

Appendix I

Bushfire Management Plan



Bushfire management plan

Mount Hopeful Battery Project | South Ulam Road | Bajool | Queensland
Prepared for Neoen Australia Power Pty Ltd | 24 September 2025

Bushfire management plan

Final V1

Report 25055 | Neoen Australia Power Pty Ltd | 24 September 2025

Approved by Robert Janssen

Position Managing principal

Signature



Date 24 September 2025

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Document control

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 **LEC**
Land and environment consultants

T: 07 2112 5692 | E: info@landeconsultants.com.au | <http://www.landeconsultants.com.au/>

Suite 5, 66 Bay Terrace | Wynnum | Queensland | 4178 | Australia

Table of contents

Contents

Table of contents	i
1 Introduction	1
1.1 Bushfire management plan review	1
1.2 Method	2
1.3 Suitably qualified person	2
2 Description of the site and the Project	3
2.1 The site	3
2.2 The Project	3
2.3 Bushfire hazard overlay map	4
3 Bushfire hazard assessment	5
3.1 Severe fire weather	5
3.2 Fire history	5
3.3 Field inspection	5
3.4 Potential bushfire intensity calculations	7
3.5 Bushfire hazard areas	8
4 Bushfire hazards associated with the site	9
4.1 Fire danger season	9
4.2 Fire history	9
4.3 Potential directions of bushfire attack	9
4.4 Potential bushfire hazards from adjacent land uses	9
4.5 Water and access for emergency services	9
5 Bushfire hazards associated with the Project	10
5.1 Siting and design	10
5.2 Land use	10
5.3 Fire-fighting water supply	10
5.4 Access and egress	10
5.5 Radiant heat exposure	10
6 Bushfire mitigation plan	12
6.1 Asset protection zones	12
6.2 Surface under infrastructure	12
6.3 Cleared vegetation	12

6.4	Fire-fighting water supply	12
6.5	Fire access trail	13
6.6	Buildings.....	13
7	Closing.....	16

Figures

Figure 3.1	VHC assessment.....	6
Figure 6.1	Bushfire mitigation plan.....	15

Tables

Table 3.1	Site observations.....	7
Table 3.2	Potential bushfire intensity	8

Photographs

Photograph 3.1	Example of VHC 13.2 regrowth (in the distance).....	7
Photograph 3.2	Example of VHC 40.4.....	7

Appendix

Appendix 1	Proposed site plan
Appendix 2	Bushfire hazard overlay map
Appendix 3	Radiant heat exposure assessment
Appendix 4	Queensland Fire Department vehicle specifications
Appendix 5	Bushfire hazard overlay code assessment

Disclaimer

Notwithstanding the precautions adopted in this report, it should always be remembered that bushfires burn under a range of conditions. An element of risk, no matter how small always remains, and although AS 3959-2018 is designed to improve the performance of such buildings, there can be no guarantee, because of the variable nature of bushfires, that any building will withstand bushfire attack on every occasion.

It should be noted that upon lodgement of a development proposal, State Government, council and/or the fire service may recommend additional construction requirements.

Although every care has been taken in the preparation of this report, Land and Environment Consultants Pty Ltd accept no responsibility resulting from the use of the information in this report.

1 Introduction

Land and Environment Consultants Pty Ltd (LEC) was engaged to prepare a bushfire management plan (BMP) for the proposed Mount Hopeful Battery Project (**the Project**).

The Project is proposed to occur across three freehold parcels, including lot 38/DT40131, lot 100/SP289441 and lot 33/DT40123, and an unnamed road reserve (**the site**).

A development permit application will be made for the Project under the Rockhampton Region Planning Scheme 2015.

The site is identified as a bushfire hazard area by the *Bushfire hazard overlay map* (**Bushfire hazard overlay map**) in the Rockhampton Region Planning Scheme 2015 online mapping (RRC 2025). Therefore, the development permit application for the Project is subject to assessment and compliance with the Rockhampton Region Planning Scheme 2015 *Bushfire hazard overlay code* (**Bushfire hazard overlay code**). Rockhampton Regional Council may also consider the example bushfire overlay code in *Natural Hazards, Risk and Resilience – Bushfire, State Planning Policy State Interest guidance material* (DSDMIP 2019) (**SPP guidance material – bushfire**) to be relevant to the development permit application.

This BMP has been prepared in general accordance with the methods and guidance in schedule 6.5 *Bushfire management planning scheme policy* (**schedule 6.5**) of the Rockhampton Region Planning Scheme 2015 and *Bushfire Resilient Communities Technical Reference Guide for the State Planning Policy State Interest ‘Natural Hazards, Risk and Resilience - Bushfire’* (QFES 2019a) (**BRC guide**) which was prepared by the former Queensland Fire and Emergency Services to provide technical guidance for the implementation of the SPP guidance material – bushfire. It also considers guidelines for a battery energy storage system (**BESS**) in *Large-scale Battery Energy Storage System Installations* (AFAC 2025).

This BMP documents the bushfire hazard assessment and demonstrates how the Project will comply with the Bushfire hazard overlay code. It includes:

- an introduction (this section) and description of methods and information resources used for the preparation of this BMP;
- description of the site and Project;
- bushfire hazard assessment;
- identification of bushfire hazards associated with the site and Project;
- radiant heat exposure assessment;
- a plan for mitigating the potential risk of bushfire hazards; and
- assessment of compliance with the Bushfire hazard overlay code.

Please note, this BMP does not consider fire hazards associated with the BESS including (amongst other things) electrical hazards, chemical hazards, explosions, potential fire spread due to the proximity of battery enclosures or mechanical damage to battery enclosures. These matters are addressed in a hazard incident management plan for the development permit application. Subject to approval of the development permit application, a separate fire safety study would be undertaken during the detailed design phase.

1.1 Bushfire management plan review

This BMP has been prepared for a development permit application. Upon approval of the Project, the appointed construction contractor and operational contractor may wish to prepare their own version of this BMP to distil the matters which are specific to their contract or to include corporate documentation or procedures. Notwithstanding, this does not permit the construction contractor or

operational contractor to change or deviate from the mitigation measures specified in Chapter 6 or associated development permit conditions.

1.2 Method

To meet requirements of schedule 6.5 of the Rockhampton Region Planning Scheme 2015, the SPP guidance material - bushfire and BRC guide, the following tasks were undertaken:

- desktop review of relevant information sources including:
 - the Bushfire hazard overlay map;
 - fire history data in the Queensland Globe (DR 2025); and
 - data in the Queensland Spatial Data Catalogue (DNRMMRRD 2025) (**Qspatial**) which is referenced in the *Bushfire Resilient Communities MapViewer User Guide* (QFD 2025), ie regional ecosystem (**RE**) map, vegetation hazard class (**VHC**) map and severe fire weather map;
- a drive over the site and field inspection for vegetation characteristics, current land management practices, slope and evidence of previous fires;
- bushfire hazard assessment in general accordance with the method in the BRC guide;
- radiant heat exposure assessment using the Fire Protection Association of Australia *BAL calculator* V4.9 (**BAL calculator**) which models the 'method 2' bushfire attack level assessment procedure in the *Australian Standard (AS 3959-2018) Construction of buildings in bushfire prone areas* (Standards Australia 2018); and
- assessment of the Project against the Bushfire hazard overlay code.

Aerial imagery of the site and measuring tools were accessed online from Google Earth and Queensland Globe to assist in validating observations and measurements made during the field inspection.

1.3 Suitably qualified person

This BMP was prepared by Robert Janssen who is a suitably qualified and experienced bushfire management consultant with respect to criteria in section 10.2 of the BRC guide.

Robert is the managing principal at LEC and has over 25 years of experience in bushfire planning and operations. He has prepared bushfire management plans for residential, commercial and industrial property developments, utilities, government facilities and conservation estates.

Robert's formal qualifications as an environmental scientist and consulting experience are coupled with 10 years of experience as a nationally accredited fire-fighter with the national parks and wildlife service in New South Wales and Queensland.

2 Description of the site and the Project

This chapter provides a description of the site and the Project.

2.1 The site

The site is located near the rural town of Bajool, approximately 50 kilometres (**km**) south of Rockhampton and 70 km west of Gladstone, within the Rockhampton Regional local government area of Council. It is agricultural land which has been cleared of bushland vegetation and historically used for low intensity agricultural activities, including cattle grazing. It does not have access to a mains water connection.

The site is sparsely vegetated with predominantly non-remnant vegetation. Notwithstanding, woody regrowth has been allowed to naturally regenerate in the western part of the site.

The topography of the site is a relatively flat plain which has shallow drainage lines including an unnamed tributary of Eight Mile Creek.

A Powerlink Queensland (**Powerlink**) transmission easement, which accommodates an existing 275 kilovolt (**kV**) overhead transmission line (**OHTL**) runs north-south through the site.

2.2 The Project

The Project is a proposed grid-scale BESS with a planned capacity of up to 600 megawatts (**MW**) of power for a duration of up to four hours. It is proposed to be delivered in two stages, which are indicatively described as follows:

- stage 1: 430 MW expected to commence mid-2026 and completed by end of 2028.
- stage 2: additional 170 MW expected to commence in 2028 and completed by end of 2029.

Key components of the Project include:

- up to 650x battery modules
- up to 170x medium voltage transformers
- 2x high voltage (**HV**) transformers
- a HV switching station.

The Project will also encompass associated ancillary infrastructure necessary to the operation of the BESS, including:

- access track
- overhead and underground electrical cables
- inverters
- HV substation
- earthing and lightning protection
- security fencing, closed-circuit television and lighting
- operations and maintenance building
- water retention pond; and
- lay down areas.

The site plan in Appendix 1 shows the conceptual design of the Project.

2.3 Bushfire hazard overlay map

The Bushfire hazard overlay map for the site is provided in Appendix 2. It shows that the land parcel extent of the site is affected by bushfire hazard areas with medium, high and very high potential bushfire intensity and potential impact buffer.

The BESS, substation and switchyard infrastructure has been sited in a location which is not affected by the bushfire hazard areas identified by the Bushfire hazard overlay map.

3 Bushfire hazard assessment

This chapter provides details about the desktop review, field inspection and bushfire hazard assessment.

3.1 Severe fire weather

The severe fire weather map in Qspatial indicates the 5 % annual exceedance probability forest fire danger index (**FFDI**) for the site is 69. An FFDI value of 69 has been used for the potential bushfire intensity calculations in Section 3.4 and the radiant heat exposure assessment in Section 5.5.

For the assessment of grassfire attack, the FFDI value of 69 has been converted to a grassland fire danger index (**GFDI**) value of 100, based on the GFDI values in Table B1 of AS 3959-2018.

3.2 Fire history

Fire history data indicates the site and adjoining land are regularly burnt. The fire history data does not identify whether the fires are planned burns or unplanned bushfires.

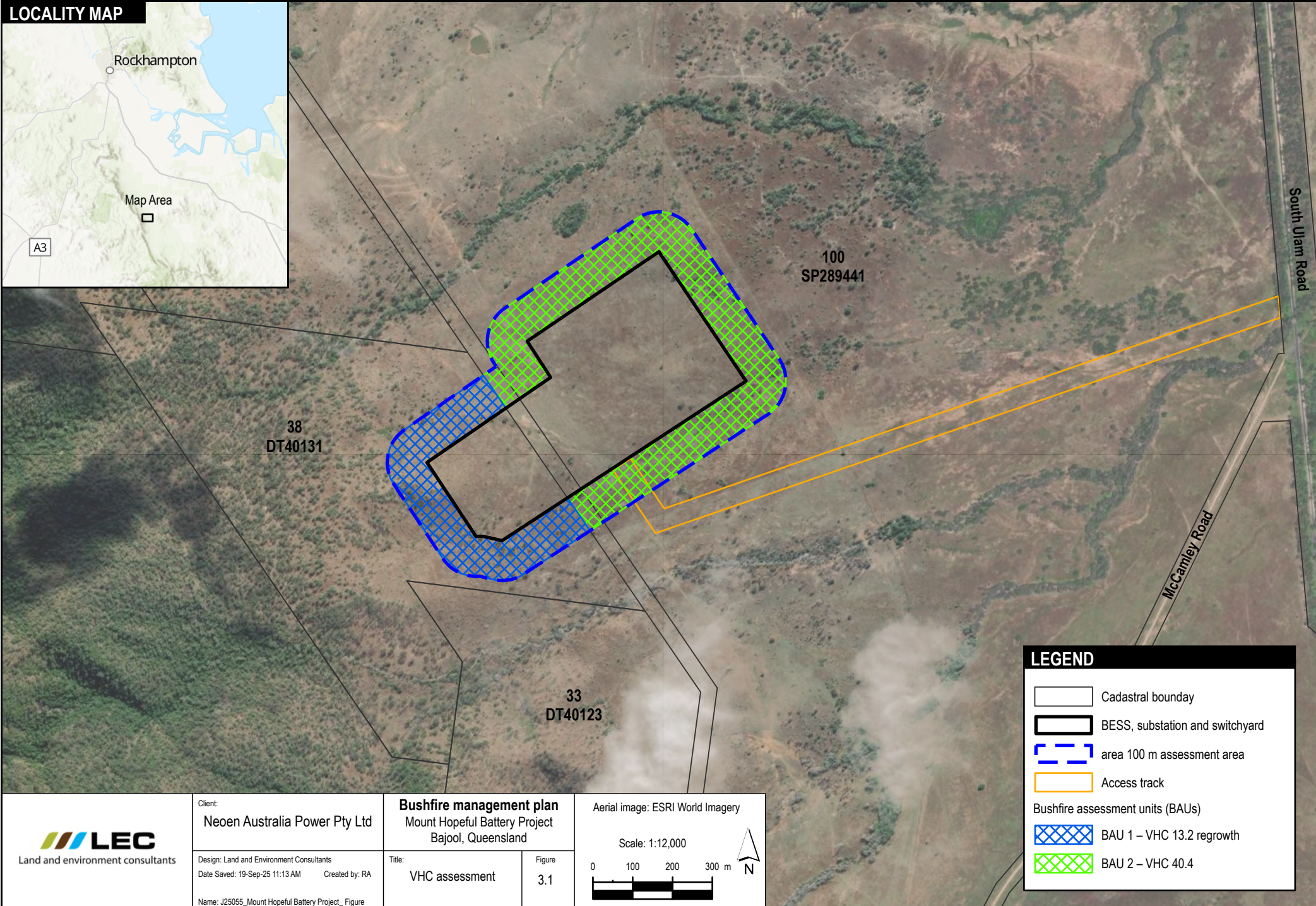
3.3 Field inspection

A drive over the site was performed by LEC on 14 November 2022. Observations were recorded about current land use and management, vegetation characteristics, the slope of land and evidence of previous fires.

Bushfire assessment units (**BAUs**) have been used to describe characteristics of vegetation within 100 metres (**m**) of the proposed BESS, HV switching station, HV substation and operations and maintenance building (**infrastructure area**), and are shown in Figure 3.1.

Table 3.1 provides a summary of the desktop review, observations from the field inspection and notes about the bushfire hazard assessment of BAUs. Features of vegetation within BAUs are shown in Photographs 3.1-3.2.

LOCALITY MAP



LEGEND

-  Cadastral boundary
-  BESS, substation and switchyard
-  area 100 m assessment area
-  Access track
- Bushfire assessment units (BAUs)
-  BAU 1 – VHC 13.2 regrowth
-  BAU 2 – VHC 40.4

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Design: Land and Environment Consultants
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Name: J25055_Mount Hopeful Battery Project_Figure

Bushfire management plan
Mount Hopeful Battery Project
Bajool, Queensland

Title:
VHC assessment

Figure
3.1

Aerial image: ESRI World Imagery

Scale: 1:12,000



Table 3.1 Site observations

BAU	State Mapping VHC	Ground truthed VHC	Notes
BAU 1	VHC 13.2 <i>Dry to moist eucalypt woodlands on undulating metamorphics and granite (VHC 13.2)</i> and VHC 40.4 <i>Continuous low grass or tree cover (VHC 40.4)</i>	VHC 13.2 regrowth	BAU 1 is located within part of the site where woody regrowth has been allowed to naturally regenerate. It is conservatively assessed based on the pre-clear RE map in Qspatial and the corresponding broad vegetation group and VHC. BAU 1 is assessed as a bushfire prone hazard class with continuous bushfire fuel.
BAU 2	VHC 40.4	VHC 40.4	BAU 2 is aligned with sparsely vegetated paddocks which are dominated by grasslands. BAU 2 is assessed as a grassfire prone hazard class with continuous grassfire fuel.



Photograph 3.1 Example of VHC 13.2 regrowth (in the distance)



Photograph 3.2 Example of VHC 40.4

3.4 Potential bushfire intensity calculations

The potential bushfire intensity of BAUs was determined using the Queensland Public Safety Business Agency *Potential Bushfire Intensity Calculator* (version November 2014) which is an Excel spreadsheet calculator that models the bushfire hazard assessment method in Section 4.2.4 of the BRC guide.

Section 3.1 of the BRC guide defines bushfire hazard classes as follows:

- very high – potential bushfire intensity > 40,000 kilowatts/m (**kW/m**);
- high – potential bushfire intensity 20,000-40,000 kW/m;
- medium – potential bushfire intensity 4,000-20,000 kW/m; and
- non bushfire hazard - potential bushfire intensity <4,000 kW/m.

Results of the potential bushfire intensity calculations which determine the bushfire hazard class of BAUs shown in Figure 3.1 are presented in Table 3.2.

Table 3.2 Potential bushfire intensity

BAU	VHC	Potential fuel load (tonnes (t)/ha) ¹	Slope (°)	Potential bushfire intensity (kW/m)	Bushfire hazard class
BAU 1	VHC 13.2 regrowth	14.4	2	10,184	Medium
BAU 2	VHC 40.4	5	2	1,228	Non-bushfire hazard class ²

Notes 1 Potential fuel load taken from the BRC guide.

2 VHC 40.4 is classified as a grassfire prone hazard class in Figure 14 of the BRC guide.

3.5 Bushfire hazard areas

Results of the potential bushfire intensity calculations in Table 3.2 generally align with the Bushfire hazard overlay map and confirm that the Project is located within a bushfire hazard area with a medium potential bushfire intensity and a grassfire hazard area.

The Project is not located in a high or very high potential bushfire intensity area.

The results also confirm the development permit application for the Project is subject to assessment and compliance with the Bushfire hazard overlay code.

4 Bushfire hazards associated with the site

This chapter identifies bushfire hazards associated with the site.

4.1 Fire danger season

The fire danger season at the site starts in August, peaks in September and will begin to fall when consistent summer rainfall occurs. Typically, the worst fire weather conditions will be experienced during the fire danger season when the wind direction is from the north or west.

An FFDI of 69 will be associated with hot, dry and windy conditions. If a bushfire or grassfire starts and takes hold under these conditions, it will be difficult to control and fast moving in bushland or grassland vegetation.

4.2 Fire history

As discussed in Section 3.2, fire history data indicates that the site and adjoining land regularly burns. Therefore, it is considered almost certain that the Project will be exposed to bushfire or grassfire attack in the future.

4.3 Potential directions of bushfire attack

The Project could be exposed to bushfire attack through BAU 1 and grassfire attack through BAU 2, shown in Figure 3.1. Bushfire attack and grassfire attack scenarios are further analysed in Section 5.5.

4.4 Potential bushfire hazards from adjacent land uses

Fire history data does not identify the ignition source of fires which have occurred within and adjoining the site.

The adjacent agricultural land use is considered to be a bushfire hazard to the Project. It is common for agricultural activities involving the operation of equipment and machinery, and hot works to result in unplanned ignitions and fires. In addition, landowners may light fires to burn waste or for fuel hazard reduction.

Direct attack of a fire in close proximity to the Project's electrical infrastructure may not be possible. Therefore, there will be a strong reliance on asset protection zones (**APZs**) around above ground infrastructure for bushfire protection.

4.5 Water and access for emergency services

The site does not have access to a mains water connection.

There are numerous dams within and adjacent to the site. However, the standard of vehicle access to these features and the reliability of their water supply is unknown, and they should not be relied upon.

The site has access to a public road network which will provide access and egress for emergency services and future occupants.

5 Bushfire hazards associated with the Project

This chapter identifies potential bushfire hazards associated with the Project.

5.1 Siting and design

The Project will be designed to mitigate the risk of bushfire hazard determined by the bushfire hazard assessment in this BMP.

The topography of the site does not involve steep slopes or ridgelines that could exacerbate bushfire intensity and make access and egress difficult

Above ground infrastructure will be separated from bushfire and grassfire hazard areas by appropriately designed and maintained APZs.

5.2 Land use

The Project will not involve a vulnerable use as defined in the SPP guidance material- bushfire.

The BESS, HV switching station and HV substation could be regarded as being consistent with 'community infrastructure providing essential services' as described in the SPP guidance material – bushfire. Infrastructure within these components of the Project will have an APZ which is designed to achieve a radiant heat flux level $\leq 10 \text{ kW/m}^2$ at the infrastructure which is considered a tolerable radiant heat exposure outcome for community infrastructure for essential services in the BRC guide.

The BESS could also be regarded as 'hazardous materials in the context of bushfire hazard' which is also described in the SPP guidance material - bushfire. Fire hazards associated with the BESS including (amongst other things) electrical hazards, chemical hazards, explosions, potential fire spread due to the proximity of battery enclosures or mechanical damage to battery enclosures are matters which are outside of the scope of this BMP and are addressed in the hazard incident management plan for the development permit application.

5.3 Fire-fighting water supply

Fire water tanks will be located inside the BESS security fence for the purpose of facility fire-fighting. These water tanks are separate to the mitigation measures in this BMP with respect to bushfire hazard.

A fire-fighter water supply outlet point for rural fire-fighting will be provided outside of the BESS and HV substation security fencing. It will be designed in general accordance with the Bushfire hazard overlay code requirements.

5.4 Access and egress

The Project will establish an access track that will link the infrastructure area to South Ulam Road. The access track will be designed for heavy articulated vehicles and will meet the design standards for rural fire-fighter vehicles.

A fire access trail will also be provided around the perimeter of the infrastructure area. It will be designed for rural fire-fighter vehicles in general accordance with the Bushfire hazard overlay code requirements.

5.5 Radiant heat exposure

The Bushfire hazard overlay code does not identify a radiant heat exposure outcome that is specifically relevant to the Project's infrastructure. Therefore, this BMP defers to the SPP guidance material – bushfire and BRC guide which require community infrastructure providing essential services and

hazardous materials in the context of bushfire hazard, to be setback from hazardous vegetation by a distance which achieves a radiant heat flux level of $\leq 10 \text{ kW/m}^2$ at the above ground infrastructure. These setbacks are also known as APZs which were previously referenced in Sections 4.4 and 5.1.

The purpose of an APZ is to minimise the impact of bushfire attack on above ground infrastructure and to provide emergency services with access and an operational space for bushfire-fighting, maintenance works and bushfire/grassfire fuel hazard reduction activities.

As discussed in Section 4.3, the Project could be exposed to bushfire attack through BAU 1 and grassfire attack through BAU 2, which are shown in Figure 3.1. The radiant heat profile of these bushfire and grassfire attack scenarios was analysed using the BAL calculator. Inputs used in the BAL calculator and results are provided in Appendix 3.

Results of the radiant heat exposure assessment have been used to design the APZ specified in Section 6.1.

6 Bushfire mitigation plan

This chapter identifies bushfire mitigation measures that must be implemented as part of the Project to comply with the Bushfire hazard overlay code.

It is the total of the mitigation measures in this chapter that will reduce the risk of bushfire hazard to a tolerable level. Failure to implement all actions in their entirety could result in an increased level of exposure to bushfire hazards.

6.1 Asset protection zones

An APZ which is 30 m wide must be established and maintained around the BESS and substation area and switchyard area as shown in Figure 6.1.

It must be shown in survey plans and identified on-site with markers so that it can be maintained consistently in perpetuity.

The APZs must be cleared of weeds and woody vegetation and have a mineral earth or grass surface. If a grass surface is chosen, it must be maintained at a height ≤ 100 millimetres (**mm**) (or as low as is practically possible) during winter and spring.

Storage or stockpiling must not be permitted within the APZs at any time.

Temporary construction facilities and laydown areas must have a 10 m wide temporary APZ.

6.2 Surface under infrastructure

A mineral earth surface must be established and maintained inside the BESS and HV substation security fence as shown in Figure 6.1. It must be maintained free of weeds, woody regrowth and grass.

When used in the context of bushfire management, mineral earth means a non-flammable surface, either natural or prepared, which has no vegetation or vegetation debris. As a result, it provides a barrier to fire travelling on or near the ground surface.

6.3 Cleared vegetation

Vegetation cleared from the infrastructure areas must be mulched and used in rehabilitation works or removed from the site. It must not be windrowed or stockpiled for use after construction.

6.4 Fire-fighting water supply

A fire-fighter water supply outlet point must be provided adjacent to the infrastructure area, ie outside of the BESS and HV substation security fence, for rural fire-fighting. Its location must be determined in consultation with the local Rural Fire Brigade Queensland (**RFBQ**).

The fire-fighter water supply outlet point can be connected to a 40,000 litre (**l**) reserve section within the proposed fire water tanks inside the BESS security fence or a separate 40,000 l water tank located outside of the security fence which is made of metal or concrete.

The fire-fighter water supply outlet point must have RFBQ fire-fighting fittings – we recommend consulting with the local RFBQ to confirm the standard of fittings in use at the locality. All above ground fittings, ie connections, valves and pipes, must be made of metal.

The fire-fighter water supply outlet point must be within 4 m of a hardstand area where a rural fire truck can park to refill. The hardstand area must have an all-weather surface and the load bearing capacity and dimensions suitable for a vehicle mass of 15 t and an axle load of 9 t.

The fire-fighter water supply outlet point must be identified by reflective wayfinding signage. An example of the wayfinding signage is provided below. It must have a reflective white background and black symbology which is at least 125 mm high.



As stated in Section 5.3, requirements in this section are separate to requirements for fire water tanks and hydrants within the BESS security fence, which are to be determined by a fire engineer.

6.5 Fire access trail

A fire access trail must be provided around the perimeter of the infrastructure area, ie generally aligned with the APZs. It must be designed and constructed in general accordance with the standard required by a 4x4 medium pumper/tanker which is described in Appendix 1 of *Fire hydrant and Vehicle Access Guidelines for Residential, Commercial and Industrial lots* (QFES 2019b) (**Fire hydrant and vehicle access guidelines**). Appendix 1 of Fire hydrant and vehicle access guidelines is provided in Appendix 4.

The design criteria for a 4x4 medium pumper/tanker are as follows:

- trafficable surface of 4 m except for short constrictions to 3.5 m for no more than 30 m in length where an obstruction cannot be reasonably avoided or removed;
- corners have a minimum inner radius of 6 m and a minimum formed width of 6 m;
- trafficable surface and crossing structures are capable of carrying vehicles with a vehicle mass of 15 t and an axle load of 9 t;
- maximum grade is not more than 15° and maximum crossfall is not more than 6°;
- minimum vertical clearance of 4 m above the trafficable surface; and
- where the width of the trafficable surface is < 6 m wide, capacity for passing is provided every 250 m comprising a widened trafficable surface of at least 6 m for a length of at least 20 m or a 6 m wide and 8 m deep reversing bay.

Short sections which do not comply with the slope and width criteria outlined above are permissible where topography or environmental constraints do not permit compliance.

Drainage for the fire access trail must be designed and constructed in accordance with relevant standards.

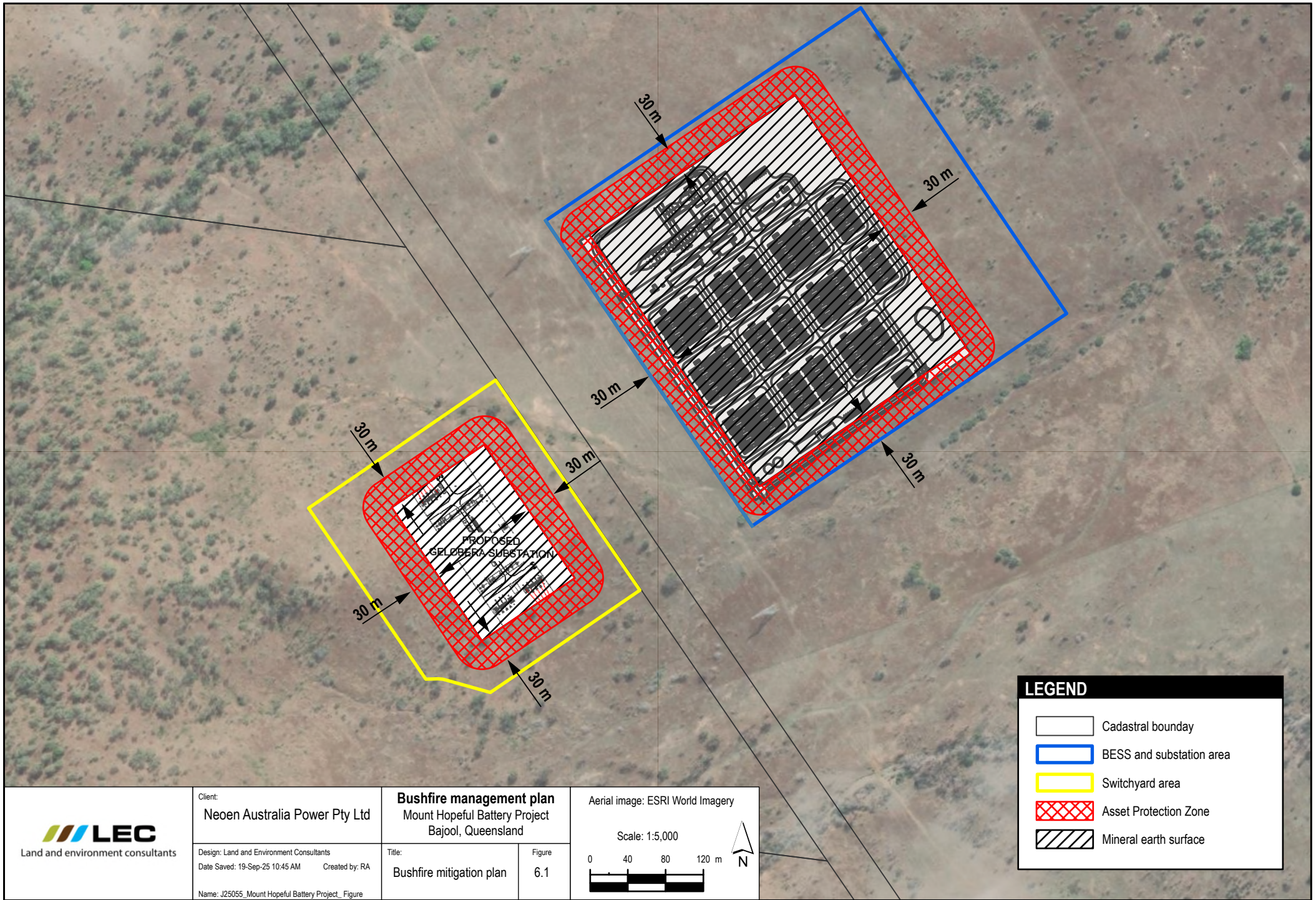
The fire access trail must be inspected every year and maintained in accordance with the specifications above prior to winter.

6.6 Buildings

Permanent buildings and structures must be designed and constructed in accordance with the fire resistance and safe access and egress requirements of the *National Construction Code-Building Code of Australia* (ABCB 2022) (**NCC-BCA**) and governing Queensland laws, codes and standards that apply to the building industry.

Fire detection and first attack fire-fighting equipment in buildings and throughout the BESS must comply with specifications in the NCC–BCA and any Queensland specific requirements.

These matters will be dealt with in detail through the building certification and approvals process.



LEGEND

Cadastral boundary

BESS and substation area

Switchyard area

Asset Protection Zone

Mineral earth surface

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Neoen Australia Power Pty Ltd

Design: Land and Environment Consultants
Date Saved: 19-Sep-25 10:45 AM
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Bushfire management plan

Mount Hopeful Battery Project

Bajool, Queensland

Title:
Bushfire mitigation plan

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Scale: 1:5,000

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7 Closing

This BMP was prepared by a suitably qualified and experienced person and is in general accordance with schedule 6.5 of the Rockhampton Region Planning Scheme 2015, SPP guidance material - bushfire and BRC guide.

The bushfire hazard assessment determined the Project is affected by a bushfire hazard area with a medium potential bushfire intensity and a grassfire hazard area, and is subject to compliance with the Bushfire hazard overlay code.

Mitigation measures that must be implemented as part of the Project are specified in Chapter 6. With the implementation of these mitigation measures the Project complies with the Bushfire hazard overlay code as demonstrated in Appendix 5.

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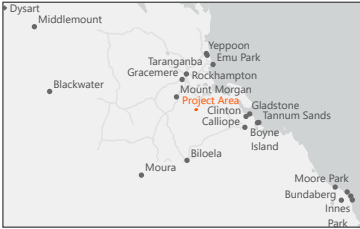
Standards Australia Limited (Standards Australia) 2018, *Australian Standard 3959-2018 Construction of buildings in bushfire prone areas*, Fourth edition, November 2018

Appendix 1 Proposed site plan



FIGURE 1.2
Project Design

- Legend
- Study Area
 - Access road
 - BESS area
 - Overhead and underground line
 - Substation area
 - Switchyard area
 - Road



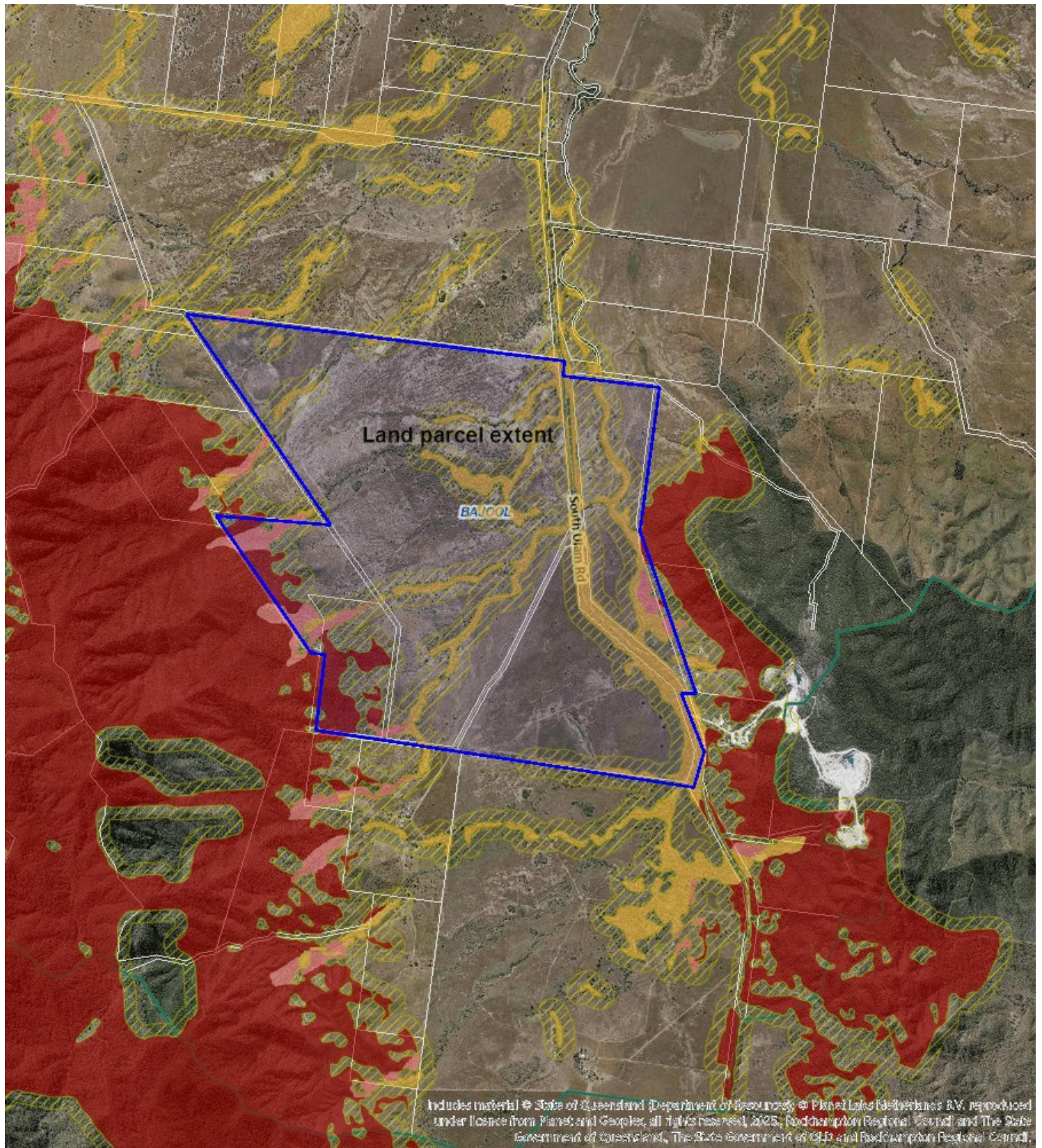
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GDA2020 MGA Zone 56



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Appendix 2 Bushfire hazard overlay map



Map Legend

Bushfire Hazard Classification

-  Very High
-  High
-  Medium

Buffer



Appendix 3 Radiant heat exposure assessment

Bushfire attack through BAU 1

- Forest fire danger index – 69
- Vegetation – VHC 13.2 *Dry to moist eucalypt woodlands on undulating metamorphics and granite*
- Understorey fuel load –12.8 tonnes/hectare (t/ha)
- Total fuel load – 14.4 t/ha
- Effective slope – 2° slope
- Site slope – 0° slope (constructed pad)
- Flame width – 100 m



Calculated August 12, 2025, 11:25 am (MDc v.4.9)

J25055

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	69	Rate of spread	1.21 km/h
Vegetation Classification	Woodland	Flame length	9.630000000000001 m
Understorey fuel load	12.8 t/ha	Flame angle	53 °, 64 °, 72 °, 77 °, 79 ° & 84 °
Total fuel load	14.4 t/ha	Elevation of receiver	3.84 m, 4.33 m, 4.58 m, 4.69 m, 4.72 m & 4.79 m
Vegetation height	n/a	Fire intensity	9,052 kW/m
Effective slope	2 °	Transmissivity	0.882, 0.868, 0.847, 0.824, 0.8110000000000001 & 0.741
Site slope	0 °	Viewfactor	0.5944, 0.4369, 0.2943, 0.1985, 0.1614 & 0.0442
Flame width	100 m	Minimum distance to < 40 kW/m²	8 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	10.9 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	16.1 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	23.5 m
		Minimum distance to < 10 kW/m²	28.3 m

Rate of Spread - Mearthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Grassfire attack through BAU 2

- Grassland fire danger index (conversion from Table B2 in AS 3959-2018) - 100
- Vegetation – VHC 40.4 *Continuous low grass or tree cover*
- Understorey fuel load –4.5 t/ha
- Total fuel load – 5 t/ha
- Effective slope – 2° slope
- Site slope – 0° slope (constructed pad)
- Flame width – 100 m



Calculated August 12, 2025, 11:24 am (MDc v.4.9)

J25055

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Grassland Fire Danger Index	100	Rate of spread	14.92 km/h
Vegetation Classification	Grassland	Flame length	7.4 m
Understorey fuel load	4.5 t/ha	Flame angle	54 °, 64 °, 73 °, 78 °, 80 ° & 85 °
Total fuel load	5 t/ha	Elevation of receiver	2.99 m, 3.32 m, 3.53 m, 3.61 m, 3.64 m & 3.68 m
Vegetation height	n/a	Fire intensity	38,552 kW/m
Effective slope	2 °	Transmissivity	0.886, 0.875, 0.858, 0.837, 0.825 & 0.752
Site slope	0 °	Viewfactor	0.5872000000000001, 0.4348, 0.2898, 0.1955, 0.1589 & 0.0436
Flame width	100 m	Minimum distance to < 40 kW/m ²	6.2 m
Windspeed	n/a	Minimum distance to < 29 kW/m ²	8.4 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m ²	12.6 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m ²	18.5 m
		Minimum distance to < 10 kW/m ²	22.6 m

Rate of Spread - Noble et al. 1980

Flame length - Purton, 1982

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Appendix 4 Queensland Fire Department vehicle specifications

QFRS Vehicle Specifications													Tyres		Weights				OEM Weights				Turning Circle												
Dimensions (in Metres)															(In Kilograms)				(In Kilograms)				(In Metres)												
															Registerable AL and GVWM				Trailing Axles Only																
Vehicle Description													Height	Head Clearance (HG)	FO	LA	DA1	RO	LR (mm=mm+mm)	Total Length	W ¹	W (mm)	TS-1	TS-2	AL-F kg	AL-1 kg	AL-2 kg	Gross Mass	F kg	L-1 kg	L-2 kg	Gross Mass	Wall to Wall	Curb to Curb	
1	Urban Pumper - Medium (Type 3 - UPLMPM) Scania P280												3.100	3.800	1.495		4.300		2.470	6.770	8.265	2.500	1.250	305/70/R22.5		6500	9000		15000	7100	11500		18600	16.5	15.2
2	16m Telescopic Aerial Pump (Type 4A - UTAP16) Freightliner												3.700	4.100	1.225	5.720		2.100	7.820	9.045	2.450	1.225	11R22.5		6000	9000		15000	6350	10430		16000	23.0	22.0	
3	4x2 Pumper / Tanker - Light (Type 1 - UPT4x2L) Mitsubishi F6417												3.000	3.200	1.195	4.250		2.055	6.305	7.500	2.440	1.220	11R22.5		3300	7700		11000	3300	7700		11000	19.8	17.4	
4	4x2 Pumper / Tanker - Medium (Type 2 - UPT4x2M) Mitsubishi FM618												3.500	3.500	1.245	4.280		2.055	6.335	7.580	2.440	1.220	11R22.5		5100	9000		13500	5100	9000		13500	22.1	19.6	
5	4x2 Pumper Tanker - Medium (Type 2 - UPT4x2M) Isuzu FTR900												3.226	3.500	1.440	4.600		2.144	6.744	8.184	2.450	1.225	275/70R22.5		6000	9000		15000	6000	9200		15000			
5a	4x2 Pumper Tanker - Medium (Type 2 - UPT4x2M) Isuzu FTR900												2.910	3.500	1.365	4.500		2.110	6.610	8.300	2.470	1.235	275/70R22.5		6000	9000		15000	6300	9200		15000	23.0	20.0	
5b	4x2 Pumper Tanker - Medium (Type 2 - UPT4x2M) Isuzu FTR900												3.100	3.600	1.600	4.610		2.330	6.940	8.540	2.470	1.235	275/70R22.5		6000	9000		15000	6300	9200		15000	18.1	16.0	
5c	4x4 Pumper Tanker - Medium (Type 2 - UPT4x4M) Isuzu FTS 800 4x4 crew												3.200	3.600	1.600	4.800		2.340	7.140	8.600	2.500	1.250	275/70R22.5		4700	9000		13900	4700	9200		13900	22.3	20.7	
6	Hydraulic Platform Turntable Ladder (Type 6L - UALP40) Scania P1134 (8x4)												3.750	4.300	1.570	5.900	1.350	2.890	10.140	11.710	2.450	1.225	275/70R22.5	275/70R22.5	10580		18210	28790 (ATO)	14200 (Twin Steer)	9200	9200	33000	30.7	29.1	
7	Hydraulic Platform Turntable Ladder (Type 6L - UALP30) Scania P114G (6x4)												3.600	4.180	1.498	4.098	1.360	2.186	7.644	9.142	2.500	1.250	275/75R22.5	275/75R22.5	7000		14650	21650 (ATO)	8000	10500	10500	26100			
7a	Hydraulic Platform Turntable Ladder (Type 6L - UALP40) Scania P380 (8x4)												3.700	4.180	2.100	4.900	1.355	2.650	8.905	11.005	2.500	1.250	295/80R22.5	305/80R22.5	11060		22540	33600 (ATO)	16000 (Twin Steer)	12000	12000	40000	23.0	22.0	
8	Urban Pumper - Light (Type 3 - UPLMPPL) Mercedes Altego												2.900	2.900	1.440	4.160		2.260	6.420	7.860	2.500	1.250	305/70/19.5		6000	9000		15000	6100	10500		16000	19.4	17.1	
9	Urban Pumper - Medium (Type 4 - UPLMPM) Scania P94D8												2.960	3.150	1.750	4.500		2.100	6.600	8.350	2.500	1.250	275/70R22.5		6000	9000		15000	7100	11500		18600	18.4	16.8	
10	Urban Pumper Tanker - Heavy (Type 4T - UPTH) Scania P94GB (6x4)												3.064	3.150	1.613	4.520	1.360	2.264	8.144	9.757	2.450	1.225	305/70R22.5	305/70R22.5	6000		16500	22500	7100	9500	9500	26100	20.8	19.2	
11	4x4 Pumper / Tanker Light (Type 2[4x4] - UPT4x4L)												2.700	3.129	1.270	4.200		1.800	6.000	5.900	2.450	1.225	8.25R20		3170	6830		10000	3170	6830		10000	17.4	15.2	
12	4x4 Pumper / Tanker Medium (Type 2 [4x4] - UPT4x4M)												3.300	3.900	1.560	4.250		2.264	6.514	7.600	2.460	1.230	275/70/R22.5		5400	9000		13000	5400	9200		13000	20.5	18.0	
13	Hazmat Tender Light (Type 8 - UHA2L) Mercedes Sprinter Van												2.610	2.800	0.939	4.025		1.625	5.650	6.589	1.988	0.994	195/70/15		1750	3200		4490	1750	3200		4490	14.3	13.6	
14	Hazmat Tender Heavy (Type 8 - UHA2H)												3.500	3.550	1.613	5.527	1.350	2.265	9.142	10.755	2.440	1.220	275/70/R22.5		6000		16500	22500	7100	9500	9500	26100	24.2	21.8	
15	Hazmat Tender Medium (Type 8 - UHA2M)												3.600	3.700	1.700	5.380		2.940	8.320	10.020	2.500	1.250	305/70R 19.5		6000	10000		16000 (ATO)	6100	10500		16000	24.2	21.8	
16	Rescue Tender Light (Type 5 - URTL)												2.640	2.800	0.950	4.600		1.900	6.500	6.600	2.400	1.200	225/70/R19.F5		2730	6150		8650	2730	6150		8650	16.5		
17	Rescue Tender Medium (Type 5 - URTM)												3.100	3.800	1.750	4.180		2.270	6.450	8.200	2.500	1.250	305/70/19.5		6000	9000		15000	6100	10500		16000	16.5	15.2	
17a	Rescue Tender Medium (Type 5 - URTM) Scania P280												3.200	3.800	1.700	4.300		2.480	6.780	8.480	2.500	1.250	305/70/19.5		6000	9000		15000	7500	11500		19000	16.5	15.2	
18	Urban Incident Support Vehicle - Command												3.800	3.900	1.440	4.160		2.640	6.800	9.150	2.500	1.250	305/70R19.5		6000	9000		15000	6100	10500		16000	19.4	17.1	

Appendix 5 Bushfire hazard overlay code assessment

8.2.4 Bushfire hazard overlay code

8.2.4.1 Application

This code applies to development where the code is identified in the table of assessment for the bushfire hazard overlay and applies to any areas included on the bushfire hazard overlay map OM-4.

When using this code, reference should be made to section 5.3.2 and where applicable, section 5.3.3 located in Part 5.

Editor's note—The bushfire hazard area is a natural hazard area for the purpose of State Planning Policy. Within this area, susceptibility to bushfire has been identified. The area identified in the bushfire hazard overlay maps may not reflect the full extent of the area that may be affected by bushfire.

Note—The bushfire hazard overlay code provisions do not apply to an approved building envelope established in response to bushfire hazard and secured by a valid development approval given under this or a previous planning scheme.

8.2.4.2 Purpose

1. The purpose of the bushfire hazard overlay code is to manage development outcomes in bushfire hazard areas so that risk to life, property, community, economic activity and the environment as a result of bushfire is avoided or minimised.
2. The purpose of the code will be achieved through the following overall outcomes:
 - a. development is compatible with the level of risk associated with the bushfire hazard;
 - b. development location, siting and design responds to the risk of bushfire hazard and minimises risk to personal safety and property;
 - c. development enables access and evacuation of people and emergency services vehicles, and access to water supplies during a bushfire hazard event;
 - d. development involving the manufacture or storage of hazardous materials does not increase the risk to public safety or the environment in a bushfire event;
 - e. natural processes and the protective function of landforms or vegetation are maintained in bushfire hazard areas;
 - f. essential community infrastructure and community facilities are located and designed to function effectively during and immediately after bushfire hazard events; and
 - g. development contributes to effective and efficient disaster management response and recovery capabilities.

Editor's note—For the purposes of Section 12 (1) of the Building Regulations 2006, the bushfire hazard areas defined by the planning scheme under map OM-4 is also designated to be the bushfire hazard area.

8.2.4.3 Specific benchmarks for assessment

Table 8.2.4.3.1 — Development outcomes for assessable development and requirements for accepted development

Performance outcomes	Acceptable outcomes	Comments
Access		
PO1 Development ensures that the location, siting, and design of development and associated driveways and access routes: a. avoid potential for entrapment during a bushfire; b. facilitate safe and efficient emergency services to access and egress the site during a bushfire; and c. enables safe evacuation of the site during a bushfire for site occupants.	AO1.1 AO1.1.1 Where the development is located in an urban area, the development: a. has direct access to a constructed, all-weather, public road capable of carrying emergency service vehicles; b. has a maximum single access driveway length of sixty (60) metres from the street to the development; and c. access driveways have a maximum gradient of 12.5 per cent. OR AO1.1.2 Where the development is located in a non-urban area, the development: a. has direct access to a constructed, all-weather, public road capable of carrying emergency service vehicles; b. is separated from hazardous vegetation by a public road or fire trail with a minimum width of four (4) metres and at least six (6) metres clear	Complies with PO1 The Mount Hopeful Battery Project (the Project) is in a non-urban area. It will establish an access track that will link the infrastructure area to South Ulam Road. The access track will be designed for heavy articulated vehicles and will meet the design standards for rural fire-fighter vehicles. Any requirement for the access tracks to be designed for urban fire trucks will be advised by a separate fire safety study. A fire access trail will also be provided around the perimeter of the proposed battery energy storage system (BESS), high voltage (HV) switching station, HV substation and operations and maintenance building (infrastructure area). It will be designed for rural fire-fighter vehicles (a 4x4 medium pumper/tanker). Specifications for the fire access trail are provided in Section 6.5 of the bushfire management plan (BMP).

	of vegetation, with a minimum of 4.8 metres vertical clearance and a maximum gradient of 12.5 per cent; and c. has: i. a maximum single access driveway length of sixty (60)metres from the street to the development; or ii. access driveways that are greater than sixty (60)metres from the street to the dwelling provide a turning circle with a minimum radius of eight (8) metres every (60) metres.	
Water supply for fire fighting purposes		
PO2 Development provides adequate and accessible water supply for fire fighting purposes which is safely located and freely accessible for fire fighting.	AO2.1 AO2.1.1 In a reticulated water supply area fire hydrants in: a. residential areas are above ground single outlet fire hydrants and provided at not less than eighty (80) metre intervals and at each street intersection; and Editor's note—To remove any doubt, these intervals also apply to common access ways within a common private title b. commercial and industrial areas are above or below ground fire hydrants and provided at not less than ninety (90) metre intervals and at each street intersection. Above ground fire hydrants are to be fitted with dual valve outlets in these areas. Editor's note—Fire hydrants are designed and installed in accordance with Australian Standard 2419.1 Fire hydrant installations — system design, installation and commissioning, unless specified by the relevant water entity. OR	Complies with AO2.1.2 The site is not serviced by mains water and there are no hydrants. Section 6.4 of the BMP requires a fire-fighter water supply outlet point to be provided adjacent to the infrastructure area, ie outside of the BESS and HV substation security fence, for rural fire-fighting and provides specifications for this water supply.

	AO2.1.2 Where a reticulated water supply is not available or the development is not within eighty (80) metres of a hydrant, a water tank is provided within ten (10) metres of the building or structure, and the water tank has: c. a take-off connection from the building to the tank which is at a level that provides on-site water storage of not less than the water requirement outlined in Table 8.2.4.3.3; d. a hardstand area allowing heavy rigid fire appliance access within six (6) metres of a tank; and e. fire brigade tank fittings consisting of: i. for above ground tanks, A. fifty (50) millimetre ball valve and male camlock coupling; and B. above ground water pipe fittings that are metal; or ii. for underground tanks, an access hole of 200 millimetre diameter (minimum) to allow access for suction lines. Note—Plastic tanks are not recommended; however, if they are fully submerged with above ground access points they are acceptable. Note—Where water tanks are required, swimming pools, creeks and dams should not be used as a substitute for a dedicated static supply as these sources of water are not reliable during drought conditions.	
Activities involving hazardous materials		
P03 Public safety and the environment are not adversely	AO3.1 Development does not involve the manufacture or	Complies with P03 The BESS, substation and switchyard infrastructure

affected by the impacts of bushfire on hazardous materials.	storage of hazardous materials within a bushfire hazard area. Editor's note—Refer to the <i>Work Health and Safety Act 2011</i> and associated regulation, the <i>Environmental Protection Act 1994</i> and the relevant building assessment provisions under the <i>Building Act 1975</i> for requirements related to the manufacture and storage of hazardous substances.	have been sited outside the medium, high and very high bushfire hazard areas and buffer areas identified by the <i>Bushfire hazard overlay map</i> in the Rockhampton Region Planning Scheme 2015 online mapping. The BESS component of the Project could be regarded as 'hazardous materials in the context of bushfire hazard' which described in the <i>Natural Hazards, Risk and Resilience – Bushfire, State Planning Policy State Interest guidance material 2019 (SPP guidance material – bushfire)</i>. Fire hazards associated with the BESS including (amongst other things) electrical hazards, chemical hazards, explosions, potential fire spread due to the proximity of battery enclosures or mechanical damage to battery enclosures. These matters are addressed in a hazard incident management plan for the development permit application. Subject to approval of the development permit application, a separate fire safety study would be undertaken during the detailed design phase. In addition, the BESS will have an asset protection zone (APZ) which is designed to achieve a radiant heat flux level ≤ 10 kilowatts/square metre (kW/m²) at the BESS infrastructure which is identified as a tolerable radiant heat exposure outcome for hazardous materials in the context of bushfire hazard in <i>Bushfire Resilient Communities Technical Reference Guide for the State Planning Policy State Interest 'Natural Hazards, Risk and Resilience - Bushfire' QFES 2019 (BRC guide)</i>. Specifications for the APZ are provided in Section 6.1 of the BMP. The APZ for the BESS will be complemented by a rural fire-fighting water supply and fire access trail
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		around the perimeter of the BESS. Specifications for the rural fire-fighting water supply and fire access trail are provided in Sections 6.4 and 6.5 of the BMP, respectively.
Development within the high and very high bushfire hazard areas		
Avoiding the hazard		
PO4 The development is compatible with the level of risk associated with the bushfire hazard.	AO4.1 The development has a Bushfire Attack Level of less than 12.5. Editor's note—The Bushfire Attack Level is calculated in accordance with the methodology described in the Australian Standard AS 3959 — Construction of buildings in bushfire prone areas.	Not applicable The bushfire hazard assessment in Chapter 3 of the BMP confirmed that the Project's infrastructure, ie the BESS, HV switching station, HV substation and operations and maintenance building, are not affected by a bushfire hazard area with a high or very high potential bushfire intensity. Notwithstanding, with the implementation of the APZs specified in Section 6.1 of the BMP, the Project's infrastructure will be separated from hazardous vegetation by a distance which achieves a radiant heat flux level $\leq 10 \text{ kW/m}^2$ at the BESS, HV switching station, HV substation and operations and maintenance building, which correlates with bushfire attack level (BAL) 12.5 in the <i>Australian Standard (AS 3959-2018) Construction of buildings in bushfire prone areas</i>.

Table 8.2.4.3.2 — Development outcomes for assessable development

Performance outcomes	Acceptable outcomes	Comments
Land use		
PO5 Essential community infrastructure and community	AO5.1 The following uses are not located in high or very high	Not applicable The BESS, HV switching station and HV substation

facilities and highly vulnerable development are located, designed and sited to: a. protect the safety of people during a bushfire; b. not increase the exposure of people to the risk from a bushfire event; c. minimise the risk to vulnerable populations; and d. ensure essential community infrastructure can function effectively during and immediately after bushfire events.	bushfire hazard areas: a. child-care centre; b. detention facility; c. educational establishment; d. emergency services; e. hospital; f. industrial use involving manufacture or storage of hazardous materials; g. multiple dwelling; h. outstation; i. relocatable home park; j. residential care facility; k. retirement facility; l. rooming accommodation; m. shopping centre; n. short-term accommodation; o. telecommunications facility; p. tourist park; q. tourist attraction; r. transport depot; and s. utility installation.	could be regarded as being consistent with 'community infrastructure providing essential services' as described in the SPP guidance material – bushfire. The bushfire hazard assessment in Chapter 3 of the BMP confirmed that the Project's infrastructure, ie the BESS, HV switching station, HV substation and operations and maintenance building, are not affected by a bushfire hazard area with a high or very high potential bushfire intensity. Notwithstanding, with the implementation of the APZs specified in Section 6.1 of the BMP, the Project's infrastructure will be separated from hazardous vegetation by a distance which achieves a radiant heat flux level $\leq 10 \text{ kW/m}^2$ at the BESS, HV switching station, HV substation and operations and maintenance building, which correlates with BAL-12.5 in AS 3959-2018.
Reconfiguring a lot		
General		
PO6 Where reconfiguration is undertaken a separation distance from hazardous vegetation is provided. Editor's note—The preparation of a bushfire management plan in accordance with SC6.5 — Bushfire management planning scheme policy can assist in demonstrating compliance with this performance outcome.	AO6.1 In urban areas lots are separated from hazardous vegetation by a distance: a. that achieves a Bushfire Attack Level of twenty-nine (29) or less at all boundaries; and b. is contained wholly within the development site. OR AO6.2 In non-urban areas a building envelope of reasonable dimensions is provided on each lot which achieves a	Not applicable The Project does not involve the reconfiguration of a lot for a subdivision in a non-urban area. Notwithstanding, with the implementation of the APZs specified in Section 6.1 of the BMP, the Project's infrastructure will be separated from hazardous vegetation by a distance which achieves a radiant heat flux level $\leq 10 \text{ kW/m}^2$ at the BESS, HV switching station, HV substation and operations and maintenance building, which correlates BAL 12.5 in

	Bushfire Attack Level of twenty-nine (29) or less at all boundaries Editor's note—Where a separation distance is proposed to be achieved by utilising existing cleared developed areas external to the site, certainty must be established (through tenure or other means) that the land will remain cleared of hazardous vegetation. For staged developments, temporary separation distances, perimeter roads or fire trails may be absorbed as part of subsequent stages.	AS 3959-2018, which is less than BAL-29.
PO7 In urban areas development includes a constructed perimeter road between the lots and hazardous vegetation with reticulated water supply. The access is available for both fire fighting and maintenance works.	AO7.1 In urban areas lot boundaries are separated from hazardous vegetation by a public road which: - has a two lane sealed carriageway; - contains a reticulated water supply; - is connected to other public roads at both ends and at intervals of no more than 500 metres; - accommodates geometry and turning radii in accordance with Queensland Fire and Emergency Services' Fire Hydrant and Vehicle Access Guidelines; - has a minimum of 4.8 metres vertical clearance above the road; - is designed to ensure hydrants and water access points are not located within parking bay allocations; and - incorporates roll-over kerbing.	Not applicable The Project does not involve the reconfiguration of a lot for a subdivision and is not in an urban area.
PO8 In non-urban areas development includes a perimeter road or an all-weather fire access trail which is available for both fire fighting and maintenance/hazard reduction works.	AO8.1 In non-urban areas the development includes a perimeter road or an all-weather fire access trail which: - separates the development from the hazardous vegetation with a width of at least twenty (20) metres; - with a minimum formed width of four (4) metres;	Not applicable The Project does not involve the reconfiguration of a lot for a sub-division. Notwithstanding, a fire access trail will be provided around the perimeter of the infrastructure area, ie generally aligned with the APZs. It will be designed and constructed in general accordance with the standard required by a 4x4 medium pumper/tanker

	c. a minimum of 4.8 metres vertical clearance above the road; d. has a turning circle with a minimum radius of eight (8) metres every sixty (60) metres; e. has adequate drainage and erosion control devices; f. has a gradient no greater than 12.5 per cent and a cross fall of no greater than ten (10) degrees; g. has access at each end of the perimeter road or the fire trail from a public road; h. has the access point signed and direction of travel identified; and i. has a suitable arrangement in place to ensure maintenance in perpetuity.	which is described in Appendix 1 of <i>Fire hydrant and Vehicle Access Guidelines for Residential, Commercial and Industrial lots 2019 (Fire hydrant and vehicle access guidelines)</i>. Design criteria for the fire access trail are provided in Section 6.5 of the BMP.
PO9 Road widths and construction within the development are adequate for fire emergency vehicles.	No acceptable outcome is nominated.	Not applicable The Project does not involve the reconfiguration of a lot for a subdivision. Notwithstanding, the Project will establish an access track that will link the infrastructure area to South Ulam Road. The access track will be designed for heavy articulated vehicles and will meet the design standards for rural fire-fighter vehicles. Any requirement for the access track to be designed for urban fire trucks will be advised by a separate fire safety study.
Emergency services access		
PO10 Development facilitates the safe and efficient access and egress of emergency services during a bushfire event.	AO10.1 The development includes a perimeter road or a fire access trail which: a. separates the development from the hazardous vegetation;	Complies with AO10.1 A fire access trail will be provided around the perimeter of the infrastructure area, ie generally aligned with the APZs. It will be designed and constructed in general accordance with the standard

	b. is a minimum of ten (10) metres in width, with a minimum formed width of four (4) metres; c. is a minimum of six (6) metres clear of standing flammable vegetation; d. has passing bays twenty (20) metres long by three (3) metres (additional to the trail width), or turning facilities every 200 metres; e. has adequate drainage and erosion control devices; f. has a gradient no greater than 12.5 per cent and a cross fall of no greater than ten (10) degrees; g. has access at each end of the perimeter road or the fire trail from a public road; h. has the access point signed and direction of travel identified; and i. has a suitable arrangement in place to ensure maintenance in perpetuity.	required by a 4x4 medium pumper/tanker which is described in Appendix 1 of Fire hydrant and vehicle access guidelines. Design criteria for the fire access trail are provided in Section 6.5 of the BMP.
PO11 Road widths and construction within the development are adequate for fire emergency vehicles to gain access to a safe working area close to dwellings and near water supplies whether or not on-street parking spaces are occupied.	AO11.1 Road access minimum clearances of 3.5 metres wide and 4.8 metres high are provided for safe passage of emergency vehicles. Editor's note—For further information on how to address the above criteria please see Queensland Fire and Emergency Service: Fire hydrant and vehicle access guidelines for residential, commercial and industrial lots.	Complies with AO11.1 The Project will establish an access track that will link the infrastructure area to South Ulam Road. The access track will be designed for heavy articulated vehicles and will meet the design standards for rural fire-fighter vehicles. Any requirement for the access track to be designed for urban fire trucks will be advised by a separate fire safety study.
PO12 Hydrants are suitably identified so that fire services can locate them at all hours.	AO12.1 Hydrants are identified as specified in Queensland Fire and Emergency Services: Fire hydrant and vehicle access guidelines for residential, commercial and industrial lots. Editor's note—Fire hydrants are designed and installed in accordance with Australian Standard 2419.1 Fire hydrant	Not applicable The site is not serviced by mains water and hydrants will not be installed outside of the infrastructure area. Notwithstanding, a water tank and outlet point will be provided adjacent to the infrastructure area, ie outside of the BESS and HV substation security

	installations — system design, installation and commissioning, unless specified by the relevant water entity.	fence, for rural fire-fighting. Specifications for the water tank and outlet are provided in Section 6.4 of the BMP. These specifications include the requirement for the water tank outlet to be identified by reflective wayfinding signage.
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Table 8.2.4.3.3 — Water storage requirements

Lot size / use type	Water requirement (per lot)
Lots less than 1,000 square metres	5,000 litres
Lots between 1,000 square metres and less than one (1) hectare	10,000 litres
Lots greater than one (1) hectare	20,000 litres