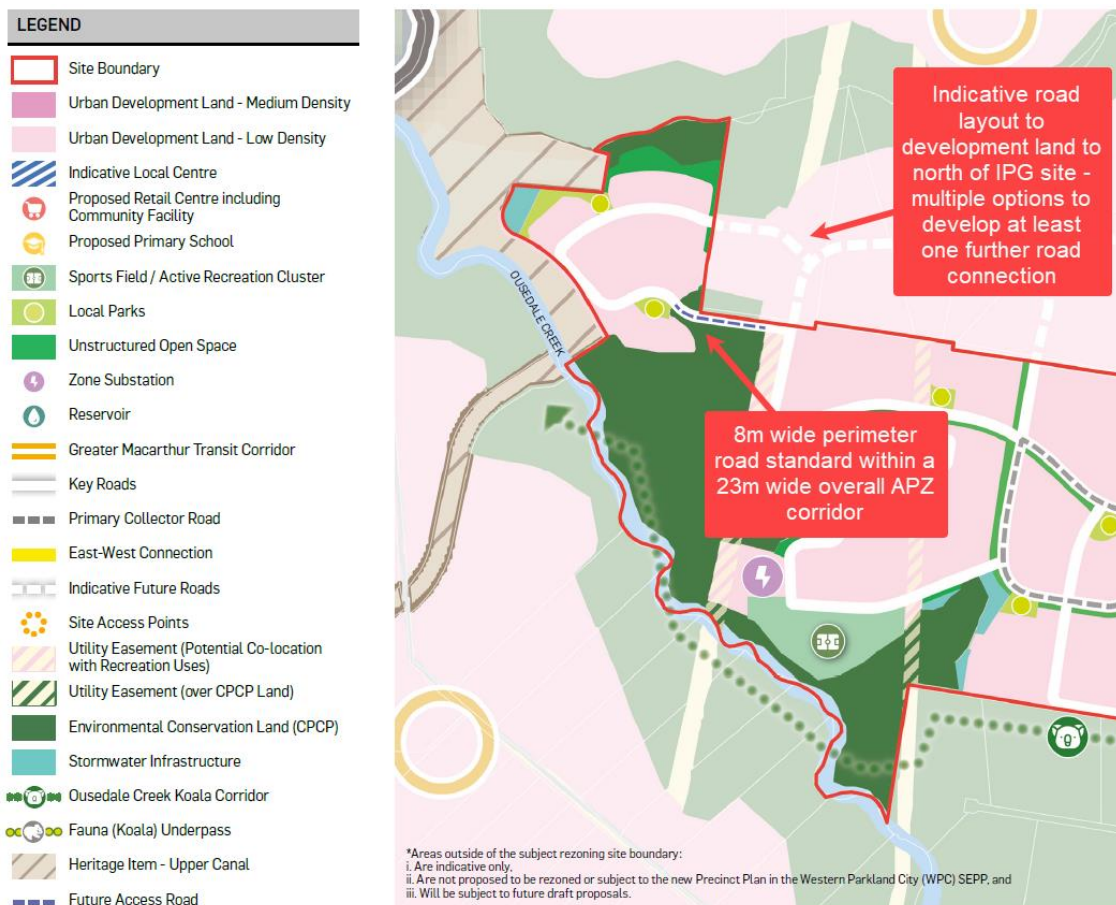


Figure 36: Highlighted access from draft Structure Plan

The site is part of the GMGA – Strategic Bushfire Study (DPHI, 2021). The study concludes overall that the overall GMGA “is not exposed to a significantly high bushfire risk” (p.5) and is extensively reviewed in the Blackash Report.

The rationale for this approach considers:

- That all development in PP will be subject to multiple layers of development assessment and will utilise the full suite of Bushfire Protection Measures (BPM) including perimeter roads, APZ and building construction standards. This significantly increases the likelihood of residents choosing to “shelter in place” during a bushfire, rather than evacuate at the last minute as fire approaches. This is likely to reduce road traffic at this time and therefore risk.
- That the likely fires to impact on the proposed route is relatively limited. In particular, fires from the north west have a very limited short fire run of approximately 100m (dependent on wind direction) with an effective upslope that becomes more pronounced as the fire travels away from the IPG boundary and down the hill towards Ousedale Creek. Fires from the northwest to the west will be limited due to urban development, as will fires from the south through to the east. Fires from the south and southwest are possible however have relatively short runs and likely to have much lower FFDI. See Figure 36.
- that the road will be impacted by fire at a certain location for a relatively short time (dwell time) as the fire front passes and then the risk reduces rapidly with limited fuel left to burn adjacent to the road (very short-term temporal impacts 5-20 minutes likely);
- that drivers have a high degree of autonomy as to whether they drive along that section of road based on conditions they can see; and
- that the time exposed to bushfire attack along the road is relatively short (calculated drive is 20 seconds), and this further informs decision making based on conditions they can see;
- the likely fire weather conditions from different aspects and very limited fire history and significant local firefighting response capability;
- the requirement to develop a bushfire management plan to manage the CPCP lands that will include a strategic Hazard Reduction burning program that is likely to reduce fire spread and intensity.

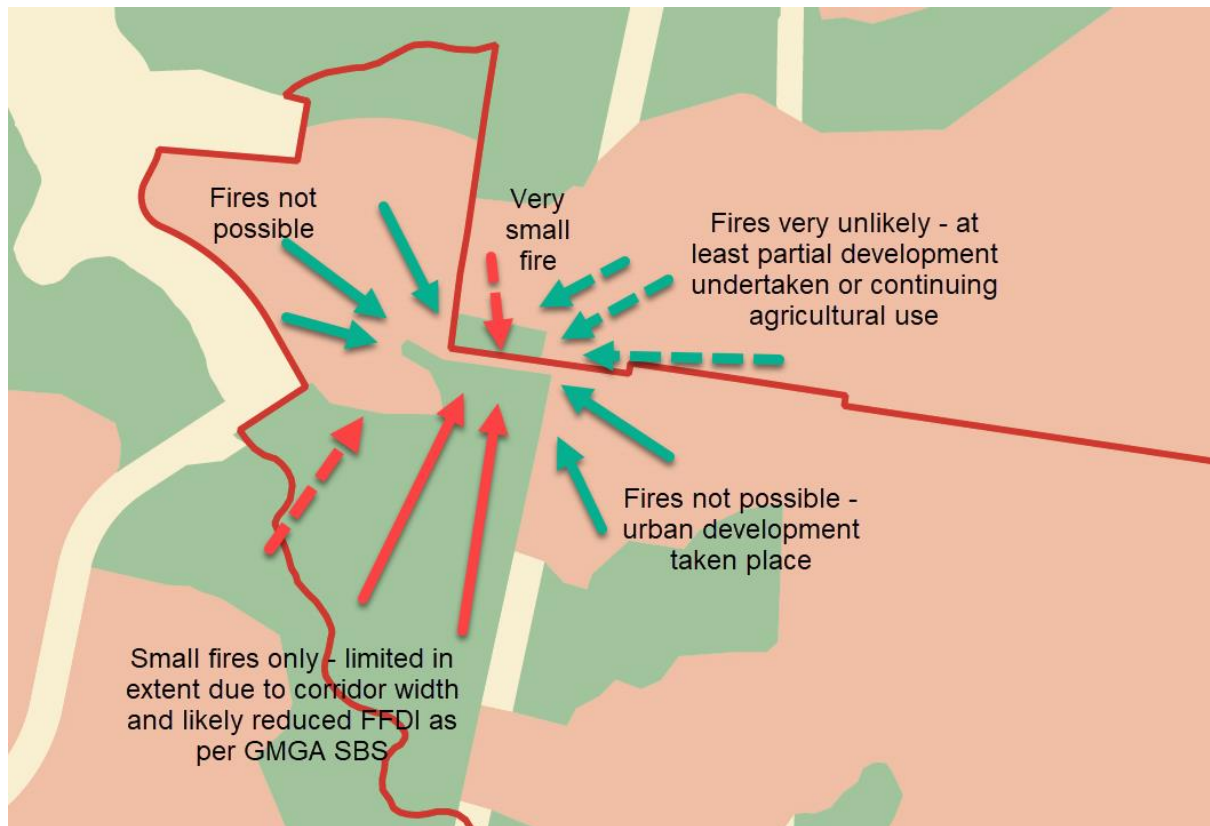


Figure 37: Indicative potential for fires based on ultimate development pattern.

To facilitate the rezoning of this north western precinct with the rest of the site, it needs to be demonstrated that a suitable access will be in place in the short term, and that it will need to meet the perimeter road standards required for the life of the development. This small stretch of road is approximately 280m long, and is located within bushland on both sides of the road for this length. The road itself will be within an overall 23m wide corridor maintained to APZ standard. This is shown in Figure 37 and is a practical demonstration that a suitable standard can be met during the future stages of development.

Finally, reasonable assumptions need to be made to consider typical development processes and timelines common to the industry. Precinct 12 is the most westerly precinct and thus the furthest from Appin Road which will be the logical location for initial development stages. The development of the site is expected to include approximately 3,000 dwellings, commercial areas and recreation facilities as well as conservation works and infrastructure. This process is expected to take place over a 5-10 year period from rezoning stage with this north western area being the final stage developed.

The land immediately to the north of the IPG site, makes up the remainder of the North Appin precinct, and is expected to follow a similar development process and timeframe. As this precinct

will naturally share infrastructure (including roads, water, sewer, open space etc) it is highly likely that the western side of this northern land will be developed either parallel or in conjunction with the IPG site. It is likely that a Development Control Plan (DCP) or similar will be established by this stage to coordinate orderly and economic development of the overall precinct. Therefore, it is highly likely that the primary access roads will enter the north western precinct from the cleared lands to the east as part of a negotiated staging agreement with the developer/s of this land.

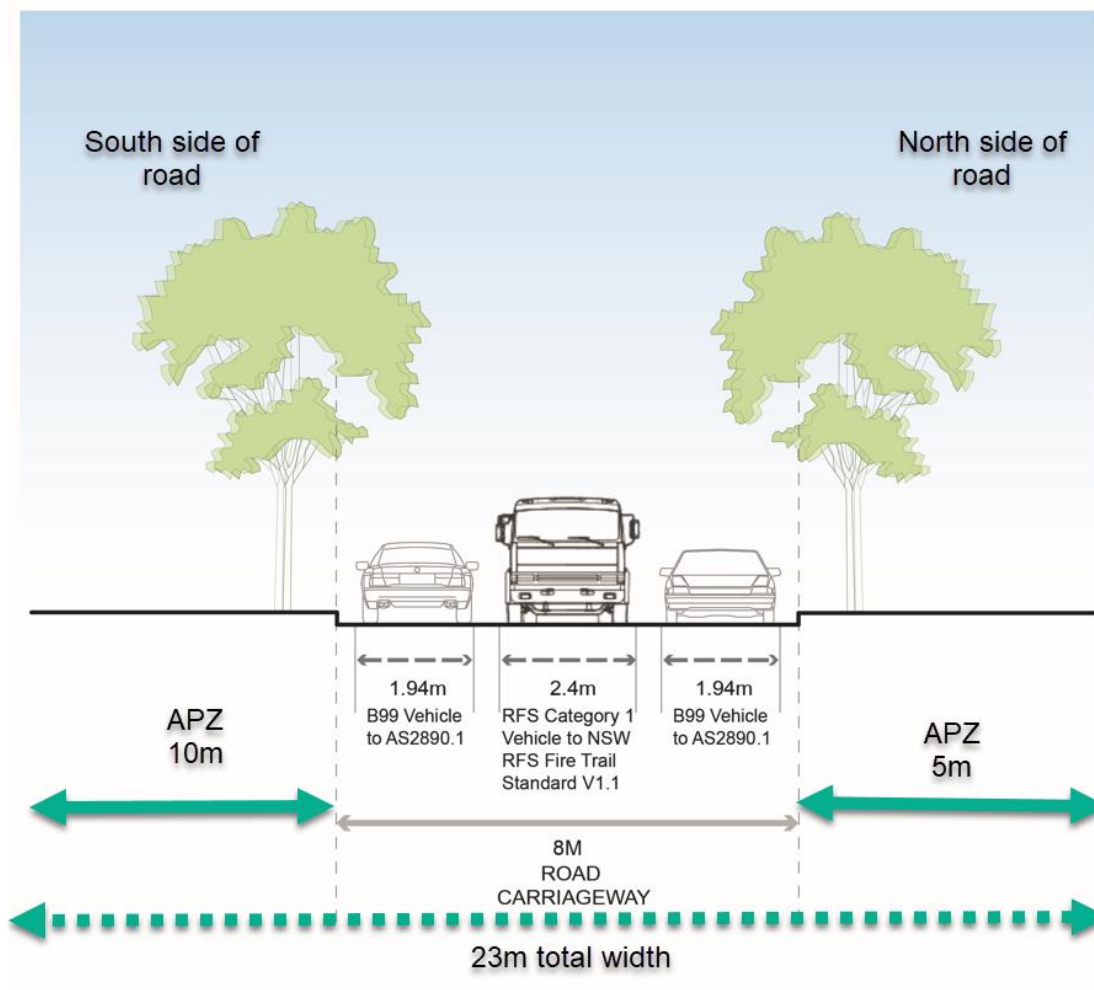


Figure 38: Layout to eliminate bushfire pinch point and maintain safe access/egress.

As discussed above, for the site overall there are significant firefighting resources located within 30km of the site, and there are multiple ways to access this location, so it is unlikely that travel routes will be isolated in any but the most extreme circumstances. Should evacuation be required the distances involved are relatively short. This complies with PBP.

13.3. The potential for development to be isolated in the event of a bushfire

The site is not isolated development as defined by PBP (p111):

Development which is located predominantly in native bushland or is considered to be within a remote area. Access and evacuation may be challenging due to distances that are required to be travelled through bush fire prone areas.

The development is not in a remote area as discussed above, and as concluded by the SBS-GMGA report covering the wider area is suitable for development in compliance with PBP. Ready access and egress via multiple routes to future and existing urban areas will be available and will be managed via suitable staging plans over the next decade.

There are multiple routes for firefighting resources to access the site and all routes are unlikely to be impassable by firefighting vehicles at once except in the most extreme circumstances.

This complies with PBP.

14. Emergency services

14.1. Consideration of the increase in demand for emergency services responding to a bush fire emergency including the need for new stations/brigades

As discussed above, there are substantial existing firefighting resources including 22 RFS brigades within close proximity to the PP area. The development is likely to be of a scale requiring additional emergency services, and a future review of fire service will be completed in accordance with the RFS and Fire and Rescue NSW *Standards of Fire Cover*. There is sufficient development area to locate a new fire station should the review require this. The planning proposal complies with the requirements of PBP.

14.2. Impact on the ability of emergency services to carry out fire suppression in a bush fire emergency

Bushfires have occurred in Australia for thousands of years and will continue to occur. Climate change modelling predicts increasing frequency and severity of fire events correlating with altered rainfall and drought patterns and increasing numbers of severe and intense heat events. As the dryness of more areas increases beyond levels historically considered 'normal', the footprint of

areas with a propensity to burn are likely to increase, which increases the importance of new development complying with the minimum bushfire safety standards set out by the NSW Government and RFS in PBP.

Not all bushfires lead to loss of life or assets. Bushfires of low to moderate intensity often pose little threat to life, property and community assets. Fire agencies are very successful at extinguishing low to moderate intensity fires before they lead to injury or death.

The risk is greatest when fire occurs on hot, dry windy days, and where ignition occurs in heavy fuels, and in steep terrain. These conditions present fire that can spread rapidly, crown in forests, produce powerful convection columns and create extensive spot fires ahead of the fire front. This often makes their control impossible until weather conditions moderate. PBP is predicated on a probable worst case fire scenario of FFDI 100. Similarly, the AS3959 provides deemed to satisfy solutions for fires up to and including FFDI 100. Fires above FFDI 100 are possible in this Fire Weather District and fire services have significant notice periods (at least 4 days) from the Bureau of Metrology (BoM) of these catastrophic conditions.

However, the national and NSW framework provides a robust policy setting for new development in Bushfire Prone Areas. The AFAC Community Safety Position Paper⁹ notes that:

Prevention measures are the most cost-effective and efficacious means of reducing bushfire risk to life and property. Land-use planning as a prevention intervention can significantly impact risk, by directing settlement growth and development to areas of lowest bushfire risk and avoiding settlement and development in areas of highest bushfire risk.

Planning policy frameworks can strengthen the resilience of settlements and communities and prioritise the protection of human life by putting in place requirements for Planning Proposals and decision making.

Land-use planning underpins and sets preconditions for all other emergency management interventions in future developments.

The proposed development can comply with all deemed to satisfy provisions for subdivision within PBP. The size of the remaining bushland and its fragmented nature reduce the risk of large or intense fires. The future detailed layout of the individual subdivision stages will ensure every lot is capable

⁹ P. 4 Australasian Fire and Emergency Services Authorities Council. (2019) *Bushfires and Community Safety Position* (AFAC Publication No. 2028)

of providing a BAL-29 practical building site, and that perimeter roads will be provided in all stages, forming part of the permanent APZ. Reticulated water and underground services will further assist firefighting.

Firefighting will be facilitated by the PBP compliant APZs. All future development within the site will be built in accordance with the National Construction Code (NCC) and AS3959 which increase the resilience of buildings to the impacts of bushfires.

The Planning Proposal provides a well-considered design that has responded to the aim and objectives of PBP to provide for the protection of life and the minimisation of impact on property while having due regard to the development potential, site characteristics and protection of the environment.

15. Infrastructure

15.1. The ability of the reticulated water system to deal with a major bush fire event in terms of pressures, flows, and spacing of hydrants

The subsequent development applications will detail provisions for services. The planning proposal area will be serviced by reticulated water, and an additional water supply reservoir is proposed to service the area. Details to better protect the new and existing reservoirs can be resolved during subdivision application stage. This complies with PBP.

Electricity supply for the new development will comply with PBP. Any gas services are to be installed and maintained in accordance with *Australian Standard AS/NZS 1596 'The storage and handling of LP Gas'* (Standards Australia 2008). This complies with PBP.

15.2. Life safety issues associated with fire and proximity to high voltage power lines, natural gas supply lines etc.

There are no issues with the high voltage power lines and gas supply mains (underground) that bisect the site north-south. These have been in place for decades and have very well-established vegetation clearing easements which are protecting the infrastructure, reducing the likelihood of ignition caused by powerlines, and operating as linear fire breaks and part of the APZ network. Specific details will be managed during subdivision development stage, however it is expected that all local services will be provided underground. This complies with PBP.

16. Adjoining land

16.1. Consideration of the implications of a change in land use on adjoining land including increased pressure on BPMs through the implementation of Bush Fire Management Plans

The future development will have no implications for the management of the retained and expanded CPCP corridors as the site is capable of providing all perimeter roads, stormwater management basins, and APZ to be PBP compliant on the future urban zoned development area. Whilst there will be a Bushfire Management Plan developed to assist overall ecological outcomes for the CPCP area, this will not be required to apply any measures to benefit the development area.

Environmental Conservation land to be retained and rezoned to C2 Conservation will be maintained and improved. APZ and perimeter roads will be established within the development footprint from the retained bushland. There will be no negative bushfire risk impact on adjoining land or need for adjoining landowners to undertake any additional bushfire mitigation works other than what they are required to currently. The final ownership of the conservation lands will be determined during later stages of the overall development process.

The additional population will bring new investment and people into the area who may wish to assist in the maintenance of conservation areas in their new neighbourhood, join the local fire brigades and otherwise potentially contribute to the maintenance and upkeep of the community.

All new development within the site will be designed to meet the minimum standards of PBP which achieve an appropriate level of bushfire resilience. The PP does not seek or rely on the provision of off-site APZs or other off-site BPM. The future development will not burden or change the existing obligations or management actions of neighbours. This complies with PBP.

17. Summary

This Section evaluates the Planning Proposal against the bushfire strategic planning requirements of PBP and is shown in Table 3.

Table 3 Strategic bushfire study - compliance with PBP Table 4.2.1

Issue	Detail	Assessment considerations	Evidence	Suitable site
Bush fire landscape assessment	A bushfire landscape assessment considers the likelihood of a bush fire, its potential severity and intensity and the potential impact on life and property in the context of the broader surrounding landscape.	The bushfire hazard in the surrounding area including: Vegetation Topography Weather	SBS-GMGA, Landscape Scale Assessment Tool, Bush Fire Risk Management Plan review, Asset Protection Zone modelling and consideration of BPMs. Sections 3, 7, 10-12 above.	YES
		The potential fire behaviour that might be generated based on the above	Potential is limited to local scale fires only and access and water supplies will improve, future dwellings will build to PBP standards and AS399-. Sections 3, 7, 10-12 above.	YES
		Any history of bush fire in the area.	Significant recent history suggest site is suitable and fires managed locally. Sections 3, 7, 10-12 above.	YES

Issue	Detail	Assessment considerations	Evidence	Suitable site
		Potential fire runs into the site and the intensity of such fire runs; and	Potential is limited to local scale fires which can be managed on site. Sections 3, 7, 10-12 above.	YES
		The difficulty in accessing and suppressing a fire, the continuity of bush fire hazards or the fragmentation of landscape fuels and the complexity of the associated terrain.	No identified difficulties for accessing and suppressing the type of fires that may occur here. Acceptable terrain and consistent vegetation generally, good local road network, close to major urban development etc. Sections 3, 7, 10-12 above.	YES
Land use assessment	The land use assessment will identify the most appropriate locations within the masterplan area or site layout for the proposed land uses.	The risk profile of different areas of the development layout based on the above landscape study	The risk profile of the whole site is varied but the combination of BPMs is varied to manage this onsite. The urban development mix proposed is a suitable and practical use of the land with respect to bushfire. Sections 10-12 above.	YES

Issue	Detail	Assessment considerations	Evidence	Suitable site
		The proposed land use zones and permitted uses	Urban development is a suitable and practical use of the land. Sections 10-12 above.	YES
		The most appropriate siting of different land uses based on risk profiles within the site (i.e. not locating development on ridge tops, SFPP development to be located in lower risk areas of the site); and	The proposed layout responds to the site suitably, including the variety of lot sizes and APZs to be managed in perpetuity. Sections 10-12 above.	YES
Access and egress	A study of the existing and proposed road networks both within and external to the masterplan area or site layout.	The capacity for the proposed road network to deal with evacuating residents and responding emergency services, based on the existing and proposed community profile;	The road network provides multiple additional connections into the local road network and the design of the roads meets or exceeds the requirements of PBP. Section 13 above.	YES

Issue	Detail	Assessment considerations	Evidence	Suitable site
		The location of key access routes and direction of travel; and	The road network provides multiple additional connections into the local road network and the design of the roads meets or exceeds the requirements of PBP. Section 13 above.	YES
		The potential for development to be isolated in the event of a bush fire.	The road network provides multiple additional connections into the local road network and the design of the roads exceeds the requirements of PBP. There is little chance of isolation due to multiple routes in and out. Section 13 above.	YES
Emergency services	An assessment of the future impact of new development on emergency services.	Consideration of the increase in demand for emergency services responding to a bush fire emergency including the need for new stations/brigades; and	Highly positive impact overall. Not likely new emergency services generated by this development alone. Section 14 above.	YES

Issue	Detail	Assessment considerations	Evidence	Suitable site
		Impact on the ability of emergency services to carry out fire suppression in a bush fire emergency.	Insignificant negative impact. May have positive impact with more water supplies, and active land management. Section 14 above.	YES
Infrastructure	An assessment of the issues associated with infrastructure and utilities.	The ability of the reticulated water system to deal with a major bush fire event in terms of pressures, flows, and spacing of hydrants; and	To be considered at DA stage	YES
		Life safety issues associated with fire and proximity to high voltage power lines, natural gas supply lines etc.	No life safety issues identified. Section 15 above.	YES
Adjoining land	The impact of new development on adjoining landowners and their ability to undertake bush fire management.	Consideration of the implications of a change in land use on adjoining land including increased pressure on BPMs through the implementation of Bush Fire Management Plans.	No significant negative impact identified. Potential positive impact related to additional people, active land management and investment locally. Section 16 above.	YES

17.1. Suitability of the Planning Proposal

This SBS had demonstrated that the Planning Proposal has considered and responded to the requirements of PBP. In a bushfire context, PBP (p. 34) requires that *strategic planning must ensure that future land uses are in appropriate locations to minimise the risk to life and property from bush fire attack. Services and infrastructure that facilitate effective suppression of bushfires also need to be provided for at the earliest stages of planning.*

The bushfire risk has been considered at the macro-scale, looking at fire runs, slopes, fire behaviour, bushfire attack into the site and it has addressed the access and evacuation requirements of PBP.

This section assesses the broad principles outlined within PBP (p. 34) which are at Table 4 and the consideration of exclusion of development as required within PBP (p. 34) at Table 5.

Table 4 Strategic Principles

Principle within PBP	Comment	Compliance
Ensuring land is suitable for development in the context of bushfire risk	The Planning Proposal provides compliance with the deemed to satisfy requirements of PBP in all BPM. The bushfire risk has been considered at FFDI 100 as required by PBP and the risk to future occupants and emergency services can be managed by meeting the requirements of PBP.	Yes
Ensuring new development on BPL will comply with PBP	The Planning Proposal meets all deemed to satisfy requirements of PBP. Future development is able to meet the standard of <29kW/m2 radiant heat at building exposures. Roads and APZs can comply with PBP.	Yes
Minimising reliance on performance-based solutions	No performance-based solutions have been proposed or used in this assessment. All BPM have been met using acceptable solutions provisions within PBP.	Yes

Principle within PBP	Comment	Compliance
Providing adequate infrastructure associated with emergency evacuation and firefighting operations	The existing road network meets or exceeds the minimum requirements of PBP. All services can be provided in accordance with Table 5.3c of PBP. Multiple short distance evacuation routes are available.	Yes
Facilitating appropriate ongoing land management practices	The future development will not burden or change the existing obligations or management actions of neighbours. Suitable legal methods, ownership transfers and/or biobanking stewardship agreements will be used to ensure APZ and other requirements will be maintained. These can be developed at development application stage.	Yes

Table 5 Exclusion of Development

Principle within PBP	Comment	Compliance
The development area is exposed to a high bush fire risk and should be avoided	The landscape bushfire risk is Low (Table 1) as it is adequately separated from landscape scale bushfires. The new development lots can comply with the minimum requirements of PBP, and the risk has been managed to the appropriate level required by PBP.	Yes
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 planning proposal will have all future lots directly accessing an existing local road network providing at least two evacuation areas within short distances.	Yes

Principle within PBP	Comment	Compliance
The development will adversely effect other bush fire protection strategies or place existing development at increased risk	All new development within the site will be designed to meet the minimum standards of PBP which achieve an appropriate level of bushfire resilience. The Planning Proposal does not seek or rely on the provision of off-site APZs or other BPM. The development will not burden or change the existing obligations or management actions of neighbours. The development will provide a positive impact to adjoining neighbours by permanently removing a bushfire hazard and provide ongoing active management.	Yes
The development is within an area of high bushfire risk where density of existing development may cause evacuation issues for both existing and new occupants	The landscape bushfire risk is Moderate (Table 2) as it is adequately separated from landscape scale bushfire and will only be exposed to local scale fires due to the limited vegetation and fragmented bushland patterns. The proposal will provide practical building envelopes and PBP compliant APZ on site, and all future lots will have direct access to the existing public road network.	Yes
The development has environmental constraints to the area which cannot be overcome	The environmental constraints have been considered and assessed separately. The Planning Proposal layout reflects the environmental constraints.	Yes

18. Conclusion

This Strategic Bushfire Study considers the suitability of the Planning Proposal with respect to bushfire risk. The Planning Proposal provides a well-considered design that has responded to the bushfire risk affecting the site and the aim and subsequent requirements within PBP to provide for the protection of life and the minimisation of impact on property while having due regard to the development potential, site characteristics and protection of the environment.

This SBS has followed the Aim and Objectives of PBP, Section 2.3 Strategic Planning, and specifically addressed the requirements of Chapter 4 – Strategic Planning. The suitability of the Planning Proposal has considered the broad land scape scale risk and the site-specific requirements of PBP.

The proposed residential subdivision zoning has been assessed against PBP Chapter 5 – Residential and Rural Residential Subdivisions to satisfy the requirements of Section 4.4.1 regarding indicative development layout. The proposed development can satisfy the detailed criteria to be assessed at the next stage of the process. All future lots will be supported by APZ to meet the standard of <29kW/m² at building exposures and will be further assessed at development application stage. The Planning Proposal meets the requirements of PBP and should be supported.

In the authors professional opinion, the Planning Proposal is a suitable use of the land, and the bushfire protection measures demonstrated in this report comply with the Aim and Objectives of Planning for Bush Fire Protection 2019, the Ministerial Direction 4.4 Planning for Bush Fire Protection, and allow for the issue of a Gateway Determination with respect to bushfire matters.



Lew Short | Principal

Blackash Bushfire Consulting

B.A., Grad. Dip. (Design for Bushfires), Grad. Cert. of Management (Macq), Grad. Cert. (Applied Management), BA (Resource & Environmental Management)

Fire Protection Association of Australia Level 3 BPAD 16373



18.1. Appendix 1 References

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18.2. Appendix 2 Curriculum Vitae



Curriculum Vitae

Lew Short

Director BlackAsh Bushfire Consulting

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Summary

Lew is an experienced leader in the government and emergency sector. He has an intimate knowledge of the workings of government and how emergency service organisations operate. He is not only a technical expert but a practitioner who has deep industry knowledge.

Lew has extensive experience providing national leadership in building community resilience representing AFAC and the FPAA. Lew's technical expertise is in bushfire consequence management, risk assessment and mitigation, specifically the planning and design of new developments in high bushfire risk areas to comply with legislative and planning requirements.

Lew has worked with some of Australia's leading organisations including NSW Rural Fire Service, Country Fire Authority, Emergency Management Victoria, Lend Lease, Mirvac, Victorian State and Local Governments, Sydney Water Corporation, Great Lakes and Warringah Councils. Lew has completed numerous industrial development assessments and assessments of new development in rural areas NSW.

Lew has a deep operational understanding of how [fire works](#) in the Australian landscape. He has multifaceted insight into how governments respond to this threat. Lew provides unique strategies to comply with regulatory requirements and safety outcomes.

Lew established and led the Community Resilience Group for the New South Wales Rural Fire Service (RFS). His areas of responsibility included land use planning, community engagement, education, vulnerable communities, bunkers, Neighbourhood Safer Places, business systems and projects, social media, integrated risk management and environmental management. He was responsible for the establishment, [management](#) and leadership of the development assessment function for the RFS at a State level where he was responsible for the assessment of over 80,000 development applications in Bush Fire Prone Areas.

Areas of Expertise

- Rezoning and strategic studies
- Industrial development assessment
- Landuse planning & consequence management
- Legal strategy, Land & Environment Court and Expert Witness
- Bushfire planning, design & construction requirements in accordance with National Standards
- Bushfire Prone Mapping, hazard mapping and risk assessments
- Australian Standard AS3959 Construction of Buildings in Bushfire Prone Areas
- Bushfire Management Plans
- Alternative & [performance based](#) solutions
- Evacuation planning and implementation
- Technical and Strategic advice



Qualifications / Accreditation

BPAD Level 3 Accredited Practitioner
Fire Protection Association of Australia

Graduate Diploma of Bush Fire Design
University of Western Sydney, 2006

Graduate Certificate of Applied Management
Australian Institute of Police Management, 2005

Graduate Certificate of Management Macquarie
Graduate School of Management Macquarie University, 2001

Bachelor of Arts, Resource and Environmental Management
Macquarie University, 1994

DAVID LEMCKE

Senior Planner & Bushfire Specialist



SKILLS

- Risk Management Planning
- Budgeting, grants & finance
- Project management – Fire Trails, APZ & HR burning
- Incident management
- Community engagement
- Policy development
- Legislation interpretation
- High level collaboration and negotiation skills
- Presentation skills
- Strategic planning
- Confidence & an open mind

RURAL FIRE SERVICE

Senior Deputy Captain

Peninsula Rural Fire Brigade
2016-2021

Deputy Captain

Peninsula Rural Fire Brigade
2008-2016

Bush fire fighter

Peninsula RFB
Lake Munmorah RFB
Katoomba HQ RFB
2002-2008

EDUCATION

Advanced Diploma of Public Safety (Emergency Management)

Australian Emergency Management
Institute
Mt Macedon 2015

Diploma of Management
Management Consultancy
International
Sydney 2012

PROFESSIONAL PROFILE

I am a highly motivated bush fire, planning and land management professional with 20+ years in local government and now working as a private sector Bushfire Consultant.

Served as Council's staff representative on the Wyong BFMC since 2007, including preparation of Bush Fire Risk Management Plans, Fire Access & Fire Trail Plan & delivery of updated Bush Fire Prone Land Maps.

Served as NCC Representative on Lake Macquarie BFMC from 2007 to 2011.

From 2010 I have been the program manager for the Wyong Shire Council (WSC) bush fire program and program manager for the Central Coast Council (CCC) since the merger in 2016. In 2012 the WSC Natural Areas Bush Fire Program won the NSW Local Government Resilient Australia Award and was a national finalist.

The CCC program includes management of over 220 fire trails, management of 264 mechanical Asset Protection Zones, Hazard Reduction burning, access management and community engagement. I have grown the budget for the program to over \$4 million per annum funding in FY 19/20, delivered using both contractors and internal staff teams.

I have been active in policy development at State level, being the Local Government NSW representative on numerous committees including the Review of the Bush Fire Environmental Assessment Code.

I am an active senior RFS volunteer, with 19 years in the service, having been a field officer for 12 years, with incident management experience at local level and have held multiple brigade Executive roles.

WORK EXPERIENCE

Senior Planner & Bushfire Specialist

Blackash Bushfire Consulting, 2021 – current

- Bushfire consultant for a wide range of private and public sector clients.
- Work includes bushfire management planning, development control and rezoning, critical infrastructure protection, evacuation management plans etc.

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TINTAGEL INVESTMENTS PTY LTD T/A BLACKASH BUSHFIRE CONSULTING ABN 99 000 704 861



DAVID LEMCKE

Senior Planner & Bushfire Specialist



EDUCATION (CONTINUED)

Master of Environmental Planning
Macquarie University
Sydney, 2005

Graduate Diploma Urban & Regional Planning
University of New England
Armidale 2000

Certificate II Bush Regeneration
Blue Mountains TAFE
Katoomba 2000

Bachelor of Arts (Geography)
University of New England
Armidale 1998

TECHNICAL SKILLS

- Incident controller at local incidents and sector leader at a wide range of larger incidents
- Highly proficient in RFS Grants, finance systems & procurement
- Highly proficient in preparation of Hazard Reduction Certificates and Part 5 Review of Environmental Factors
- Proficient in use of RFS BPED tool
- Worked as team member in Building Impact Assessment
- Prepared Level 1 & 2 HR burn plans in collaboration

WORK EXPERIENCE (CONTINUED)

Senior Planner, Emergency Protection & Natural Assets
Central Coast Council, 2016 – 2021

- Council's representative on the BFMC and program manager of the bush fire risk mitigation program. Have increased and delivered the budget from approximately \$1.5 million in 2016 to \$4 million in FY 19/20.
- On-ground coordination of Council response and recovery from 19/20 bush fires and flood clean up works following January 2020 storms, including dam catchments.

Senior Planner, Environment and Planning Unit
Wyong Shire Council, 2003-2016

- Founding member of the Local Government Bush Fire Mangers Network and part of team hosting multiple events and field days from 2007 to date.
- Project sponsor for applied research project on methods to improve preparation of private property including detailed costings and community engagement.
- Council's subject matter expert for bush fire providing detailed advice on development proposals, including successfully representing Council in the Land & Environment Court.
- Numerous partnerships with Crown Lands, National Parks & Wildlife Service and Darkinjung Local Aboriginal Land Council to deliver jointly funded HR projects.
- Preparation of environmental assessments for mechanical Hazard Reduction, Fire Trails and prescribed burns.
- Delivered increased Hazard Reduction burning on Council land. Increased the number and effectiveness of burns through collaboration with local RFS staff & volunteers.
- Worked with internal units to protect critical infrastructure including telecommunications towers, pump stations and community buildings.
- Delivering community engagement programs.
- Numerous conference presentations and submissions to inquiries including 2014 Productivity Commission report on Natural Disaster Funding.

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18.3. Appendix 3 EP&A Act 1979 – Section 9.1 Ministerial Direction

LOCAL PLANNING DIRECTIONS

Section 9.1(2) of the *Environmental Planning and Assessment Act 1979*

4.4 Planning for Bushfire Protection

Objectives

- (1) The objectives of this direction are:
 - (a) 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
 - (b) to encourage sound management of bush fire prone areas.

Where this direction applies

- (2) This direction applies to all local government areas in which the responsible Council is required to prepare a bush fire prone land map under section 10.3 of the *Environmental Planning and Assessment Act 1979* (the EP&A Act), or, until such a map has been certified by the Commissioner of the NSW Rural Fire Service, a map referred to in Schedule 6 of that Act.

When this direction applies

- (3) This direction applies when a relevant planning authority prepares a planning proposal that will affect, or is in proximity to land mapped as bushfire prone land.

What a relevant planning authority must do if this direction applies

- (4) In the preparation of a planning proposal the relevant planning authority must consult with the Commissioner of the NSW Rural Fire Service following receipt of a gateway determination under section 3.34 of the Act, and prior to undertaking community consultation in satisfaction of Schedule 1, clause 4 of the Act, and take into account any comments so made,
- (5) A planning proposal must:
 - (a) have regard to *Planning for Bushfire Protection 2019*,
 - (b) introduce controls that avoid placing inappropriate developments in hazardous areas, and
 - (c) ensure that bushfire hazard reduction is not prohibited within the APZ.
- (6) A planning proposal must, where development is proposed, comply with the following provisions, as appropriate:
 - (a) provide an Asset Protection Zone (APZ) incorporating at a minimum:
 - (i) 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
 - (ii) an Outer Protection Area managed for hazard reduction and located on the bushland side of the perimeter road,
 - (b) for infill development (that is development within an already subdivided area), where an appropriate APZ cannot be achieved, provide for an appropriate performance standard, in consultation with the NSW Rural Fire Service. If the provisions of the planning proposal permit Special Fire Protection Purposes (as defined under section 100B of the *Rural Fires Act 1997*), the APZ provisions must be complied with,
 - (c) contain provisions for two-way access roads which links to perimeter roads and/or to fire trail networks,
 - (d) contain provisions for adequate water supply for firefighting purposes,
 - (e) minimise the perimeter of the area of land interfacing the hazard which may be developed,
 - (f) introduce controls on the placement of combustible materials in the Inner Protection Area.

Consistency

- (7) A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Director-General of the Department of Planning (or an officer of the Department nominated by the Director-General) that the council 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.

Direction 4.4 – issued 20 February 2020