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APPENDIX U – Environmental Impact Statement

Bushfire assessment

Prepared for Lake Lyell Project Pty Ltd

Bush Fire Assessment Report

Lake Lyell Pumped Hydro Energy Storage

REF: W24052

Date: 19 November 2025

WARATAH BUSHFIRE
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Bush Fire Assessment Report

Lake Lyell Pumped Hydro Energy Storage

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File:	W24054	Version 4.0 Final
BAL rating	BAL 29 or less	
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BPAD Bushfire Planning & Design Accredited Practitioner Level 3

EXECUTIVE SUMMARY

EnergyAustralia Portfolio Holdings Pty Ltd (EnergyAustralia) in partnership with EDF power solutions Australia (EDFA), referred to as Lake Lyell Project Pty Ltd (LLP) as trustee, is developing the Lake Lyell Pumped Hydro Energy Storage (PHES) project (the project). The project will have the capacity to store up to 3,080 megawatt hours (MWh) of energy and generate at 385 megawatts (MW) for 8 hours or generate up to around 440 MW for a shorter period.

The project is located approximately 5 kilometres (km) west of Lithgow and 110 km west of the Sydney central business district within the Lithgow local government area (LGA). The project takes advantage of existing infrastructure (i.e. Lake Lyell) associated with Mt Piper power station which will be decommissioned in the coming decades and allows Lake Lyell to continue to serve a specific purpose in electricity generation (consistent with its existing use).

In June 2024, the Minister for Planning and Public Spaces (the Minister) declared the project to be critical State significant infrastructure (CSSI) as it is a development that is essential for the State for economic, social, and environmental reasons. This required Schedule 5 of the State Environmental Planning Policy (Planning Systems) 2021 to be updated to reflect the CSSI status of the project. As CSSI, the project is subject to Part 5, Division 5.2 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), which requires the preparation of an environmental impact statement (EIS) in accordance with Secretary's environmental assessment requirements (SEARs) and the approval of the Minister.

This report has been prepared to support the project's EIS submission and address the requirement of the SEARs issued on 17 November 2025 and the New South Wales Rural Fire Service (NSW RFS) correspondence dated 8 August 2023.

The findings of this assessment in relation to Planning for Bush Fire Protection 2019(PBP) and the combination of bush fire mitigation measures to address the risk of bush fire to the project are summarised below.

Asset Protection Zones

Asset Protection Zones (APZ) for the temporary workforce accommodation camps, laydown area, switchyard and main access tunnel (MAT) and emergency, cable and ventilation tunnel (ECVT) portal have been confined to the disturbance area and are exposed to a radiant heat level of <29 kilowatts per square metre (kW/m^2).

Refuge buildings will require increased APZs equivalent to <10 kW/m^2. The laydown area, switchyard and accommodation camps can accommodate an area that achieves the required 10 kW/m^2. Given the isolated location of the main works area, it is recommended that a safe refuge building be provided within either the laydown area or the switchyard that can accommodate the expected workforce numbers during both the construction and operation phases.

The available APZ for all project design components avoids flame contact with a maximum radiant heat of <29 kWm^2 for the MAT and ECVT portal.

Building construction standards

Bushfire Attack Levels (BAL) have been determined for each component of the project design.

The administration building will be in the laydown area and is provided with APZs of >100 metres (m). To provide for improved bush fire resilience, the administration building should be constructed to BAL 29. The control room within the switchyard is to be located within the area available for safe refuge (refer to Figure 4-5) and should also be constructed to BAL 29.

The MAT portal and ECVT portal can achieve a minimum BAL 29 setback. It is recommended that the proposed permanent infrastructure be sited within areas capable of achieving their level of construction standard (i.e. the ability of exposed elements to withstand radiant heat).

The preferred lakeside accommodation camp is surrounded by a grassland hazard to most aspects, with the majority of the site capable of achieving a BAL Low (i.e. over 100 m from woodland or over 50 m from a grassland hazard). The alternative town accommodation camp is surrounded by forest vegetation to the southern and eastern aspects.

It is recommended that habitable buildings within the accommodation camps be sited within BAL 19 or less and be constructed to comply with AS3959: Construction of buildings in bushfire-prone areas.

Access

The main works area is in an isolated location, with access roads that traverse through vegetation within steep terrain.

Access will comply with the performance criteria outlined in PBP for non-perimeter roads.

The road design complies with the intent and performance criteria outlined in PBP as follows:

- Provision of a safe refuge building (BAL 29 construction) in areas where the expected radiant heat exposure is <10 kW/m^2. Larger APZs outside of the range prescribed in PBP (along with increased BAL) create a safer area for occupants and firefighters remaining on site.
- Development of a bush fire emergency management and evacuation management plan with procedures for early off-site evacuation and shelter in place for the construction and operational phases of the project.
- Management of traffic within the project area via the provision of bus transportation for personnel to reduce the incidents and potential obstruction caused by parked vehicles and traffic congestion on the main roads and the accommodation camp.
- Upgrading/maintaining the fire trail within the project area (in consultation with the NSW National Park and Wildlife Service (NPWS)) as an emergency egress option from the upper reservoir site to existing fire trails within Marrangaroo National Park.

Water and utilities

It is recommended that the water supply for firefighting purposes is located at the primary vehicle access point to the project and elsewhere, determined in consultation with the NSW RFS and Fire and Rescue NSW or a suitably qualified hydraulic and/or BCA consultant at the detailed design stage.

The design, construction, and maintenance of high voltage infrastructure and easement will be in accordance with TransGrid and other industry standards.

The water supply, electricity and gas requirements will seek to achieve compliance with the performance criteria outlined in PBP.

Conclusion

This bushfire assessment addresses the SEARs and NSW RFS correspondence to achieve compliance and provide bush fire protection measures that exceed the minimum requirements required by PBP as follows:

- Increased APZ setbacks.
- Provision of a shelter in place refuge building.
- Constructing buildings and infrastructure to comply with or exceed their BAL exposure.
- Provision of fire-fighting water supply with appropriate access and egress.
- Developing a fire management plan and bush emergency management and evacuation plan.

GLOSSARY

ABCB	Australian Building Codes Board
APZ	Asset Protection Zone
AS1596	Australian Standard – The storage and handling of LP Gas
AS3745	Australian Standard – Planning for emergencies in facilities
AS3959	Australian Standard – Construction of buildings in bushfire-prone areas 2018
BAL	Bushire Attack Level
BPL	Bush fire prone land
BCA	Building Code of Australia
BPM	Bush fire protection measures
BSA	Bush Fire Safety Authority
CSSI	Critical state significant infrastructure
DA	Development application
DCP	Development Control Plan
DPHI	Department of Planning, Housing and Infrastructure
DSF	Dry sclerophyll forest
ECTV	Emergency, cable and ventilation tunnel
EIS	Environmental impact statement
EMM	EMM Consulting Pty Limited
EP&A Act	Environmental Planning and Assessment Act 1979
EP&A Regulation	Environmental Planning and Assessment Regulation 2000
FFDI	Forest Fire Danger Index
GFDI	Grassland Fire Danger Index
ha	Hectares
IPA	Inner Protection Area
PHES	Lake Lyell Pumped Hydro Energy Storage
LEP	Local Environmental Plan
LGA	Local government area
m	metres
MW	megawatt
NEM	National Electricity Market

NCC	National Construction Code
NSW	New South Wales
NPWS	National Parks and Wildlife Service
OPA	Outer Protection Area
PCT	Plant Community Type
PBP	Planning for Bush Fire Protection 2019
RF Act	Rural Fires Act 1997
RFS	Rural Fire Service
SEARs	Secretary's Environmental Assessment Requirements
SFAZ	Strategic Fire Advantage Zone
SWS	Static water supply
SVTM	State Vegetation Type Map
WTP	Water treatment plant

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1. INTRODUCTION

EnergyAustralia Portfolio Holdings Pty Ltd (EnergyAustralia) in partnership with EDF power solutions Australia (EDFA), referred to as Lake Lyell Project Pty Ltd (LLP) as trustee, is developing the Lake Lyell Pumped Hydro Energy Storage (PHES) Project (the project). The project will have the capacity to store up to 3,080 megawatt hours (MWh) of energy and generate at 385 megawatts (MW) for 8 hours or generate up to around 440 MW for a shorter period. At a basic level, it will consist of upper and lower water reservoirs, a pipeline connecting them, and a hydro-electric power station connected to the national energy grid that is capable of generating or consuming electricity.

The project is located approximately 5 kilometres (km) west of Lithgow and 110 km west of the Sydney central business district, shown in Figure 1-1 and Figure 1-2. The project takes advantage of existing infrastructure (i.e. Lake Lyell) associated with Mt Piper power station, which will be decommissioned in the coming decades, and allows Lake Lyell to continue to serve a specific purpose in electricity generation (consistent with its existing use).

In June 2024, the Minister for Planning and Public Spaces declared the project to be critical State significant infrastructure (CSSI). Accordingly, approval for the project is required under Part 5, Division 5.2 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). This requires the preparation of an environmental impact statement (EIS) for the project in accordance with Secretary's environmental assessment requirements (SEARs) and the approval of the Minister. EMM Consulting Pty Limited (EMM) has been engaged by LLP to prepare the EIS.

This bush fire assessment report is an appendix to the project's EIS and should be read in conjunction with it. The bush fire assessment report addresses the SEARs issued for the project.

1.1 Purpose of this report

This bushfire assessment report has been prepared in accordance with the requirements of the NSW Department of Planning, Housing and Infrastructure (DPHI), which are set out in the SEARs for the project, issued on 17 November 2025 and the correspondence received by the New South Wales Rural Fire Service (NSW RFS) on 8 August 2023. The SEARs identify matters that must be addressed in the EIS. Individual requirements relevant to this bushfire assessment report and where they are addressed in this report are listed below.

Table 1-1 – SEARs and NSW RFS assessment requirements

SEARs requirements		Section addressed
Key Issue – Hazards including:	As assessment of: • any potentially hazardous impacts of the project; and • any public safety risk, including bushfire and flooding risks (including potential impacts on National parks and reserves (including Marrangaroo National Park), State forests and conservation areas and downstream landholdings) and consideration of Dam Safety Committee Guidance.	Section 4.6 & Section 5
NSW RFS requirements		**Section addressed**
Input regarding SEARs:	A bushfire assessment report shall be prepared which includes the extent to which the proposed development conforms or deviates from the relevant provisions of Planning for Bush Fire Protection 2019.	Section 5 & Section 6

1.2 Aims of the assessment

The aims of the bushfire assessment report are to:

- provide recommendations for the protection of human life and to minimise impacts on property from the threat of bush fire
- address the bush fire risk in accordance with Planning for Bush Fire Protection 2019 (PBP), through bush fire hazard identification and assessment

- enable safe and effective emergency response through the provision of:
    - safe access in and around the project area including firefighting infrastructure such as water supply
    - management of vegetation
    - implementation and maintenance of building construction standards
    - prevention of fire ignition on site and prevention of fire spread between site infrastructure.

1.3 Referenced documents and information collation

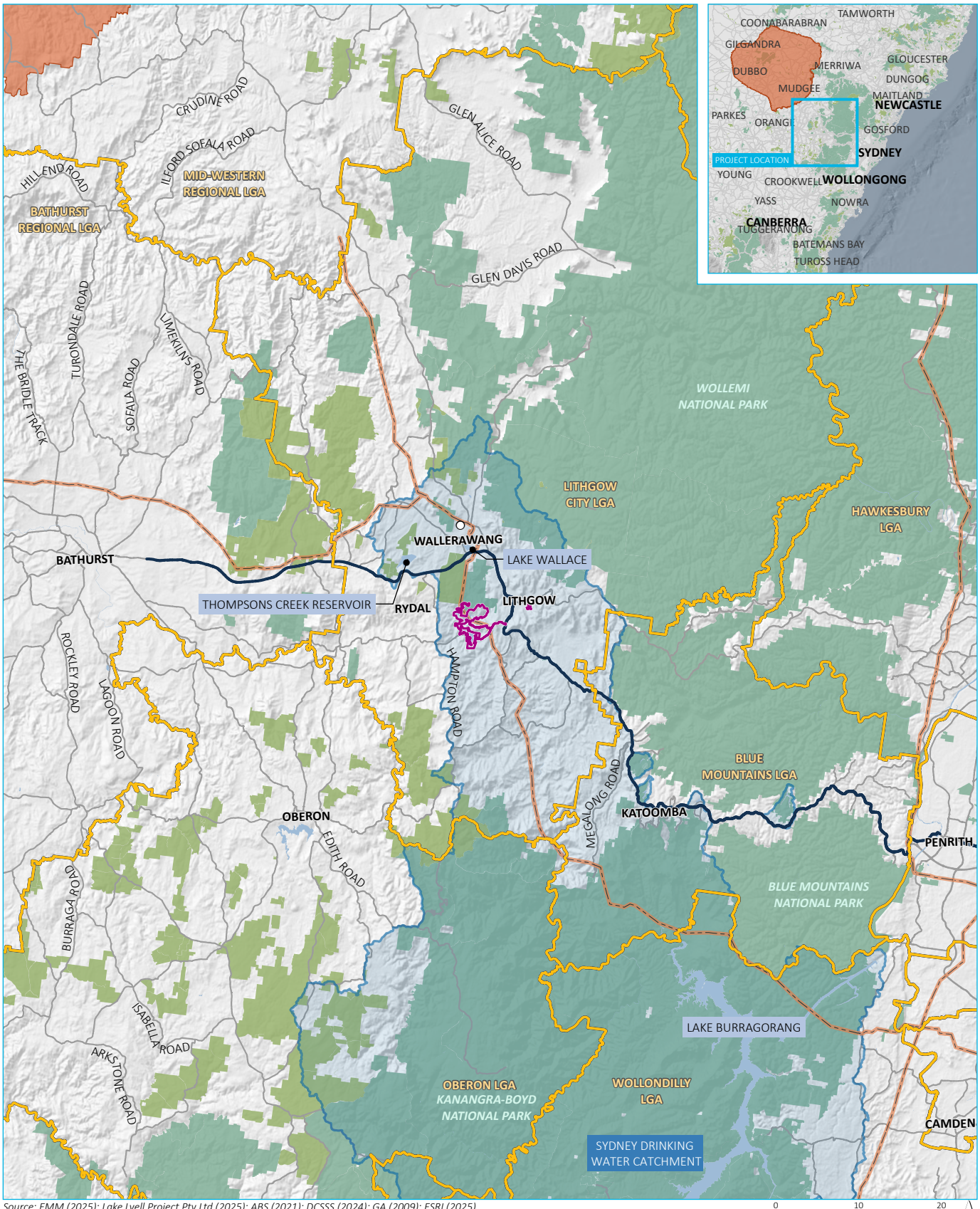
An assessment of the bush fire risk and measures required to mitigate this risk was performed through a desktop assessment. Documents reviewed for the preparation of this report include the following:

- SEARs (SSI-77018220), Lake Lyell Pumped Hydro Energy Storage Project, dated 17 November 2025.
- Correspondence from the NSW RFS dated 8 August 2023, ref: DA20230803003416-SEARS-1.
- Vegetation mapping by EMM.
- State Vegetation Type Map (STVM) by DPE (SVTM_vC1.1.M1.1).
- Environmental Systems Research Institute (ESRI) aerial photography (2023).
- Planning for Bush Fire Protection 2019 (PBP), NSW RFS.
- Comprehensive Vegetation Fuel Loads, March 2019, NSW RFS.
- Australian Standard (AS) 3959 Construction of buildings in bushfire-prone areas (2018).

1.4 Project location

The project area is located about 5 km west of Lithgow, within the City of Lithgow local government area (LGA). The project area includes parts of Mount Walker, Lake Lyell, and adjacent land, and the road corridors needed for site access.

Figure 1-1 and Figure 1-2 provide the regional and local context of the project respectively.



Source: EMM (2025); Lake Lyell Project Pty Ltd (2025); ABS (2021); DCSSS (2024); GA (2009); ESRI (2025)

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KEY

- Project area

Existing environment

- Mt Piper Power Station
- Major road
- Great Western Highway
- 330 kV transmission line
- Named waterbody
- NPWS reserve
- State forest
- Local government area
- Sydney Drinking Water Catchment
- Central West Orana Renewable Energy Zone

INSET KEY

- Major road
- NPWS reserve
- State forest
- Central West Orana Renewable Energy Zone

Regional context

Lake Lyell PHES
Bushfire Assessment Report
Figure 1.1

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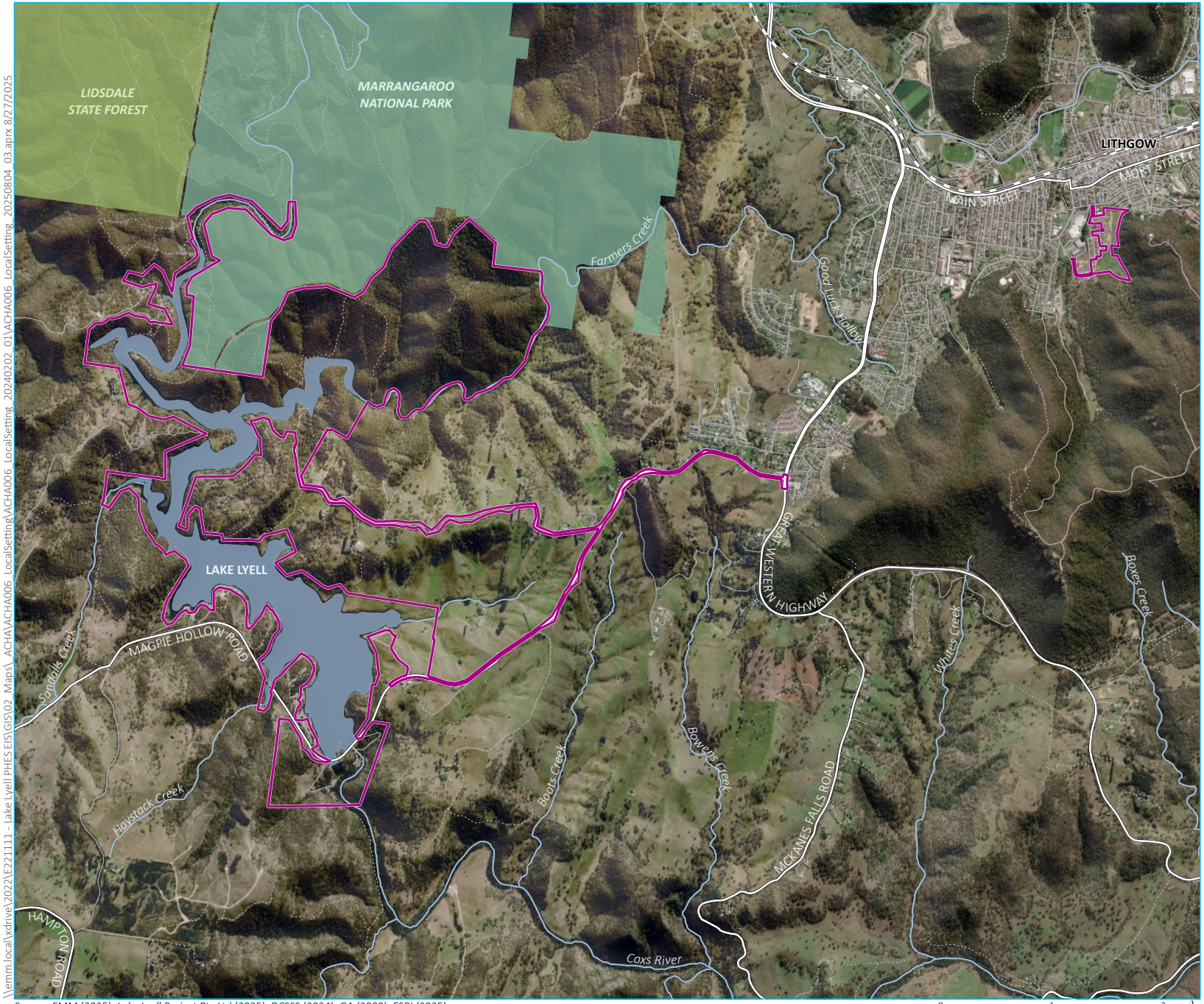

KEY

- Project area

Existing environment

- Rail line
- Major road
- Minor road
- Vehicular track
- Named watercourse
- Named waterbody
- NPWS reserve
- State forest

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Source: EMM (2025); Lake Lyell Project Pty Ltd (2025); DCSSS (2024); GA (2009); ESRI (2025)

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Local context

Lake Lyell PHES
Bushfire Assessment Report
Figure 1.2

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2. PROJECT DESCRIPTION

2.1 Overview

A detailed description of the project, including an overview of its design, construction and operation, is provided in the project's EIS. The EIS (specifically Chapter 3 and Appendix B) should be read in conjunction with this report. A summary of the project's key elements is provided below.

The project design, as shown in Figure 2.1, can be broadly categorised into:

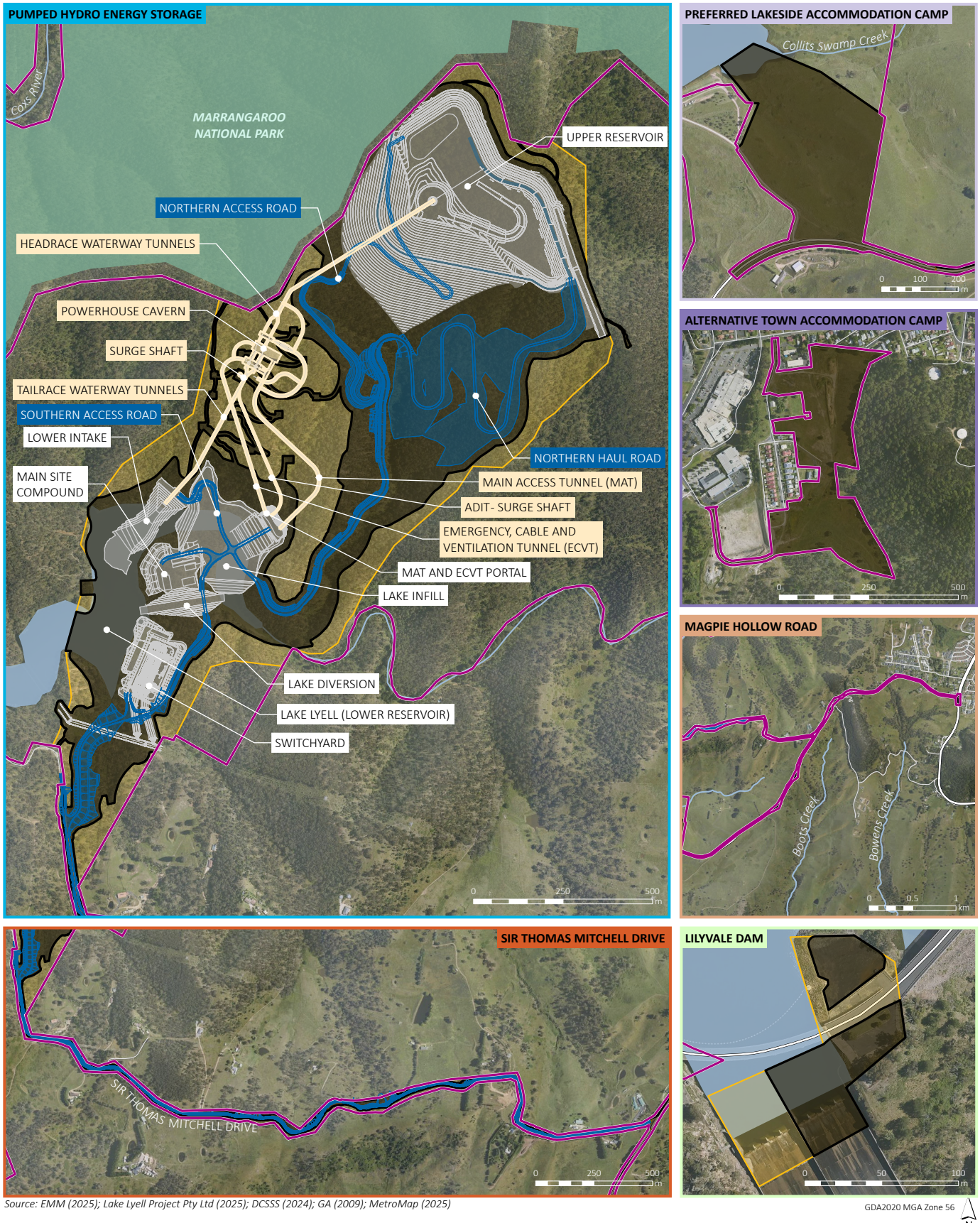
- pumped hydro generation components – including a 5.3-gigalitre (GL) upper reservoir to be constructed behind the southern ridge of Mount Walker, a 33.5 GL lower reservoir (existing Lake Lyell), inlet/outlet structures, and an underground powerhouse, surge shaft and waterway tunnels
- transmission connection components – including a new high voltage switchyard and connection to the existing 330 kilovolt (kV) transmission line that runs through the site
- site access and ancillary facilities – including upgrade of existing and construction of new access roads and bridges, a diversion and infill of a section of Lake Lyell, administration and utilities
- other construction components or works – including geotechnical investigations, temporary workforce accommodation, site work pads, laydown areas and facilities, and spoil management.

Construction will be completed in stages, including:

- pre-construction / enabling works – consisting of initial access works (internal and external roads), geotechnical investigations, site establishment and preparation of the worker's accommodation camp
- main works – consisting of all other construction activities needed to enable the operation of the project.

During operation, the project will act as an electrical energy storage system through the conversion of electrical to kinetic energy to gravitational energy and back via water as it is transferred from the elevated upper reservoir to a lower reservoir. The project will provide services to the wholesale 'spot' market on the National Electricity Market, and support ancillary services used to manage the power system reliably.

After the 80 to 100-year design life of the project, the asset may remain viable for a plant refurbishment and extension of life, as has been seen for other older assets globally. Following the plant's final refurbishment or once it has reached the end of its serviceable life, the project would look to return the site to a more natural state and encourage community beneficial use.



Source: EMM (2025); Lake Lyell Project Pty Ltd (2025); DCSSS (2024); GA (2009); MetroMap (2025)

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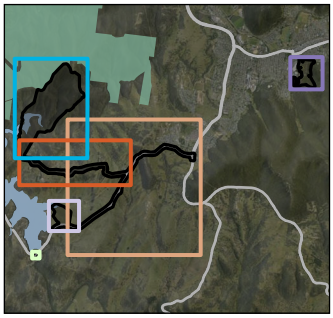

KEY

- Project area
- Permanent road
- Above ground design
- Underground design
- Construction envelope
- Disturbance footprint

Existing environment

- Major road
- Minor road
- Named watercourse
- Named waterbody
- NPWS reserve

Project overview

Lake Lyell PHES
Bushfire Assessment Report
Figure 2.1

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To accommodate changes and amendments to the design as it progresses, a 'project area', 'construction envelope', 'disturbance footprint' and 'operational footprint' approach is being adopted for the project.

The construction envelope represents the maximum extent of where disturbance may occur during the construction of the project.

Located entirely within the bounds of the construction envelope sits the disturbance footprint. The disturbance footprint represents the physical disturbance that is expected as part of the construction works. As the design is refined, the final siting of the disturbance footprint can move within the construction envelope, subject to the recommended environmental management measures.

Progressively, and at the end of construction, temporary components that are required to support the construction of the project will be rehabilitated and returned to a state representing their previous use. The exceptions to this are the areas needed for the permanent operation of the project, which would be retained (referred to as the operational footprint), as well as the Asset Protection Zones (APZs).

For the purposes of this assessment, APZs are limited to the disturbance footprint.

2.2 Temporary workforce accommodation camp

A temporary workforce accommodation facility is proposed to house up to 600 workers (referred to as an accommodation camp). The preferred Lakeside camp will be located on the land south of 340 Magpie Hollow Road, South Bowenfels, with an alternative Town camp located at 21 Willowbank Avenue, Sheedys Gully. The final configuration of the accommodation camp will be confirmed during detailed design; however, it is expected to include:

- accommodation units/rooms
- camp kitchen, first aid facility
- gym and/or recreation room
- laundry and carparking.

Buses will be provided to transport workers to and from the accommodation camp to the project area.

The workforce accommodation may also be progressively decommissioned as the workforce size decreases, approaching project completion.

2.3 Construction works

Normal construction works would generally be conducted within the hours of 6.00 am to 6.00 pm Monday to Saturday and 9.00 am to 5.00 pm on Sundays or public holidays.

As some activities (underground excavation and tunnelling) would be undertaken 24 hours a day, seven days a week, the project construction environmental management plan (CEMP) would include out-of-hours mitigation measures to reduce potential impacts of these construction activities at nearby receptors during these periods.

The project's peak workforce is expected to be approximately 500 to 600 full-time equivalent workers, 80% of which are expected to require temporary accommodation. For this reason, temporary accommodation for approximately 500 workers will be provided near the site.

2.4 Operation

The operational footprint of the project will have a significantly smaller area than the overall construction footprint. Similarly, ongoing personnel activities within the project site will be significantly lower than during construction. Permanent infrastructure which will remain in use during the operating phase of the project's life are listed below.

- Upper reservoir and dam.
- Inlet/outlet structures.
- Southern access road (via Sir Thomas Mitchell Drive).
- Northern access road (for operational, repair and maintenance purposes).
- Farmers Creek diversion bridge.
- Administration building (act as a control centre, staff centre and office.
- HV switchyard.
- Transmission connection.
- MAT and portal (primary route for accessing the powerhouse).

- EVCT and portal (for operational and emergency purposes).
- Powerhouse (essential equipment and machinery).

Operation of the generating facility would include regular periods of maintenance, yearly minor shut maintenance, yearly major shut maintenance, five-yearly major inspections (including dams), ~20 yearly major facility wide maintenance. A maintenance shut would typically see 20 to 50 personal on site, these personal would typically be housed in local accommodation.

Operation and maintenance of the HV switchyard will be undertaken by Transgrid as the Transmission Network Service Provider in NSW.

3. LEGISLATIVE AND POLICY REQUIREMENTS

3.1 Environmental Planning and Assessment Act 1979

The project is declared to be CSSI under the EP&A Act. The Minister is the approval authority for this project.

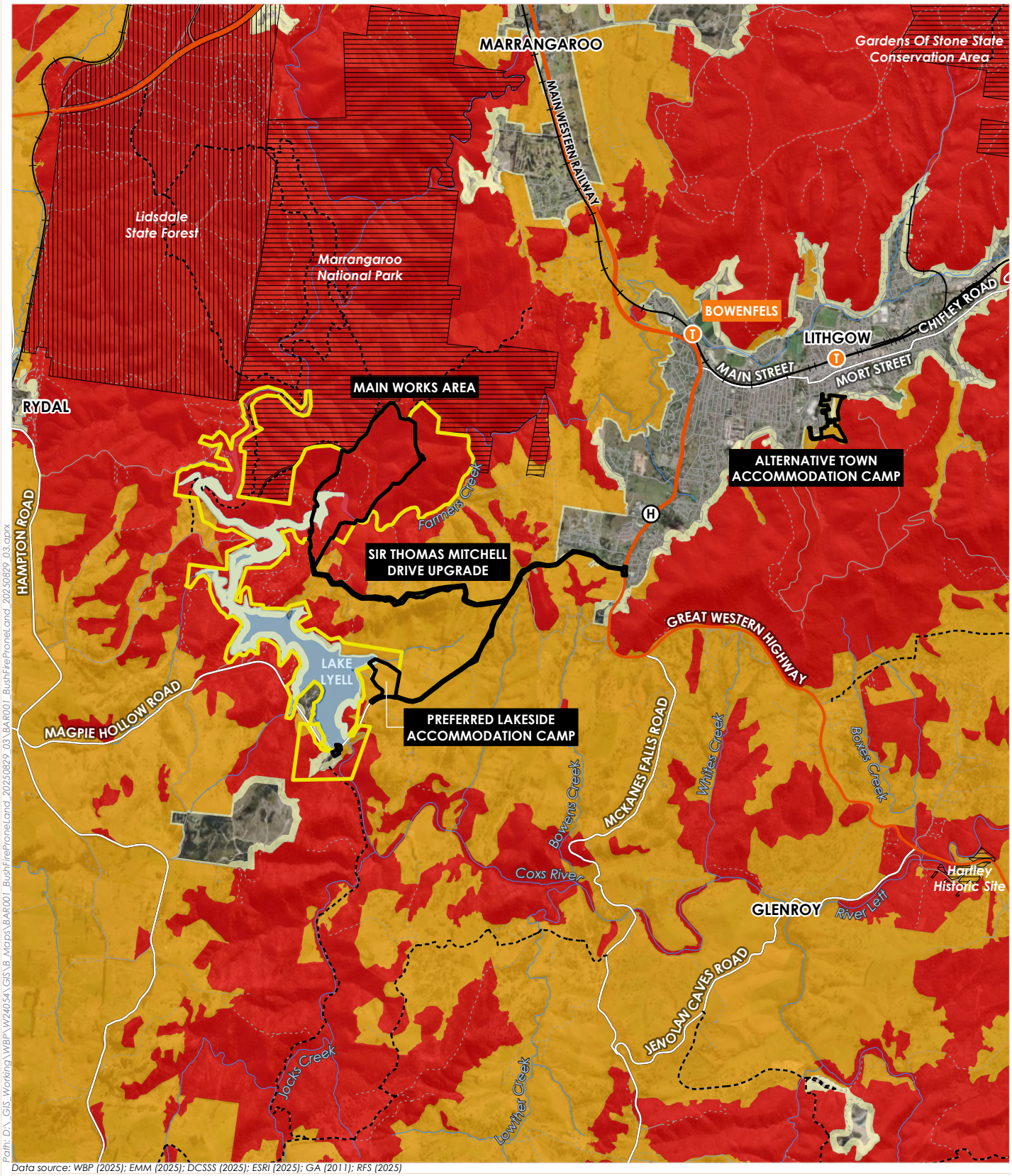
3.1.1 Bush fire prone land mapping

The EP&A Act requires that any development on bush fire prone land (BPL) for any purpose complies with PBP.

Councils maintain and update BPL maps according to the NSW RFS *Guide for Bush Fire Prone Land Mapping* and then they are certified by the NSW RFS. BPL maps are based on the vegetation types present which are classified into one of four categories, as follows:

- Category 1: which includes areas of forest, woodland, heath, forested wetland and timber plantation. Highest risk category.
- Category 2: rainforests and "lower risk vegetation parcels". These parcels contain remnant vegetation that is limited in its connectivity to larger areas and land parcels with land management practices that actively reduce bush fire risk (and are subject to a bush fire plan or similar).
- Category 3: which includes grasslands, freshwater wetlands, semi-arid woodlands, alpine complex and arid shrublands. Moderate risk category.
- Exclusion: Areas of vegetation less than 1 ha and greater than 100 m separation from category 1, 2 or 3 vegetation; small patches or strips of remnant vegetation; managed grasslands; agricultural cropland; gardens; and mangroves are not mapped as bush fire prone.

BPL is defined as land with category 1, 2 or 3 vegetation and land within 100 m of category 1 or within 30 m of category 2 or 3 vegetation. The project area is located on land classified as bushfire prone within the Lithgow Council Bush Fire Prone Land map. As required under the SEARs and the NSW RFS response, key issues such as hazards, including the requirement to demonstrate compliance with PBP, must be addressed.



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Data source: WBP (2025); EMM (2025); DCSSS (2025); ESRI (2025); GA (2011); RFS (2025)

LEGEND

- Project area
- Construction envelope
- Helipad
- Railway station
- Rail
- Major road
- Minor road
- Local road
- Vehicular track
- Classified fire trail
- Named watercourse
- Lake Lyell
- State forest
- National park/reserve

Bush fire prone land (RFS, 2025)

- Vegetation Category 1 (highest risk)
- Vegetation Category 3 (medium risk)
- Vegetation Buffer

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Figure 3.1 – Bush fire prone land map

Lake Lyell Pumped Hydro Energy Storage

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3.2 Rural Fires Act 1997

The objectives of the *Rural Fires Act 1997 (*RF Act*)* are to provide:

- the prevention, mitigation and suppression of fires
- coordination of bush fire fighting and prevention
- protection of people and property from fires
- protection of the environment.

In relation to the management of bush fire fuels on public and private lands within NSW, sections 63(1) and 63(2) of the RF Act require public authorities and owners/occupiers of land to take all practicable steps to prevent the occurrence of bush fires on their land, and to minimize the danger of the spread of bush fires.

A bush fire safety authority under section 100B of the RF Act, is not required under section 5.23 of the EP&A Act for State significant infrastructure.

3.3 Planning for Bush Fire Protection 2019

The NSW RFS document PBP provides and explains the legal requirements, framework and protection measures needed for all types of development on bush fire prone land in NSW.

PBP aims "to provide for the protection of human life and minimise impacts on property from the threat of bush fire, while having due regard to development potential, site characteristics and protection of the environment".
The objectives of PBP are to:

- afford buildings and their occupants protection from exposure to a bush fire
- provide for a defendable space to be located around buildings
- provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings
- ensure that appropriate operational access and egress for emergency service personnel and occupants is available
- provide for ongoing management and maintenance of bush fire protection measures
- ensure that utility services are adequate to meet the needs of firefighters.

3.4 National Construction Code

The Building Code of Australia (BCA) is adopted in NSW through the EP&A Act. The National Construction Code 2019 (NCC) comprising the BCA as Volumes 1 and 2, is a performance-based code for the construction of buildings.

Construction of buildings in bushfire prone areas are required to meet the performance requirements and Deemed-to-Satisfy provisions that are covered in the NCC.

Provisions apply to buildings of Class 1, 2, 3, 4, 10 and Class 9 buildings considered Special Fire Protection Purpose. The Deemed-to-Satisfy solution in the NCC for buildings in designated bushfire prone areas is AS3959 Construction of buildings in bush fire prone areas and the NASH Standard: Steel Framed Construction in Bushfire Areas 2014.

3.5 Australian Standard 3959

AS3959-2018 Construction of buildings in bush fire prone areas (Standards Australia 2018) (AS3959) is applied throughout Australia to the construction of buildings on bushfire prone lands. Its objectives are to prescribe particular construction details for buildings to reduce the risk of ignition from a bushfire.

4. BUSHFIRE RISK FACTORS

4.1 Current bush fire management controls

The project area comprises 32 land parcels of land that is largely owned by EnergyAustralia. The Lithgow Bush Fire Risk Management Plan (2020) identifies the majority of the project area as a Strategic Fire Advantage Zone (SFAZ). The purpose of an SFAZ is to provide strategic areas of fire protection advantage, which will reduce the speed and intensity of bush fires, minimise the potential for spot fire development, and aid in the containment of wildfires within existing management boundaries.

Management practices within an SFAZ include achieving mosaic fuel reduction patterns (dependent on topography, aspect, spotting propensity, location of fire breaks, etc) so that the majority of the SFAZ has an overall fuel hazard of less than high.

Proposed hazard reduction burning within the project area will be undertaken in consultation with the NSW RFS and adjoining landholders (including NPWS) in accordance with a program of works and the Lithgow Bush Fire Risk Management Plan.

The following programs and activities are examples of current local government-wide controls and have been considered:

- the declaration and management of burning restrictions, such as total fire bans, restricted burning times, prohibited burning times and harvest and vehicle movement bans to reduce ignition risk.

The area is also relatively well-served by fire response services. The nearest volunteer fire brigade is South Bowenfels Rural Fire Brigade, located approximately 6 km to the east of the project area, followed by Lithgow West Fire and Rescue NSW, approximately 8.5 km to the east.

4.2 Climate and bush fire season

As outlined in the Bush Fire Risk Management Plan, the Lithgow area has cold to very cold winters (mean temps 1.3° to 11.2°) followed by hot dry summers (11.5° to 24.9°) with average rains experienced per month throughout the year, average annual rainfall is 862 millimetres (mm). The bush fire season generally runs from October to March, yet has, on occasion, been extended when the weather conditions have created a landscape more susceptible to fire occurrences and expansion.

The weather conditions associated with the bush fire season in the Lithgow Bush Fire Management Committee (BFMC) area, which covers the Lithgow LGA and spans 450,341 hectares (ha), are high daytime temperatures and low relative humidity associated with strong gusty north-westerly winds. Dry lightning storms occur frequently during the Bush Fire Danger Period (1 October to 31 March).

4.3 Fire ignition

Bush fires within the region are typically started by natural causes (i.e. lightning), mainly associated with late spring and early summer, escaped fires from legal burning activities, as well as illegal/careless burning activities by private landowners.

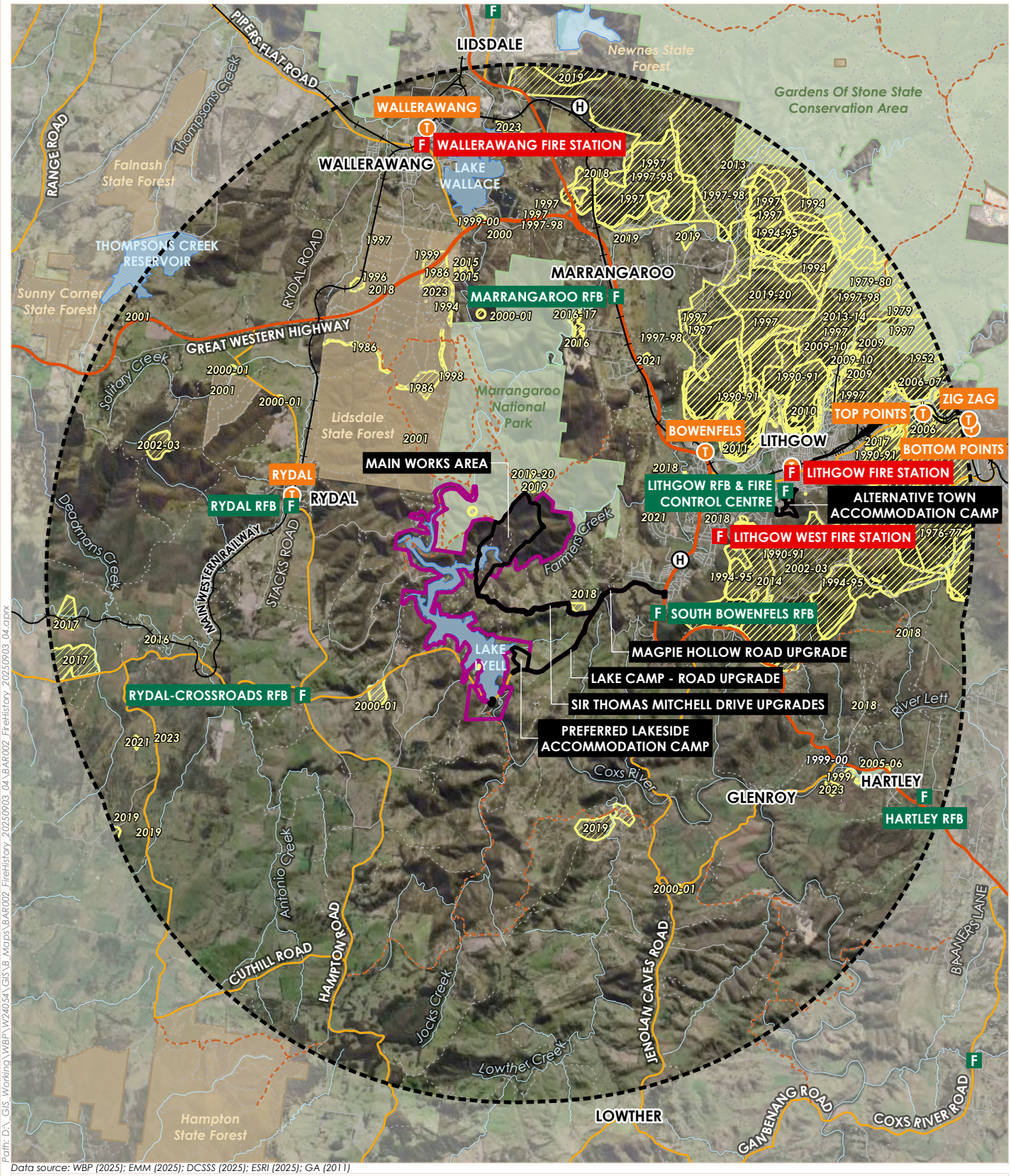
4.4 Fire history

The Lithgow BFMC area has on average 128 bush/grass fires per year of which three on average are considered a major fire (>20 ha) (BFMC, 2020).

The Gosper's Mountain Fire commenced in October 2019 in a remote area of the Wollemi National Park. This fire burnt an area of 512,626 ha, of which 225,882 ha is within the Lithgow BFMC area. This is the largest recorded fire in the Lithgow BFMC area and burnt within approximately 5 km to the north-east of the project area.

NPWS fire history data was also reviewed which suggests that there have been no fires recorded within the project area. The following two wildfires were recorded within Marrangaroo National Park approximately 600 m to the north:

- 2000 to 2001 – 3.12 ha, cause undetermined
- 2019 to 2020 – 1.69 ha, cause lighting strike.



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Data source: WBP (2025); EMM (2025); DCSSS (2025); ESRI (2025); GA (2011)

LEGEND

- Project area
- Construction envelope
- Main works area & preferred lakeside accommodation camp 10 km buffer
- Fire and rescue
- Rural fire service
- Helipad
- Railway station
- Rail
- Major road
- Minor road
- Local road
- Vehicular track
- Classified fire trail
- Named watercourse
- Waterbody
- State forest
- National park/reserve

Fire history (DCSSS, 2025)

- Wildfire

WARATAH BUSHFIRE
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Figure 4.1 – Fire History and location of emergency services

Lake Lyell Pumped Hydro Energy Storage

03/09/2024 (v4) 1:125,000 @A4 GDA2020 MGA Zone 56

0 2.5 5
Kilometers

4.5 Fire behaviour potential

Bush fire behaviour refers to how bush fires spread and develop and is strongly influenced by weather, vegetation (fuel), topography (slope) and fire weather.

Temperature, humidity, and wind play a crucial role and strongly influence the likelihood of ignition, determining whether a fire will be uncontrollable. Wind can significantly increase the spread and direction of a fire, carrying embers ahead of the main fire and igniting new fires, which in turn cause the fire to spread more rapidly.

Vegetation structure and fuel moisture content interact to influence fuel availability, which in turn affects the rate of spread and intensity of fire behaviour.

The topography also affects the rate of spread, as fires move faster uphill due to the preheating of fuel. A 10-degree slope increase can double a fire's spread.

The vegetation formations within the main works area are predominantly a mixture of forest and woodland. Fuel loads contributing to the rate of spread of forest fires for surface and elevated fuels can be expected to be up to 22 tonnes per hectare (t/ha), with overall fuel loads, including bark and canopy fuels, reaching 36.1 t/ha (PBP Table A1.12.8, RFS 2019).

Fuel loads contributing to the rate of spread for woodland fire are 10.5 t/ha (surface and elevated fuel) and 20.2 t/ha (including bark and canopy).

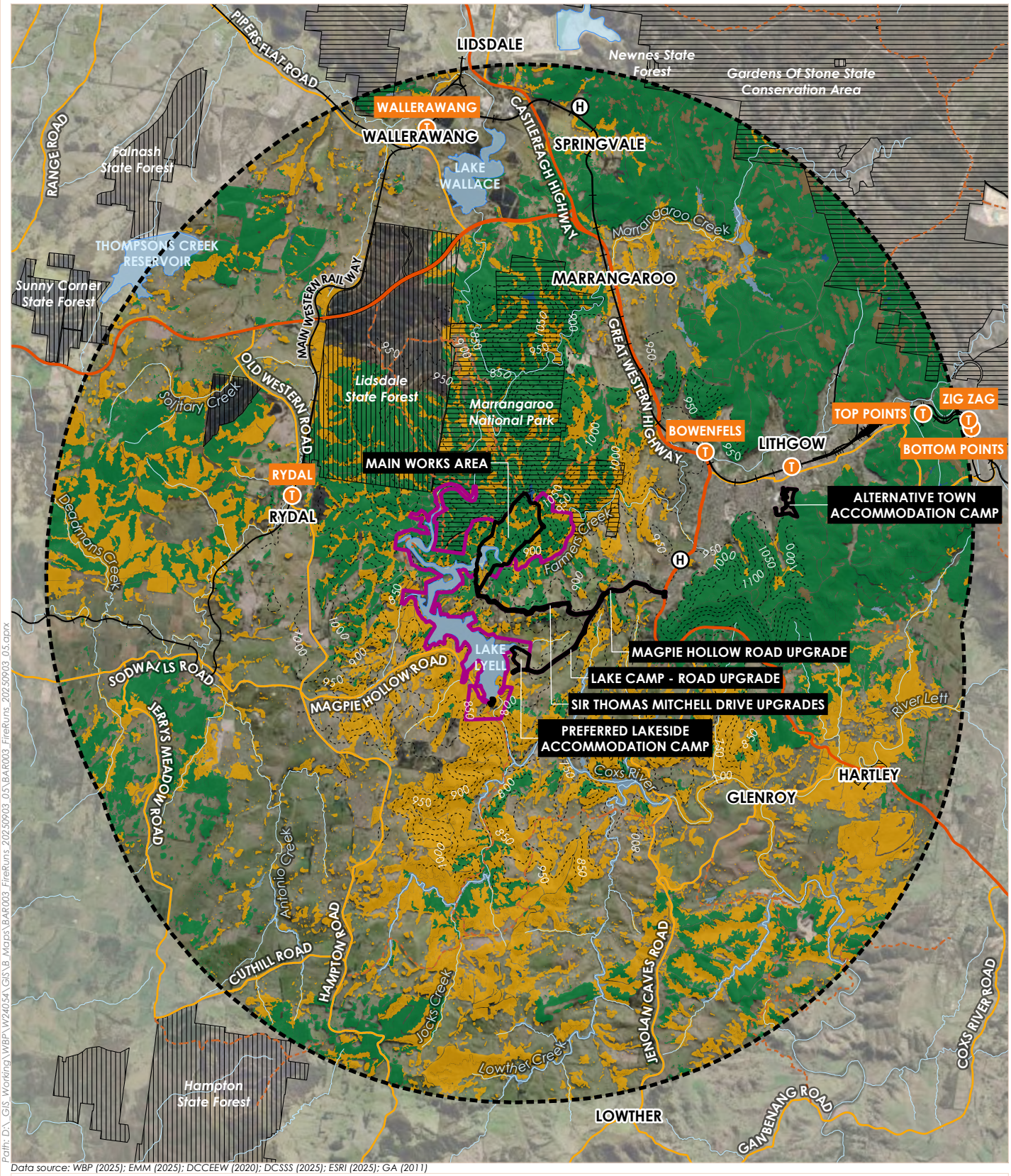
At a landscape scale, the construction envelope associated with the main works area is exposed to downslope vegetation to the west and east, with up-slope vegetation hazard to the north.

The preferred lakeside accommodation camp is surrounded by predominantly grassland vegetation on downslopes to the north, south and west, with an up-slope grassland hazard to the east. The alternative town accommodation camp is located within Lithgow and is adjacent to extensive bushland (uphill topography) to the east and south.

It would be expected that a fire that starts within the adjoining Marrangaroo National Park to the north or on the lower reaches of the site along Lake Lyell will spread more rapidly and with higher intensity upslope towards the west of the north-west of the construction envelope than a fire impacting from the southeast and spreading downslope.

The above scenarios have been considered when evaluating the combination of bush fire protection measures to be implemented for the project, including measures to further increase bush fire resilience, beyond the minimum requirements.

Additionally, any retained vegetation or proposals to rehabilitate land within the disturbance footprint, particularly in relation to changes in slope, will influence fire behaviour. The presence of Lake Lyell, along with APZs of up to 100 m in the west, south and north of the main works area, will mitigate the threat of a bush fire impacting the project. Similarly, the large lot rural residential nature of land, and broader road network will provide mitigation to the south-east.



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Data source: WBP (2025); EMM (2025); DCCEEW (2020); DCSSS (2025); ESRI (2025); GA (2011)

LEGEND

- Project area
- Construction envelope
- Main works area & preferred lakeside accommodation camp 10 km buffer
- Helipad
- Railway station
- Rail
- Major road
- Minor road
- Classified fire trail
- Topographic contour (50 m)
- Named watercourse
- Waterbody
- State forest
- National park/reserve

Vegetation formation (NSW SVTM vC2.0.M2.0)

- Freshwater Wetlands
- Forested Wetlands
- Heathlands
- Grassy Woodlands
- Forests
- Rainforests

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Figure 4.2 – Potential fire runs (landscape scale)

Lake Lyell Pumped Hydro Energy Storage

03/09/2025 (v5) | 1:125,000 @A4 | GDA2020 MGA Zone 56

0 3 5
Kilometers

4.6 Bush fire hazard assessment

The following assessment uses the methodology identified in PBP and AS3959 to provide a focused assessment of the following specific design components of the project:

- Accommodation camp.
- Refuge building(s).
- Site offices and workshops (within the laydown area).
- Substation and switchyard area.
- MAT and ECTV portal.
- Access, water and utilities.

In addition to the project's design components, PBP aims to protect human life for all persons (contractors, staff and firefighting personnel) during both the construction and operational phases.

A bush fire hazard assessment for each of the proposed design components takes into account the hazardous vegetation and the effective slope surrounding each site, along with the applicable Forest Fire Danger Index (FFDI) for the area.

4.6.1 Predominant vegetation

PBP guidelines require the identification of the predominant vegetation formation in accordance with the publication *Ocean Shores to Desert Dunes* (David Keith, 2004) if using the simplified acceptable solutions.

The hazardous vegetation is calculated for a distance of at least 140 m from a proposed project design component. The vegetation posing a bush fire threat to the design components identified above includes:

Table 4-1 – Vegetation

PCT	Vegetation class (EMM, 2024)	Vegetation classification	Acceptable solution fuel loads (t/ha) (PBP)	Comprehensive Vegetation fuel loads (t/ha) NSW RFS
3347	Southern Tableland Creekflat Ribbon Gum Forest	Tableland Clay Grassy Woodlands	10.5/20.2	10.5/18.61
3348	Southern Tableland Granites Ribbon Gum Grassy Forest			
3369	Central Tableland Ranges Peppermint-Gum Grassy Forest	Southern Tableland Grassy Woodlands		10.5/19.01
3367	Central Tableland Granites Grassy Box Woodland			
3534	Central West Stony Hills Stringybark-Box Forest	Upper Riverina Dry Sclerophyll Forest	22/36.1	14/25.09
3650	Goulburn-Lithgow Ranges Silvertop Ash Forest	South East Dry Sclerophyll Forest		17/28
3735	Central Tableland Peppermint Shrub-Grass Forest	Southern Tableland Dry Sclerophyll Forest		22.5/30.85
3747	Southern Tableland Western Hills Scribbly Gum Forest			

The vegetation classes within the development corridor have been confirmed by EMM during their field survey.

4.6.2 Effective slope

Topography has a significant effect on bush fire behaviour and therefore can increase the risk to assets. For example, fire travels faster when moving uphill than when moving downhill. For every 10-degree slope, the fire will double its speed and increase in intensity.

The effective slope has been assessed within the vegetation up to 100 m from the project design components to determine the minimum APZs required and the expected radiant heat output in a bush fire event. This is described in detail within Table 4-2 and Figure 4-3 to Figure 4-5.

4.6.3 Determination of APZs and BAL

The following assessment has determined the APZ and BAL setbacks for the project. It will serve as a guide for the final detailed design (micro-siting) of buildings associated with the laydown area, switchyard, and accommodation camp.

The assessment has provided the:

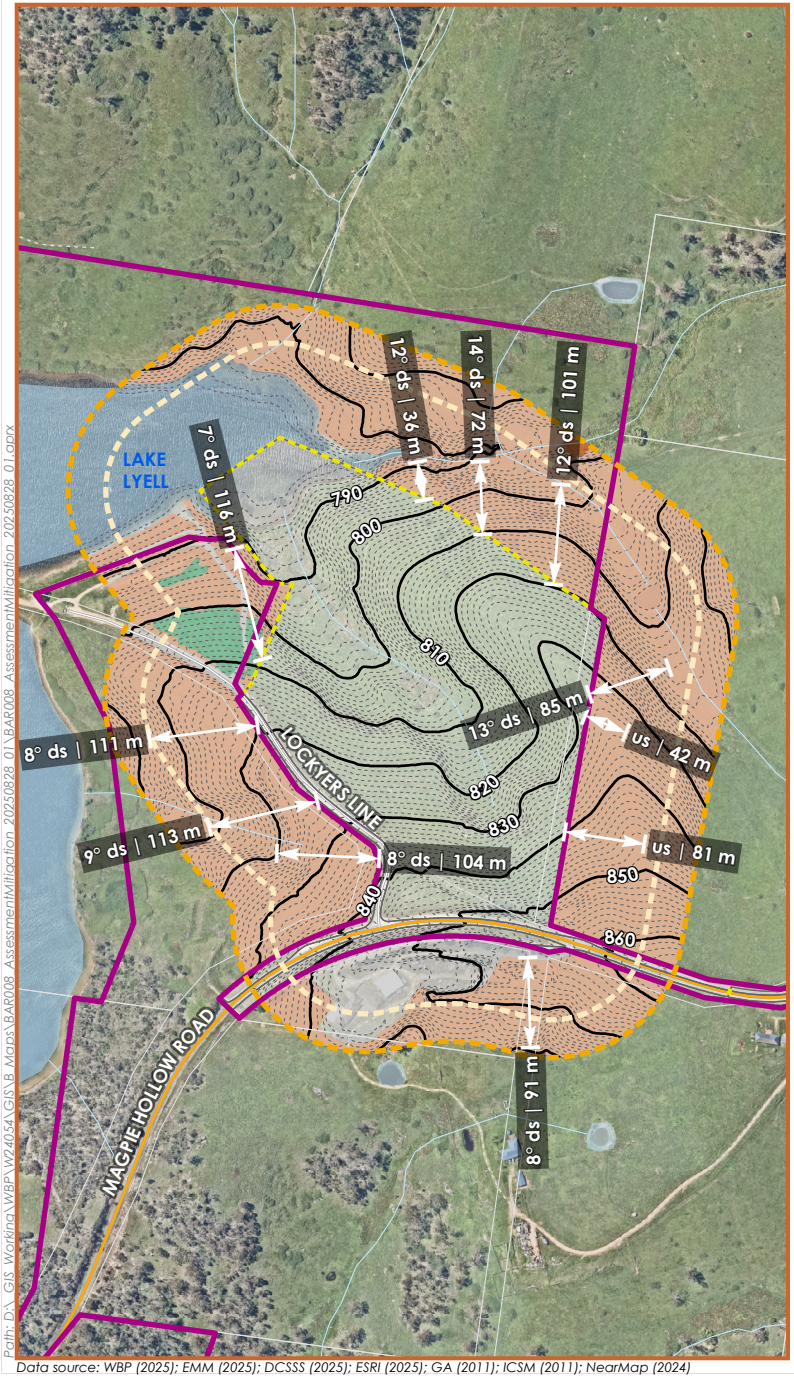
- minimum APZ to achieve BAL 29 (avoid flame contact and excessive radiant heat) (refer Column 4 in Table 4-2)
- minimum APZ required for a suitable safe refuge building within the laydown area, switchyard and accommodation camps (<10 kW/m^2) using Table A1.12.1 of PBP (refer Column 5 in Table 4-2). Whilst separate refuge buildings are currently not proposed, they are recommended to form part of the detailed design requirements for the permanent infrastructure (i.e. administration building in the laydown area or control room in the switchyard) due to the site's isolated location and required travel distance (through bushfire prone land)
- radiant heat levels (expressed in BAL thresholds BAL 29, BAL 19 and BAL 12.5) using Table A1.12.6 of PBP.

A fire danger index (FDI) of 80 has been used to calculate bush fire behaviour in the project area based on its location within the Central Ranges region. Refer Figure 4-3 to Figure 4-5 for APZs and BAL thresholds.

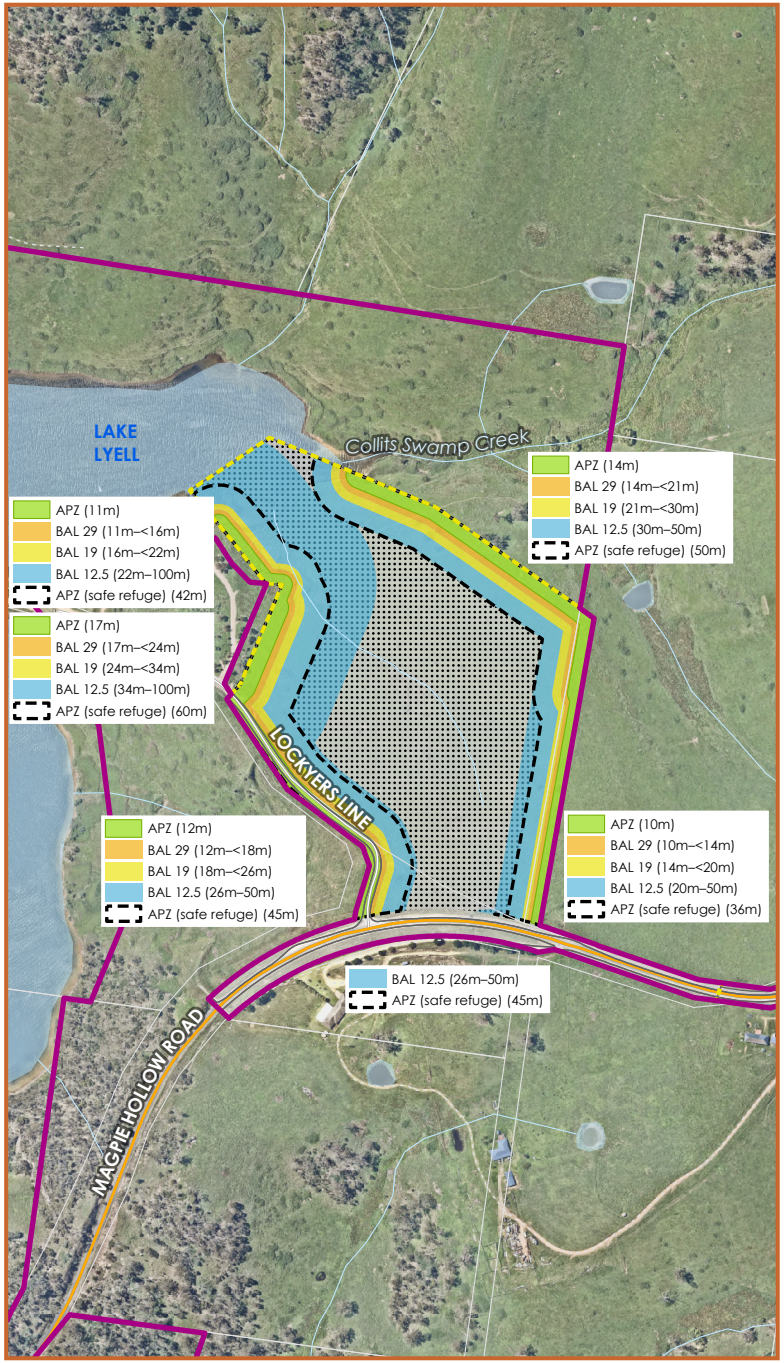
Table 4-2 –Bush fire attack assessment – Lakeside camp

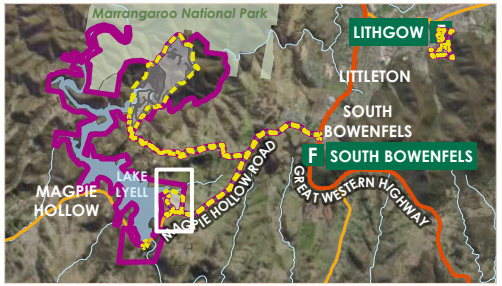
Aspect	Vegetation Formation within 140m	Effective slope within 100m	Minimum APZ recommended (BAL 29)	Minimum APZ recommended for safe refuge	APZ provided	BAL thresholds
Preferred Lakeside camp (refer to Figure 4-3)						
North & north east	Grassland	10-15^0 downslope	14 m	50 m	>14 m	BAL 29 (14-<21 m) BAL 19 (21-<30 m) BAL 12.5 (30-<50 m)
West	Grassland	Level and upslope	10 m	36 m	>10 m	BAL 29 (10-<14 m) BAL 19 (14-<20 m) BAL 12.5 (20-<50 m)
South & South west	Grassland	5-10^0 downslope	12 m	45 m	>12 m	BAL 29 (12-<18 m) BAL 19 (18-<26 m) BAL 12.5 (26-<50 m)
North west	Woodland	5-10^0 downslope	17 m	60 m	>17 m	BAL 29 (17-<24 m) BAL 19 (24-<34 m) BAL 12.5 (34-<100 m)
West	Woodland	Level and upslope	11 m	42 m	>11 m	BAL 29 (11-<16 m) BAL 19 (16-<22 m) BAL 12.5 (22-<100 m)
No refuge buildings are currently proposed as part of the indicative layout for the accommodation camp. Given the temporary nature of the camp and low overall risk (i.e. grassland, woodland and/or waterbody) a safe refuge building is not considered necessary. However, buildings must be constructed to the relevant BAL rating based on their location.						

VEGETATION AND SLOPE ASSESSMENT



ASSET PROTECTION ZONES AND BUSH FIRE ATTACK LEVELS





LEGEND

- Project area
- Construction envelope
- Disturbance footprint
- Available area for safe refuge
- Slope buffer (100 m)
- Vegetation buffer (140 m)

Existing environment

- F Rural fire service
- Major road
- Minor road
- Local road
- Vehicular track
- Topographic contour (1 m)
- Topographic contour (10 m)
- Watercourse/drainage line
- Lot boundary
- National park/reserve

Bush fire land category/vegetation class

- Grassland
- Southern Tableland Grassy Woodlands
- Tableland Clay Grassy Woodlands
- Waterbody
- Other (non-native vegetation, managed land)

Figure 4.3 – Bush Fire Assessment & Mitigation Measures (Preferred Lakeside Accommodation Camp)

Lake Lyell Pumped Hydro Energy Storage

29/08/2025 (v1) 1:8,000 @A4 GDA2020 MGA Zone 56

0 100 200
metres

WARATAH BUSHFIRE
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Data source: WBP (2025); EMM (2025); DCSSS (2025); ESRI (2025); GA (2011); ICSM (2011); NearMap (2024)

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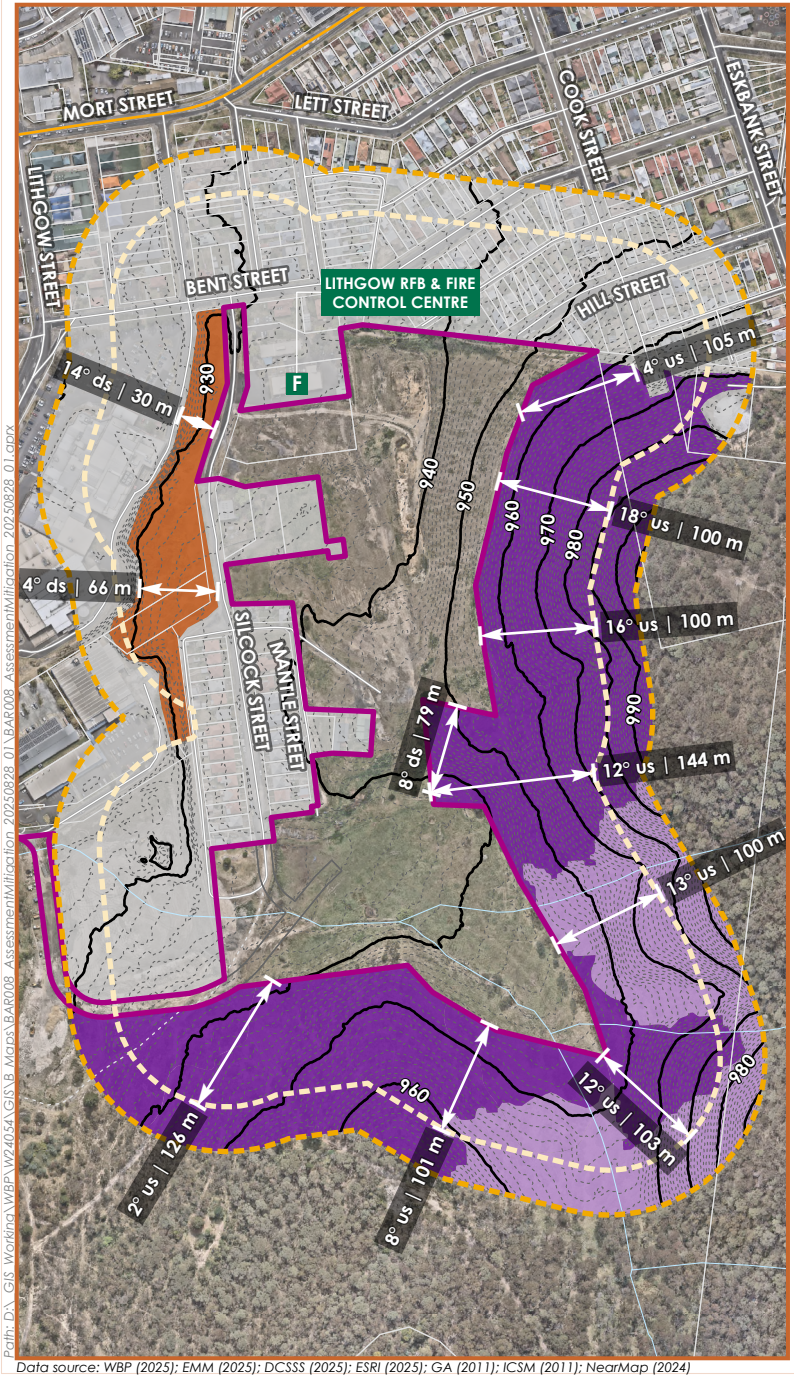
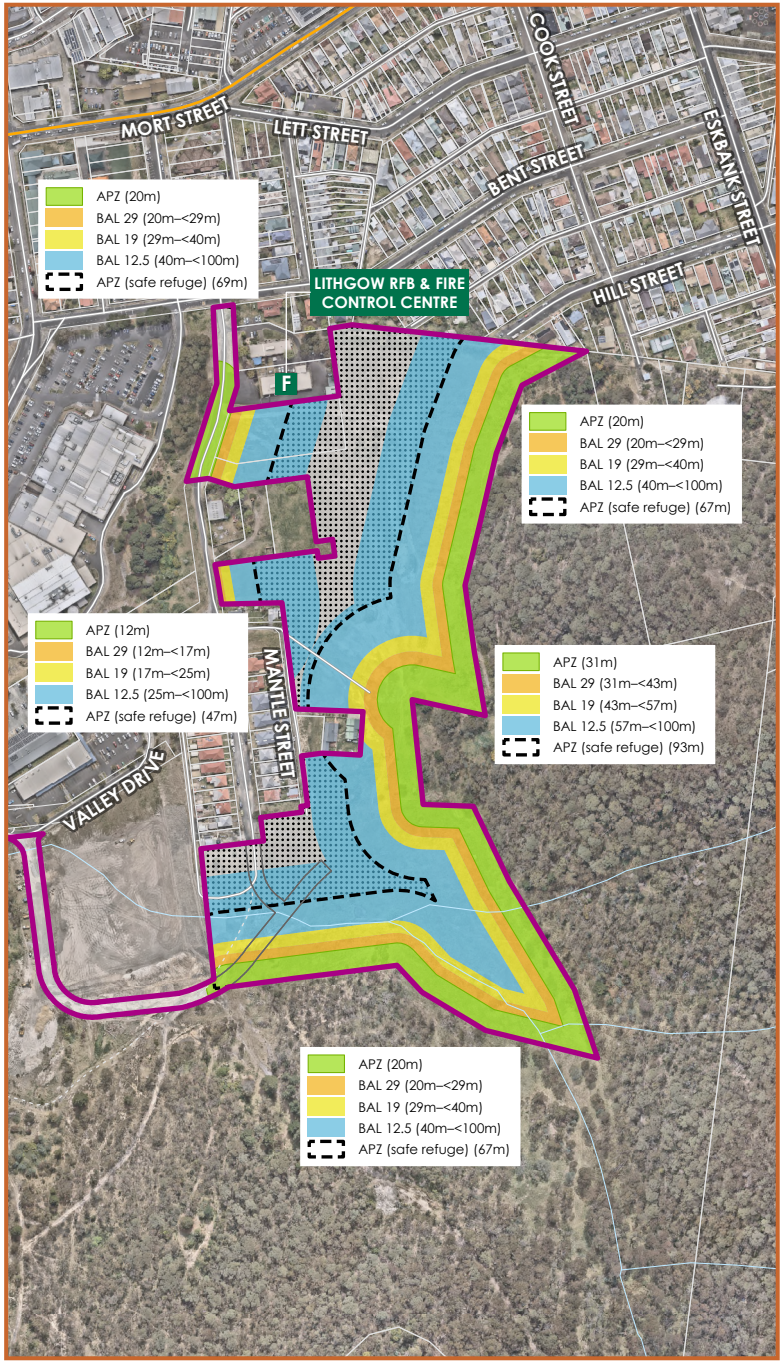
Table 4-3 –Bush fire attack assessment – Town camp

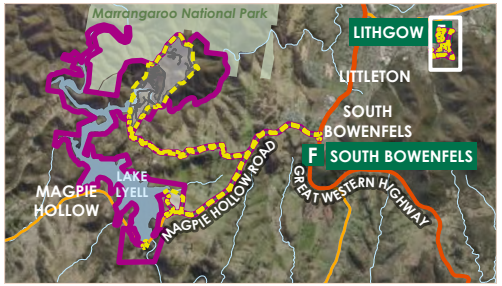
Aspect	Vegetation Formation within 140m	Effective slope within 100m	Minimum APZ recommended (BAL 29)	Minimum APZ recommended for safe refuge	APZ provided	BAL thresholds
Alternative Town camp (refer to Figure 4-4)						
East & south	Forest	Level and upslope	20 m	67 m	>20 m	BAL 29 (20-<29 m) BAL 19 (29-<40 m) BAL 12.5 (40-<100 m)
East	Forest	5-10^0 downslope	31 m	93 m	>31 m	BAL 29 (31-<43 m) BAL 19 (43-<57 m) BAL 12.5 (57-<100 m)
North west	Remnant/ exotic vegetation	10-15^0 downslope	20 m	69 m	>20 m	BAL 29 (17-<24 m) BAL 19 (24-<34 m) BAL 12.5 (34-<100 m)
West	Remnant/ exotic vegetation	0-5^0 downslope	12 m	47 m	>12 m	BAL 29 (11-<16 m) BAL 19 (16-<22 m) BAL 12.5 (22-<100 m)
No refuge buildings are currently proposed as part of the indicative layout for the accommodation camp. Given the temporary nature of the camp and its location within the centre of town, it is not considered necessary. However, buildings must be constructed to the relevant BAL rating based on their location.						

VEGETATION AND SLOPE ASSESSMENT



ASSET PROTECTION ZONES AND BUSH FIRE ATTACK LEVELS





LEGEND

- Project area
- Construction envelope
- Disturbance footprint
- Available area for safe refuge
- Slope buffer (100 m)
- Vegetation buffer (140 m)

Existing environment

- F Rural fire service
- Major road
- Minor road
- Local road
- Vehicular track
- Topographic contour (1 m)
- Topographic contour (10 m)
- Watercourse/drainage line
- Waterbody
- Lot boundary
- National park/reserve

Bush fire land category/vegetation class

- Remnant/exotic vegetation
- Sydney Montane Dry Sclerophyll Forests
- Southern Tableland Dry Sclerophyll Forest
- Other (non-native vegetation, managed land)

Figure 4.4 – Bush Fire Assessment & Mitigation Measures (Alternative Town Accommodation Camp)

Lake Lyell Pumped Hydro Energy Storage

29/08/2025 (v1) 1:6,750 @A4 GDA2020 MGA Zone 56

0 100 200
metres

WARATAH BUSHFIRE
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Data source: WBP (2025); EMM (2025); DCSSS (2025); ESRI (2025); GA (2011); ICSM (2011); NearMap (2024)

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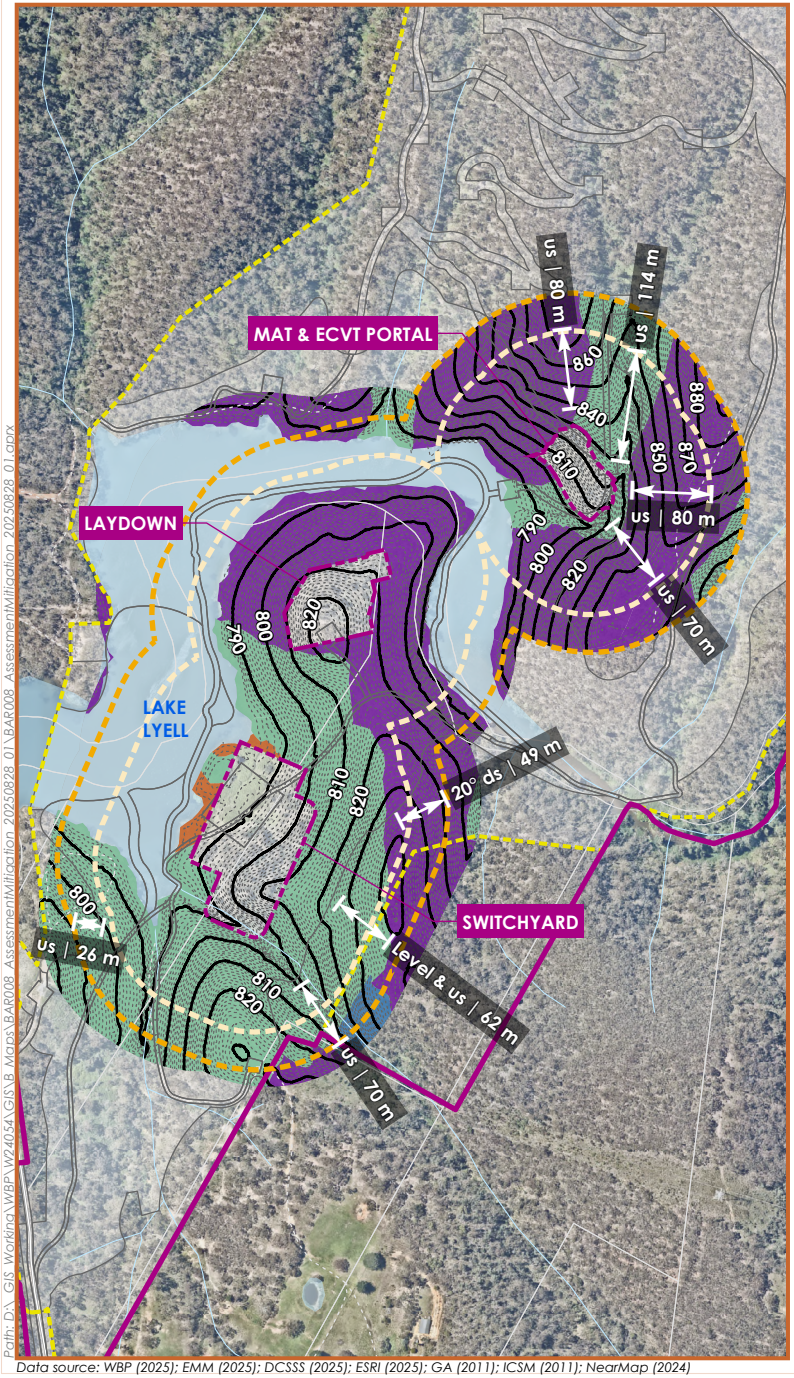
Table 4-4 –Bush fire attack assessment – main works area

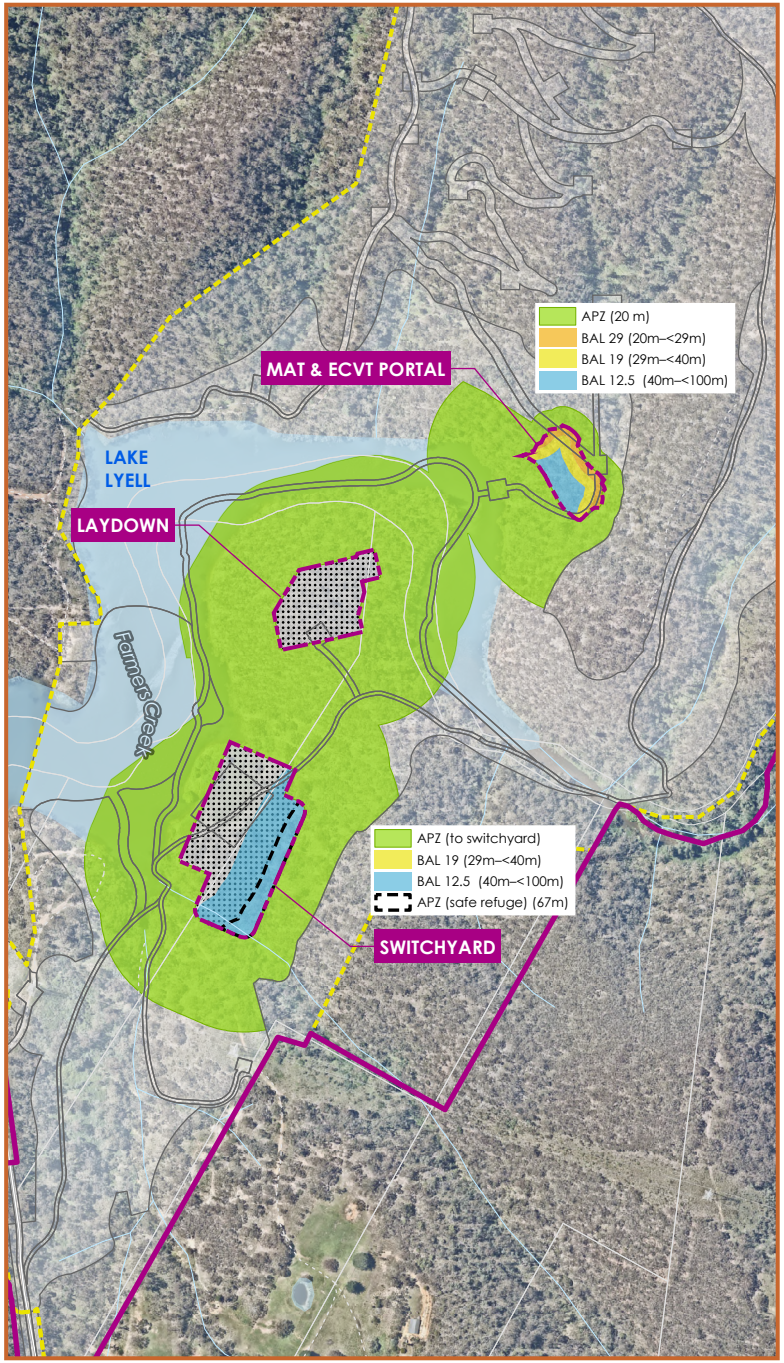
Aspect	Vegetation Formation within 140m	Effective slope within 100m	Minimum APZ recommended (BAL 29)	Minimum APZ recommended for safe refuge	APZ provided	BAL thresholds
Laydown (refer to Figure 4-5)						
North, east & south	N/A	N/A	N/A	N/A	100m	BAL Low (based on the disturbance footprint the nearest unmanaged vegetation is located 125 m to the west and south
West & south	Southern Tableland Dry Sclerophyll Forest	N/A	N/A	N/A		
No refuge buildings are currently proposed as part of the indicative layouts for the laydown area however a refuge building is recommended due to the site's isolated location. The available setback of >100m based on the existing disturbance footprint allows for a safe refuge anywhere within the laydown footprint. It is recommended that the administration building is constructed within the laydown footprint to comply with BAL 29 construction.						
Switchyard (refer to Figure 4-5)						
East	Forest & woodland	Level & upslope	20 m	67 m	>40 m	BAL 19 (29-<40 m) BAL 12.5 (40-<100 m)
Northeast	Forest	15-20^0 downslope	48 m	100 m	54 m	BAL 29 (48-<63 m) BAL 19 (63-<81 m) BAL 12.5 (81-<100 m)
Southwest	Woodland	Level and upslope	11 m	42 m	>95 m	BAL 12.5 (22-<100 m)

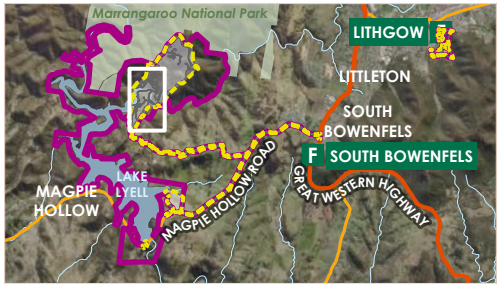
Aspect	Vegetation Formation within 140m	Effective slope within 100m	Minimum APZ recommended (BAL 29)	Minimum APZ recommended for safe refuge	APZ provided	BAL thresholds
North & Northwest	Managed land (switchyard infill & disturbance area)	N/A	N/A	N/A	>100 m	BAL 29 (31-<43 m) BAL 19 (43-<57 m) BAL 12.5 (57-<100 m)
No refuge buildings are currently proposed as part of the indicative layout for the switchyard. It is recommended that the control room is constructed within the available area for safe refuge to comply with BAL 29 construction.						
MAT & ECTV portal (refer to Figure 4-5)						
North and east	Forest	Level and upslope	20 m	N/A	>20 m	BAL 29 (20-<29 m) BAL 19 (29-<40 m) BAL 12.5 (40-<100 m)
South & west	Managed land within disturbance footprint	N/A	N/A	N/A	>100 m	N/A

VEGETATION AND SLOPE ASSESSMENT



ASSET PROTECTION ZONES AND BUSH FIRE ATTACK LEVELS





LEGEND

- Project area
- MAT and ECVT portal, laydown, switchyard
- Construction envelope
- Disturbance footprint
- Available area for safe refuge
- Slope buffer (100 m)
- Vegetation buffer (140 m)

Existing environment

- F Rural fire service
- Major road
- Minor road
- Local road
- Vehicular track
- Topographic contour (1 m)
- Topographic contour (10 m)
- Watercourse/drainage line
- Lot boundary
- National park/reserve

Bush fire land category/vegetation class

- Southern Tableland Grassy Woodlands
- Tableland Clay Grassy Woodlands
- Southern Tableland Dry Sclerophyll Forest
- Upper Riverina Dry Sclerophyll Forest
- Waterbody

Figure 4.5 – Bush Fire Assessment & Mitigation Measures (Main Works Area)

Lake Lyell Pumped Hydro Energy Storage

29/08/2025 (v1) 1:8,000 @A4 GDA2020 MGA Zone 56

0 100 200
metres

WARATAH BUSHFIRE
PLANNING | GIS | ASSESSMENT

Data source: WBP (2025); EMM (2025); DCSSS (2025); ESRI (2025); GA (2011); ICSM (2011); NearMap (2024)

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5. BUSH FIRE MITIGATION MEASURES

Bush fire mitigation measures have been developed based on guidance from NSW RFS guidelines, PBP. Adoption of these measures is expected to reduce the risk that bush fires in the landscape pose to human life and the projects assets.

5.1 Asset protection zones and landscaping

APZs have been recommended around the accommodation camp, laydown, switchyard and MAT and ECTV portal to reduce radiant heat impact to <29 kW/m^2 and inform future design and location of infrastructure.

To provide increased bush fire resilience, a proposed refuge building should be sited outside the special fire protection purpose (SFPP) APZ to ensure radiant heat levels of <10 kW/m^2.

The APZ must be effectively managed for the duration of the operational life of the project design component in accordance with the requirements of an inner protection area as outlined in Appendix 4 of PBP.

5.2 Building construction

Building construction standards form part of the suite of bush fire protection measures that can be applied in the design and construction of buildings (and infrastructure) to enhance their survivability in a bush fire event.

The accommodation camp, switchyard, laydown area (including locations for a suitable safe refuge), and MAT and ECTV portal are shown in Figure 4-3 to Figure 4-5. While the actual location of the buildings will not be confirmed until the detailed design, the APZ will be large enough to allow placement of buildings so that radiant heat exposure is <29 kW/m^2, with a suitable safe refuge building being located within an area exposed to a radiant heat exposure of <10 kW/m^2.

Under the BCA Class 1, 2 and 3, Class 4 parts of a building and some Class 10 and Class 9 SFPP buildings necessitate construction requirements in accordance with AS3959 and the NASH Standard for buildings in designated bushfire prone areas.

Although not required under the BCA, given the isolated nature of the site, the administration building within the laydown area (although exposed to BAL Low) and control room within the switchyard should be constructed to comply with BAL 29 to increase bush fire resilience and for the protection of human life.

It is recommended that buildings associated with the accommodation camp, permanent infrastructure within the MAT and ECTV portal and the switchyard are sited within areas exposed to BAL 29 or less where practicable, or to the level of their construction standard (i.e. the ability of exposed elements to withstand radiant heat).

5.3 Design and construction of safe refuges

It is acknowledged that the main works area is in an isolated location, with access via narrow and winding roads located in vegetation with a high hazard and steep terrain.

The logistics of evacuating such a large transient population (up to 600 workers for the construction duration of 4 to 5 years) and a lesser number of 20 to 50 full-time workers during operation will be managed through the preparation of a bush fire emergency management and evacuation management plan.

Specific areas to accommodate safe refuge buildings have been identified within the laydown and switchyard. It is recommended that a safe refuge is constructed within the laydown area to comply with BAL 29 to improve bush fire resilience.

The safe refuge building will be designed to provide short-term shelter from the immediate life-threatening effects of a bush fire event. Sheltering in a refuge must be accepted as being a last resort option in the development of the bush fire emergency management and evacuation plan, with sheltering to be considered when it is no longer safe to move to an area not prone to bushfire risk, but sufficiently safe to reach the refuge.

The administration building itself will be approximately 20 m by 15 m in size. Based on the building's 300 metres squared (m^2) area, it has the capacity to accommodate 300 people. The proposed control building within the switchyard can also be used as a safe refuge (minimum size of 100 m^2). Combined, these buildings are capable of supporting up to 600 workers during the construction duration.

5.4 Access for fire fighting operation

The project area will be accessed via Sir Thomas Mitchell Drive, which will undergo upgrades to allow project-related vehicles safe access.

The roads have been designed with consideration of both construction and operational requirements. It is intended that, where possible, construction haul roads will become permanent roads for operation or otherwise rehabilitated.

The site access and internal roads needed permanently for operation of the project are shown in Figure 5-1, and include:

- the permanent road (including southern haul road). This road joins directly with Sir Thomas Mitchell Drive and provides direct access to the MAT platform with intersections to the switchyard, Surface building platform, inlet/outlet platform and the intersection to the road to the upper reservoir and includes a permanent bridge over the Farmers Creek Diversion at the lake
- the permanent road will continue from the southern haul road and will run between the Farmers Creek crossing, tunnel portals, upper reservoir laydown pad and upper reservoir. At the completion of construction, the road will be retained permanently for operation
- the eastern haul road. This road will connect the upper reservoir laydown pad and the upper reservoir and will be used predominantly by heavy vehicles. At completion of construction, the road will be either permanently retained for operation or revegetated if not required.

Several additional haul roads will be needed to enable the movement of spoil within the site. These roads would be rehabilitated following construction and not required permanently for operation.

Two temporary bridges will be established across Farmers Creek to provide construction access to the northern part of the project area. One will provide access to the tunnel portals and the other will provide access to the upper reservoir. A permanent bridge will be established to cross the diverted path of Farmers Creek arm of Lake Lyell. This bridge will provide operational access to the upper reservoir and powerhouse.

PBP does not specifically outline the acceptable solutions for access design for this type of development. However, the following performance criteria should be used as a guide to ensure safe operational access to structures and water supply for emergency services while staff and contractors are accessing or egressing the area.

Table 5-1 – Performance criteria for access (Table 5.3b of PBP 2019)

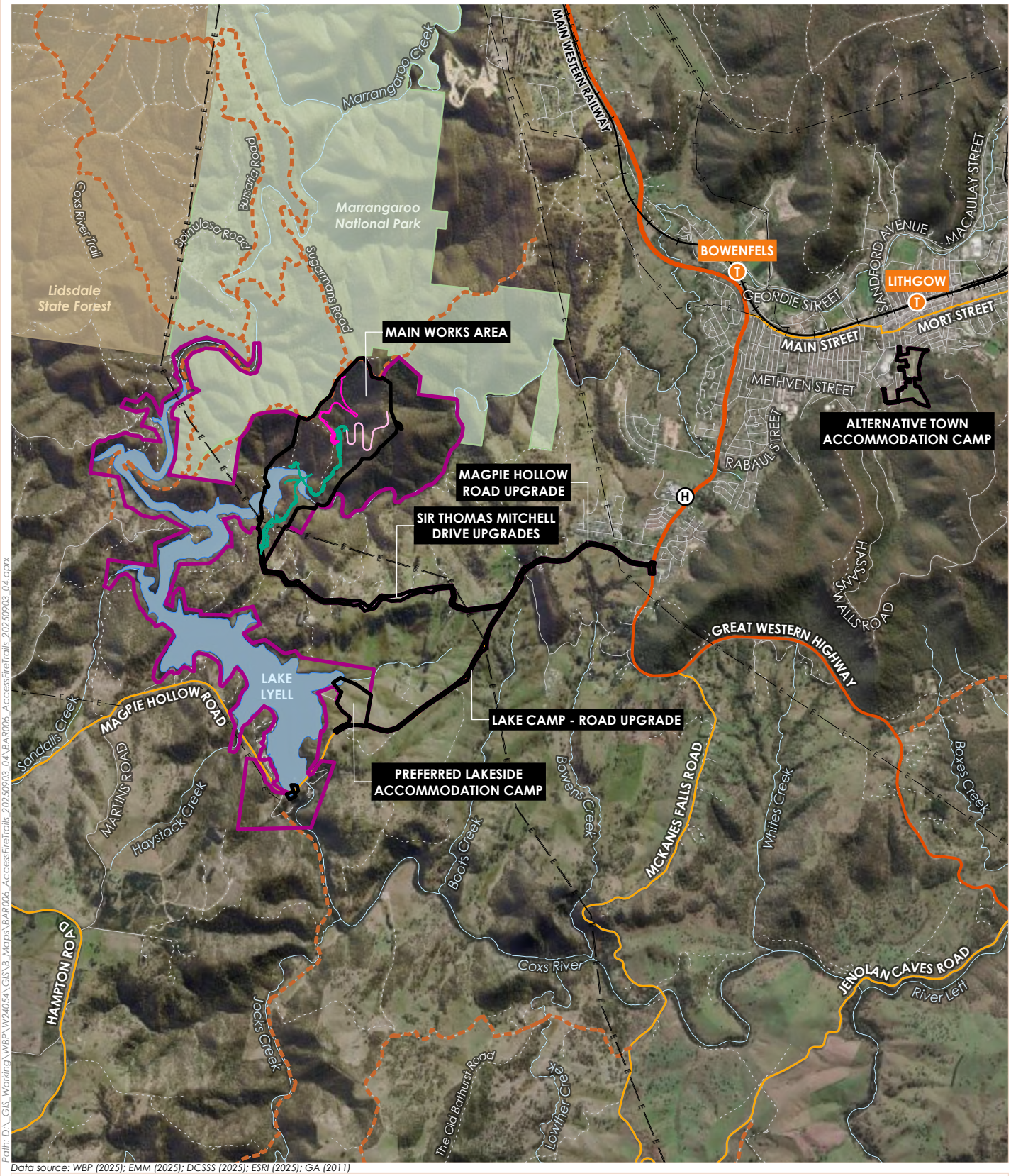
Performance criteria		Acceptable solution	Achievable for the project	Comment
Access (general requirements)	Firefighting vehicles are provided with safe, all-weather access to structures.	Property access roads are two-wheel drive, all-weather roads	☑	Complies (all roads)
		Perimeter roads are provided for residential subdivisions of three or more allotments	☑	Can comply for the accommodation camps.
		Subdivisions of three or more allotments have more than one access in and out of the development	N/A	Not required for the preferred accommodation camp due to the low bush fire risk. Secondary firefighting access for the main works area can be achieved via the existing fire trail through Mount Walker Road in the north (Category 9 tanker accessible)
		Traffic management devices are constructed to not prohibit access by emergency services vehicles	☑	Can comply
		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	☑	Can comply
		All roads are through roads	☑	Proposed through access within the main works area is provided from Sir Thomas Mitchell Drive in the south through the project area connecting
		Dead end roads are not recommended, but if unavoidable, dead ends	N/A	

Performance criteria		Acceptable solution	Achievable for the project	Comment
		are not more than 200 m in length, incorporate a minimum 12 m outer radius turning circle, and are clearly sign posted as a dead end		to Mount Walker Road (Marrangaroo National Park) in the north
		Where kerb and guttering are provided on perimeter roads, roll top kerbing should be used to the hazard side of the road	N/A	Kerb and gutter are not proposed
		Where access / egress can only be achieved through forest, woodland or heath vegetation, secondary access shall be provided to an alternate point on the existing public road system	☑	Complies, as outlined above
	Firefighting vehicles are provided with safe, all-weather access to structures	One way only public access roads are no less than 3.5 m wide and have designated parking bays with hydrants located outside of these areas to ensure accessibility to reticulated water for fire suppression	N/A	One-way roads are not proposed
	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 t); bridges / causeways are to clearly indicate load rating	☑	Can comply
	There is appropriate access to water supply.	Hydrants are located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression	N/A	Reticulated water is not provided. Provision of access to a static water supply can be achieved

Performance criteria		Acceptable solution	Achievable for the project	Comment
		Hydrants are provided in accordance with AS2419.1:2021	N/A	
		There is suitable access for a Category 1 fire appliance to within 4 m of the static water supply where no reticulated supply is available	☑	
Perimeter roads	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.	Are two-way sealed roads	☐	The perimeter roads for the accommodation camps may be reduced to 5.5 m based on the camp's location and hazard profile. Sealed roads are not proposed. Staff and contractors within the accommodation camps will be transported to the main works area via bus (therefore significantly reducing the number of cars on site and supporting onsite firefighting access).
		Minimum 8 m carriageway width kerb to kerb	☐	
		Parking is provided outside of the carriageway width	☑	Can comply
		Hydrants are located clear of parking areas	N/A	Hydrants are not proposed
		Roads are through roads, and these are linked to the internal road system at an interval of no greater than 500 m	N/A	Roads are through roads
		Curves of roads have a minimum inner radius of 6 m	☑	Can comply
		The maximum grade road is 15° and average grade is 10°	☑	Can comply
		The road crossfall does not exceed 3°	☑	Can comply
		A minimum vertical clearance of 4 m to any overhanging	☑	Can comply

Performance criteria		Acceptable solution	Achievable for the project	Comment
		obstructions, including tree branches, is provided		
Non-perimeter roads	Access roads are designed to allow safe access and egress for medium rigid firefighting vehicles while residents are evacuating	Minimum 5.5 m carriageway width kerb to kerb	☑	All roads will be at least 5.5 m in width
		Parking is provided outside of the carriageway width	☑	Can comply
		Hydrants are located clear of parking areas	N/A	Hydrants are not proposed
		Roads are through roads, and these are linked to the internal road system at an interval of no greater than 500 m	☑	Refer above
		Curves of roads have a minimum inner radius of 6 m	☑	Can comply
		The road crossfall does not exceed 3°	☑	Can comply
		A minimum vertical clearance of 4 m to any overhanging obstructions, including tree branches, is provided	☑	Can comply

Figure 5-1 shows the access road locations and fire trails within and adjacent to the project.



Path: D:_GIS_Working\WBP\W240S4\GIS\B_Maps\BAR006_AccessFireTrails_20250903_04\BAR006_AccessFireTrails_20250903_04.aprx

Data source: WBP (2025); EMM (2025); DCSSS (2025); ESRI (2025); GA (2011)

LEGEND

- Project area
- Construction envelope
- Northern haul road
- Northern access road
- Southern access road
- Helipad
- Railway station
- Rail
- Electricity transmission line
- Major road
- Minor road
- Local road
- Vehicular track
- Classified fire trail
- Named watercourse
- Lake Lyell
- State forest
- National park/reserve

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Figure 5.1 – Access roads and fire trails

Lake Lyell Pumped Hydro Energy Storage

03/09/2025 (v4) 1:60,000 @A4 GDA2020 MGA Zone 56

0 1 2
Kilometers

The main works area is in an isolated location, with access roads traversing through vegetation within steep terrain.

Access will comply with the performance criteria outlined in PBP as described within Table 5-1. The intent and performance criteria can be addressed via the following:

- Provision of safe refuge building (BAL 29 construction) within the layout area where the expected radiant heat exposure is <10 kW/m^2. Larger APZs outside of the range prescribed in PBP (along with increased BAL) creates a safer area for occupants and firefighters remaining on site.
- Clearing and management of vegetation along the main access roads (to the full extent of the disturbance area (i.e. minimum of 5 to 10 m on either side of carriageway) to improve safety for attending emergency vehicles.
- Increased water supply at the laydown area along with associated firefighting equipment (i.e. pump and hose reel).
- Development of a bush fire emergency and evacuation management plan (BEEMP) with procedures for early off-site evacuation and shelter in place for the construction and operational phases of the project.
- Management of traffic within the project via the provision of bus transportation for personnel to reduce the incidents and potential obstruction caused by parked vehicles and traffic congestion on the main roads.
- The portion of fire trail within the northwestern boundary of the project area (adjoining Marrangroo National Park) and link between Sugarmans Road and Mount Walker Road must be upgraded/maintained to comply with the fire trail standards for a Category 9 firefighting vehicle. https://www.rfs.nsw.gov.au/__data/assets/pdf_file/0009/69552/RFS-Fire-Trail-Standards-Nov2023.pdf

5.5 Water supply

Provision of adequate water supply is required to minimise the risk of bush fire attack and provide protection for emergency services personnel and others assisting firefighting activities.

5.5.1 Water supply construction phase

Non-potable water sourced from the Lake Lyell, a bore (installed adjacent to the creek), onsite water treatment plant (WTP), and sediment basins for use in concrete batching and dust suppression can be used for firefighting purposes if required.

Potable water will be trucked into the site and stored in water tanks or supplied by the onsite WTP. Potable water will be required for the accommodation camp and site offices.

5.5.2 Water supply operational phase

Adequate water supply and pressure for firefighting purposes is to be designed, implemented and maintained during construction and occupation for each site that will accommodate personnel. This includes the accommodation camp, administration building, switchyard and works areas.

Water supply for firefighting is to be sourced from Lake Lyell and will be stored in raw water storage tanks.

PBP does not specifically outline the acceptable solutions for water supply requirements for this type of development.

It is recommended that water supply for firefighting purposes is located at the primary vehicle access point to the project and elsewhere, determined in consultation with the NSW RFS and Fire and Rescue NSW or a suitably qualified hydraulic and/or BCA consultant at the detailed design stage.

The water supply requirements must seek to achieve compliance with the following performance criteria outlined in PBP.

Table 5-2 – Performance criteria for water supplies (PBP 2019)

Performance criteria	Acceptable solutions	Achievable for the project	Comment
An adequate water supply is provided for firefighting purposes.	Reticulated water is to be provided, where available.	N/A	The project is to be provided with a static water supply
	A static water supply is to be provided where no reticulated water is available.	☑	
The integrity of the water supply is maintained.	All above-ground water service pipes are metal, including and up to any taps.	☑	Can comply
A static water supply is provided for firefighting purposes in areas where reticulated water is not available.	Where no reticulated water supply is available, water for firefighting purposes is provided in accordance with Table 5.3d of PBP 2019. These requirements are designed for residential development.	☑	Water requirements are to be determined in consultation with the district RFS & Fire Rescue NSW
	A connection for firefighting purposes is located within the inner protection area (IPA) or non-hazard side and away from the structure; 65 mm Storz outlet with a ball valve is fitted to the outlet.	☑	Can comply
	Ball valve and pipes are adequate for water flow and are metal	☑	Can comply
	Supply pipes from tank to ball valve have the same bore size to ensure flow volume.	☑	Can comply
	Underground tanks have an access hole of 200 mm to allow tankers to refill direct from the tank.	☑	Can comply
	A hardened ground surface for truck access is supplied within 4 m.	☑	Can comply

Performance criteria	Acceptable solutions	Achievable for the project	Comment
	Above-ground tanks are manufactured from concrete or metal.	☑	Can comply
	Raised tanks have their stands constructed from non-combustible material or bush fire-resisting timber (see Appendix F of AS3959(2018).	☑	Can comply
	Unobstructed access can be provided at all times.	☑	Can comply
	Underground tanks are clearly marked.	☑	Can comply
	Tanks on the hazard side of a building are provided with adequate shielding for the protection of firefighters.	☑	Can comply
	All exposed water pipes external to the building are metal, including any fittings.	☑	Can comply
	Where pumps are provided, they are a minimum 5 hp or 3 kW petrol or diesel-powered pump, and are shielded against bush fire attack; any hose and reel for firefighting connected to the pump shall be 19mm internal diameter.	☑	Pumps are not mandatory. If provided they are to comply with the acceptable solutions. Fire hose reels are not mandatory. If provided they are to comply with the acceptable solutions.
	Fire hose reels are constructed in accordance with AS/NZS 1221:1997, and installed in accordance with the relevant clauses of AS2441:2005.	☑	

5.6 Electricity and gas

A connection request will be made to Endeavour Energy for electricity supply for both the construction and operation of the project.

From the switchyard, an approximate 220 m long dual circuit transmission line will be constructed to connect with the existing 330 kV lines that pass through the project area. Due to the relatively short length of the transmission connection, up to six monopole towers are anticipated for each circuit. The connection will utilise a single turn-in from the existing transmission line.

A cleared easement of about 60 m will be maintained along the transmission connection (i.e. ongoing vegetation maintenance). Access to the new towers will be via the main entrance road and access to the grid connection tie-in points will be via existing easements.

Approximately 3 km of 11 kV electricity connection will also need to be installed within the site from Sir Thomas Mitchell Drive to the batch plant, site compounds, tunnel entrances and HV workshop and satellite compound. Generators will be used to supply initial power until the external supply is completed.

Utilities for the accommodation camp include connection to the electricity network via an extension of poles and wires from the existing distribution network.

It is recommended that design, construction, and maintenance of high voltage infrastructure and easements be in accordance with TransGrid and other industry standards.

The PBP performance criteria and acceptable solutions for utilities (low voltage electricity and gas) are provided in Table 5-3.

Table 5-3 – Performance criteria for electricity & gas services (PBP 2019)

Performance criteria	Acceptable Solutions	Comment
Location of electricity services limit the possibility of ignition of surrounding bushland or the fabric of buildings	Where practicable, electrical transmission lines are underground.	N/A
	Where overhead electrical transmission lines are proposed: • Lines are installed with short pole spacing (30 m), unless crossing gullies, gorges or riparian areas • No part of a tree is closer to a power line than the distance set out in ISSC3 Guideline for Managing Vegetation Near Power Lines.	Can comply with performance criteria
Location of gas services will not lead to the ignition of surrounding bushland or the fabric of buildings	Reticulated or bottled gas bottles are to be installed and maintained in accordance with AS/NZS 1596 (2014), the requirements of relevant authorities and metal piping is to be used.	No gas services are anticipated for the main works. Future bottled gas for the accommodation camps can comply.
	All fixed gas cylinders are to be kept clear of flammable materials to a distance of 10 m and shielded on the hazard side.	
	Connections to and from gas cylinders are metal.	
	Polymer sheathed flexible gas supply lines are not used.	
	Above ground gas service pipes are metal, including and up to any outlets.	

5.7 Potential environmental impact of bush fire mitigation measures

The disturbance footprint is the maximum extent of ground disturbing works associated with the construction and operation of the project, and direct impacts within this area have been assessed as part of the EIS (EMM 2025).

All bush fire mitigation measures have been confined to the disturbance footprint.

5.8 Bush fire emergency management and evacuation plan

The main works area is isolated and ongoing engagement with the NSW RFS will consider the practicality of bushfire emergency management within the landscape. The proponent will develop an emergency management and evacuation plan as well as incorporate additional bush fire risk mitigation measures outlined within this report to reduce residual bushfire risk, maintain bushfire awareness, implement preparedness procedures, and document management actions and responsibilities for fire response, evacuation/shelter in place actions, monitoring and review. These recommendations are based on the prevention, preparedness, response, and recovery (PPRR) framework found in the NSW State Emergency Management Plan (EMPLAN 2018).

5.9 Fire management plan

A fire management plan must be developed for the project, in consultation with the NSW RFS District Office and Fire and Rescue NSW, before construction starts. The fire management plan will inform operational and emergency management practices at the facility and effectively describes all fire hazards and provides clear actions and accountabilities for their management.

The minimum requirements of a fire management plan are:

- ongoing bush fire fuel management within the disturbance footprint
- site infrastructure plan
- site access and internal road plan
- APZs and their continued maintenance
- location of hazards (physical, chemical, etc.) that may impact firefighting operations.

6. CONCLUSION & RECOMMENDATIONS

6.1 Conclusion

This bush fire assessment report has been prepared for the project.

Bush fire mitigation measures have been developed to address the SEARs and will increase the resilience of the project beyond that provided by the application of the minimum bush fire protection measures prescribed by PBP.

The project is categorised by the NSW RFS as 'other development' and complies with the following aims and objectives of PBP 2019.

Table 6-1 – Aims and objectives of PBP 2019

Aims and objectives	Statement of compliance
Afford buildings and their occupants protection from the exposure to bush fire	APZs have been applied in accordance with Table A1.12.3 of PBP 2019 to avoid flame contact and radiant heat >29 kW/m^2. High risk and vulnerable infrastructure are recommended to be located in BAL 19 areas or less. The control room and administration building will be constructed to comply with BAL 29 to increase bush fire resilience. Buildings (i.e. accommodation camp, staff offices) within 100 m of bush fire prone vegetation is to be constructed to the relevant BAL rating as depicted in Figure 4-4.
Provide for a defendable space to be located around buildings	
Provide appropriate separation between a hazard and buildings which in combination with other measures, prevent the likely fire spread to buildings	
Ensure that appropriate operational access and egress for emergency personnel and occupants is available	An internal network of roads of access tracks will be established to enable responding emergency services to access all areas of the project, including fire service infrastructure (water tanks), buildings and related infrastructure. Subject to detailed design, internal access tracks will include: • a perimeter track (within the APZ) up to 5.5 m-wide for the accommodation camp • upgrade of Sir Thomas Mitchell Drive • construction of a permanent road through the main works area to connect with the existing

Aims and objectives	Statement of compliance
	fire trail network within Marrangaroo National Park • upgrade and/or maintenance of the existing fire trail along the projects northwestern boundary connecting Sugarmans Road and Mount Walker Road.
Provide for ongoing management and maintenance of bush fire mitigation measures	All bush fire mitigation measures are confined within the disturbance footprint. A fire management plan is to be prepared to ensure ongoing management and maintenance.
Ensure that utility services are adequate to meet the needs of firefighters	All utility services will comply with PBP 2019. It is recommended that water supply for firefighting purposes is located at the primary vehicle access point to the facility and elsewhere in consultation with the NSW RFS District Office and Fire and Rescue NSW at the detailed design stage.

The following recommendations are provided to ensure that the project has adequate clearances to combustible vegetation, firefighting access and water supplies in accordance with the requirements of *PBP 2019*.

6.2 Recommendations

Recommendation 1- The laydown, switchyard and MAT and ECVT portal must be maintained as an inner protection area in accordance with the requirements of Appendix 4 of *Planning for Bush Fire Protection 2019*.

Recommendation 2- To ensure ongoing protection from the impact of bush fires, APZs must be provided in the main works area as shown on Figure 4-5 asset protection zones (APZ) and bush fire attack level (BAL) prepared by Waratah Bushfire Planning, dated 29/08/2025(v1).

Recommendation 3 – The design and layout of the accommodation camp must consider the APZs and BAL as shown on Figure 4-3 and Figure 4-4, prepared by Waratah Bushfire Planning, dated 29/08/2025(v1).

Recommendation 4 - It is recommended that future buildings within the accommodation camp are sited to achieve a maximum BAL 19. All habitable buildings proposed in the accommodation camp must comply with AS3959-2018 *Construction of buildings in bushfire-prone areas* or the relevant requirements of the *NASH Standard - Steel Framed Construction in Bushfire Areas* (incorporating amendment A - 2015). New construction must also comply with the construction requirements in section 7.5 of *Planning for Bush Fire Protection 2019*

Recommendation 5 – The administration building (within the laydown area) and/or control room (within the switchyard) is to be constructed to comply with BAL 29 (improved bushfire resilience based on the main works area isolation).

Recommendation 6 – To prevent building-to-building fire, all buildings within 6m of the administration building, control room or habitable buildings within the accommodation camp must comply with AS3959-2018 *Construction of buildings in bushfire-prone areas* or the relevant requirements of the *NASH Standard - Steel Framed Construction in Bushfire Areas* (incorporating amendment A - 2015). New construction must also comply with the construction requirements in section 7.5 of *Planning for Bush Fire Protection 2019.*

Recommendation 7 – Critical infrastructure is to be sited and constructed in accordance with its BAL exposure as shown on Figure 4-5 asset protection zones (APZ) and bush fire attack level (BAL) prepared by Waratah Bushfire Planning, dated 29/08/2025(v1).

Recommendation 8 – Access roads are to comply with the performance criteria for non-perimeter roads as outlined in Table 5.3b of *Planning for Bush Fire Protection 2019*.

Recommendation 9 – The existing fire trail on the northwestern boundary of the project linking Sugarmans Road and Mount Walker Road must comply with the standards for a Category 9 firefighting vehicle.

https://www.rfs.nsw.gov.au/__data/assets/pdf_file/0009/69552/RFS-Fire-Trail-Standards-Nov2023.pdf

Recommendation 10 – The provision of water, electricity and gas must comply with Table 5.3c of *Planning for Bush Fire Protection 2019*. Water supply for firefighting purposes must be located at the primary vehicle access point to the accommodation camp, the main works area and elsewhere in consultation with the NSW RFS District Office and Fire and Rescue NSW at the detailed design stage. Further:

- a static water supply (SWS) must be provided on site located within the IPA or non-hazard side and away from structures
- unobstructed access is to be provided within 4 m of the SWS at all times
- a 65 mm Storz connection with a ball valve is fitted to the outlet of the SWS
- ball valve and pipes are adequate for water flow and are metal
- supply pipes from tank to ball valve have the same bore size to ensure flow volume
- underground tanks have an access hole of 200 mm to allow tankers to refill direct from the tank and a hardened ground surface for truck access is supplied within 4 m
- underground tanks are clearly marked
- above-ground tanks are manufactured from concrete or metal
- raised tanks have their stands constructed from non-combustible material or bush fire-resisting timber (see Appendix F of AS3959)
- tanks on the hazard side of a building are provided with adequate shielding for the protection of firefighters
- all exposed water pipes external to the building are metal, including any fittings
- where pumps are provided, they are a minimum 5 hp or 3 kW petrol or diesel-powered pump, and are shielded against bush fire attack
- any hose and reel for firefighting connected to the pump must be 19 mm internal diameter
- any fire hose reels are constructed in accordance with AS/NZS 1221:1997, and installed in accordance with the relevant clauses of AS2441:2005.

Recommendation 11: An emergency management and evacuation plan is to be in accordance with Table 6.8d of *Planning for Bush Fire Protection 2019* and be consistent with the following:

- The NSW RFS document: A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan.

A copy of the emergency management and evacuation plan should be provided to the Local Emergency Management Committee for its information prior to the commencement of construction.

Recommendation 12: A fire management plan must be prepared that addresses the following (as a minimum):

- ongoing bush fire fuel management within the development footprint
- site infrastructure plan
- site access and internal road plan
- APZs and their continued maintenance
- location of hazards (physical, chemical, etc.) that may impact firefighting operations.

7. REFERENCES

Australian Building Codes Board (2010) – *Building Code of Australia*, Class 1 and Class 10 Buildings Housing Provisions Volume 2.

Councils of Standards Australia AS3959 (2018) – *Australian Standard Construction of buildings in bush fire-prone areas.*

Keith, David (2004) – *Ocean Shores to Desert Dunes – The Native Vegetation of New South Wales and the ACT*. The Department of Environment and Climate Change.

Rural Fire Service (2019) - *Planning for Bush Fire Protection – a guide for councils, planners, fire authorities and developers*. NSW Rural Fire Service.

Tan, B., Midgley, S., Douglas, G. and Short (2004) - *A methodology for assessing bushfire attack.* RFS Development Control Service

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