Narrabri Special Activation Precinct

Bushfire Assessment Report

3 May 2023

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Signature Page

3 May 2023

Narrabri Special Activation Precinct

Bushfire Assessment Report

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EXECUTIVE SUMMARY

This Bushfire Assessment has been prepared for the Department of Planning and Environment (DPE) to support the development of the Narrabri Special Activation Precinct (SAP) Master Plan. It has been designed to test the structure plan that was developed as part of a series of Enquiry by Design Workshops and aims to establish the relevant specifications and requirements to assist in the development of the Master Plan.

This assessment considers the bushfire landscape, land use, access and egress and emergency services capacity. Based on these factors it is anticipated that new development within the precinct can be designed to meet the requirements of *Planning for Bushfire Protection 2019*. Of particular note is the importance of future development to consider existing access and egress routes across the locality with key consideration of the existing industrial and rural residential development surrounding the precinct to enable compliance with *Planning for Bushfire Protection 2019*.

To streamline future building construction works it is intended to maximise the type and number of developments which can occur through complying development pathways under State Environmental Planning Policy (Precincts – Regional) 2021 (the Precincts-Regional SEPP). Complying development will not be applicable to all land use types or where a referral to the NSW RFS is required. The remaining commercial and industrial type development can be addressed within the Master Plan through the aims and objectives of *Planning for Bushfire Protection 2019*. Specifically:

- Complying development is only permitted on lower risk bushfire prone land (BAL-29 or lower);
- Where hazardous industries are proposed, consultation with the NSW RFS and preparation of a performance-based solution will be required. These development types will not be considered for complying development;
- Developments classified as special fire protection purpose (SFPP) would trigger referral to the NSW Rural Fire Service under s100b *Rural Fires Act 1997* and will not be considered complying development; and
- Other land uses such as public assembly buildings (i.e. function centres) also require referral to the NSW RFS under s.4.14 of the Environmental Planning and Assessment Act. Any buildings used for public assembly with a floor space area of greater than 500m² will be treated as SFPP and complying development is not permitted.

At a strategic level, the structure plan has taken into consideration the bushfire prone land mapping and new development within the precinct can be designed to meet the requirements of *Planning for Bushfire Protection 2019*. This includes the creation of an Environmental Protection Area along Bohena Creek which corresponds with the area's high bushfire hazard, and the provision of defendable space along its full perimeter (within the boundary of the SAP). This also includes the creation of an Environmental Protection Area along the central drainage line within the Residential Growth Area and the provision of a well-defined defendable space along its full perimeter.

These areas of defendable space include the perimeter road network, drainage channels and maintained public open space. All drainage channels, wetlands and landscaped areas should be designed and managed to meet the requirements of an Asset Protection Zone and must be maintained in perpetuity to ensure ongoing protection from the impact of bushfires, particularly in advance of the bushfire season.

The development of the structure plan has also considered the application of suitable Asset Protection Zones across the precinct to result in a Bushfire Attack Level of:

- BAL 29 or lower to all the future building envelopes;
- BAL 12.5 or lower to all SFPP; and
- BAL 12.5 or lower to all potential hazardous industry.

The SAP may also require the creation of Asset Protection Zones that need to be maintained sequentially until the final phase of development is completed to afford each stage of the development the appropriate level of bushfire protection.

Key specifications and requirements to assist in the development of the Master Plan and to be implemented as part of the Delivery Plan are provided in Table E.1.

Table E.1 Proposed Performance Criteria – Bushfire

Performance Criteria No.	Performance Criteria Description
1	Asset Protection Zones are managed and maintained to prevent the spread of a fire within the precinct in accordance with the requirements of Appendix 4 of *Planning for Bushfire Protection 2019* to result in a Bushfire Attack Level of BAL 29 or lower (not BAL 40 or BAL FZ) to all future building envelopes that are being assessed as complying development. This includes part of a staged or partial development of the Precinct.
2	Where referral to NSW RFS is required (SFPP, hazardous development and/or places of public worship), Asset Protection Zones should be managed and maintained to result in a Bushfire Attack Level of BAL 12.5 or lower (not BAL 29, BAL 40 or BAL FZ). These developments will not be assessed as complying development.
3	All landscaping is to comply with Appendix 4 of *Planning for Bushfire Protection 2019* and relevant environmental approvals required under the NSW *Biodiversity Conservation Act 2016* and/or Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. Where environmentally sensitive vegetation such as endangered ecological communities or threatened species habitat are to be cleared, the proposals will need to be carefully considered and may no longer be consistent with complying development.
4	Access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating as well as providing a safe operational environment for emergency service personnel during firefighting and emergency management on the interface. The requirements for access identified in *Planning for Bushfire Protection 2019* must be met for all stages of development within the Special Activation Precinct.
5	Adequate water supplies are provided for firefighting purposes. Hydrants are to be installed to achieve compliance with AS 2419.1 – 2021 Fire Hydrant Installations - System Design, Installation and Commissioning (AS 2419) and must be located less than 70m from each building envelope.
6	The location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings. Reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 and the requirements of relevant authorities, and metal piping is used.
7	The location of electricity services limits the possibility of ignition of surrounding bush land or the fabric of buildings and must comply with requirements of *Planning for Bushfire Protection 2019*.
8	Any revegetation proposed along the Green Loop must be designed to ensure that it does not increase the risk of bushfire to existing residential development.
9	The Residential Growth Area would be rezoned under the Narrabri Shire Council Local Environment Plan and will require consultation with the NSW RFS. In addition to the review of any layout designs, the proposal must demonstrate that the road network can support evacuation demand in the event of an emergency. It is important that new development does not increase the level of bushfire risk to the existing community and consideration must also be given to the LEP provisions relating to minimum lot sizes to ensure appropriate APZs can be accommodated within future subdivisions.

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Acronyms and Abbreviations

Name	Description
APZ	Asset Protection Zones
AS 3959-2018	*Australian Standard 3959 - 2018 Construction of Buildings in Bushfire-prone Areas*
Asset	anything valued by the community which includes houses, crops, heritage buildings and places, infrastructure, the environment, businesses, and national parks, that may be at risk from bushfire.
BAL	Bushfire Attack Level
BC Act	*Biodiversity Conservation Act 2016*
BFMC	Bushfire Management Committee
BFRMP	Bushfire Risk Management Plan
BPM	bushfire protection measure
Bushfire Hazard	the potential severity of a bushfire, which is determined by fuel load and topography under a given climatic condition
Bushfire Risk	the chance of a bushfire igniting, spreading and causing damage to the community or the assets they value
DPE	NSW Department of Planning and Environment
EP&A Act	*NSW Environmental Planning and Assessment Act 1979*
ERM	Environmental Resources Management Australia Pty Ltd
GIS	Geographic Information System
ha	Hectare
IFEG	International Fire Engineering Guidelines
IPA	inner protection area
km/h	Kilometres per hour
kW/m^2	Kilowatts per metre squared
LGA	Local Government Area
Major Bushfire	A bushfire which requires the attendance of multiple brigades, or causes damage to property or injury to one or more persons
MNES	Matter of National Environmental Significance
NASH standard	NASH Standard - Steel Framed Construction in Bushfire Areas
NCC	National Construction Code
N2IP	Narrabri Logistics and Industrial Hub
NPWS	National Parks and Wildlife Service
NSW	New South Wales
NSW RFS	NSW Rural Fire Service
RF Act	*NSW Rural Fires Act 1997*
RFS	Rural Fire Service
SAP	Special Activation Precinct
SAP Investigation Area	This is the focus of investigation for the Narrabri SAP
SFP	Special Fire Protection

Name	Description
SFPP	"special fire protection purpose" means the purpose of the following: (a) a school, (b) a child care centre, (c) a hospital (including a hospital for the mentally ill or mentally disordered), (d) a hotel, motel or other tourist accommodation, (e) a building wholly or principally used as a home or other establishment for mentally incapacitated persons, (f) seniors housing within the meaning of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 , (g) a group home within the meaning of State Environmental Planning Policy No 9--Group Homes , (h) a retirement village, (i) any other purpose prescribed by the regulations.
TOBAN	Total Fire Ban
Urban Investigation Area.	10km radius of the centre of Narrabri to support additional housing, infrastructure and community and social needs, and the transport network required to support an increasing population.
VM	Verification Method

Note:

Despite the mitigation measures and treatments that are put in place, it is noted that some bushfire risk will always remain and that some of the infrastructure may be subject to direct flame contact. The absence of any identified hazard or asset within the SAP Investigation Area should not be interpreted as a guarantee that such hazards or impacts do not exist. Approval authorities may require that a Bushfire Emergency Management Plan is prepared as part of the delivery phase of the project in conjunction with relevant stakeholders, including local fire services, NSW RFS, NSW Fire and Rescue, and adjoining property owners and employees.

Disclaimer:

Any representation, statement of opinion, or advice expressed or implied in the bushfire assessment will be made in good faith on the basis that ERM employees and / or agents are not liable (whether by reason of negligence, lack of care or any other reason) to any person, company or their agents for any damage or loss whatsoever which has occurred or may occur in relation to that person taking (or not taking) action in respect of any representation, statement or advice provided within the bushfire assessment.

ACKNOWLEDGEMENT OF COUNTRY

We acknowledge country and pay respects to the Gomeroi/Gamilaroi/Gamilaraay/Kamilaroi people as the Traditional Owners and Custodians of the land and waters on which the Narrabri Special Activation Precinct is located on.

We recognise their continued connection to Country and that this connection can be seen through stories of place and cultural practices such as art, songs, dances, storytelling and caring for the natural and cultural landscape of the area.

We also recognise the continuing living culture of Aboriginal people, and the significance of Narrabri in that living culture. We recognise the contemporary stories of displacement and the cultural significance of Narrabri in the continued journey of self-determination in Australia.

1. INTRODUCTION

Environmental Resources Management Australia Pty Ltd (ERM) has been engaged by the Department of Planning and Environment (DPE) to undertake a program of environmental and heritage studies to support the development of the Narrabri Special Activation Precinct (SAP) Master Plan.

Bushfire presents a threat to human life and assets and can adversely impact ecological values. In planning for the use of land in the rural or urban context, it is important to consider the potential threat from bushfire. Bushfire risk is a major constraint to future development, and with the impacts of climate change already being observed, the need to address these issues as early as possible within the planning process is critical.

This Bushfire Assessment Report has been designed to test the structure plan that was developed as part of a series of Enquiry by Design Workshops and aims to establish the relevant specifications and requirements to assist in the development of the Master Plan. This document is for design purposes only and has not been prepared to support any development application process.

1.1 Project Background

The New South Wales (NSW) Government, through its introduction of the Special Activation Precincts (SAPs) has identified six distinctive areas throughout regional NSW to bring together planning and investment to stimulate economic growth across a range of industries including freight and logistics, manufacturing, waste management and recycling, energy generation and agricultural and food processing activities. The planning and creation of these areas is partially facilitated and funded through the $4.2 billion Snowy Hydro Legacy Fund.

The establishment of SAPs is a joint NSW Government Agency initiative by the Department of Regional Growth NSW, Department of Planning and Environment (DPE) and the Regional Growth NSW Development Corporation (RGDC) as part of the 20-Year Economic Vision for Regional NSW. DPE is responsible for preparing the planning framework whereas the Department of Regional NSW manages each precinct.

In November 2020, Narrabri was declared the sixth and final SAP investigation area, enabled by its strong reputation and location within Australia’s highest productive grain region as well as its strong transportation linkages including existing road and rail connections and the future Inland Rail. To facilitate the planning within this precinct DPE has engaged ERM to prepare a series of technical studies within Narrabri SAP investigation area.

As part of the master planning process and to inform this technical study two Enquiry by Design (EbD) workshops were organised. A preliminary EbD was held on the 29th and 30th of March 2022 to develop three initial land use scenarios. Following an interdisciplinary assessment of the three scenarios, a final EbD workshop was held between 5th and 8th of September 2022 to study the interdisciplinary constraints of the three scenarios and identify and develop a preferred land use Structure Plan. This report assesses the land use Structure Plan from the final EbD workshop from a bushfire risk perspective only.

Narrabri township is located within the Narrabri Shire local government area (LGA), 530 km northwest of Sydney. As of 2021 census, the population of Narrabri township was 6,898 persons with 16% identifying as Aboriginal and/or Torres Strait Island Peoples.

The township lies at the junction of the Newell and Kamilaroi highways and has direct rail connection to the Port of Newcastle via the Walgett branch of the Main North line. Once completed, Narrabri will also have a direct connection to the new Inland Rail route which will connect Melbourne to Brisbane via new and upgraded track.

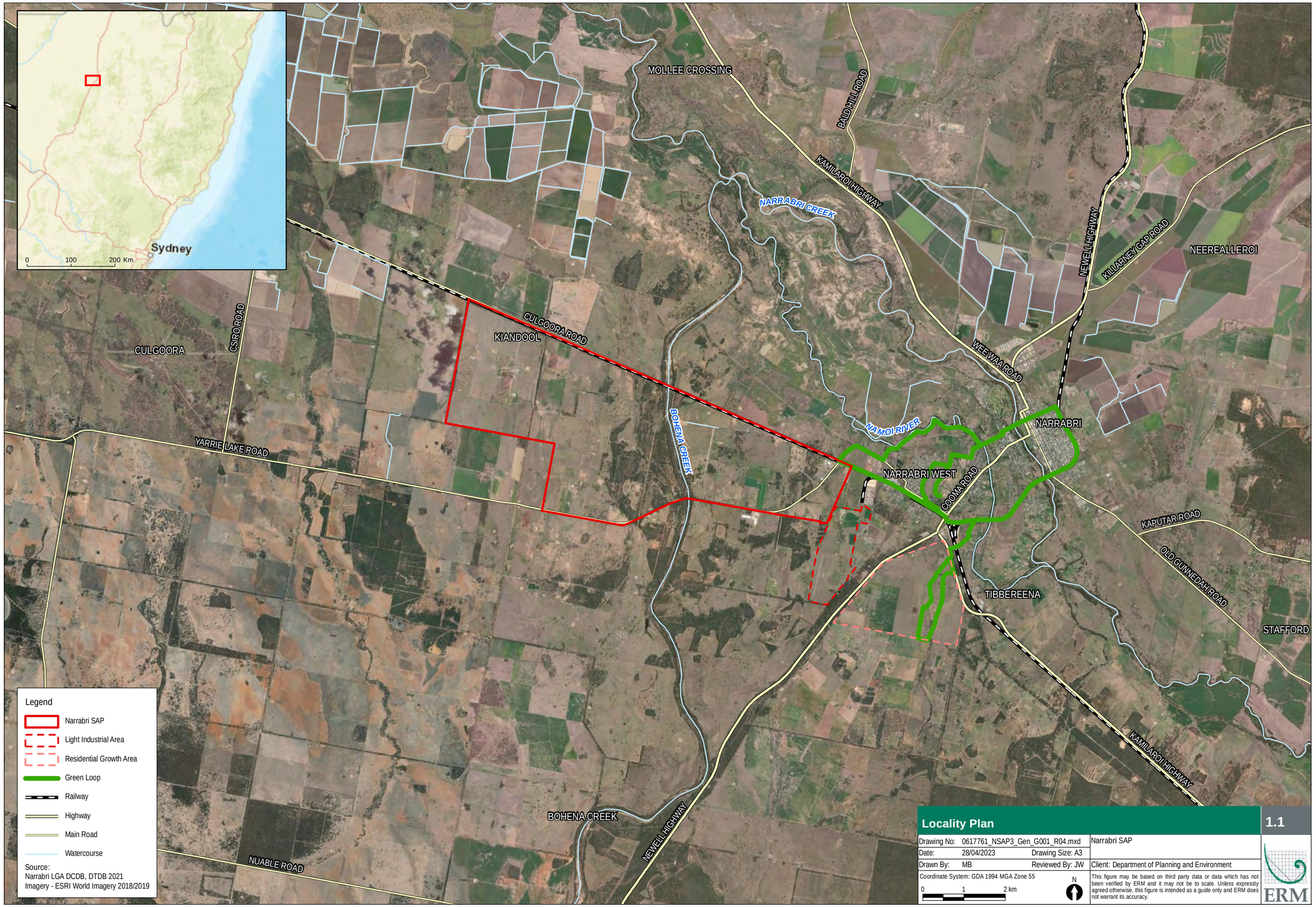
1.2 Structure Plan

The Narrabri SAP, refined at the Final EbD covers an area of approximately 2629.46 ha. It is located to the west of the existing township and incorporates two areas separated by an environmental buffer zone. This investigation area is being utilised as a basis for all technical studies, however, will not necessarily form the final SAP boundary which may change throughout the master planning process.

The Structure Plan describes the preferred land use scenario and the sequencing and/or staging of development and includes the following key considerations:

- The relation between the Inland Port and the Narrabri SAP;
- The relationship and interactions between the Narrabri SAP and the existing Narrabri Town Centre; and
- The provision of a residential growth area, associated infrastructure for a new residential area, and the relationship between the new residential area and the SAP.

The Narrabri SAP Structure Plan is summarised in Figure 1.2 below. The investigation area for the Narrabri SAP is defined as the red outline on Figure 1.2 below and forms the focus of this technical study. Additional areas outside the Narrabri SAP boundaries but within the place making proposal of the Narrabri SAP are also shown within the Structure Plan and includes a residential growth area, light industrial uses and recreational/open-space use (Green Loop).


Sydney
0
100
200 Km
MOLLEE CROSSING
BALD HILL ROAD
KAMILAROI HIGHWAY
NARRABRI CREEK
NEWELL HIGHWAY
KILLARNEY GAP ROAD
NEEREALLEROI
CULGOORA
CSIRO ROAD
KIANDOOL
CULGOORA ROAD
WEE WAA ROAD
NAMOI RIVER
NARRABRI
BOHENA CREEK
NARRABRI WEST
COOMA ROAD
YARRIE LAKE ROAD
KAPUTAR ROAD
OLD GUNNEDAH ROAD
TIBBEREENA
STAFFORD
KAMILAROI HIGHWAY
BOHENA CREEK
NEWELL HIGHWAY
NUABLE ROAD
Legend
Narrabri SAP
Light Industrial Area
Residential Growth Area
Green Loop
Railway
Highway
Main Road
Watercourse
Source:
Narrabri LGA DCDB, DTDB 2021
Imagery - ESRI World Imagery 2018/2019
Locality Plan
1.1
Drawing No: 0617761_NSAP3_Gen_G001_R04.mxd
Narrabri SAP
Date: 28/04/2023
Drawing Size: A3
Drawn By: MB
Reviewed By: JW
Client: Department of Planning and Environment
Coordinate System: GDA 1994 MGA Zone 55
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This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.
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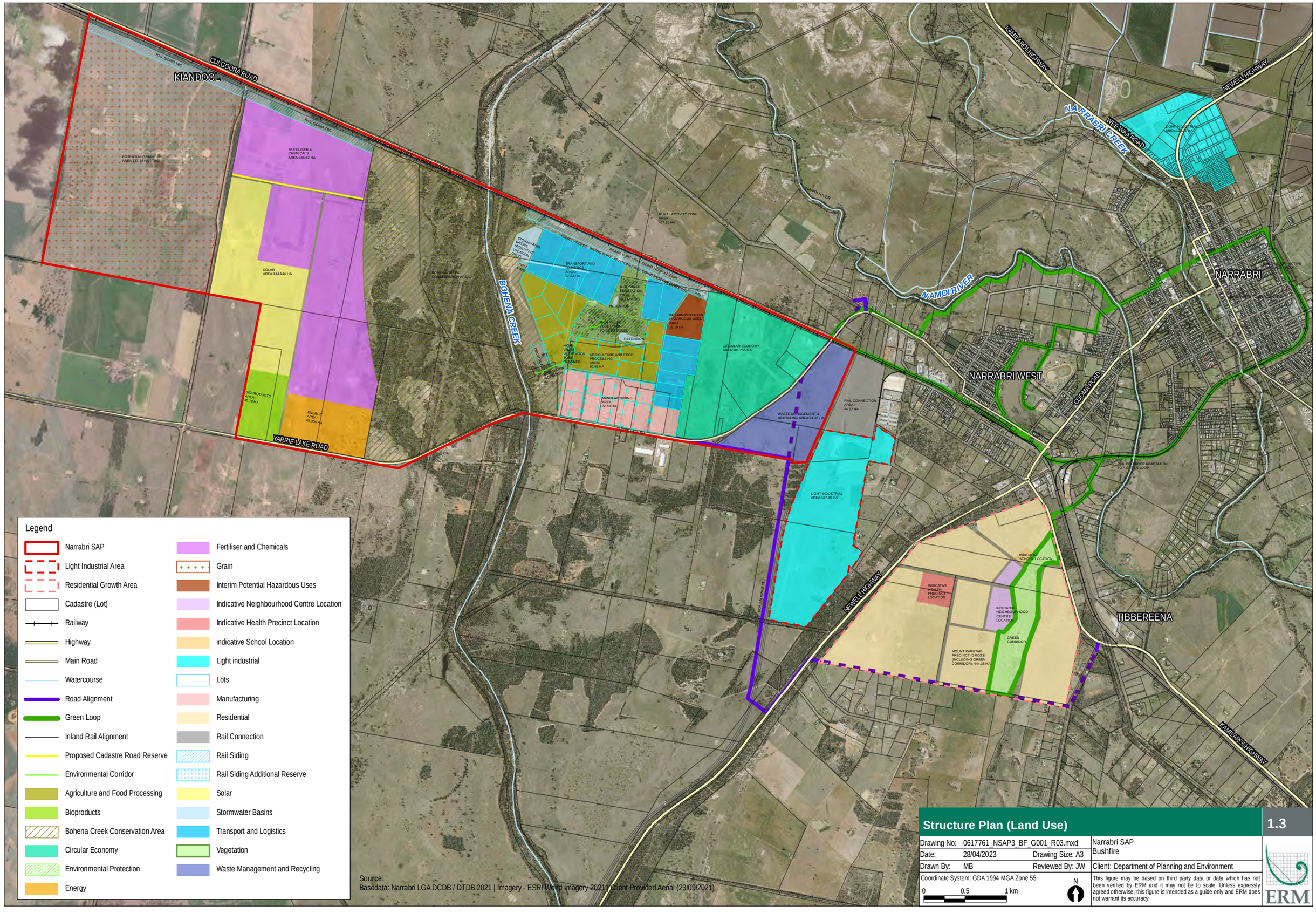

Legend

- Narrabri SAP
- Light Industrial Area
- Residential Growth Area
- Cadastre (Lot)
- Railway
- Highway
- Main Road
- Watercourse
- Road Alignment
- Green Loop
- Inland Rail Alignment
- Proposed Cadastre Road Reserve
- Environmental Corridor
- Agriculture and Food Processing
- Bioproducts
- Bohena Creek Conservation Area
- Circular Economy
- Environmental Protection
- Energy
- Fertiliser and Chemicals
- Grain
- Interim Potential Hazardous Uses
- Indicative Neighbourhood Centre Location
- Indicative Health Precinct Location
- indicative School Location
- Light industrial
- Lots
- Manufacturing
- Residential
- Rail Connection
- Rail Siding
- Rail Siding Additional Reserve
- Solar
- Stormwater Basins
- Transport and Logistics
- Vegetation
- Waste Management and Recycling

Source:
Basedata: Narrabri LGA DCDB / DTDB 2021 | Imagery - ESRI World Imagery 2021, Client Provided Aerial (23/09/2021)

Structure Plan (Land Use)

1.3

Drawing No:	0617761_NSAP3_BF_G001_R03.mxd		Narrabri SAP Bushfire
Date:	28/04/2023	Drawing Size: A3	
Drawn By:	MB	Reviewed By: JW	Client: Department of Planning and Environment

Coordinate System: GDA 1994 MGA Zone 55

0 0.5 1 km

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2. STRATEGIC BUSHFIRE PLANNING

Bushfire should be considered in every phase of development, from regional plans, land-use zoning, Master Plans, subdivisions to individual building applications.

A detailed overview of the relevant legislation and policies applicable to this assessment were provided in the Narrabri SAP Bushfire Baseline Analysis report (ERM 2021). In summary, the NSW land use planning framework provides two main phases: strategic planning (this assessment) and development assessment (future development within the SAP). NSW RFS *Planning for Bushfire Protection 2019* (PBP 2019) provides the foundation for bushfire protection during both of these phases of development.

In accordance with the Section 4 of PBP 2019, in bushfire prone areas strategic planning should provide for the exclusion of inappropriate development. Development should be avoided as follows:

- Where a development area is exposed to a high bushfire risk;
- Where a 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;
- Where the development will adversely affect other bushfire protection strategies or place existing development at increased risk;
- Where density of existing development may cause evacuation issues for both existing and new occupants; and
- Where the development has environmental constraints to the area which cannot be overcome.

Table 2.1 below, provides the minimum assessment considerations that have been (or will be) included within the final Master Plan. **Appendix A provides the results of the Stage 1 analysis and a description of the bushfire landscape.**

Table 2.1 Minimum Assessment Considerations for Strategic Bushfire Assessment

Issue	Assessment Considerations*	Addressed within the Narrabri SAP Planning Process
Bushfire landscape assessment	The bushfire hazard in the surrounding area, including: ■ Vegetation, Topography, Weather ■ Any history of bushfire in the area; and ■ The potential fire behaviour that might be generated based on the above	This was addressed within the Stage 1 Baseline Assessment and is summarised in Appendix A.
Land use assessment	■ The risk profile of different areas of the development layout based on the above landscape study	An assessment of proposed land uses and potential for development to impact on existing infrastructure is a key element of the strategic planning process in bushfire prone areas. Refer to the Landuse Analysis in Section 3.
Access and egress	■ The capacity for the proposed road network to deal with evacuating residents and responding emergency services; ■ The location of key access routes and direction of travel; and ■ The potential for development to be isolated in the event of a bushfire.	The capacity of the current road network to deal with increased traffic volumes associated with the development of the SAP including evacuating residents and workers is being addressed separately. Appendix C provides a summary of the design principles that will need to be considered the internal road network.

Issue	Assessment Considerations*	Addressed within the Narrabri SAP Planning Process
Emergency services	■ Consideration of the increase in demand for emergency services responding to a bushfire emergency including the need for new stations/ brigades.	The Narrabri Fire Control Centre is located on Old Newell Hwy, at the northern end of the Residential Growth Area. The need to upgrade these services to respond to the demands of the Narrabri SAP will be addressed within the delivery phase of the project and will be based on the confirmed staging and types of development that are being considered. It is noted that a Project Control Group (PCG) for a replacement (new) facility has recently been formed.
Infrastructure	■ The ability of the reticulated water system to deal with a major bushfire 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.	Hydrogeology and Water Demand is being addressed as a separate package and it is noted that additional water supplies may need to be developed to meet the full water demand for the SAP. Refer to Section 5.9 and Section 5.10.
Adjoining land	The impact of new development on adjoining landowners and their ability to undertake bushfire management.	Construction and maintenance of Asset Protection Zones (APZ) within the final precinct must be restricted to the final Narrabri SAP boundaries and will not rely on protective measures implemented on neighbouring lands.

** A summary from Table 4.2.1 of Planning for Bushfire Projection 2019*

2.1 Section 100B Rural Fires Act 1997

With specific reference to the Narrabri SAP, the subdivision of bushfire prone land that could lawfully be used for residential or rural residential purposes (unlikely within the SAP boundary itself but does apply to the Residential Growth Area), or development of bushfire prone land for a Special Fire Protection Purpose (SFPP) would trigger referral to the NSW Rural Fire Service under s100b *Rural Fires Act 1997*. These developments would not be considered under complying development.

Clause 44 of the *Rural Fires Act 1997* provides that an application for a Bushfire Safety Authority must be made in writing and must include an assessment of the extent to which the proposed development conforms with or deviates from the standards, specific objectives and performance criteria set out in PBP 2019.

2.2 Planning for Bushfire Protection 2019

PBP 2019 is a planning document to link responsible planning and development control with the protection of life, property and the environment. PBP 2019 is the culmination of significant investment in scientific research and policy development to provide appropriate bushfire protection whilst still having due consideration for development potential and economic sustainability.

Therefore, during development of the Master Plan, consideration is given to the overall aims and objectives of PBP 2019 and the expectation will be that the future development will be able to comply with PBP 2019 at the project delivery stage.

Appendix B provides additional information on meeting the objectives of PBP 2019.

2.3 Bushfire Attack Level and Complying Development

Of particular relevance to the Narrabri SAP is consideration of complying and exempt development. It is understood that to streamline future building construction works it is intended for most applications to be assessed under the new Precincts-Regional SEPP with similar provisions to those in the current *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008*.

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

2.4 Assumptions and Limitations

Although the SAP Investigation Area itself is not currently mapped as bushfire prone land, it is recognised that Category 1 vegetation has been confirmed within the SAP boundary. Category 3 vegetation (including but not limited to grasslands and freshwater wetlands) will also likely be added to the bushfire prone land mapping at some stage to align with the requirements of the NSW RFS Guide for Bushfire Prone Land Mapping (NSW RFS 2015). This will increase the area of bushfire prone land and would extend across both the Narrabri SAP and Residential Growth Area.

The bushfire assessment is largely confined to Narrabri SAP and the identified Residential Growth Area and does not provide any detailed assessment of any other commercial centres/hubs that may be facilitated as a result of the SAP. These concepts would require detailed assessment on a case-by-case basis and have been addressed within this report at a very high level only.

This assessment is based on desktop resources and the specifications outlined within PBP 2019 only. The assessment does not include detailed flame length modelling and does not provide any performance-based solutions. A detailed land use safety planning assessment is being prepared as a separate package and considers the risk arising from potentially hazardous industries. The risk of any specific development or land use leading to fires, explosions or toxic releases is not addressed within this bushfire report.

It is neither possible nor desirable to eliminate bushfires in NSW – they are inevitable across all fire-prone vegetation types. When high fuel loads, ignition sources and adverse weather inevitably coincide, wildfires will result. It is also important to note that despite the mitigation measures and treatments that are put in place, some bushfire risk will always remain and that some of the infrastructure may be subject to direct flame contact. Approval authorities may require that a Bushfire Emergency Management Plan is prepared as part of the delivery phase of the project in conjunction with relevant stakeholders, including local fire services, NSW RFS, NSW Fire and Rescue, and adjoining property owners and employees.

3. LAND USE ANALYSIS WITHIN THE NARRABRI SAP

As outlined within PBP 2019, land use planning can be an effective tool in minimising or avoiding the impact of natural hazards such as bushfire. From a risk management perspective, the safest approach is always to avoid high risk areas. In a bushfire context, strategic planning must ensure that future land uses are in appropriate locations to minimise the risk to life and property from bushfire attack. Services and infrastructure that facilitate effective suppression of bushfires also need to be provided for at the earliest stages of planning.

The design of the precinct includes the retention of the central riparian corridor along Bohena Creek as well as protection of high value vegetation within the western portion of the SAP and a central green corridor within the Residential Growth Area. This presents a clear, well-defined interface between the hazard and potential development within the SAP. This interface will be the focus of the bushfire mitigation measures and required setbacks (asset protections zones) although it is noted that some bushfire risk will always remain.

It is also noted that at the strategic land use planning stage the range of possible tenants, activities and associated hazards are unknown. Hence, it is not possible to undertake a detailed land use assessment and the following information provided is general in nature.

3.1 Complying Development

Special Activation Precincts will deliver faster planning approvals to provide local councils, regional communities, industry and businesses with greater confidence around future investment and development. It is understood that to streamline future building construction works and make it easier for businesses to set-up or expand within the precinct it is intended to maximise the type and number of developments which can occur through complying development pathways.

When preparing an application for development, the applicant must complete a strategic merit assessment step to get an Activation Precinct Certificate from Regional Growth NSW Development Corporation. Under the *Environmental Planning and Assessment Regulation 2000*, an Activation Precinct certificate is required to accompany an application for development consent for development on land within an Activation Precinct. The requirements will ensure development is consistent with the vision for the precincts, and in line with planning controls. The general requirements of complying development is outlined within Part 3.4 of the Precincts-Regional SEPP.

At this Master Plan phase, one of the important items is the ability for future development to provide suitable APZs to result in a **Bushfire Attack Level of BAL 29 or lower** (not BAL 40 or BAL FZ) to the future building envelopes in accordance with the requirements of PBP 2019.

The identification, application and management of asset protection zones is further considered in Section 5.

3.2 Hazardous Industry

Some developments are considered by their very nature to be hazardous, as much for their ability to start bushfires as their susceptibility to bushfire impacts. Where hazardous industries are proposed with the precinct, consultation with the NSW RFS and preparation of a performance-based solution will be required. These development types will also not be considered for complying development.

Hazardous industries include but are not limited to:

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

Hazardous and offensive industries are types of industries and storage establishments that cannot comply with the conditions of their EPA licence, and present a risk to life, property and the environment. Hazardous developments are unlikely to be suitable within the Narrabri SAP due to land use conflicts.

Potentially hazardous development such as service stations that can comply with their license and conditions of consent may be permitted within the precinct. Environmental Planning Policy (Resilience and Hazards) 2021 (Resilience and Hazards SEPP) will continue to apply. Consultation with the NSW RFS and preparation of a performance-based solution may be required. Potentially hazardous developments, including those handling toxic material(s), are likely to be acceptable in within the boundary of Narrabri SAP although it is noted that the fertilizer plant and other potentially hazardous developments that require large buffers are better suited to the western portion of the SAP.

High risk potentially hazardous development will not be considered for complying development within the Narrabri SAP. State Environmental Planning Policy No 33—Hazardous and Offensive Development and State Environmental Planning Policy No 55—Remediation of Land will apply to development within an Activation Precinct that is not complying development.

3.3 Commercial / Industrial Development

Under the building classification system within the National Construction Code (NCC), Class 5 to 8 buildings include offices, shops, factories, warehouses, public car parks and other commercial and industrial facilities. The NCC does not provide for any bushfire specific performance requirements for these particular classes of buildings and as such Australian Standard 3959 ‘Construction of buildings in bushfire-prone areas’ does not apply as a set of ‘deemed to satisfy’ provisions.

In this case (and as outlined within Section 8.3.1 of PBP 2019, the following objectives will be applied in relation to access, water and services, and emergency and evacuation planning:

- to provide safe access to/from the public road system for firefighters providing property protection during a bushfire and for occupant egress for evacuation;
- to provide suitable emergency and evacuation (and relocation) arrangements for occupants of the development;

- to provide adequate services of water for the protection of buildings during and after the passage of bushfire, and to locate gas and electricity so as not to contribute to the risk of fire to a building; and
- provide for the storage of hazardous materials away from the hazard wherever possible.

Construction requirements for bushfire protection will need to be considered on a case-by-case basis. Where a manager's residence is included in the proposal for a commercial and industrial development it is captured by s4.14 of the *Environmental Planning and Assessment Act* (EP&A Act).

Where no residential component is included, commercial and industrial development is addressed through the objectives of PBP 2019, being:

i. afford buildings and their occupants protection from exposure to a bushfire;
ii. provide for a defendable space to be located around buildings;
iii. provide appropriate separation between a hazard and buildings which, in combination with other measures, minimises material ignition;
iv. ensure that appropriate operational access and egress for emergency service personnel and residents is available;
v. provide for ongoing management and maintenance of bushfire protection measures (BPMs); and
vi. ensure that utility services are adequate to meet the needs of firefighters.

The scale of the development and numbers of people likely to be occupying the building will directly influence the bushfire protection measures. While there are no minimum required APZs applicable to commercial / industrial development to satisfy the aim and objectives of PBP 2019, the buildings must be located outside Flame Zone.

To satisfy the requirements of complying development, commercial and industrial development should have a Bushfire Attack Level of BAL 29 or lower (refer to Section 5.2).

4. LAND USE ANALYSIS WITHIN THE RESIDENTIAL GROWTH AREA

4.1 Residential Development

It is noted that the Residential Growth Area is located outside of the Narrabri SAP and would be rezoned under the Narrabri Shire Council Local Environment Plan and not under the Precincts-Regional SEPP. Under Direction 4.4 of PBP 2019, Council must consult with the Commissioner of the NSW RFS during the preparation of a draft LEP and take into account any comments made. In addition to the review of any layout designs, consideration must also be given to the LEP provisions relating to minimum lot sizes to ensure appropriate APZs can be accommodated within future subdivisions.

In accordance with PBP 2019, where an application for rezoning is for residential or SFPP development on bushfire prone land, it should include an indicative development layout. This enables an assessment of the suitability of the land for the proposed development given the bushfire risk and existing land uses. The proposal must demonstrate that the required APZs can be met on the development site and that the road network can support evacuation demand volumes in the event of an emergency. It is important that new development does not increase the level of bushfire risk to the existing community.

Subdivision can occur across a range of different forms such as residential, rural-residential and rural. Certain subdivisions may pose significant challenges from a planning and/or bushfire risk perspective and may require additional considerations. A BFSA is required from the NSW RFS for subdivision on BFPL under RF Act. The specific objectives for residential and rural residential subdivisions are as follows:

- minimise perimeters of the subdivision exposed to the bushfire hazard (hourglass shapes, which maximise perimeters and create bottlenecks should be avoided);
- minimise vegetated corridors that permit the passage of bushfire towards buildings;
- provide for the siting of future dwellings away from ridge-tops and steep slopes, within saddles and narrow ridge crests;
- ensure that APZs between a bushfire hazard and future dwellings are effectively designed to address the relevant bushfire attack mechanisms;
- ensure the ongoing maintenance of APZs; provide adequate access from all properties to the wider road network for residents and emergency services;
- provide access to hazard vegetation to facilitate bushfire mitigation works and fire suppression; and
- ensure the provision of an adequate supply of water and other services to facilitate effective firefighting.

At this Master Plan phase, one of the important items is the ability for future development to provide suitable APZs to result in a **Bushfire Attack Level of BAL 29 or lower** (not BAL 40 or BAL FZ) to the future building envelopes in accordance with the requirements of PBP 2019.

The identification, application and management of asset protection zones is further considered in Section 5.2. These would be required along the interface between the development and the central vegetation corridor. As the Residential Growth Area would be developed in stages, additional asset protection zones would need to be applied as development progress. This would be confirmed on a site-by-site basis at the development application stage and does not form part of the Narrabri SAP or the Precincts-Regional SEPP.

4.2 Special Fire Protection Purpose Development

A SFPP development is one which is occupied by people who are considered to be at-risk members of the community. In a bushfire event, these occupants may be more susceptible to the impacts of bushfire. Evacuating at-risk members of the community is more challenging because they may be physically or psychologically less able to relocate themselves or are unfamiliar with their surroundings.

Due to the potential vulnerable nature of the occupants, there is more reliance on the provision of a wider APZ and emergency management. The specific objectives for SFPP developments are to:

- Minimise levels of radiant heat, localised smoke and ember attack through increased APZ, building design and siting;
- Provide an appropriate operational environment for emergency service personnel during firefighting and emergency management; ensure the capacity of existing infrastructure (such as roads and utilities) can accommodate the increase in demand during emergencies as a result of the development; and
- Ensure emergency evacuation procedures and management which provides for the special characteristics and needs of occupants.

Examples of SFPP developments relevant to the Narrabri SAP itself may include industrial or agricultural training hubs. Other sensitive land uses such as schools or childcare centres are unlikely to be suitable within the SAP boundary itself based on the risk profile and land use conflicts.

Health care facilities, childcare centres, neighbourhood centres and schools may be located within the Residential Growth Area. 'Information and education facilities' are defined in the NSW Standard Instrument as a building or place used for providing information or education to visitors, and the exhibition or display of items, and includes an art gallery, museum, library, visitor information centre and the like. For the purposes of this assessment and in accordance with Section 8.3.11 of PBP 2019, any buildings used for public assembly with a floor space area of greater than 500m² will also be treated as SFPP.

It is also noted that the location of sensitive land uses will be defined by a number of additional restrictions such as access capabilities, air quality, noise impacts and consideration of other planned facilities (co-location) and have not been assessed in detailed as part of this assessment report.

To satisfy the requirements of complying development, SFPP development should have a Bushfire Attack Level of BAL 12.5 or lower.

It is also important to note that development of bushfire prone land for a Special Fire Protection Purpose (SFPP) triggers referral to the NSW Rural Fire Service under s100b Rural Fires Act 1997 and cannot be considered 'complying development' under any environmental planning instrument.

5. ASSET PROTECTION ZONES AND DEFENDABLE SPACE

Appendix B provides additional information on meeting the objectives of PBP 2019.

An APZ is a buffer zone between a bushfire hazard and buildings, and is managed to minimise fuel loads and reduce potential radiant heat levels, flame, localised smoke and ember attack. The appropriate APZ distance is based on vegetation type, slope and the nature of the development.

The APZ can include roads, fences, boardwalks, signage, seating or other passive recreational activities managed to be consistent with the NSW RFS document Standards for Asset Protection Zones. A fuel-reduced, physical separation between buildings and bushfire hazards is a key element in the suite of bushfire measures and has a major influence on the type of construction necessary to mitigate bushfire attack.

Irrespective of the bushfire prone land mapping, it is important to ensure that a defendable space is provided for the size and scale of the development. Proposed measures must operate in combination to minimise the impact of bushfire and ensure that access and services are adequate. At this stage of the Master Plan process, it is important to highlight the need to provide suitable APZs across the precinct to result in a Bushfire Attack Level of:

- BAL 29 or lower to all the future building envelopes;
- BAL 12.5 or lower to all SFPP; and
- BAL 12.5 or lower to all hazardous industry.

As indicated within Figure 5.1, the width of the APZ will differ based on the location of the hazard (slope and vegetation type) relevant to the development footprint. As an indication, the separation distances in Table 5.1 will apply to achieve a BAL 29 or lower. For the development on the eastern side of Bohena Creek, with a slope of 5-10 degrees (downslope), a 31m wide asset protection zone will be required. To achieve a BAL 12.5 or lower, with a slope of 5-10 degrees (downslope), a 57m wide asset protection zone would be required to areas of forest, and a 26m wide asset protection zone to areas of grassland. This would be reduced to 40m and 20m respectively for upslope and flat land.

Table 5.1 Minimum distances for APZs – FFDI 80 areas (≤29kW/m2, 1090K)

KEITH VEGETATION FORMATION	EFFECTIVE SLOPE				
	Up slopes and flat	>0°-5°	>5°-10°	>10°-15°	>15°-20°
	Distance (m) from the asset to the predominant vegetation formation				
Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	20	25	31	39	48
Grassy and Semi-Arid Woodland	11	13	17	21	27
Arid-Shrublands (acacia and chenopod)	6	7	8	9	10
Freshwater Wetlands	5	6	6	7	8
Grassland	10	11	12	14	16

**Based on Table A1.12.3 Planning for Bushfire Protection 2019. Only those vegetation formations relevant to the Narrabri SAP Investigation Area have been included here. A full list of vegetation communities is provided in Planning for Bushfire Protection 2019.*

Table 5.2 Minimum distances for APZs – SFPP developments (≤10kW/m², 1200K)

KEITH VEGETATION FORMATION	EFFECTIVE SLOPE				
	Up slopes and flat	>0°-5°	>5°-10°	>10°-15°	>15°-20°
	Distance (m) from the asset to the predominant vegetation formation				
Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	67	79	93	100	100
Grassy and Semi-Arid Woodland	42	50	60	72	85
Arid-Shrublands (acacia and chenopod)	24	27	30	34	37
Freshwater Wetlands	19	22	25	28	30
Grassland	36	40	45	50	55

**Based on Table A1.12.1 Planning for Bushfire Protection 2019. Only those vegetation formations relevant to the Narrabri SAP Investigation Area have been included here. A full list of vegetation communities is provided in Planning for Bushfire Protection 2019.*

Table 5.3 Determination of BAL, FFDI 80

KEITH VEGETATION FORMATION		BUSHFIRE ATTACK LEVEL (BAL)*				
		BAL-FZ	BAL-40	BAL-29	BAL-19	BAL-12.5
		Distance (m) from the asset to the predominant vegetation formation				
All upslope and flat land	Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	< 15	15 -< 20	20 -< 29	29 -< 40	40 -< 100
	Grassy and Semi-Arid Woodland (including Mallee)	< 8	8-<11	11 -< 16	16 -< 22	22 -< 100
	Arid-Shrublands (acacia and chenopod)	< 5	5-<6	6-<9	9-<14	14 -< 100
	Freshwater Wetlands	< 4	4-<5	5	-< 7	7-<11
	Grassland	< 7	7-<10	10 -< 14	14 -< 20	20 -< 50
> 0 > 5 degrees – downslope	Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	< 19	19 -< 25	25 -< 35	35 -< 47	47 -< 100
	Grassy and Semi-Arid Woodland (including Mallee)	< 10	10 -< 13	13 -< 19	19 -< 28	28 -< 100
	Arid-Shrublands (acacia and chenopod)	< 5	5-<7	7-<11	11 -< 16	16 -< 100
	Freshwater Wetlands	< 4	4-<6	6-<8	8-<12	12 -< 100
	Grassland	< 8	8-<11	11 -< 16	16 -< 23	23 -< 50

KEITH VEGETATION FORMATION		BUSHFIRE ATTACK LEVEL (BAL)*				
		BAL-FZ	BAL-40	BAL-29	BAL-19	BAL-12.5
		Distance (m) from the asset to the predominant vegetation formation				
> 5 > 10 degrees – downslope	Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	< 24	24 -< 31	31 -< 43	43 -< 57	57 -< 100
	Grassy and Semi-Arid Woodland (including Mallee)	< 12	12 -< 17	17 -< 24	24 -< 34	34 -< 100
	Arid-Shrublands (acacia and chenopod)	< 6	6-<8	8-<12	12 -< 18	18 -< 100
	Freshwater Wetlands	< 5	5-<6	6-<10	10 -< 14	14 -< 100
	Grassland	< 9	9-<12	12 -< 18	18 -< 26	26 -< 50

**Based on Table A1.12.6 Planning for Bushfire Protection 2019.*

Only those vegetation formations relevant to the Narrabri SAP Investigation Area have been included here. A full list of vegetation communities is provided in Planning for Bushfire Protection 2019.

>10 degrees is also specified in Planning for Bushfire Protection 2019 although it is unlikely to apply at Narrabri due to the flat topography

KIANDOOL

CULGOORA ROAD

YARRIE LAKE ROAD

BOHENA CREEK

NARRABRI CREEK

NAMOI RIVER

NARRABRI

NARRABRI WEST

TIBBEREENA

KAMILAROI HIGHWAY

NEWELL HIGHWAY

WEE WAA ROAD

COOMA ROAD

POTENTIAL GRAIN AREA 527.48 HA (TBC)

FERTILISER & CHEMICALS AREA:366.62 HA

SOLAR AREA:144.144 HA

BIOPRODUCTS AREA: 40.79 HA

ENERGY AREA: 63.306 HA

RURAL ACTIVITY ZONE AREA: 567.36 HA

TRANSPORT LOGISTICS AREA: 57.84 HA

INTERIM POTENTIAL HAZARDOUS USES AREA: 19.19 HA

CIRCULAR ECONOMY AREA:181.756 HA

AGRICULTURE AND FOOD PROCESSING AREA: 80.88 HA

MANUFACTURING AREA: 72.59 HA

WASTE MANAGEMENT & RECYCLING AREA:94.32 HA

RAIL CONNECTED AREA: 44.92 HA

LIGHT INDUSTRIAL AREA:187.30 HA

INDICATIVE SCHOOL LOCATION

INDICATIVE HEALTH PRECINCT LOCATION

INDICATIVE NEIGHBOURHOOD CENTRE LOCATION

GREEN CORRIDOR

MOUNT KAPUTAR PRECINCT (GROSS) (INCLUDING GREEN CORRIDOR): 444.38 HA

Figure 5.2 Detail

Figure 5.3 Detail

Figure 5.4 Detail

Legend

- Narrabri SAP
- Light Industrial Area
- Residential Growth Area
- Indicative Asset Protection Zone
- Cadastre (Lot)
- Railway
- Highway
- Main Road
- Watercourse
- Road Alignment
- Green Loop
- Inland Rail Alignment
- Proposed Cadastre Road Reserve
- Environmental Corridor
- Development Footprint
- Bohena Creek Conservation Area
- Environmental Protection
- Vegetation

Source:
Basedata: Narrabri LGA DCDB / DTDB 2021 | Imagery - ESRI World Imagery 2021 | Client Provided Aerial (23/09/2021)

Indicative APZ for Structure Plan Overview

5.1

Drawing No:	0617761_NSAP3_BF_G003_R04.mxd		Narrabri SAP Bushfire
Date:	01/05/2023	Drawing Size: A3	
Drawn By:	MB	Reviewed By: JW	Client: Department of Planning and Environment

Coordinate System: GDA 1994 MGA Zone 55

0 0.5 1 km

N

ERM

Important notes:
1. This figure shows indicative APZ to achieve BAL 29 and 12.5 only as referenced within the Narrabri SAP Bushfire Assessment Report.
This figure is not be used to support any development application and it does not show areas of BAL-FZ, BAL 40 or BAL 19. Please refer to Planning for Bushfire Protection 2019 and AS 3959 to confirm BAL ratings across the precinct and to assess bushfire risk at a site specific scale.

2. The staged development of the SAP may require the creation of additional APZs that need to be maintained sequentially until the final phase of development is completed to afford each stage of the development the appropriate level of bush fire protection. This will need to be considered for all development within 100m of woodland and forest vegetation and 50m of grassland. This has not be depicted in this figure.

KIANDOOL
CULGOORA ROAD
RAIL SIDING TBC
RAIL SIDING TBC
SAP BOUNDARY - AREA 3096.81 HA
BOHENA CREEK
25m wide
25m wide
POTENTIAL GRAIN
AREA 527.48 HA (TBC)
FERTILISER &
CHEMICALS
AREA:366.62 HA
10m wide
10m wide
SOLAR
AREA:144.144 HA
25m wide
BOHENA CREEK
CONSERVATION AREA
STORMWATER
BASINS
(INDICATIVE
LOCATION
ONLY)
DIRECT ACCESS
10m wide
F&B
CAFE
TRANSPORT A
LOGISTICS
AREA:
57.84 HA
BOHENA CREEK
47m wide
25m wide
10m wide
HIGH
VALUE
VEGETATION
TO BE
RETAINED
DECOMMIS
VEGETATION
CORRIDOR
31m wide
25m wide
BIOPRODUCTS
AREA:
40.79 HA
ENERGY
AREA:
63.306 HA
31m wide
10m wide

Legend

- Narrabri SAP
- Light Industrial Area
- Residential Growth Area
- 10m wide Asset Protection Zone (BAL 29)
- 25m wide Asset Protection Zone (BAL 29)
- 31m wide Asset Protection Zone (BAL 29)
- 47m wide Asset Protection Zone (BAL 12.5)
- BAL 12.5
- BAL Low
- Cadastre (Lot)
- Railway
- Main Road
- Watercourse
- Road Alignment
- Green Loop
- Inland Rail Alignment
- Proposed Cadastre Road Reserve
- Environmental Corridor
- Agriculture and Food Processing
- Bioproducts
- Bohena Creek Conservation Area
- Environmental Protection
- Energy
- Fertiliser and Chemicals
- Grain
- Lots
- Manufacturing
- Rail Siding
- Rail Siding Additional Reserve
- Solar
- Stormwater Basins
- Transport and Logistics

Source:
Basedata: Narrabri LGA DCDB / DTDB 2021 | Imagery - ESRI World Imagery 2021 | Client Provided Aerial (23/09/2021)

Indicative APZ for Structure Plan Western Area

5.2

Drawing No:	0617761_NSAP3_BF_G004_R04.mxd		Narrabri SAP Bushfire
Date:	01/05/2023	Drawing Size: A3	
Drawn By:	MB	Reviewed By: JW	Client: Department of Planning and Environment

Coordinate System: GDA 1994 MGA Zone 55

0 250 500m

N

ERM

Important notes:
1. This figure shows indicative APZ to achieve BAL 29 and 12.5 only as referenced within the Narrabri SAP Bushfire Assessment Report.
This figure is not be used to support any development application and it does not show areas of BAL-FZ, BAL 40 or BAL 19. Please refer to Planning for Bushfire Protection 2019 and AS 3959 to confirm BAL ratings across the precinct and to assess bushfire risk at a site specific scale.

2. The staged development of the SAP may require the creation of additional APZs that need to be maintained sequentially until the final phase of development is completed to afford each stage of the development the appropriate level of bush fire protection. This will need to be considered for all development within 100m of woodland and forest vegetation and 50m of grassland. This has not be depicted in this figure.

BOHENA CREEK CONSERVATION AREA

BOHENA CREEK

GULGOORA ROAD

RURAL ACTIVITY ZONE
AREA:
467.36 HA

NAMOI RIVER

DIRECT ACCESS - INLAND PORT - RAIL SIDING (100m x 2,400m

INLAND PORT - ADDITIONAL RAIL SIDING RESERVE (50m

DIRECT ACCESS

STORMWATER BASINS (INDICATIVE LOCATION ONLY)

F&B / CAFE

TRANSPORT AND LOGISTICS
AREA:
57.84 HA

HIGH VALUE VEGETATION TO BE RETAINED

RETENTION

INTERIM POTENTIAL HAZARDOUS USES
AREA:
19.19 HA

HIGH VALUE VEGETATION TO BE RETAINED

25m wide

RETENTION

10m wide

DECOUPLING

HIGH VALUE VEGETATION TO BE RETAINED

AGRICULTURE AND FOOD PROCESSING
AREA:
90.88 HA

CIRCULAR ECONOMY
AREA:181.756 HA

INLAND RAIL ALIGNMENT

31m wide

VEGETATION CORRIDOR

25m wide

MANUFACTURING
AREA:
72.59 HA

YARRIE LAKE ROAD

YARRIE LAKE RD

RAIL CONNECTIO
AREA:
44.92 HA

WASTE MANAGEMENT & RECYCLING AREA:94.32 HA

10m wide

LIGHT INDUSTRIAL
AREA:187.30 HA

Legend

- Narrabri SAP
- Light Industrial Area
- Residential Growth Area
- 10m wide Asset Protection Zone (BAL 29)
- 25m wide Asset Protection Zone (BAL 29)
- 31m wide Asset Protection Zone (BAL 29)
- BAL 12.5
- BAL Low
- Cadastre (Lot)
- Railway
- Main Road
- Watercourse
- Road Alignment
- Green Loop
- Inland Rail Alignment
- Proposed Cadastre Road Reserve
- Environmental Corridor
- Agriculture and Food Processing
- Bohena Creek Conservation Area
- Circular Economy
- Environmental Protection
- Interim Potential Hazardous Uses
- Light industrial
- Lots
- Manufacturing
- Rail Connection
- Rail Siding
- Rail Siding Additional Reserve
- Stormwater Basins
- Transport and Logistics
- Waste Management and Recycling

Source:
Basedata: Narrabri LGA DCDB / DTDB 2021 | Imagery - ESRI World Imagery 2021 | Client Provided Aerial (23/09/2021)

Indicative APZ for Structure Plan Central Area

5.3

Drawing No:	0617761_NSAP3_BF_G005_R04.mxd		Narrabri SAP Bushfire
Date:	01/05/2023	Drawing Size: A3	
Drawn By:	MB	Reviewed By: JW	Client: Department of Planning and Environment

Coordinate System: GDA 1994 MGA Zone 55

0 250 500m

N

ERM

Important notes:
1. This figure shows indicative APZ to achieve BAL 29 and 12.5 only as referenced within the Narrabri SAP Bushfire Assessment Report.
This figure is not be used to support any development application and it does not show areas of BAL-FZ, BAL 40 or BAL 19. Please refer to Planning for Bushfire Protection 2019 and AS 3959 to confirm BAL ratings across the precinct and to assess bushfire risk at a site specific scale.

2. The staged development of the SAP may require the creation of additional APZs that need to be maintained sequentially until the final phase of development is completed to afford each stage of the development the appropriate level of bush fire protection. This will need to be considered for all development within 100m of woodland and forest vegetation and 50m of grassland. This has not be depicted in this figure.

LIGHT INDUSTRIAL AREA:187.30 HA

ROAD ALIGNMENT

INDICATIVE HEALTH PRECINCT LOCATION

25m wide

IVE SCHOOL LOCATION

KAMILAROI HIGHWAY

NAMOI RIVER

INDICATIVE NEIGHBOURHOOD TRE LOCATION

47m wide

TIBBEREENA

GREEN CORRIDOR

MOUNT KAPUTAR PRECINCT (INCLUDING GREEN CORRIDOR): 444.38 HA

25m wide

10m wide

10m wide

NEWELL HIGHWAY

Legend

- Narrabri SAP
- Light Industrial Area
- Residential Growth Area
- 10m wide Asset Protection Zone (BAL 29)
- 25m wide Asset Protection Zone (BAL 29)
- 47m wide Asset Protection Zone (BAL 12.5)
- BAL 12.5
- BAL Low
- Cadastre (Lot)
- Railway
- Highway
- Watercourse
- Road Alignment
- Green Loop
- Inland Rail Alignment
- Proposed Cadastre Road Reserve
- Environmental Corridor
- Indicative Neighbourhood Centre Location
- Indicative Health Precinct Location
- indicative School Location
- Light industrial
- Residential
- Vegetation

Source:
Basedata: Narrabri LGA DCDB / DTDB 2021 | Imagery - ESRI World Imagery 2021 | Client Provided Aerial (23/09/2021)

Indicative APZ for Structure Plan Residential Growth Area

5.4

Drawing No:	0617761_NSAP3_BF_G006_R04.mxd		Narrabri SAP Bushfire
Date:	01/05/2023	Drawing Size: A3	
Drawn By:	MB	Reviewed By: JW	Client: Department of Planning and Environment

Coordinate System: GDA 1994 MGA Zone 55

0 250 500m

N

ERM

6. CONCLUSION AND RECOMMENDATIONS

The broad principles that apply to this analysis are ensuring land is suitable for development in the context of bushfire risk; ensuring new development on bushfire prone land will comply with PBP 2019; minimising reliance on performance-based solutions; providing adequate infrastructure associated with emergency evacuation and firefighting operations; and facilitating appropriate ongoing land management practices.

To streamline future building construction works within the Narrabri SAP, it is intended to maximise the type and number of developments which can occur through complying development pathways under State Environmental Planning Policy (Precincts-Regional) 2021 (the Precincts-Regional SEPP). Complying development will not be applicable to all land use types or where a referral to the NSW RFS is required. The remaining commercial and industrial type development can be addressed within both the Master Plan and the Delivery Plan through the aims and objectives of PBP 2019. Specifically:

- All development within 100m of high bushfire hazard and 50m of grassland will require consideration of the PBP 2019 and the application of asset protection zones.
- Complying development is only permitted on lower risk bushfire prone land (BAL-29 or lower).
- Where hazardous industries are proposed, consultation with the NSW RFS and preparation of a performance-based solution will be required. High risk potentially hazardous developments will not be considered for complying development;
- Developments classified as special fire protection purpose (SFPP) would trigger referral to the NSW Rural Fire Service under s100b *Rural Fires Act 1997* and will not be considered complying development; and
- Other land uses such as public assembly buildings (i.e. function centres) also require referral to the NSW RFS under s.4.14 of the EP&A Act. Any buildings used for public assembly with a floor space area of greater than 500m² will be treated as SFPP and complying development is not permitted.

At a strategic level, the structure plan has taken into consideration the bushfire prone land mapping and new development within the precinct can be designed to meet the requirements of PBP 2019. This includes the creation of an Environmental Protection Area along Bohena Creek which corresponds with the areas high bushfire hazard, and the provision of defendable space along its full perimeter (within the boundary of the SAP). This also includes the creation of an Environmental Protection Area along the central drainage line within the Residential Growth Area (external to the SAP) and the provision of a well-defined defendable space along its full perimeter.

These areas of defendable space include the perimeter road network, drainage channels and maintained public open space. All drainage channels, wetlands and landscaped areas should be designed and managed to meet the requirements of an APZ, and must be maintained in perpetuity to ensure ongoing protection from the impact of bushfires, particularly in advance of the bushfire season.

The development of the structure plan has also considered the application of suitable Asset Protection Zones across the precinct to result in a Bushfire Attack Level of:

- BAL 29 or lower to all the future building envelopes;
- BAL 12.5 or lower to all SFPP; and
- BAL 12.5 or lower to all potential hazardous industry.

To achieve a BAL 12.5 or lower, with a slope of 5-10 degrees (downslope), a 57m wide asset protection zone would be required to areas of forest, and a 26m wide asset protection zone to areas of grassland. This would be reduced to 40m and 20m respectively for upslope and flat land. To further reduce the risk and streamline the development approval process, a separation distance of 100m to woodland and forest vegetation and 50m to grassland would need to be maintained.

The SAP may also require the creation of APZs that need to be maintained sequentially as part of the Delivery Plan until the final phase of development is completed to afford each stage of the development the appropriate level of bushfire protection. These will need to be considered for all development within 100m of woodland and forest vegetation and 50m of grassland. Key specifications and requirements to assist in the development of the Master Plan and to be implemented as part of the Delivery Plan are provided in Table 6.1.

Table 6.1 Proposed Performance Criteria – Bushfire

Performance Criteria No.	Performance Criteria Description
1	Asset Protection Zones are managed and maintained to prevent the spread of a fire within the precinct in accordance with the requirements of Appendix 4 of *Planning for Bushfire Protection 2019* to result in a Bushfire Attack Level of BAL 29 or lower (not BAL 40 or BAL FZ) to all future building envelopes that are being assessed as complying development. This includes part of a staged or partial development of the Precinct and will need to be considered for all development within 100m of woodland and forest vegetation and 50m of grassland.
2	Where referral to NSW RFS is required (SFPP, hazardous development and/or places of public worship), Asset Protection Zones should be managed and maintained to result in a Bushfire Attack Level of BAL 12.5 or lower (not BAL 29, BAL 40 or BAL FZ). These developments may not be assessed as complying development.
3	All landscaping is to comply with Appendix 4 of *Planning for Bushfire Protection 2019* and relevant environmental approvals required under the NSW *Biodiversity Conservation Act 2016* and/or Commonwealth Environment Protection and *Biodiversity Conservation Act 1999*. Where environmentally sensitive vegetation such as endangered ecological communities or threatened species habitat are to be cleared, the proposals will need to be carefully considered and may no longer be consistent with complying development.
4	Access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating as well as providing a safe operational environment for emergency service personnel during firefighting and emergency management on the interface. The requirements for access identified in *Planning for Bushfire Protection 2019* must be met for all stages of development within the Special Activation Precinct.
5	Adequate water supplies are provided for firefighting purposes. Hydrants are to be installed to achieve compliance with AS 2419.1 – 2021 Fire Hydrant Installations - System Design, Installation and Commissioning (AS 2419) and must be located less than 70m from each building envelope.
6	The location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings. Reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 and the requirements of relevant authorities, and metal piping is used.
7	The location of electricity services limits the possibility of ignition of surrounding bush land or the fabric of buildings and must comply with requirements of *Planning for Bushfire Protection 2019*.
8	Any revegetation proposed along the Green Loop must be designed to ensure that it does not increase the risk of bushfire to existing residential development.
9	The Residential Growth Area would be rezoned under the Narrabri Shire Council Local Environment Plan and will require consultation with the NSW RFS. In addition to the review of any layout designs, the proposal must demonstrate that the road network can support evacuation demand in the event of an emergency. It is important that new development does not increase the level of bushfire risk to the existing community and consideration must also be given to the LEP provisions relating to minimum lot sizes to ensure appropriate APZs can be accommodated within future subdivisions.

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APPENDIX A STAGE 1 BUSHFIRE LANDSCAPE ASSESSMENT

STAGE 1 BUSHFIRE LANDSCAPE ASSESSMENT

Climate and Fire Weather

Weather conditions influence the size, intensity, speed, and predictability of bushfires and how dangerous they can be to the community. While bushfires can happen at any time of the year in Australia, the time of peak bushfire activity varies across the country with the changes in the seasonal weather patterns. In NSW and southern Queensland this generally occurs in spring to mid-summer.

Source: Bureau of Meteorology – Bushfire Weather (2021)
http://www.bom.gov.au/weather-services/fire-weather-centre/bushfire-weather/index.shtml

As described by the Bureau of Meteorology (BOM) (2021), the greatest danger occurs following a dry winter and spring (as seen during the bushfires in 2019). The worst conditions occur when deep low-pressure systems near Tasmania bring strong, hot and dry, westerly winds to the coastal districts. The end of the fire season is determined by the onset of moister conditions, sometimes the result of a tropical cyclone developing near the Queensland coast.

Prevailing weather associated with the bushfire season, as reported by the Namoi-Gwydir Bushfire Management Committee (BFMC) (BFMC, 2018), are north-westerly winds accompanied by high daytime temperatures and low relative humidity. Dry lightning storms occur frequently during the bushfire season. The Bushfire Danger Period runs from 1st October through to 30th March, however prevailing weather has the potential to extent outside of this normal timeframe.

Strong gusty winds help fan the flames and cause a fire to spread faster across the landscape. Strong winds can carry hot embers long distances - these can start spot fires many kilometres ahead of the main fire front. Smoke attributed to bushfire can also have a major impact on various assets and the environment. Wind direction, fuel moisture content, and ignition source should be considered and managed to reduce the likelihood of smoke issues.

Climate Change and Bushfires

Eastern Australia is documented to be one of the most bushfire-prone areas in the world. As reported by the Bureau of Meteorology (BOM 2022), human induced climate change is influencing the frequency and severity of dangerous bushfire conditions in Australia and other regions of the world, influencing temperature, environmental moisture, weather patterns, and fuel conditions. Observed changes in southern and eastern Australia include more extreme conditions during summer, as well as an earlier start to the bushfire season with dangerous weather conditions occurring significantly earlier in spring than they used to.

This is also supported by the Adapt NSW New England North West Climate Change Snapshot which reports that in the near future (by 2030), projected changes to the Forest Fire Danger Index (FFDI) will occur, increasing fire weather in summer, spring and winter and also increasing the number of fire weather days in summer and spring. Severe and average FFDI is projected to increase, particularly in spring and summer.

While climate change might not ignite the fire, it is giving fires the chance to turn into catastrophic fires by creating warmer temperatures, increasing the amount of fuel (dried vegetation) available, and reducing water availability due to higher evaporation. In relation to fire ignition, there is some indication that human induced climate change could also influence the risk of ignitions from dry-lightning (i.e., lightning that occurs without significant rainfall).

Bushfire weather conditions in future years are projected to increase in severity for many regions including Narrabri. This will result in:

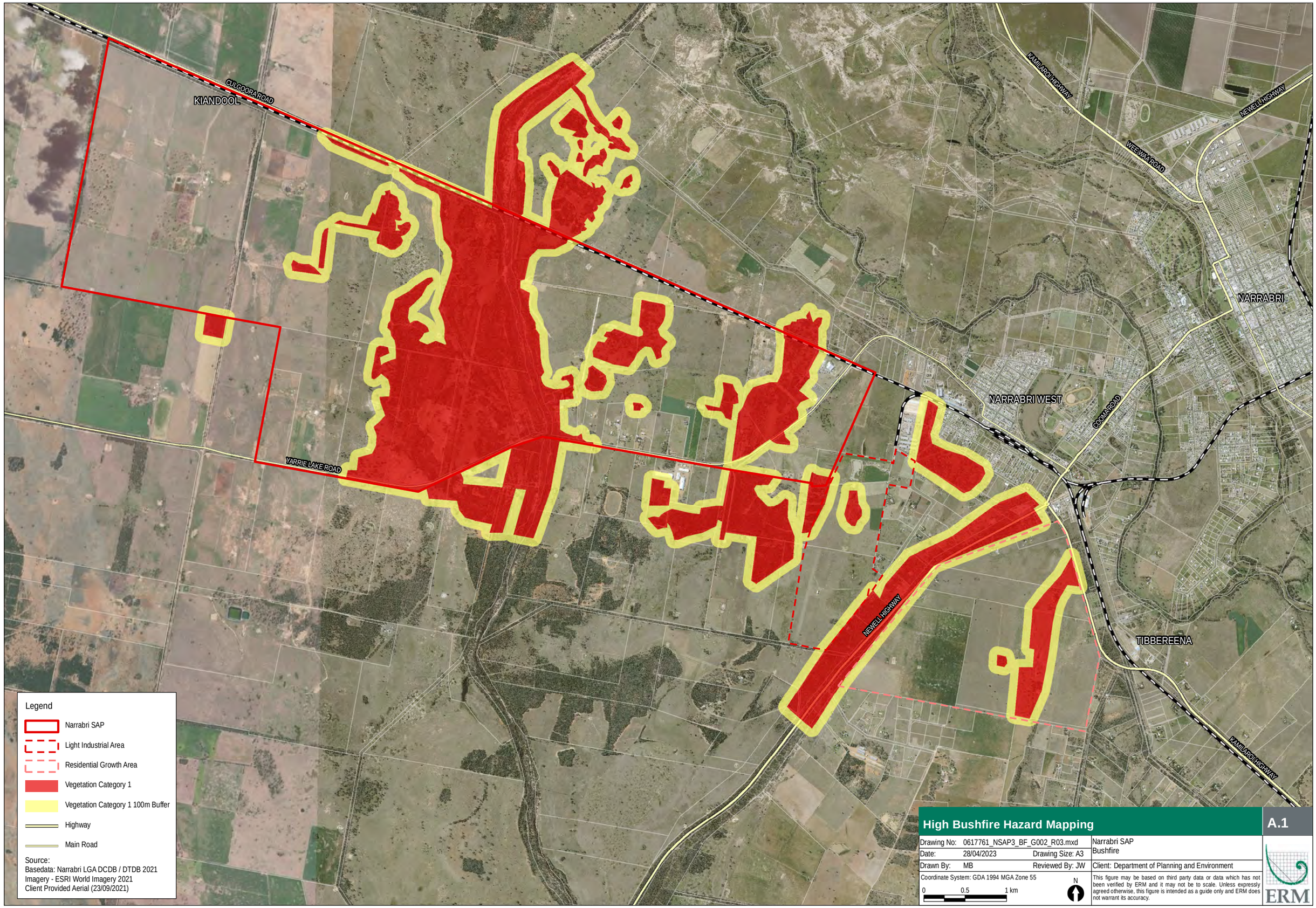
- an earlier start to the bushfire season;
- reduced opportunities for fuel reduction burning;
- management of fire risk to property, people and biodiversity will become increasingly challenging; and
- an increase in the number of extreme fire danger days.

Bushfire Prone Land Mapping

Bushfire prone land is land that has been identified by local council, which can support a bushfire or is subject to bushfire attack. Bushfire prone land maps are prepared by local council and certified by the Commissioner of the NSW RFS. Although the SAP Investigation Area itself is not currently mapped as bushfire prone land (refer to Figure A2), the riparian vegetation along Bohena Creek is recognised as Category 1 vegetation. Category 1 vegetation is also recognised and has been mapped within the eastern portion of the SAP boundary as well as the central corridor within the residential growth area.

These areas of high bushfire hazard have been presented below in the revised bushfire prone land mapping (refer to Figure A1). This map is the trigger for the consideration of bushfire protection measures for all development within the Narrabri SAP.

It is also recognised that Category 3 vegetation (including but not limited to grasslands and freshwater wetlands) will likely be added to the bushfire prone land mapping at some stage to align with the requirements of the NSW RFS Guide for Bushfire Prone Land Mapping (NSWRFS 2015). This will increase the area of bushfire prone land and would extend into the SAP Investigation Area as well as the identified Residential Growth Area.


KIANDOOL
CULGOORA ROAD
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NEWELL HIGHWAY
WEE WAA ROAD
NARRABRI
NARRABRI WEST
GOOMA ROAD
YARRIE LAKE ROAD
NEWELL HIGHWAY
TIBBEREENA
KAMILAROI HIGHWAY
Legend
Narrabri SAP
Light Industrial Area
Residential Growth Area
Vegetation Category 1
Vegetation Category 1 100m Buffer
Highway
Main Road
Source:
Basedata: Narrabri LGA DCDB / DTDB 2021
Imagery - ESRI World Imagery 2021
Client Provided Aerial (23/09/2021)
High Bushfire Hazard Mapping
A.1
Drawing No: 0617761_NSAP3_BF_G002_R03.mxd
Narrabri SAP
Bushfire
Date: 28/04/2023
Drawing Size: A3
Drawn By: MB
Reviewed By: JW
Client: Department of Planning and Environment
Coordinate System: GDA 1994 MGA Zone 55
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This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.
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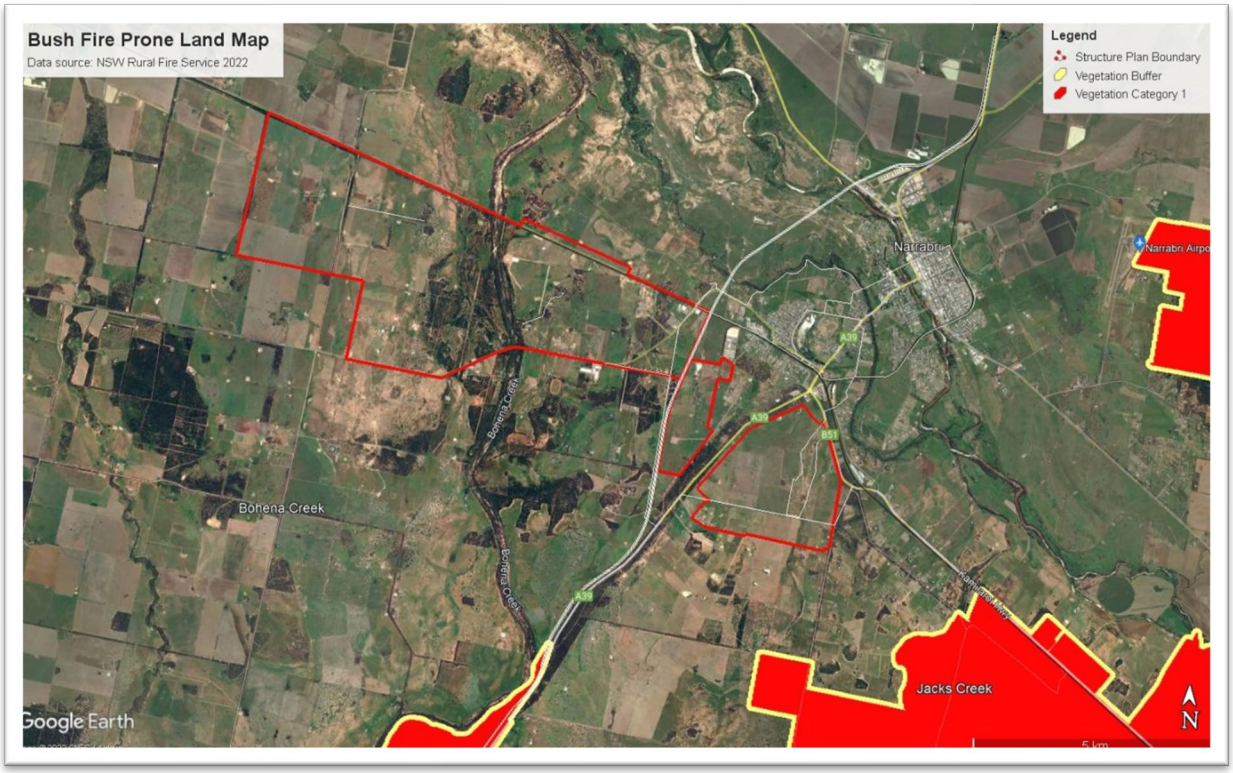


Figure A.2 Bushfire Prone Land Mapping
Source: NSW Rural Fires Service 2022

Vegetation Hazard

Vegetation growth can be encouraged by periods of wet weather, increasing the amount of fuel available (grass, leaf litter, twigs, bark). When the weather is hot, the humidity is low, and there has been little recent rain, this vegetation dries out and becomes more flammable. A fire is more likely to start, and continue to burn, in hot, dry and windy weather.

For the purposes of this assessment, the regional vegetation mapping and where available ground-truthed vegetation mapping as reported in the Biodiversity Assessment Report (ERM 2022) has been simplified in line with the vegetation formations as per Keith (2004).

While not identified as a bushfire prone vegetation community the current bushfire prone land mapping, grassfires should not be underestimated and can start and spread quickly. For this reason we have considered these as a bushfire hazard. They can travel up to 25km per hour and pulse even faster over short distances. As described by Sullivan *et al*. (2012), grass is a fine, high surface area to volume ratio fuel with high thermal conductivity, low density and vertical orientation, which rapidly ignites (and rapidly burns out). Grassfires are also generally more open to wind than forest fuels (Cheney and Sullivan 2008) making them unpredictable. Grassfires tend to be less intense and produce fewer embers than bushfires, but still generate enormous amounts of radiant heat. Grassfires can also start earlier in the day than bushfires, because grass dries out more quickly when temperatures are high and humidity is low. It should be assumed that, under the most extreme weather, a fire would spread even in heavily grazed grass and embers may breach any Asset Protection Zone (APZ).

There are also patches of woodland and forest vegetation along Bohena Creek riparian corridor and within the western portion of the SAP boundary that will influence fire behaviour. They tend to have continuous fuels that are available to burn during average seasons. They are highly combustible and the regional climatic conditions may support crown fires. These areas should be avoided where possible and will be subject to asset protection zones.

The NSW RFS Guide for Bushfire Prone Land Mapping (NSW RFS 2015) also provides the following definitions which can be applied to the final structure plan and will also determine the requirement for addition management and mitigation measures to be applied:

Remnant Vegetation: Remnant vegetation is considered to be of a lower bushfire risk (than Category 1 and Category 3) due to the size and/or shape of the parcel. This includes areas of vegetation greater than one hectare, but less than 2.5 hectares in size. These areas represent a lower likelihood of ignitions because the vegetation is surrounded by development in such a way that an ignition in any part of the vegetation has a higher likelihood of detection.

Vegetation Exclusions: Vegetation excluded from being mapped as bushfire prone and relevant to the Narrabri SAP includes

- Single areas of vegetation less than 1 hectare in area and greater than 100 metres separation from other areas of Category 1, 2 or 3 vegetation;
- Multiple areas of vegetation less than 0.25 hectares in area and not within 30 metres of each other;
- Strips of vegetation less than 20 metres in width, regardless of length and not within 20 metres of other areas of Category 1, 2 or 3 vegetation;
- Areas of “managed grassland” including grassland on, but not limited to, recreational areas, commercial/industrial land, residential land, airports/airstrips, maintained public reserves and parklands, commercial nurseries and the like.
- Non-vegetated areas, including waterways, roads, footpaths, buildings and rocky outcrops.
- Agricultural lands used for annual and/or perennial cropping, orchard, market gardens, nurseries.

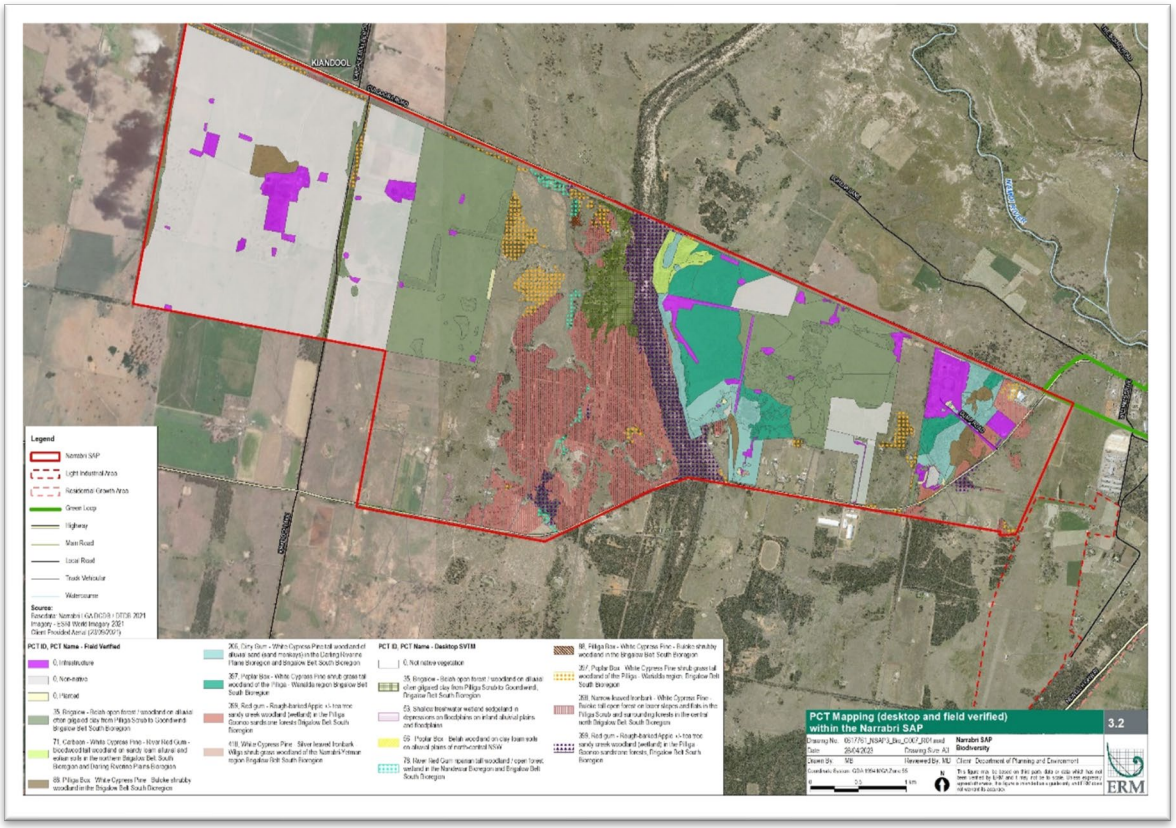


Figure A.3 Vegetation Communities
Source: Biodiversity Assessment Report (ERM 2023)

Table A.1 Vegetation Classification within the Narrabri SAP Investigation Area

Vegetation Community (Biodiversity Assessment ERM 2022)	Vegetation Formation (Keith 2004)	Vegetation Category (NSW RFS 2015)
Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion	Semi-arid Woodlands (Grassy sub-formation)	Category 3
Carbeen - White Cypress Pine - River Red Gum - bloodwood tall woodland on sandy loam alluvial and eolian soils in the northern Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion	Semi-arid Woodlands (Shrubby sub-formation)	Category 1
Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Category 1
Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Dry Sclerophyll Forests (Shrubby sub-formation)	Category 1
Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Category 3
Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga – Goonoo sandstone forests, Brigalow Belt South Bioregion	Dry Sclerophyll Forests (Shrubby sub-formation)	Category 1
White Cypress Pine - Silver-leaved Ironbark - Wilga shrub grass woodland of the Narrabri-Yetman region, Brigalow Belt South Bioregion	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Category 1
Narrow-leaved Ironbark – White Cypress Pine Open Forest	Dry Sclerophyll Forests (Shrubby sub-formation);	Category 1
Derived Copperburr shrubland of the NSW northern inland alluvial floodplains	Arid Shrublands (Chenopod sub-formation);	Category 3
Non-Native Grassland and Pasture	Managed Grassland	Category 3
Agricultural lands used for annual and/or perennial cropping	NA	Excluded
Other	NA	Excluded

- *Vegetation Category 1 is considered to be the highest risk for bushfire.*
- *Vegetation Category 2 is considered to be a lower bushfire risk than Category 1 and Category 3 but higher than the excluded areas.*
- *Vegetation Category 3 is considered to be medium bushfire risk vegetation. It is higher in bushfire risk than category 2 (and the excluded areas) but lower than Category 1.*

Topography

Steeper slopes significantly increase the rate of spread of fires, and the relationship of the steepness of slope, and whether a fire moves upslope or downslope, is vital to understanding bushfire behaviour potential. For every 10 degree slope, the fire will double its speed. Slope and wind are often the major factors determining the direction of fire spread.

The Narrabri SAP Investigation Area is characterised by low lying relatively level topography that is not a major contributor to bushfire behaviour within the locality although it does still influence the classification and mapping of bushfire hazards.

Fire History within the Narrabri SAP Investigation Area

As reported in the Namoi-Gwydir Bushfire Risk Management Plan (BFRMP) (Namoi-Gwydir BFMC 2018), the region has on average 440 bushfires per year, of which 10 on average can be considered to be major fires. A review of the NSW RFS Fire History Mapping available via SEED maps does not identify any fires within the Narrabri SAP Investigation Area.

A summary of the publicly available information for all fires within the surrounding area is presented in below. None of these are considered to be major fires events.

Table A.2 Fire History within the Narrabri SAP Investigation Area

Fire Name	Fire No	Label	Start Date	End Date	Area (ha)
Fires within the 10km Investigation Area					
Assist NSWFB - Yarrie Lake Rd	29285	2009-10 Wildfire	10/12/2009	-	0.57
Rail Corridor Burning	HR06080719843	2006-07 Prescribed Burn	31/7/2006	-	804.18
NPWS-NBRI-LMZ-Killarney	HR16061577082	2017-18 Prescribed Burn	23/08/2017	28/08/2017	213.32
"Rockdale" HR	HR09092240384	2009-10 Prescribed Burn	21/08/2009	-	5.05
Gun Club Burn	HR09051937788	2009-10 Prescribed Burn	01/07/2009	-	3.79
Gun Club	HR08040329258	2007-08 Prescribed Burn	03/04/2008	-	4.44
Tibbereena RFB Station	HR09051937800	2009-10 Prescribed Burn	21/08/2009	-	0.81

Fire Ignition

Based on a review of the publically available information, bushfires occur in most years in this district, and natural ignitions such as lightning strikes are likely and historically common across the region.

As reported by Namoi-Gwydir BFRM (Namoi-Gwydir BFMC, 2018), the main source of ignition for larger fires in the Namoi-Gwydir BFMC area is lightning. These fires usually occur during summer as dry storm cells move throughout the BFMC area. Other causes of fires are farm machinery, arson and escaped burns both legal and illegal.

Fire Behaviour Potential

Based on the information provided above and stated previously in the Stage 1 Baseline Analysis (ERM 2022), the greatest hazard already present in the landscape is a combination of undesirable fire weather (i.e. hot and dry winds and low humidity during summer) and the potential for a fire to spread from the adjacent properties towards assets in the Narrabri SAP investigation area.

Firefighter and Public Safety

The firefighters likely to respond to a bushfire in this area would be volunteers from the NSW RFS and/or individual property owners. Based on the locality of the site, NSW RFS may also work closely with the Fire and Rescue NSW and NSW NPWS in the event of any major fires in this area.

These agencies and groups work together through local bushfire management committees across NSW. Set up under the NSW RF Act, these committees coordinate fire management planning, prevention and suppression in local areas.

Bushfire Hazard Classification

The evaluation of existing bushfire behaviour shows that the greatest hazard is a combination of undesirable fire weather (i.e. hot and dry north/north-westerly winds during summer) and the potential for a fire to spread towards key infrastructure and assets in the surrounding area. A fire under the influence of wind may travel fast in an easterly or south-easterly direction, reaching assets before fire fighters can attend the scene as was observed across Australia during the recent 2019/2020 fire season.

High bushfire hazard has been mapped across the Narabri SAP and considers both vegetation hazard and slope. This analysis does not indicate how often an area will receive potentially damaging fires or the actual intensity of a fire, it does however, identify sites of higher and lower potential fire behaviour compared to others in an area.

The Bohena Creek corridor presents the largest area of high bushfire hazard and extends off site to the north and south. All development within 100m of high bushfire hazard will require consideration of the PBP 2019 and the application of asset protection zones.

As identified above, the areas of grassland have not been identified as a high bushfire hazard however they have been considered a low-moderate bushfire hazard (depending on their structure and condition i.e. grazing pressure). Development within a 50m buffer of grassland will also require consideration of the PBP 2019 and the application of asset protection zones.

APPENDIX B MEETING THE OBJECTIVES OF *PLANNING FOR BUSHFIRE PROTECTION 2019*

MEETING THE OBJECTIVES OF *PLANNING FOR BUSHFIRE PROTECTION 2019*

It is neither possible nor desirable to eliminate bushfires in NSW – they are inevitable across all fire-prone vegetation types. When high fuel loads, ignition sources and adverse weather inevitably coincide, wildfires will result. Modern fire management requires the assessment, measurement and mitigation of risks – to social, economic and environmental values. As reported by OEH (2012), this creates an imperative to work closely with adjoining land managers, community groups and fire authorities to continually improve our understanding of bushfires, and to work together in managing the risks associated with living in a fire-prone environment.

As outlined within PBP 2019, land use planning can be an effective tool in minimising or avoiding the impact of natural hazards such as bushfire. From a risk management perspective, the safest approach is always to avoid high risk areas. In a bushfire context, strategic planning must ensure that future land uses are in appropriate locations to minimise the risk to life and property from bushfire attack. Services and infrastructure that facilitate effective suppression of bushfires also need to be provided for at the earliest stages of planning.

Development of the Narrabri SAP must ensure complementary bushfire management and mitigation strategies.

Firefighter and Public Safety

The firefighters likely to respond to a bushfire in this area would be volunteers from the NSW RFS and/or individual property owners. Based on the locality of the site, NSW RFS may also work closely with the Fire and Rescue NSW in the event of any major fires in this area.

These agencies and groups work together through local bushfire management committees across NSW. Set up under the NSW RF Act, these committees coordinate fire management planning, prevention and suppression in local areas.

NSW Police, NSW Ambulance and the NSW State Emergency Services will also assist in active support roles in bushfire and emergency incidents.

Emergency service capacity may need to expand to meet suppression requirements based on the type, nature and size of development within Narrabri over the coming years. Once the scale and type of development is known, a decision to scale up emergency resources in the region may be required.

APZs on Environmentally Protected Lands

Bushfire protection measures such as APZs may not necessarily be compatible with environmental protection and conservation objectives. It must not be assumed that an APZs can extend into an adjoining vegetated area or the Bohena Creek riparian corridor. Where environmentally sensitive vegetation such as endangered ecological communities or threatened species habitat are to be cleared for the purposes of an APZ, the proposals will need to be carefully considered and may no longer be consistent with complying development.

Landscaped Areas and Recreational Spaces

All landscaping is to comply with Appendix 4 of PBP 2019 and relevant environmental approvals required under the NSW BC Act 2016 and/or EPBC Act 1999. All landscaped areas should be designed and managed to meet the requirements of an APZ. These areas should be maintained in perpetuity to ensure ongoing protection from the impact of bushfires, particularly in advance of the bushfire season. As a minimum:

Trees

- tree canopy cover should be less than 30%; and
- canopies should be separated by 2 to 5 m.

Shrubs

- shrubs should not form a continuous canopy; and
- shrubs should form no more than 20% of ground cover.

Grass

- grass should be kept mown to a height of less than 100 mm; and
- leaf and other debris should be removed.

Provided that these areas are designed (and maintained) to comply with Appendix 4 of PBP 2019, no additional asset protection zones need to applied to these areas.

Landscape Buffers and the Green Loop

The Master Plan aims to establish site planning controls to promote the retention and enhancement of landscape buffers and a green loop to provide connection the current Narrabri town centre and to facilitate movement, health and wellbeing. Any revegetation and rehabilitation proposed along the Green Loop must be designed to ensure that it does not increase the risk of bushfire to existing residential development within Narrabri.

In accordance with PBP 2019 and AS3959, landscape buffers are considered to be low threat vegetation and are not required to be considered for the purposes of Planning for Bushfire Protection provided that they are designed and maintained as follows:

- Strips of vegetation less than 20 metres in width (regardless of length) and not within 20m of other areas of vegetation being Category 1, 2 or 3 vegetation; and/or
- Multiple areas of vegetation less than 0.25 hectares in area and not within 20m of other areas of vegetation being classified vegetation.

To meet this requirement, all landscape buffers must be less than 20m wide. Where they are designed to be greater than 20m wide, they should have a 20m wide break every 125m so that each patch of vegetation is less 0.25ha in area. This break can include roads, carparks, road verges and other cleared areas such outdoor recreation spaces.

Staged Development

As outlined within PBP 2019 and relevant to the Narrabri SAP, often a time lag can occur between one or more stages of development which can result in persons and property being unprotected in the event of a bushfire. The precinct may require the creation of APZs that need to be maintained sequentially until the final phase of development is completed to afford each stage of the development the appropriate level of bushfire protection.

These will also need to be applied to the Residential Growth Area and the Light Industrial Area and would be assessed for each individual development application.

Building Construction, Siting and Design

Construction measures should not be applied as a stand-alone mitigation solution but will form part of a suite of bushfire management measures. Building design needs to ensure adequate protection of vulnerable building elements. Construction standards are outlined in AS 3959 and the NCC to provide various levels of protection for different building elements.

The NCC does not provide any bushfire specific performance requirements for Class 5 to 8 buildings including offices, shops, factories, warehouses, public car parks and other commercial and industrial facilities.

Access

Firefighting access and evacuation potential must be considered and an assessment of traffic volumes and evacuation routes will be required. It will be important to consider any increase traffic volume on the main evacuation pathways (including but not limited to, Kamilaroi Highway, Newell Highway, Culgoora Road, Yarrie Lake Road, and various local roads).

The potential for these evacuation routes to be non-trafficable during a bushfire event will be factored into the Traffic and Transport Assessment (separate package). The Master Plan will need consider appropriate site access points and the staged design of access roads to enable safe access and egress for residents/site users attempting to leave the area at the same time that emergency service personnel are arriving to undertake firefighting operations.

Based on the Structure Plan presented in Figure 1.3, access to the SAP will be available at a number of locations directly off Yarrie Lake Road. Additional access will be provided off the Newell Highway to the south. The Residential Growth Area will have through access to both the Newell Highway and Kamilaroi Highway.

Design of the internal road network must enable safe access and egress for occupants attempting to leave the area at the same time that emergency service personnel are arriving to undertake firefighting operations. In a bushfire prone area, the purpose of the road system is to:

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

A perimeter road should be provided where possible to separate retained bushland from the development precincts, allowing more efficient use of firefighting resources. A perimeter road usually runs parallel to the bush land interface and provides space to conduct active firefighting operations and hazard reduction activities. Where this is not provided, the application of defendable space within each of the lots should be considered.

Roads must provide sufficient width and other dimensions to ensure safe unobstructed access and allow firefighting crews to operate equipment around the vehicle. Road width is defined as the trafficable width from kerb to kerb or the inside edge of the table drain.

Dead-end roads should be avoided. However, where they are present, they must incorporate a sufficient turn-around area to minimise the need for vehicles to make multipoint turns.

Appendix C provides a summary of the design principles that will need to be considered the internal road network. Table 5.1 identifies the Acceptable Solutions under the PBP 2019.

Table B.1 Acceptable Solutions for Access Roads (General)

Performance criteria	Acceptable solutions*
Firefighting vehicles are provided with safe, all-weather access to structures.	■ property access roads are two-wheel drive, all-weather roads; ■ traffic management devices are constructed to not prohibit access by emergency services vehicles; ■ maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient; ■ all roads are through roads; ■ dead end roads are not recommended, but if unavoidable, are not more than 200m in length, incorporate a minimum 12m outer radius turning circle, and are clearly sign posted as a dead end; ■ where kerb and guttering is provided on perimeter roads, roll top kerbing should be used to the hazard side of the road; ■ where access/egress can only be achieved through forest, woodland and heath vegetation, secondary access shall be provided to an alternate point on the existing public road system; and ■ one way only public access roads are no less than 3.5m wide and have designated parking bays with hydrants located outside of these areas to ensure accessibility to reticulated water for fire suppression.
The capacity of access roads is adequate for firefighting vehicles.	■ the capacity of perimeter and non-perimeter road surfaces and any bridges/causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes); bridges/ causeways are to clearly indicate load rating.
There is appropriate access to water supply.	■ hydrants are located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression; ■ hydrants are provided in accordance with the relevant clauses of AS 2419.1:2005; and ■ there is suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available.
Access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating as well as providing a safe operational environment for emergency service personnel during	■ are two-way sealed roads; ■ minimum 8m carriageway width kerb to kerb; ■ parking is provided outside of the carriageway width; ■ hydrants are located clear of parking areas; ■ are through roads, and these are linked to the internal road system at an interval of no greater than 500m; ■ curves of roads have a minimum inner radius of 6m;

Performance criteria	Acceptable solutions*
firefighting and emergency management on the interface.	■ the maximum grade road is 15 degrees and average grade of not more than 10 degrees; ■ the road crossfall does not exceed 3 degrees; and ■ a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.

**Planning for Bushfire Protection (NSW Rural Fire Service, 2019)*

Water Supply

An adequate supply of water is essential for firefighting purposes and suitable water supply arrangements must be provided for firefighting that meet the NSW RFS requirements. It is essential to ensure that any water sources are maintained at the appropriate capacity.

Hydrogeology and Water Demand is being addressed as a separate package and it is noted that additional water supplies may need to be developed to meet the full water demand for the SAP.

Where a non-reticulated water supply is provided or the reticulated water supply is deemed inadequate, an additional on site dedicated supply of water for firefighting will be required. Different storage options may be explored to harvest stormwater or recycled water, such as water tanks and constructed wetlands that may be used as a static water supply in the event of a bushfire emergency.

Any future development must comply with the water supply requirements detailed in PBP 2019. These requirements can be achieved in two ways, being:

- reticulated water is to be provided to the development, where available; and
- a static water supply is provided where no reticulated water is available.

Given the scale of the proposal it would be considered likely that any future development will be serviced at least in part by a hydrant system.

- The fire hydrant spacing, design and sizing must comply with the Australian Standard AS 2419.1:2021;
- hydrants are not located within any road carriageway;
- reticulated water supply uses a ring main system for areas with perimeter roads;
- fire hydrant flows and pressures comply with AS 2419.1:2021; and
- all above-ground water service pipes external to the building are metal, including and up to any taps.

Electricity and Gas

PBP 2019 also addresses the installation of services (i.e., electricity and gas) within bushfire prone areas. The following are the requirements for the relevant services:

- where practicable, electrical transmission lines are underground;
- where overhead, electrical transmission lines are proposed as follows:
  - lines are installed with short pole spacing (30m), unless crossing gullies, gorges or riparian areas;
  - no part of a tree is closer to a power line than the distance set out in accordance with the specifications in ISSC3 Guideline for Managing Vegetation Near Power Lines;
- reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 and the requirements of relevant authorities, and metal piping is used;

- all fixed gas cylinders are kept clear of all flammable materials to a distance of 10m and shielded on the hazard side;
- connections to and from gas cylinders are metal;
- polymer-sheathed flexible gas supply lines are not used; and
- above-ground gas service pipes are metal, including and up to any outlets.

Emergency management

Despite the mitigation measures and treatments that are put in place, some bushfire risk will always remain and some of the infrastructure may be subject to direct flame contact. Development of the Master Plan should ensure complementary bushfire management and mitigation strategies and the approval authority may require that a Bushfire Emergency Management Plan is prepared in conjunction with relevant stakeholders, including local fire services, NSW RFS, NSW Fire and Rescue, and adjoining property owners and employees.

At this strategic land use planning stage, no detailed recommendations have been provided for the content or structure of any Bushfire Emergency Management Plan although it is noted that the Royal Commission Inquiry into the 2009 Victorian 'Black Saturday' Bushfires delivered a number of recommendations that reiterated the importance of educating the community on the most appropriate actions to take prior to and during a bushfire. Recommendations 1-5 of the final report, which relate to bushfire safety policy, provided the direction for the creation of the new Community Protection Plan (CPP) framework.

The development and implementation of a CPP is an asset specific treatment for a very high to extreme risk human settlement asset identified in a Bushfire Risk Management Plan (BFRMP). These documents can also be prepared by the NSW Rural Fire Service (RFS) in consultation with stakeholders independent of the BFRMP and may provide some direction for emergency management planning within the precinct.

CPP consist of maps with supporting documentation that are made publicly available at https://www.rfs.nsw.gov.au/resources/publications/community-protection-plans.

- Bushfire Survival Map - includes information on the potential bushfire threat, the safety of access / egress provisions, early relocation options and contingency shelter options. This map provides information that can be used by members of the community when developing their personal Bushfire Survival Plan or Emergency Management and Evacuation Plan.
- Bushfire Preparation Map - provides information for land managers, fire agencies and community members on details of the existing and proposed bushfire risk treatment works for the community. The map will also provide information that will prompt home owners / occupiers to take action to reduce their bushfire risk.

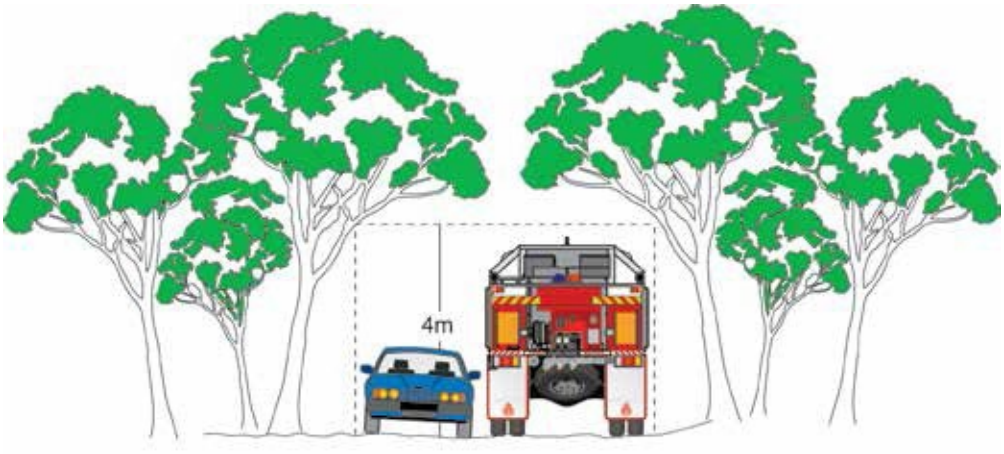
APPENDIX C DESIGN PRINCIPLES FOR EMERGENCY SERVICE VEHICLE ACCESS, *PLANNING FOR BUSHFIRE PROTECTION 2019*

ACCESS

This appendix provides design principles for emergency service vehicle access and is an extract from Appendix 4, PBP 2019.

VERTICAL CLEARANCE

An unobstructed clearance height of 4 metres should be maintained above all access ways including clearance from building construction, archways, gateways and overhanging structures (e.g. ducts, pipes, sprinklers, walkways, signs and beams). This also applies to vegetation overhanging roads.



Vehicle Turning Requirements

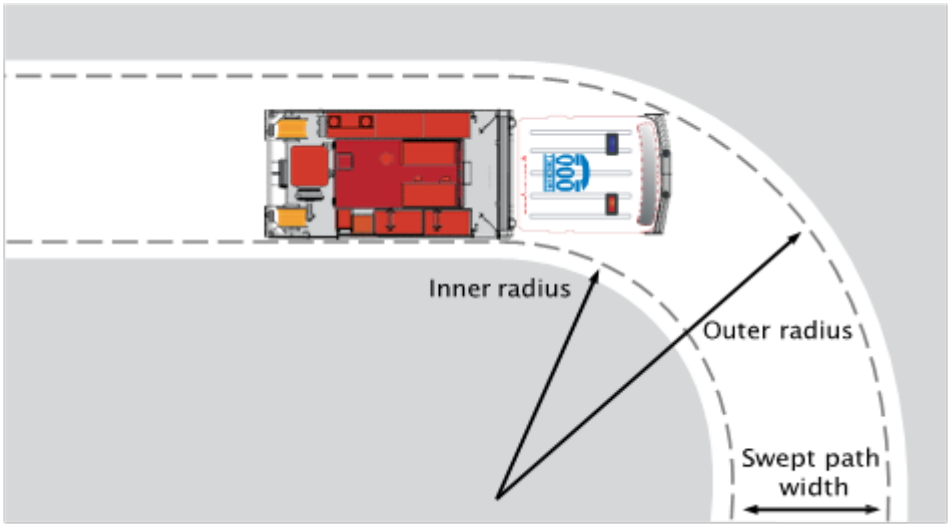
Curved carriageways should be constructed using the minimum swept path as outlined in the Table below:

Minimum curve radius for turning vehicles.

Curve radius (inside edge in metres)	Swept path (metres width)
< 40	4.0
40 - 69	3.0
70 - 100	2.7
> 100	2.5

Swept Path width for Turning Vehicles.

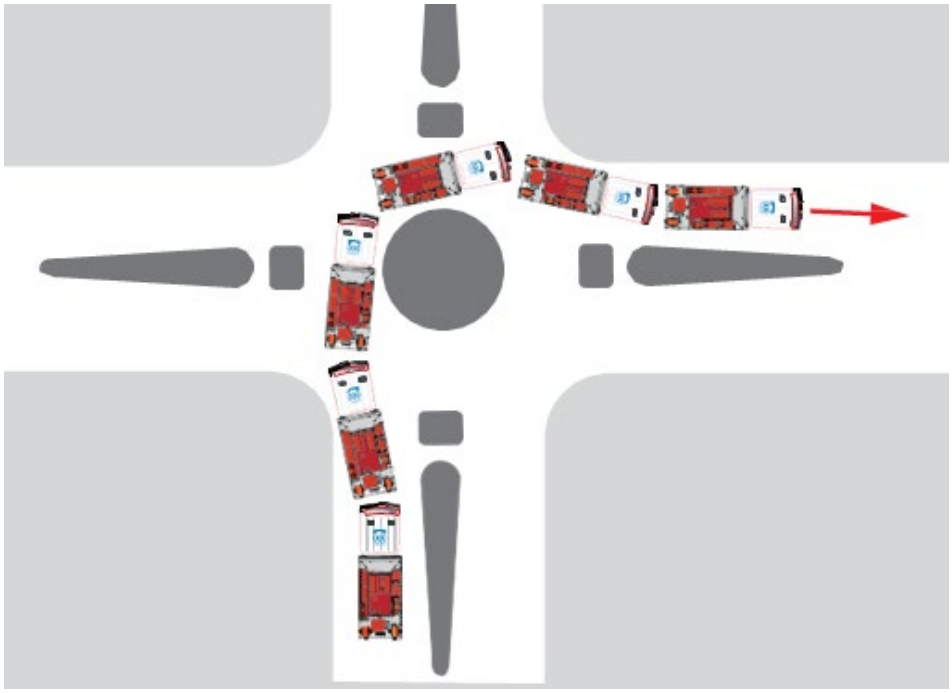
The radius dimensions given are for wall-to-wall clearance where body overhangs travel a wider arc than the wheel tracks (vehicle swept path). The swept path shall include an additional 500mm clearance either side of the vehicle.



Roundabout Swept Path.

Example of a swept path as applied to a roundabout.

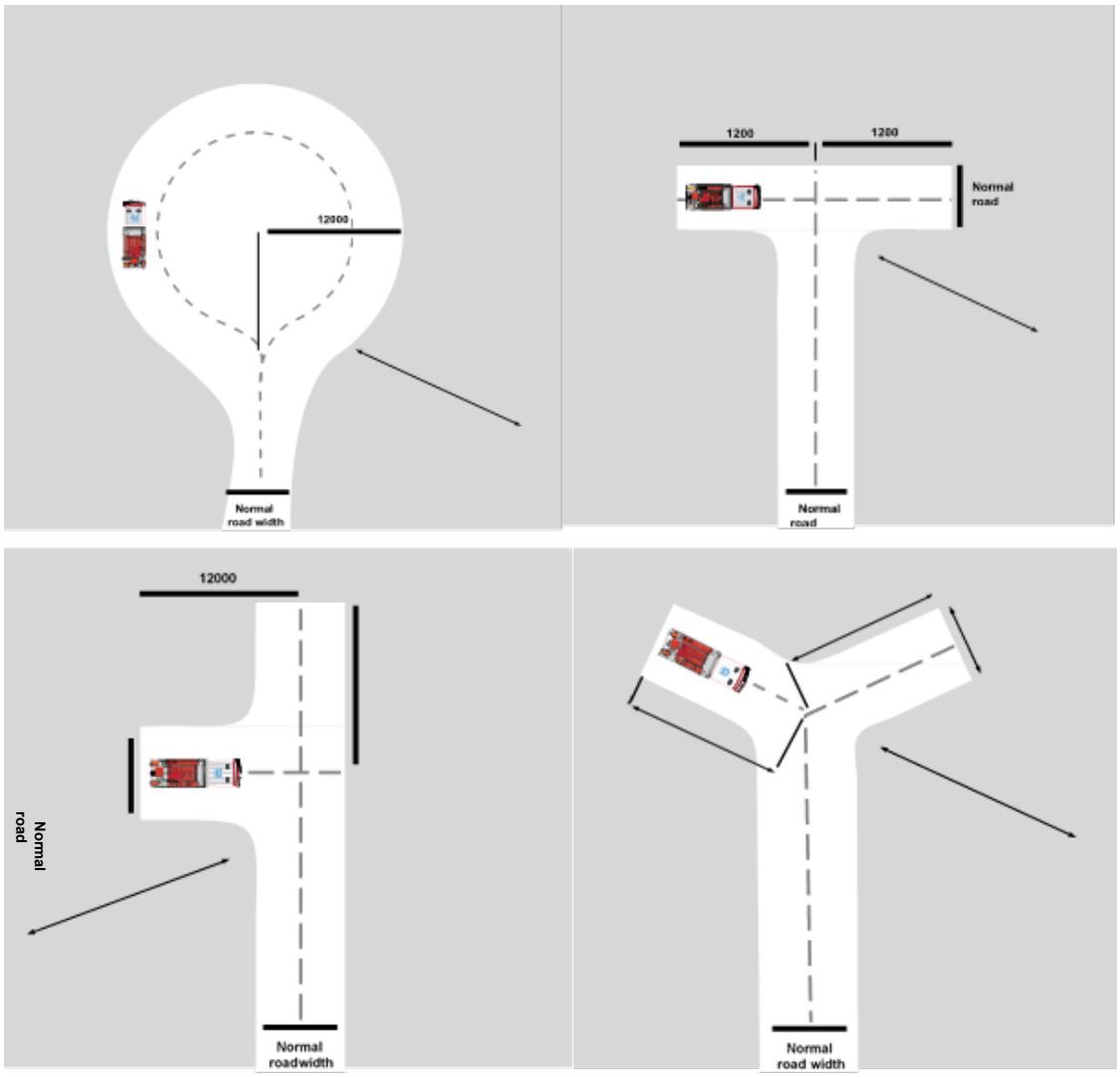
The distance between inner and outer turning arcs allows for expected vehicle body swing of front and rear overhanging sections.



Vehicle Turning Head Requirements

Dead ends that are longer then 200m must be provided with a turning head area that avoids multipoint turns. “No parking” signs are to be erected within the turning head.

The minimum turning radius shall be in accordance with Table A3.2 of PBP 2019. Where multipoint turning is proposed the NSW RFS will consider the following options:



Services

Hydrant services should be located outside the carriageway and parking bays to permit traffic flow and access. Setup of standpipes within the carriageway may stop traffic flow. Hydrant services shall be located on the side of the road away from the bushfire threat where possible.

Passing Bays

The construction of passing bays, where required, shall be 20m in length and provide a minimum trafficable width at the passing point of 6m.

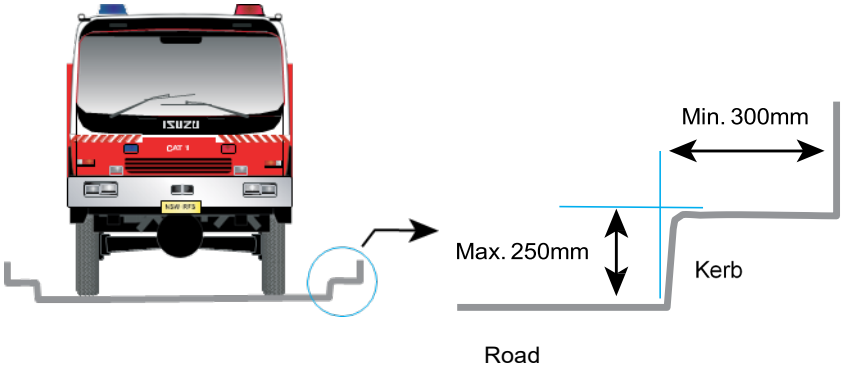
Passing bays can provide advantages when designed correctly. Poor design can and does severely impede access.

Parking

Parking can create a pinch point in required access. The location of parking should be carefully considered to ensure fire appliance access is unimpeded. Hydrants shall be located outside of access ways and any parking areas to ensure that access is available at all times.

Kerb Dimensions

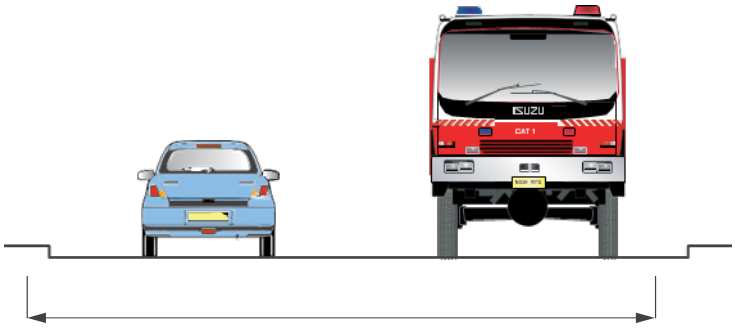
All kerbs constructed around access roads should be no higher than 250mm and free of vertical obstructions at least 300mm back from the kerb face to allow clearance for front and rear body overhang.



ROAD TYPES

Perimeter Roads

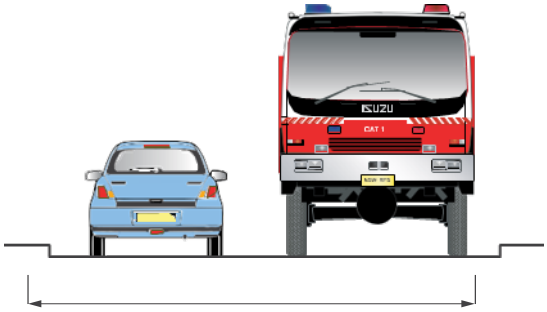
Perimeter roads are to be provided with a minimum clear width of 8m. Parking and hydrants are to be provided outside of carriageways. Hydrants are to be located outside of carriageways and parking areas.



Perimeter roads = 8m to kerb

Non-perimeter Roads

Non-perimeter roads shall be provided with a minimum clear width of 5.5m. Parking is to be provided outside of the carriageway and hydrants are not to be located in carriageways or parking areas.



Non-perimeter roads = 5.5m to kerb

Property Access

Property access roads are to be a minimum of 4m wide.

Property access road
4m wide carriage way

APPENDIX D KEY ASSETS WITHIN THE INVESTIGATION AREA (NAMOI – GWYDIR BFMC 2018)

Table D.1 Assets within the baseline Urban Investigation Area
(extract from Gwydir Bushfire Risk Management Plan (Namoi – Gwydir BFMC 2018)

Asset Name	Asset Location	MDA	Class	Subclass	Strategy	Action Description	Comment	Responsible Agencies	Support Agencies
ARTC Signalling and Cable Infrastructure	Rail Corridor between Turrawan and Narrabri	Narrabri	Economic	Infrastructure	Hazard Reduction	Implement ARTCs vegetation management program	Implement ARTCs vegetation management program.	ARTC	RFS
Aboriginal Cultural Assets	Namoi Gwydir BFMC Area	undefined	Cultural Heritage	Aboriginal Significance	Preparedness	Implement AHIMS Management Conditions	Works/actions in the area are to comply with conditions listed in the Aboriginal Heritage Information Management System.	OEH	TI CL;RFS; DPI
Jacks Creek Road	-	Narrabri	Human Settlement	Residential	Community Education	Undertake targeted community engagement activities	Areas are targeted as part of ongoing local and State Public Awareness/Education campaigns including newspapers, radio, and the internet.	RFS	LGA
Isolated Properties in Narrabri LGA	Across Narrabri LGA	Narrabri	Human Settlement	Residential	Community Education	Undertake targeted community engagement activities	Areas are targeted as part of ongoing local and State Public Awareness/ Education campaigns including newspapers, radio, and the internet.	RFS	LGA
Running Bare Resort	Westport Road - Jacks Creek	Narrabri	Economic	Tourist and Recreation	Community Education	Undertake targeted community engagement activities	Areas are targeted as part of ongoing local and State Public Awareness/Education campaigns including newspapers, radio, and the internet.	RFS	LGA
Coal and Gas Mines	Across the BFMC area	undefined	Economic	Mines	Property Planning	Implement Site Emergency Plan	Mining companies are required to develop and implement emergency plans which contain bushfire mitigation and incident response procedures.	Other	RFS
Westport / Rockdale Road (Jacks Creek)	Westport / Rockdale Road (Jacks Creek)	Narrabri	Human Settlement	Residential	Preparedness	Inspect and maintain Fire Trails	Inspect and maintain Fire Trails as required	RFS	LGA;OEH; DPI
					Preparedness	Inspect and maintain unsealed roads in area.	Inspect and maintain unsealed roads in area as part of strategic network of fire control lines. Unsealed roads are to be maintained to minimum Fire Trail standard.	LGA	RFS
					Preparedness	Inspect and maintain Bimbadeen Crossing.	Inspect and maintain Bimbadeen Crossing as part of strategic network of fire control lines.	DPI	RFS
					Community Education	Undertake targeted community engagement activities	Areas are targeted as part of ongoing local and State Public Awareness/Education campaigns including newspapers, radio, and the internet.	RFS	LGA;DPI
Agricultural Cropping	Narrabri Moree BFMC Area	undefined	Economic	Agricultural	Community Education	Undertake targeted community engagement activities	Areas are targeted as part of ongoing local and State Public Awareness/Education campaigns including newspapers, radio, and the internet.	RFS	LGA;DPI
					Hazard Reduction	Conduct Strategic Hazard Reduction	Conduct, as required, hazard reduction in areas that will result in reduced fire impact on the assets.	Private; RFS	TI CL;LGA;F RNSW;R MS
Narrabri	Narrabri NSW	Narrabri	Human Settlement	Residential	Community Education	Undertake targeted community engagement activities	Areas are targeted as part of ongoing local and State Public Awareness/Education campaigns including newspapers, radio, and the internet.	FRNSW;RFS	LGA
					Hazard Reduction	Conduct Strategic Hazard Reduction	Conduct, as required, hazard reduction in areas that will result in reduced fire impact on the assets.	Private; RFS	TI CL;LGA;F RNSW;R MS
					Hazard Reduction	Conduct Strategic Hazard Reduction	Conduct, as required, hazard reduction in areas that will result in reduced fire impact on the assets.	Private; RFS	TI CL;LGA
Wilga Park Power Station	Corner Yarrie Lake Road and KiandoolLane	Narrabri	Economic	Infrastructure	Property Planning	Implement Fire Management Plan		Other	
Narrabri Pistol Club	Stoney Creek Road Narrabri	Narrabri	Economic	Tourist and Recreation	Hazard Reduction	Conduct Strategic Hazard Reduction	Conduct, as required, hazard reduction in areas that will result in reduced fire impact on the assets.	Private; RFS	TI CL;LGA
NSP Narrabri Showground	Wukawa Street Narrabri	Narrabri	Human Settlement	Other	Hazard Reduction	Maintain fuels in accordance with Guidelines	Maintain bushfire fuels at or below the level that meets the Essential Selection Criteria specified in the	LGA	RFS

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