

# Attachment 6

## Draft Bushfire Management Plan

---

## Bushfire management plan

Mount Fox Energy Park | Mount Fox | Queensland  
Prepared for TagEnergy Australia Pty Ltd | 10 August 2023

---

Draft

Land and Environment Consultants Pty Ltd  
Suite 5, 66 Bay Terrace  
Wynnum Queensland 4178  
T: 07 2112 5692  
E: [info@landeconsultants.com.au](mailto:info@landeconsultants.com.au)

---

---

## Bushfire management plan

Draft

Report 23050 | TagEnergy Australia Pty Ltd | 10 August 2023

---

Approved by Robert Janssen

Position Managing principal

Signature

Date

---

This report has been prepared in accordance with the brief provided by the client and has relied upon the information collected at or under the times and conditions specified in the report. All findings, conclusions or recommendations contained in the report are based on the aforementioned circumstances. The report is for the use of the client and no responsibility will be taken for its use by other parties. The client may, at its discretion, use the report to inform regulators and the public.

© Reproduction of this report for educational or other non-commercial purposes is authorised without prior written permission from LEC provided the source is fully acknowledged. Reproduction of this report for resale or other commercial purposes is prohibited without LEC's prior written permission.

### Document control

| Version | Date           | Prepared by | Reviewed by |
|---------|----------------|-------------|-------------|
| Draft   | 10 August 2023 | C. Turner   | R. Janssen  |
|         |                |             |             |
|         |                |             |             |
|         |                |             |             |
|         |                |             |             |



T: 07 2112 5692 | E: [info@landeconsultants.com.au](mailto: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  |
| Executive Summary.....                                                      | 1  |
| 1 Introduction .....                                                        | 3  |
| 1.1 Approvals context.....                                                  | 3  |
| 1.2 Bushfire management plan review.....                                    | 4  |
| 1.3 Method .....                                                            | 4  |
| 1.4 Suitably qualified person .....                                         | 4  |
| 2 Description of the Project area and the Project .....                     | 5  |
| 2.1 The Project area.....                                                   | 5  |
| 2.2 The Project.....                                                        | 5  |
| 2.3 State Planning Policy bushfire prone area map.....                      | 5  |
| 3 Bushfire hazard assessment .....                                          | 9  |
| 3.1 Severe fire weather .....                                               | 9  |
| 3.2 Fire history.....                                                       | 9  |
| 3.3 Field inspection.....                                                   | 9  |
| 3.4 Potential bushfire intensity calculations .....                         | 9  |
| 3.5 Bushfire prone areas.....                                               | 9  |
| 3.6 Radiant heat exposure assessment .....                                  | 10 |
| 4 Bushfire hazards associated with the Project area and the Project .....   | 12 |
| 4.1 Fire danger season.....                                                 | 12 |
| 4.2 Fire history.....                                                       | 12 |
| 4.3 Vegetation .....                                                        | 12 |
| 4.4 Bushfire management within the Project area .....                       | 12 |
| 4.5 Bushfire attack and the protection of above ground infrastructure ..... | 13 |
| 4.6 Workforce .....                                                         | 13 |
| 4.7 Hazardous chemicals .....                                               | 13 |
| 4.8 Access .....                                                            | 13 |
| 4.9 Rural Fire Brigade resources and capability .....                       | 14 |
| 4.10 Aerial fire-fighting operations .....                                  | 14 |
| 4.11 Fire-fighter water supply .....                                        | 14 |
| 4.12 Warning and evacuation requirements.....                               | 14 |

|        |                                                |    |
|--------|------------------------------------------------|----|
| 4.13   | Buildings.....                                 | 14 |
| 5      | Fire ignition risks.....                       | 15 |
| 5.1    | Land use.....                                  | 15 |
| 5.2    | Overhead transmission lines .....              | 15 |
| 5.3    | Lightning strike .....                         | 15 |
| 5.4    | Mechanical or electrical fire .....            | 15 |
| 5.5    | Construction activities .....                  | 16 |
| 5.6    | The operations and maintenance activities..... | 16 |
| 6      | Bushfire mitigation plan .....                 | 17 |
| 6.1    | Asset protection zones .....                   | 17 |
| 6.2    | Overhead transmission lines .....              | 17 |
| 6.3    | Cable pits .....                               | 17 |
| 6.4    | Vegetation waste.....                          | 17 |
| 6.5    | Access and evacuation.....                     | 18 |
| 6.6    | Fire-fighter water supply .....                | 18 |
| 6.7    | Wayfinding.....                                | 19 |
| 6.8    | Buildings.....                                 | 19 |
| 6.9    | Administrative controls .....                  | 19 |
| 6.9.1  | General.....                                   | 19 |
| 6.9.2  | Information transfer.....                      | 20 |
| 6.9.3  | Bushfire preparedness .....                    | 20 |
| 6.9.4  | Project rules and inductions.....              | 20 |
| 6.9.5  | Safety documentation.....                      | 20 |
| 6.9.6  | Monitor fire weather conditions.....           | 20 |
| 6.9.7  | High voltage overhead transmission line .....  | 22 |
| 6.9.8  | Communications planning .....                  | 22 |
| 6.9.9  | Emergency response planning .....              | 22 |
| 6.9.10 | Fire-fighter operations plan.....              | 23 |
| 6.9.11 | Electrical safety.....                         | 23 |
| 6.9.12 | Hazardous chemicals .....                      | 23 |
| 6.9.13 | Shut down.....                                 | 23 |
| 6.9.14 | Lighting fires .....                           | 23 |
| 7      | Closing.....                                   | 27 |

## Figures

|                                                      |    |
|------------------------------------------------------|----|
| Figure 2.1 SPP bushfire prone area map – area 1..... | 6  |
| Figure 2.2 SPP bushfire prone area map – area 2..... | 7  |
| Figure 2.3 SPP bushfire prone area map – area 3..... | 8  |
| Figure 6.1 Bushfire mitigation plan –area 1.....     | 24 |
| Figure 6.2 Bushfire mitigation plan – area 2.....    | 25 |
| Figure 6.3 Bushfire mitigation plan – area 3.....    | 26 |

## Tables

|                                                                          |    |
|--------------------------------------------------------------------------|----|
| Table 3.1 Asset Protection Zones around above ground infrastructure..... | 10 |
| Table 6.1 Fire Danger Rating activity guidelines.....                    | 21 |

## Appendix

Appendix 1 Staging plans

Appendix 2 Summary of site observations

Appendix 3 Photographs of infrastructure areas

Appendix 4 Potential bushfire intensity calculations

Appendix 5 Radiant heat exposure assessment

Appendix 6 State Planning Policy bushfire prone area 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.

Draft

## Executive Summary

This bushfire management plan (**BMP**) has been prepared for the Mount Fox Energy Park (**the Project**) which is located approximately 35 kilometres south-west of Ingham, within the local government area of Hinchinbrook Shire Council.

The BMP is required for compliance with condition 11(a) of the State Assessment and Referral Agency (**SARA**) development permit (**the development permit**) – SARA reference 2102-21213 SDA.

The Project area is identified as a bushfire hazard area by the Queensland State Planning Policy (**SPP**) *Bushfire prone area map*. As a result, condition 11(a) of the development permit is seeking compliance with the SPP *Bushfire prone area overlay code* (**SPP bushfire prone area overlay code**) and *Bushfire Resilient Communities Technical Reference Guide for the State Planning Policy State Interest 'Natural Hazards, Risk and Resilience - Bushfire'* (**Bushfire resilient communities**) which was prepared by the Queensland Fire and Emergency Services (**QFES**) to provide technical guidance for the implementation of the *Natural Hazards, Risk and Resilience – Bushfire, State Planning Policy State Interest guidance material* (DSDMIP 2019). Although not referred to in condition 11(a) of the development permit; compliance with guidelines in *Wind Farms and Bushfire Operations* (AFAC 2018) is also considered relevant to the construction and operations and maintenance phases of the Project.

This BMP has been prepared to satisfy condition 11(a) of the development permit.

The Project involves the development of a battery energy storage system (**BESS**) and a wind farm that will be constructed in two stages and will deliver 350 megawatts of energy to the national grid. It will consist of:

- 5 wind turbine generators;
- wind turbine generator foundations and hardstand areas;
- BESS;
- meteorology masts;
- access tracks and underground and overhead transmission lines;
- BESS and wind farm operations and maintenance facilities;
- BESS and wind farm substations; and
- BESS and wind farm substation construction facilities, construction compound, laydown area and batching plant.

The bushfire hazard assessment of the Project area confirmed the Project is within a bushfire hazard area.

The SPP bushfire prone area overlay code and Bushfire resilient communities requires above ground infrastructure to be appropriately setback from bushfire hazard areas. These setbacks are referred to as asset protection zones (**APZs**). APZs were identified for above ground infrastructure based on results of radiant heat exposure assessments and compliance with the radiant heat exposure outcomes of the SPP bushfire prone area overlay code. The recommended width of APZs for the Project range from 10-45 m but there is potential for the refinement of APZs through detailed design and micro-siting of the Project's above ground infrastructure.

Chapter 6 of the BMP provides the bushfire mitigation measures that must be implemented during the construction and operations and maintenance phases of the Project. These mitigation measures include:

- Design and maintenance specifications for APZs around above ground infrastructure.
- Requirements for vegetation clearing and maintenance under overhead transmission lines.
- Requirements for vegetation clearing around cable pits.

- Requirements for the disposal of vegetation waste that is cleared during the construction phase.
- Design and construction specifications for vehicle access tracks.
- Design specifications for a fire-fighter water supply.
- Requirements for wayfinding signage.
- Requirements for buildings to comply with the relevant sections of the *National Construction Code–Building Code of Australia* (volume 1) and governing Queensland laws, codes and standards that apply to the building industry.
- Requirements for administrative controls which include:
  - a hot works permit system;
  - provision of fire-extinguishers;
  - information sharing with the QFES and local Rural Fire Brigades (RFB);
  - annual bushfire preparedness meetings;
  - project rules and inductions;
  - safety documentation;
  - the monitoring of fire weather conditions and the associated precautions;
  - the planning and implementation of fire-fighting near Powerlink Queensland high voltage overhead transmission lines;
  - communication with staff and landowners about bushfire mitigation;
  - emergency response planning;
  - the development of a fire-fighter operations plan poster for the local RFBs;
  - operation of the Project in accordance with the Queensland *Electrical Safety Act 2002* and its regulations and the electrical safety codes of practice by the Electrical Safety Office of Queensland;
  - the storage and handling of hazardous chemicals away from bushfire hazard areas;
  - the shut-down of wind turbine generators during fire-fighting operations; and
  - lighting fires.

With the implementation of the above listed bushfire mitigation measures, the Project complies with the SPP bushfire prone area overlay code and Bushfire resilient communities.

# 1 Introduction

This bushfire management plan (**BMP**) has been prepared for the Mount Fox Energy Park (**the Project**) which is located approximately 35 kilometres (**km**) south-west of Ingham within the local government area of the Hinchinbrook Shire Council.

The Project involves six properties described as lot 18/WU6, lot 21/WU4, lot 3/WG274, lot 57/SP237064 and lots 591 and 592/SP302249. These properties have a combined area of approximately 3,285 hectares (**ha**) and are hereafter referred to as the **Project area**.

This BMP documents a bushfire hazard assessment for the above ground infrastructure areas and identifies strategies that will mitigate the potential risk of bushfire hazards for the construction and operations and maintenance phases of the Project. It includes:

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

## 1.1 Approvals context

On 13 September 2021, the State Assessment and Referral Agency (**SARA**) approved a development permit – material change of use for a wind farm (up to 57 wind turbine generators and ancillary infrastructure) and operational works for native vegetation clearing (**the development permit**) – SARA reference 2102-21213 SDA.

This BMP has been prepared to demonstrate compliance with condition 11(a) of the development permit which states (sic):

- a) Prepare a Bushfire Management Plan (BMP) certified by a suitably qualified person and in consultation with the Queensland Fire and Emergency Services addressing construction and operations, and including the following information at a minimum:
  - i. a fire hazard analysis
  - ii. mitigation strategies to achieve the development outcomes in Part E of the State Planning Policy July 2017 – Natural Hazards, Risk and Resilience.

The Project area is identified as a bushfire hazard area by the Queensland State Planning Policy (**SPP**) *Bushfire prone area map* (**SPP bushfire prone area map**). As a result, condition 11(a) of the development permit is seeking compliance with the SPP *Bushfire prone area overlay code* (**SPP bushfire prone area overlay code**) and *Bushfire Resilient Communities Technical Reference Guide for the State Planning Policy State Interest 'Natural Hazards, Risk and Resilience - Bushfire'* (QFES 2019) (**Bushfire resilient communities**) which was prepared by the Queensland Fire and Emergency Services (QFES) to provide technical guidance for the implementation of the *Natural Hazards, Risk and Resilience – Bushfire, State Planning Policy State Interest guidance material* (DSDMIP 2019). Although not referred to in condition 11(a) of the development permit; compliance with guidelines in *Wind Farms and Bushfire Operations* (AFAC 2018) (**Wind farms and bushfire operations**) is also considered relevant to the construction and operations and maintenance phases of the Project.

The design of the Project has been amended since the development permit was issued. This BMP has been prepared to satisfy condition 11(a) of the development permit as it relates to the current layout of the Project. It demonstrates how compliance with the SPP bushfire prone area overlay code and

Bushfire resilient communities will be achieved during the construction and operations and maintenance phases of the Project.

## 1.2 Bushfire management plan review

This BMP has been prepared to satisfy condition 11(a) of the development permit. Upon appointment, the construction contractor and operations and maintenance 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 operations and maintenance contractor to change or deviate from the mitigation measures specified in Chapter 6.

## 1.3 Method

To meet requirements of Bushfire resilient communities, the following steps were undertaken:

- review of the SPP bushfire prone area map in the SPP interactive mapping system (DSDILGP 2023) and the Queensland regional ecosystem map, vegetation hazard class (**VHC**) map, severe fire weather map and fire history map in the QFES online mapping system (QFES 2023) (**Catalyst**);
- a drive over the Project area and field inspection of the above ground infrastructure areas for vegetation characteristics, current land management practices, slope and evidence of previous fires;
- bushfire hazard assessment in accordance with the method in Bushfire resilient communities;
- 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
- identification of mitigation measures required to reduce the potential risk of bushfire hazards for the construction and operations and maintenance phases of the Project and for compliance with the SPP bushfire prone area overlay code.

Aerial imagery of the Project area was accessed online from Google Earth to assist in validating observations and measurements made during the field inspection.

## 1.4 Suitably qualified person

This BMP was technically reviewed and approved by Robert Janssen who is a suitably qualified and experienced bushfire management consultant.

Robert is the managing principal at Land and Environment Consultants Pty Ltd (**LEC**) and has over 25 years of experience in bushfire planning and operations. He has prepared BMPs 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 Project area and the Project

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

### 2.1 The Project area

The Project area consists of six properties and is approximately 3,285 ha.

Access and egress for the Project area is via Mount Fox Road, Ewan Road and Knuckledown Road.

The western part of the Project area, ie west of Ewan Road, consists of bushland vegetation and modified vegetation which is a result of land clearing and grazing livestock. The eastern part of the Project, ie east of Ewan Road, consists of bushland vegetation.

The Mount Fox switching station, which is under construction is located within lot 591/SP302249 in the western part of the Project area and will provide a connection to the existing Powerlink Queensland (**Powerlink**) high voltage overhead transmission line which runs along the western boundary of the Project area. The Mount Fox switching station is not included in the scope of this BMP.

The boundaries of the Project area mostly adjoin farming land with large continuous areas of bushland vegetation. The exception is part of the northern boundary which adjoins the Girringun Forest Reserve.

### 2.2 The Project

The current layout of the Project is shown in the staging plans in Appendix 1. It involves the development of a battery energy storage system (**BESS**) and a wind farm that will be constructed in two stages and will deliver 350 megawatts of energy to the national grid. It will consist of:

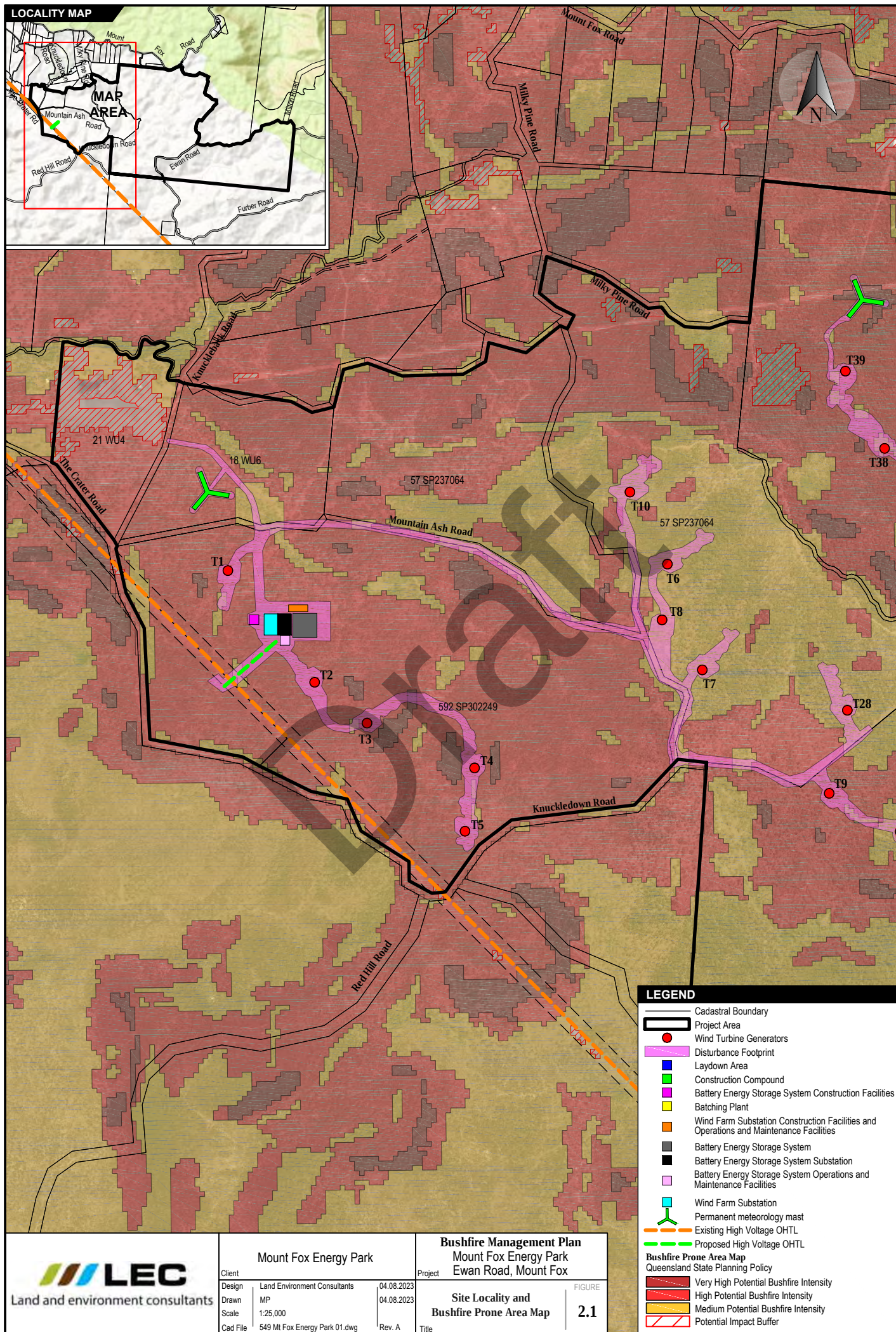
- 57 wind turbine generators;
- wind turbine generator foundations and hardstand areas;
- BESS;
- meteorology masts;
- access tracks and underground and overhead transmission lines;
- BESS and wind farm operations and maintenance facilities;
- BESS and wind farm substations; and
- BESS and wind farm substation construction facilities, construction compound, laydown area and batching plant.

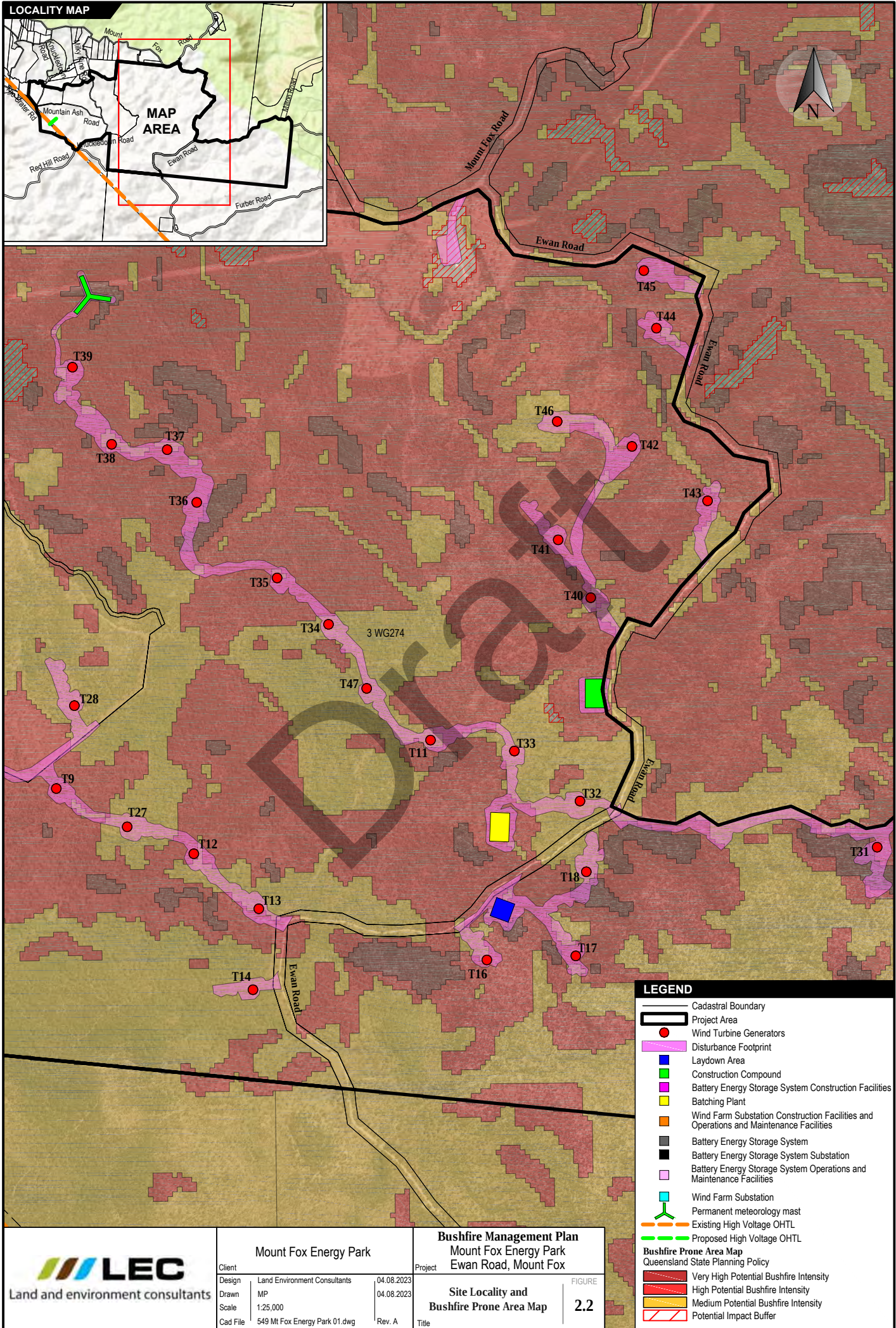
The Projects substations will distribute energy to the national grid via a new Powerlink high voltage overhead transmission line connection to the Mount Fox switching station.

### 2.3 State Planning Policy bushfire prone area map

The SPP bushfire prone area map for the Project area is shown in Figure 2.1-Figure 2.3. They show that the Project is located within a combination of medium, high and very high potential bushfire intensity areas and potential impact buffer areas.

Please note, the terms 'bushfire prone area' and 'bushfire hazard area' have the same meaning and are interchanged throughout this BMP. Both terms mean an area of vegetation which is determined to have a potential bushfire intensity  $\geq 4,000$  kilowatts/metre (**kW/m**) and the land within 100 m of this vegetation.







### 3 Bushfire hazard assessment

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

#### 3.1 Severe fire weather

The severe fire weather map in Catalyst indicates the 5 % annual exceedance probability forest fire danger index (**FFDI**) for the Project area is 46-47. An FFDI value of 47 has been used for the potential bushfire intensity calculations in Section 3.4 and the radiant heat exposure assessment in Section 3.6.

#### 3.2 Fire history

Fire history data in Catalyst indicates that the Project area and adjoining land regularly burns. The burnt areas generally align with the medium, high or very high potential bushfire intensity areas shown in Figure 2.1-Figure 2.3.

#### 3.3 Field inspection

A drive over the Project area and field inspection of the above ground infrastructure areas was performed by LEC from 3-7 July 2023. Observations were recorded about current land use and management, vegetation characteristics, the slope of land and evidence of previous fires.

A summary of observations made at the infrastructure areas shown in the staging plans in Appendix 1 is provided in Appendix 2. Features of the infrastructure areas are shown in photographs in Appendix 3.

Where infrastructure adjoined two VHCs, the VHC which was associated with the worst case bushfire attack scenario was used to assess potential bushfire intensity and radiant heat exposure at the infrastructure area.

#### 3.4 Potential bushfire intensity calculations

The potential bushfire intensity of infrastructure areas 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 Bushfire resilient communities.

Bushfire resilient communities defines bushfire hazard classes as follows:

- very high – potential bushfire intensity > 40,000 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 potential bushfire intensity calculations which determine the bushfire hazard class of the infrastructure areas shown in the staging plans in Appendix 1 are presented in Appendix 4.

#### 3.5 Bushfire prone areas

Results of the potential bushfire intensity calculations in Appendix 4 generally align with the SPP bushfire prone area map and confirm that the Project is within a bushfire hazard area. These results confirm the Project must comply with the SPP bushfire prone area overlay code.

### 3.6 Radiant heat exposure assessment

The SPP bushfire prone area overlay code and Bushfire resilient communities requires above ground infrastructure to be appropriately setback from bushfire prone areas. They require above ground infrastructure associated with ‘community infrastructure for essential services’, ie the BESS and wind farm and BESS substations, to be setback from hazardous vegetation by a distance which achieves a radiant heat flux level  $\leq 10 \text{ kW/m}^2$ . They also require permanent above ground infrastructure associated with ‘other uses’, ie the wind farm and BESS operations and maintenance facilities and wind turbine generators, to be setback from hazardous vegetation by a distance which achieves a radiant heat flux level  $\leq 29 \text{ kW/m}^2$ . These setbacks are hereafter referred to as asset protection zones (APZs).

The APZs minimise the impact of bushfire attack on above ground infrastructure and provide a defensible space for fire-fighters to operate.

The radiant heat profile of bushfire attack on permanent above ground infrastructure, ie the BESS, wind farm and BESS substations, wind farm and BESS operations and maintenance facilities and wind turbine generators, shown in the staging plans in Appendix 1 was assessed using the BAL calculator.

The analysis of bushfire attack scenarios was based on VHCs observed during the field inspection, VHC mapping in Catalyst and the steepest slopes measured for VHCs during the desktop review and field inspection. Inputs used to assess the radiant heat profile of each bushfire attack scenario and results of the BAL calculator are provided in Appendix 5.

The APZs were identified for permanent above ground infrastructure based on results of the radiant heat exposure assessment and compliance with the radiant heat exposure outcomes of the SPP bushfire prone area overlay code.

For the meteorology masts and temporary infrastructure, ie the wind farm and BESS substation construction facilities, construction compound, laydown area and batching plant, this BMP applies an alternative solution to the SPP bushfire prone area overlay code and Bushfire resilient communities and recommends an APZ with a nominal cleared width of 10 m.

The APZs around above ground infrastructure are summarised in Table 3.1.

**Table 3.1 Asset Protection Zones around above ground infrastructure**

| Width of APZ around above ground infrastructure (m) <sup>1</sup>                                                                                                                                                                                                             |                       |                                                                                                                                                                           |                                       |     |                                                                                                                                          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-----|------------------------------------------------------------------------------------------------------------------------------------------|
| 10                                                                                                                                                                                                                                                                           | 15                    | 20                                                                                                                                                                        | 30                                    | 35  | 45                                                                                                                                       |
| Meteorology mast 1 (near T1),<br>Meteorology mast 2 (near T39),<br>Meteorology mast 3 (near T24), Batching plant (near T33),<br>laydown area (near T16), Construction compound (near T40),<br>BESS construction facilities and Wind farm substation construction facilities. | T8, T14, T28 and T33. | T1, T2, T3, T4, T5, T6, T7, T9, T10, T11, T13, T16, T18, T19, T20, T21, T22, T24, T26, T27, T29, T30, T31, T32, T34, T35, T36, T39, T41, T42, T43, T44, T45, T46 and T47. | T12, T15, T17, T25, T37, T38 and T40. | T23 | BESS operations and maintenance facility, BESS, BESS substation, Wind farm substation and Wind farm operations and maintenance facility. |

Note 1 The locations of above ground infrastructure are shown in the staging plans in Appendix 1.

2 APZs may be refined and potentially reduced through detailed design and micro-siting of the Project.

The APZs are not applied to access tracks, retaining walls, earthwork embankment batters, fences, terraced walkways or transmission lines. Notwithstanding, above ground transmission lines are

located within a vegetation clearing which is designed to be relevant to electricity transmission and distribution networks in Queensland.

The APZs are measured from the electrical infrastructure within the wind farm and BESS substations, the external walls, supporting posts or columns of buildings, wind turbine generators and the location of compound fencing at the wind farm and BESS construction facilities, construction compound, laydown area and batching plant. If there is no compound fencing at the wind farm and BESS construction facilities, construction compound, laydown area and batching plan, the APZ can be measured from the location of temporary structures, plant, equipment and storage areas.

Draft

## 4 Bushfire hazards associated with the Project area and the Project

This chapter identifies bushfire hazards associated with the Project area and the Project.

### 4.1 Fire danger season

The fire danger season at the Project area starts in August, peaks in September and begins to fall in November, but will remain elevated until 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 47, ie the 5 % annual exceedance probability FFDI for the Project area, will be associated with hot, dry and windy conditions. If a bushfire starts and takes hold under these conditions, it will be difficult to control and fast moving in large areas of bushland vegetation.

The fire danger rating (**FDR**) system provides advice about the level of bushfire threat on a day. The most recent national FDR system was introduced in September 2022. It is based on a new fire behaviour index system and is no longer linked to FFDI values. The FDR system has four levels which are summarised below:

- moderate – most fires can be controlled;
- high – fires can be dangerous;
- extreme – fires will spread quickly and be extremely dangerous; and
- catastrophic – if a fire starts to take hold, it could result in the loss of life.

The FDRs will be monitored during both the construction and operations and maintenance phases of the Project.

### 4.2 Fire history

As discussed in Section 3.2, fire history data indicates that the Project area and adjoining land regularly burns.

Based on the fire history data it is considered almost certain that the Project's above ground infrastructure will be exposed to bushfire attack in the future.

### 4.3 Vegetation

The disturbance footprint of the Project will be cleared of vegetation in preparation for civil works.

The APZs will be established around above ground infrastructure as specified in Table 3.1 and will be maintained for the life of the Project.

The APZs will be either hardstand areas which are maintained free of weeds and grass cover or grass areas which are maintained at a nominal height of < 30 centimetres (**cm**).

### 4.4 Bushfire management within the Project area

TagEnergy Australia Pty Ltd (**TagEnergy**) and the construction contractor or operations and maintenance contractor will be responsible for bushfire management within the disturbance footprint which is leased from the landowners of the Project area. The landowner's hosting the Project are responsible for bushfire management in the balance of the Project area.

Notwithstanding, bushfire management is a landscape issue and there will be benefits for both the Project and landowners if all parties work collaboratively to manage bushfire hazards within the Project area.

#### 4.5 Bushfire attack and the protection of above ground infrastructure

A bushfire in areas of woodland or forest vegetation on steep slopes present the main issue for the protection of above ground infrastructure.

During fire weather conditions which correlate with the 5 % annual exceedance probability FFDI for the Project area, a bushfire in areas of woodland or forest vegetation has potential to generate radiant heat energy up to 62,789 kW/m which in combination with steep slopes will make fire-fighting operations and access difficult. Therefore, direct attack of a fire under these fire weather conditions and the protection of infrastructure may not always be possible.

#### 4.6 Workforce

The Project will not result in the permanent exposure of large numbers of people to bushfire hazard. It is expected that the workforce will peak during construction at <<TagEnergy to advise number>> personnel over an <<TagEnergy to advise duration>> month period and will be reduced to <<TagEnergy to advise number>> full time equivalent roles during the operations and maintenance phase.

Workers will not be accommodated within the Project area for the construction or operations and maintenance phases of the Project.

During the construction phase, it is expected that most of the workforce will live locally or in adjacent regional centres.

Workers employed for the operations and maintenance phase of the Project are generally local people seeking employment, who are trained appropriately by the operations and maintenance contractor.

#### 4.7 Hazardous chemicals

Storage or handling of hazardous chemicals during the construction and operations and maintenance phases of the Project will be in accordance with *Managing risks of hazardous chemicals in the workplace – Code of Practice* (SWA 2023), applicable safety data sheets, and otherwise in accordance with the *Queensland Work Health and Safety Act 2011* and its regulations.

#### 4.8 Access

The Project will establish an access track network that will link the Project infrastructure to existing roads. Access tracks will be designed for heavy articulated vehicles and will meet the design standards for emergency vehicle access in the SPP bushfire prone area overlay code including (where required) the provision of turnaround areas on dead-end access tracks. If there are gates across access tracks, they will be at least 4 m wide.

In addition to the Project's access tracks and the road network, there are numerous property access tracks which are of varying design and maintenance standards and may require restoration prior to use for bushfire management operations.

There are multiple vehicle access points into the Project area, ie via Mount Fox Road, Ewan Road and Knuckledown Road.

#### 4.9 Rural Fire Brigade resources and capability

The local Rural Fire Brigades (**RFBs**) are voluntary primary producer brigades and have limited resources to respond to a fire ignition within the Project area. They are unlikely to have any training or experience operating around electrical infrastructure, ie the wind farm and BESS substations, and have limited capability to respond to structural fires.

Local RFB personnel may not be familiar with the layout of the Project and out of area RFBs will not be familiar with the location of the Project area, ie access roads, water points, terrain, etc.

#### 4.10 Aerial fire-fighting operations

The wind turbine generators and meteorology masts pose a navigation risk to pilots performing aerial fire-fighting operations.

#### 4.11 Fire-fighter water supply

There will be dedicated fire-fighter water supply tanks for the construction and operations and maintenance phases of the Project.

There are numerous dams and creeks within the Project area. However, the standard of vehicle access to them and the reliability of their water supply is unknown and they should not be relied upon.

#### 4.12 Warning and evacuation requirements

Queensland emergency services use a range of methods to warn the community about bushfire, severe weather and other emergencies that require preparation and action at the property level. The construction workforce and operations and maintenance workforce will be subject to advice and warnings by Queensland emergency services via radio, online media and local community safety announcements.

A safety and emergency management plan and an evacuation plan will be prepared for the construction phase and operations and maintenance phase of the Project. These plans will provide details of actions to be undertaken in response to a bushfire emergency. They are separate plans to this BMP.

#### 4.13 Buildings

Offices and worker amenities that are required for the construction phase of the Project will be demountable buildings, ie temporary buildings, that will be located in a cleared compound.

Buildings associated with the wind farm and BESS operations and maintenance facilities and the wind farm and BESS substations will be designed to meet the fire resistance and safe access and egress requirements of the *National Construction Code–Building Code of Australia (NCC-BCA)* (volume 1) (ABCB 2019) and governing Queensland laws, codes and standards that apply to the building industry.

Fire detection and first attack fire-fighting equipment in buildings will comply with requirements in the NCC-BCA (volume 1) and any Queensland specific requirements.

## 5 Fire ignition risks

This chapter identifies fire ignition risks within the Project area.

### 5.1 Land use

The boundaries of the Project area mostly adjoin farming land with large continuous areas of bushland vegetation. The exception is part of the northern boundary which adjoins the Girringun Forest Reserve.

The operation of equipment and machinery or hot works associated with agricultural activities could result in unplanned fires that impact on the Project, particularly on days with an FDR of extreme or above. In addition, landowners may light fires to burn waste or for bushfire fuel hazard reduction. Therefore, land which is used for agricultural activities is a potential bushfire hazard to the Project.

The custodians of the Girringun Forest Reserve are likely to light fires for bushfire fuel hazard reduction or to achieve biodiversity conservation outcomes. Therefore, this area is also a potential bushfire hazard to the Project.

### 5.2 Overhead transmission lines

Powerlink high voltage overhead transmission lines are susceptible to ‘flashover’ which can cause a fire ignition in surrounding vegetation. Fires with a flame height greater than 1 m adjacent to or under high voltage overhead transmissions lines have the potential to:

- create electrical arcs (known as flashovers) that can endanger people, animals and objects;
- damage or destroy wires, insulators and supports of the transmission line; and
- interrupt power supply to households, business and industry.

Vegetation under the high voltage overhead transmission lines will be maintained in accordance with Powerlink’s vegetation management specifications for high voltage overhead transmission lines (Powerlink 2018).

Wind turbine generators will be connected to the wind farm substation by underground and overhead transmission lines. The risk of a fire ignition caused by these overhead transmission lines is minor when compared to the risk profile that exists for Powerlink’s high voltage overhead transmission lines. Nonetheless, vegetation management under these overhead transmission lines will be in accordance with *Energy Queensland – Vegetation Management Strategy – Version 2* (EQ 2023).

### 5.3 Lightning strike

A lightning strike could cause a fire within the Project area, particularly during the fire danger season, ie from late winter to early summer, when dry electrical storms most commonly occur.

The Australasian Fire and Emergency Service Authorities Council Limited suggests that it is possible that wind turbine generators may reduce the risk of bushfires caused by lightning strikes, given that wind turbine generators can attract lightning during thunderstorms. If struck by lightning, a wind turbine generator is not expected to start a fire as it has built-in fire protection mechanisms (AFAC 2018).

### 5.4 Mechanical or electrical fire

There is potential for a fire of electrical or mechanical origin to develop in wind turbine generators, transformer kiosks or substations and result in a fire within the Project area. However, this situation is unlikely to occur as this infrastructure has built-in fire protection mechanisms (AFAC 2018), will be surrounded by an APZ where vegetation is managed.

## 5.5 Construction activities

The use of tracked earthmoving machinery on rocky ground, vehicles driving or parking in long grass, hot works and people smoking has potential to cause a bushfire during the construction phase.

## 5.6 The operations and maintenance activities

Similar risks may exist during the operations and maintenance phase of the Project that existed during the construction phase, ie vehicles driving or parking in long grass, hot works and people smoking. However, worker numbers will be significantly reduced and access throughout the Project area will be on formed access tracks, meaning vehicle and mobile plant movement off formed access tracks will rarely occur.

Draft

## 6 Bushfire mitigation plan

This chapter identifies bushfire mitigation measures that must be implemented during the construction and operations and maintenance phases of the Project.

The bushfire mitigation measures will reduce the risk of bushfire hazards to a tolerable level which in this report means compliance with outcomes of the SPP bushfire prone area overlay code.

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

### 6.1 Asset protection zones

The APZs shown in Figure 6.1-Figure 6.3 must be established and maintained around above ground infrastructure. The width of APZs must comply with the minimum widths specified for the above ground infrastructure in Table 3.1.

The APZs must be measured from the electrical infrastructure within the wind farm and BESS substations, the external walls, supporting posts or columns of buildings, wind turbine generators and the location of compound fencing at the wind farm and BESS construction facilities, construction compound, laydown area and batching plant. If there is no compound fencing at the wind farm and BESS construction facilities, construction compound, laydown area and batching plan, the APZ can be measured from the location of temporary structures, plant, equipment and storage areas.

The APZs must be cleared of vegetation and established as a gravel hardstand area or grass area. A gravel hardstand area must be maintained free of weeds and grass cover. Where establishing a gravel hardstand area is not practical, a grass area must be established. A grass area must be maintained free of woody vegetation and with grass cover which has a height of  $\leq 30$  cm.

The APZs must be inspected at regular times intervals during the calendar year and vegetation maintained in accordance with the specifications above.

### 6.2 Overhead transmission lines

Vegetation management under any high voltage overhead transmission lines must be in accordance with Powerlink's vegetation management specifications for high voltage transmission lines (Powerlink 2018).

Vegetation management under overhead transmission lines which connect wind turbine generators to the wind farm substation must be in accordance with the *Energy Queensland – Vegetation Management Strategy* (EQ 2023).

### 6.3 Cable pits

A 1 m wide area around cable pits must be cleared of all vegetation greater than 10 cm in height.

### 6.4 Vegetation waste

Vegetation cleared from the disturbance footprint during the construction phase must not be pushed into windrows. The cleared vegetation must be removed from the disturbance footprint or mulched, in which case the mulch can be used for erosion and sediment control within the disturbance footprint. Maintenance must occur prior to the annual fire danger season, ie prior to the end of August.

## 6.5 Access and evacuation

There are multiple vehicle access routes into the Project area, ie via Mount Fox Road, Ewan Road and Knuckledown Road. These access routes and the access track network that will be constructed within the Project area are shown in Figure 6.1-Figure 6.3.

As a minimum requirement, access tracks must meet the design specifications for category 1 fire-fighter vehicles by the New South Wales Rural Fire Service (NSW RFS 2016) which are summarised as follows:

- Width – The trafficable surface has a width 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. Curves have a minimum inner radius of 6 m. The minimum distance between inner and outer curves is 6 m.
- Capacity – Trail surfaces and crossing structures are capable of carrying vehicles with a gross vehicle mass of 15 tonnes (t) and an axle load of 9 t.
- Grade and crossfall – The maximum grade of a trail is not more than 15 degrees. The crossfall of the trail surface is not more than 6 degrees. Drainage structures, feature crossings, or other significant changes in the grade of the trail shall be in accordance with the *Fire Trail Design, Construction and Maintenance Manual* (NSW DISCS 2017).
- Clearance – A minimum vertical clearance of 4 m is provided above the surface of the trafficable surface clear of obstructions.
- Passing – 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 long area clear of the trafficable surface with a minimum inner curve radius of 6 m and minimum outer radius of 12 m; or
  - a turnaround area is provided (as outlined below).
- Turnarounds – A turning area is provided at the termination of a trail and every 500 m and is achieved by:
  - an area clear of the trafficable surface, which is 6 m wide and 8 m deep, with a minimum inner curve radius of 6 m and minimum outer radius of 12 m; or
  - a turning circle of minimum 22 m diameter;
  - a T-junction with each terminating end of the junction being at least 10 m in length from the intersection of the roads and the inner radius of the intersection being at least 6 m; or
  - a fire trail or road intersection.

Drainage for access tracks must be designed and constructed in accordance with the *Fire Trail Design, Construction and Maintenance Manual* (NSW DISCS 2017).

Access tracks must be inspected at regular times intervals during the calendar year and maintained in accordance with the specifications above. Maintenance must occur prior to the annual fire danger season, ie prior to the end of August.

## 6.6 Fire-fighter water supply

Upon commencement of the construction phase, fire-fighter water storage tanks must be installed at the BESS or wind farm construction facilities and the construction compound. They must be made of metal or concrete and have a minimum capacity of 40,000 litres. The indicative locations of the fire-fighter water storage tanks are shown in Figure 6.1 and Figure 6.2.

The fire-fighter water storage tanks must remain in place during both the construction phase and the operations and maintenance phase. They must be kept full of water and must not be used for activities other than bushfire management.

The fire-fighter water storage tanks must be fitted with RFB fire-fighter fittings – we recommend contacting the local RFB to confirm the standard RFB fittings in use at the locality. All above ground fittings, ie connections, valves and pipes, must be made of metal.

The fire-fighter water storage tanks must have a hardstand area within 4 m of the inlet and outlet points. The hardstand areas must have the load bearing capacity and dimensions suitable for a heavy rigid vehicle to park.

The fire-fighter water storage tanks and fittings must be inspected annually and any required maintenance work undertaken prior to the annual fire danger season, ie prior to the end of August.

## 6.7 Wayfinding

Reflective wayfinding signage must be installed at the intersection of access tracks and identify the location of project infrastructure and fire-fighter water storage tanks.

Wayfinding signage must be based on a naming and marking convention which enhances accessibility for out of area fire-fighters. For example, marking the intersection of access tracks as A-B to indicate that it links landmark A to landmark B; landmarks used for this purpose must be identifiable on site and marked on any site mapping.

Access track marking must clearly indicate no through access tracks.

## 6.8 Buildings

Buildings must comply with the fire resistance and safe access and egress requirements of the 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 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.

## 6.9 Administrative controls

### 6.9.1 General

Hot works must be managed under a hot works permit system.

Hot works and other high fire risk activities, eg the operation of track machinery on rocky ground, must be monitored for ignitions and only performed if fire management controls are in place.

Vehicles and mobile plant and equipment must not be operated or parked in long grass, ie grass > 30 cm in height, unless fire management controls are in place.

Vehicles and mobile plant and equipment must be fitted with an ultra-high frequency (UHF) radio and a portable fire extinguisher. The portable fire extinguisher must be suitable for extinguishing a fire associated with the vehicle or mobile plant and equipment.

Water carts/water tanks must be located adjacent to construction work areas during the fire danger season, ie from late winter until summer when significant rainfall occurs.

### 6.9.2 Information transfer

Prior to commencing the operations and maintenance phase of the Project, spatial data which identifies the location of access tracks and infrastructure must be provided to the QFES so that it can be uploaded into the QFES online incident management system and is readily available for bushfire emergency planning.

TagEnergy must consult with the QFES to determine the information and data format requirements and the specifics of the data transfer.

### 6.9.3 Bushfire preparedness

The construction contractor and operations and maintenance contractor must invite the local QFES and RFBs and landowners hosting the Project to participate in an annual bushfire preparedness meeting for the Project.

The meeting will be used to familiarise QFES and RFB personnel and landowners with the Project's infrastructure, access tracks, fire-fighter water storage tank and fittings, communication procedures and safety requirements for operating within the Project area. It will also provide an opportunity to review any bushfire incidents within or adjacent to the Project area and any plans for hazard reduction burns by the landowners.

Opportunities to upgrade dams and access tracks located within the Project area must also be discussed at the preparedness meeting as these upgrades could have benefits for the Project.

The bushfire preparedness meeting also provides an opportunity to run a bushfire response training drill with the local QFES and RFBs.

### 6.9.4 Project rules and inductions

Access to the Project area during the construction and operations and maintenance phases of the Project will be conditional on compliance with workers completing an induction and complying with entry rules, including rules regarding smoking.

Smoking must only be permitted in cleared areas, ie the site compound, laydown areas, the operations and maintenance facility and wind turbine generator hardstands.

### 6.9.5 Safety documentation

Activities associated with the construction and operations and maintenance phases of the Project must be governed by safety documentation, including safe work method statements. Activity specific bushfire risk management controls must be identified through the safety documentation. Where required, the safety documentation must be managed through a permit to work system which must provide an additional layer of control around bushfire risk management.

### 6.9.6 Monitor fire weather conditions

The FDRs and fire weather warnings must be monitored daily for the construction and operations and maintenance phases of the Project. The FDR and associated guidance from the QFES must be communicated to staff or contractors prior to commencing the day's work, ie during the daily pre-start safety brief.

The FDRs for the Project area are updated daily by the QFES and can be accessed online at <https://www.qfes.qld.gov.au/prepare/bushfire/fire-danger-rating> - search for Herbert and Lower Burdekin district. Fire weather warnings are published online by the Bureau of Meteorology at <http://www.bom.gov.au/qld/index.shtml>.

Table 6.1 provides guidance on precautions for activities during the construction and operations and maintenance phases of the project in relation to FDRs.

**Table 6.1 Fire Danger Rating activity guidelines**

| FDR      | Fire danger guidance                                                                                                                                                                                                             | Operational guidance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Moderate | <p>Plan and prepare.</p> <p>Most fires can be controlled.</p> <p>Stay up to date and be ready to act if there is a fire.</p>                                                                                                     | <p>Maintain APZs.</p> <p>Access tracks are checked and maintained clear of obstacles.</p> <p>Fire extinguishers are checked and are operational.</p> <p>Fire-fighter water storage tanks are full and plumbing is checked and is operational.</p> <p>During construction - inspect any mulched piles of cleared vegetation for signs of combustion.</p> <p>Hot works are performed in accordance with a hot works permit.</p> <p>Monitor FDR conditions.</p>                                                                                                                                                                                                                                                                                                                 |
| High     | <p>Be ready to act.</p> <p>Fires can be dangerous.</p> <p>Decide what you will do if a fire starts.</p> <p>There is a heightened risk. Be alert for fires in your area.</p> <p>If a fire starts, avoid bushfire prone areas.</p> | <p>Maintain APZs.</p> <p>Access tracks are checked and maintained clear of obstacles.</p> <p>Fire extinguishers are checked and are operational.</p> <p>Fire-fighter water storage tanks are full and plumbing is checked and is operational.</p> <p>During construction - inspect any mulched piles of cleared vegetation for signs of combustion.</p> <p>Construction and operational activities that may cause accidental ignitions, eg slashing and machine/vehicle operation in long grass, require a spotter and water cart to be present onsite.</p> <p>Hot works require additional approval from the construction contractor and operations and maintenance contractor or delegate and will occur under a permit to work system.</p> <p>Monitor FDR conditions.</p> |
| Extreme  | <p>Fires will spread quickly and will be extremely dangerous.</p> <p>Make sure the Project is fire ready.</p> <p>If a fire starts, take immediate action.</p>                                                                    | <p>Fire extinguishers are checked and are operational.</p> <p>Fire-fighter water storage tanks are full and plumbing is checked and is operational.</p> <p>During construction - inspect any mulched piles of cleared vegetation for signs of combustion.</p> <p>Fire weather warnings and restrictions imposed by the QFES must be observed.</p>                                                                                                                                                                                                                                                                                                                                                                                                                            |

| FDR          | Fire danger guidance                                       | Operational guidance                                                                                                                             |
|--------------|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
|              |                                                            | Construction and operational activities that may cause accidental ignitions, eg slashing and machine operation in long grass, are not permitted. |
|              |                                                            | Hot works must not occur in outdoor areas.                                                                                                       |
|              |                                                            | Surveillance for fire ignitions and smoke plumes within and adjoining the Project area.                                                          |
|              |                                                            | Monitor FDR conditions.                                                                                                                          |
| Catastrophic | Do not enter bushfire prone areas.                         | Fire weather warnings and restrictions imposed by the QFES must be observed.                                                                     |
|              | If a fire starts, it will potentially be life threatening. | Surveillance for fire ignitions and smoke plumes within and adjoining the Project area.                                                          |
|              | These are the most dangerous conditions for a fire.        | No construction activities are permitted (other than administrative activities which occur indoors).                                             |
|              | Stay safe by going to a safer location early.              | No operational or maintenance activities are permitted (other than administrative activities which occur indoors).                               |
|              | Buildings may not withstand fires in these conditions.     | Monitor FDR conditions.                                                                                                                          |

#### 6.9.7 High voltage overhead transmission line

Fire-fighting operations near the Powerlink high voltage overhead transmission lines must be planned and implemented in accordance with the *National Guidelines on Electrical Safety for Emergency Service Personnel* (ENA DOC 008-2006) and the Powerlink's instructions.

#### 6.9.8 Communications planning

TagEnergy must ensure the following is in place by the time construction commences:

- all relevant staff are aware of the mitigation measures in this BMP;
- an emergency contact number is available online and is attended to at all times by trained staff;
- contingency communication systems are in place for the onsite representative of the construction contractor and operations and maintenance contractor in case of failed telephone communication attempts;
- communication with the landowners hosting the Project to ensure that access to the Project area is not constrained for the local QFES and RFBs; and
- a mechanism to provide periodical updates to the landowners hosting the Project and the local QFES and RFBs as the Project is progressively built.

#### 6.9.9 Emergency response planning

A separate emergency response plan must be prepared by the construction contractor for the construction phase of the Project and by the operations contractor for the operations and maintenance phase of the Project.

The emergency response plan must include procedures to be followed in the event of a bushfire warning by the QFES and a bushfire within properties hosting the Project. It must also identify the location of safe assembly/evacuation areas and the access routes to these areas.

With regards to bushfire, a safe assembly or evacuation area must have a gravel surface or consist of low cut grass, ie grass slashed to a nominal height  $\leq 30$  cm, and must not be located in areas identified as medium, high and very high potential bushfire intensity in Figure 2.1-Figure 2.3.

In the event of a fire ignition that cannot be safely extinguished with available resources, ie a bushfire, the following procedure must be followed:

1. Contact the QFES via a 000 call.
2. Notify property owners hosting the Project of the fire ignition.
3. Evacuate personnel and contractors to a safe assembly/evacuation area and account for all personnel and contractors.
4. Meet the QFES and provide information relevant to the bushfire emergency.
5. Resume construction or operations and maintenance works when advised by the QFES that it is safe to do so.

#### 6.9.10 Fire-fighter operations plan

Prior to the operations and maintenance phase of the Project, a fire-fighter operations plan must be prepared for the Project area and provided to the local RFBs. It must be in the format of a poster plan that can be rolled out and used in the field.

The fire-fighter operations plan must identify (as a minimum) the location of infrastructure, access tracks, water points and reference wayfinding signage. It must also include contact and communications information, instructions for operating around electrical infrastructure and operational guidelines for fire control.

#### 6.9.11 Electrical safety

The Project must be operated in compliance with the Queensland *Electrical Safety Act 2002* and its regulations and the electrical safety codes of practice by the Electrical Safety Office of Queensland (ESO 2020a, ESO 2020b and ESO 2021).

Electrical equipment installed to support the operations and maintenance phase of the Project must be regularly inspected in accordance with the manufacturer's guidance (where this applies) or in accordance with industry best practice.

#### 6.9.12 Hazardous chemicals

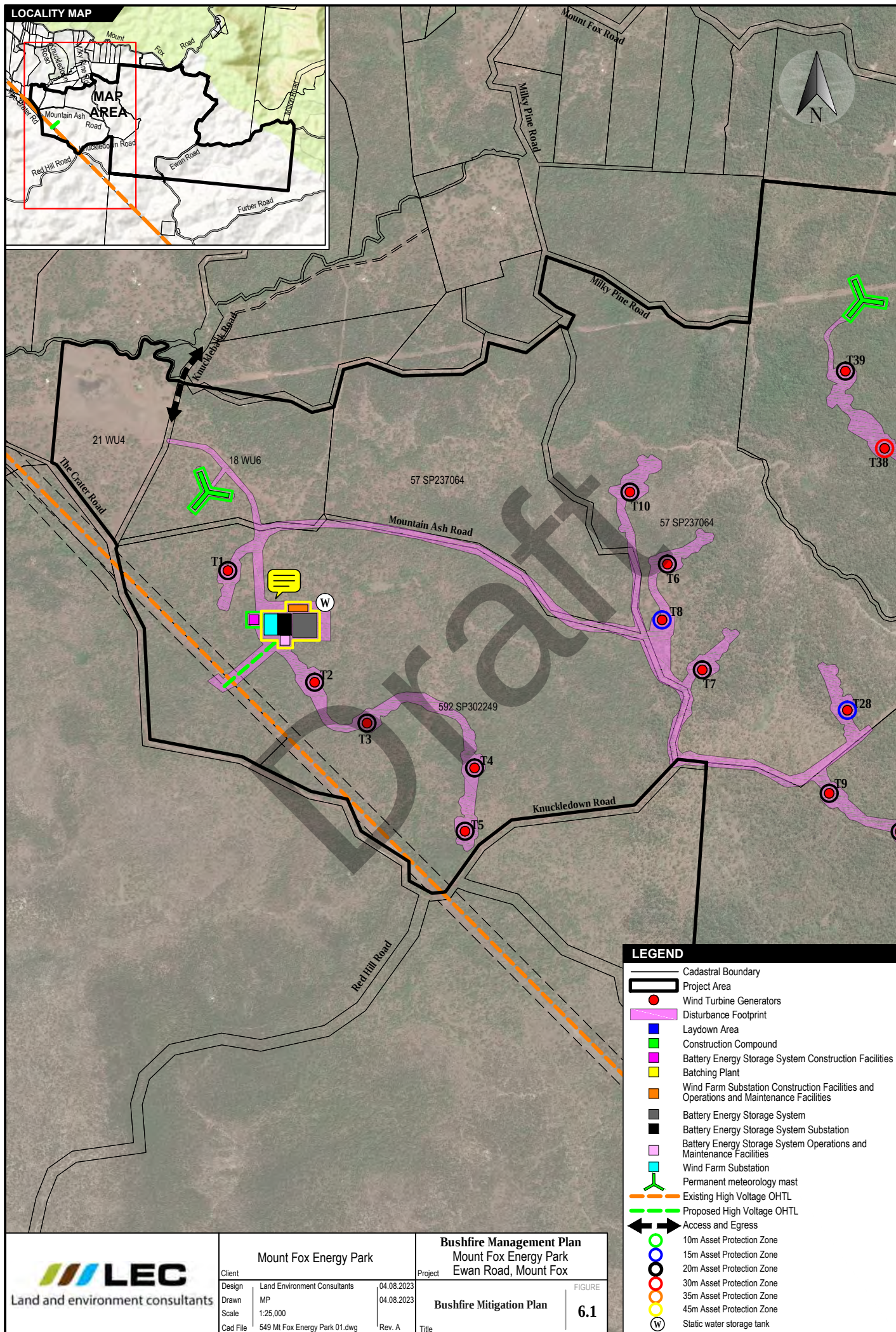
Storage or handling of hazardous chemicals during the construction and operations and maintenance phases of the Project must not occur in vegetated areas and must be in accordance with *Managing risks of hazardous chemicals in the workplace – Code of Practice* (SWA 2023), applicable safety data sheets, and otherwise in accordance with Queensland *Work Health and Safety Act 2011* and its regulations.

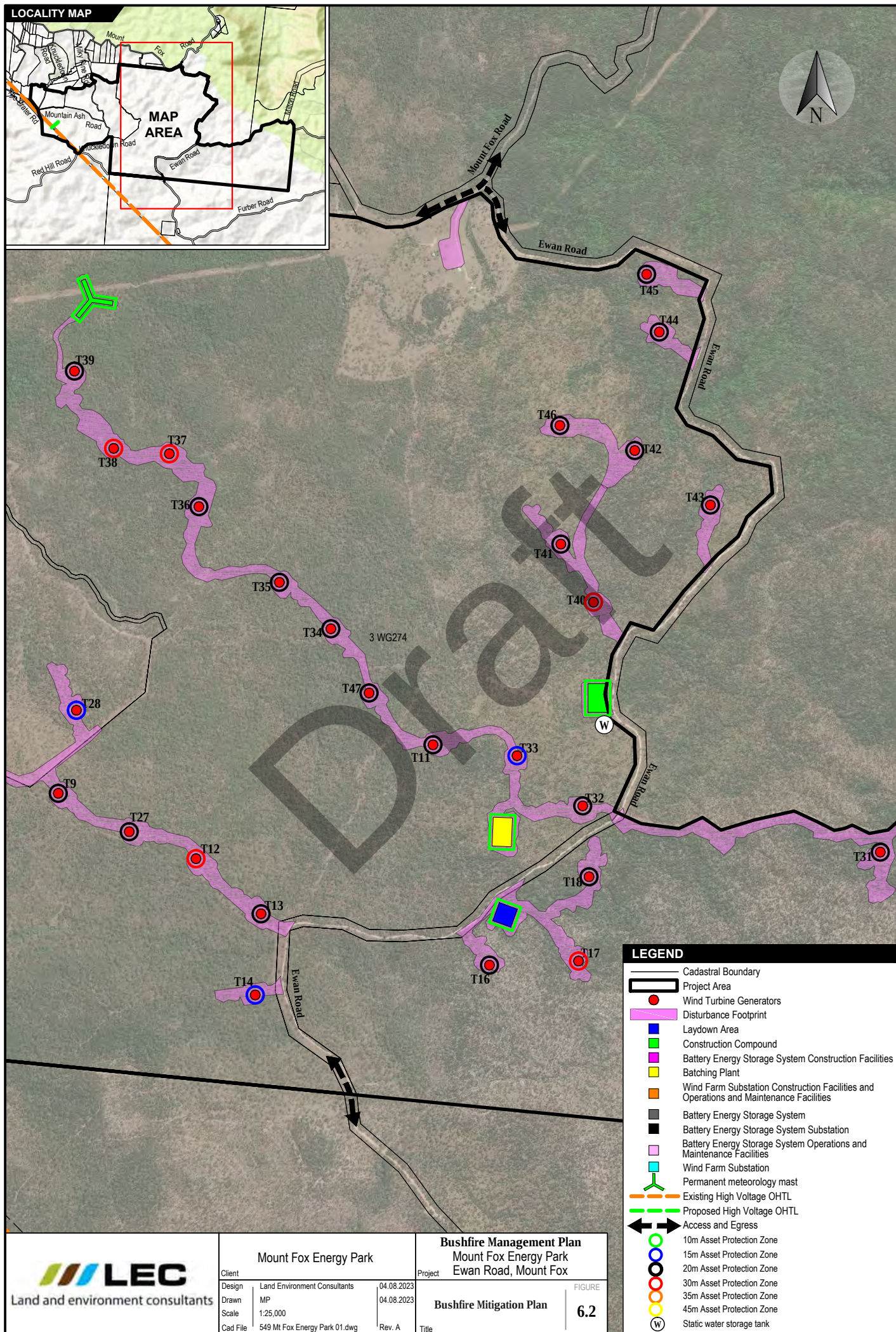
#### 6.9.13 Shut down

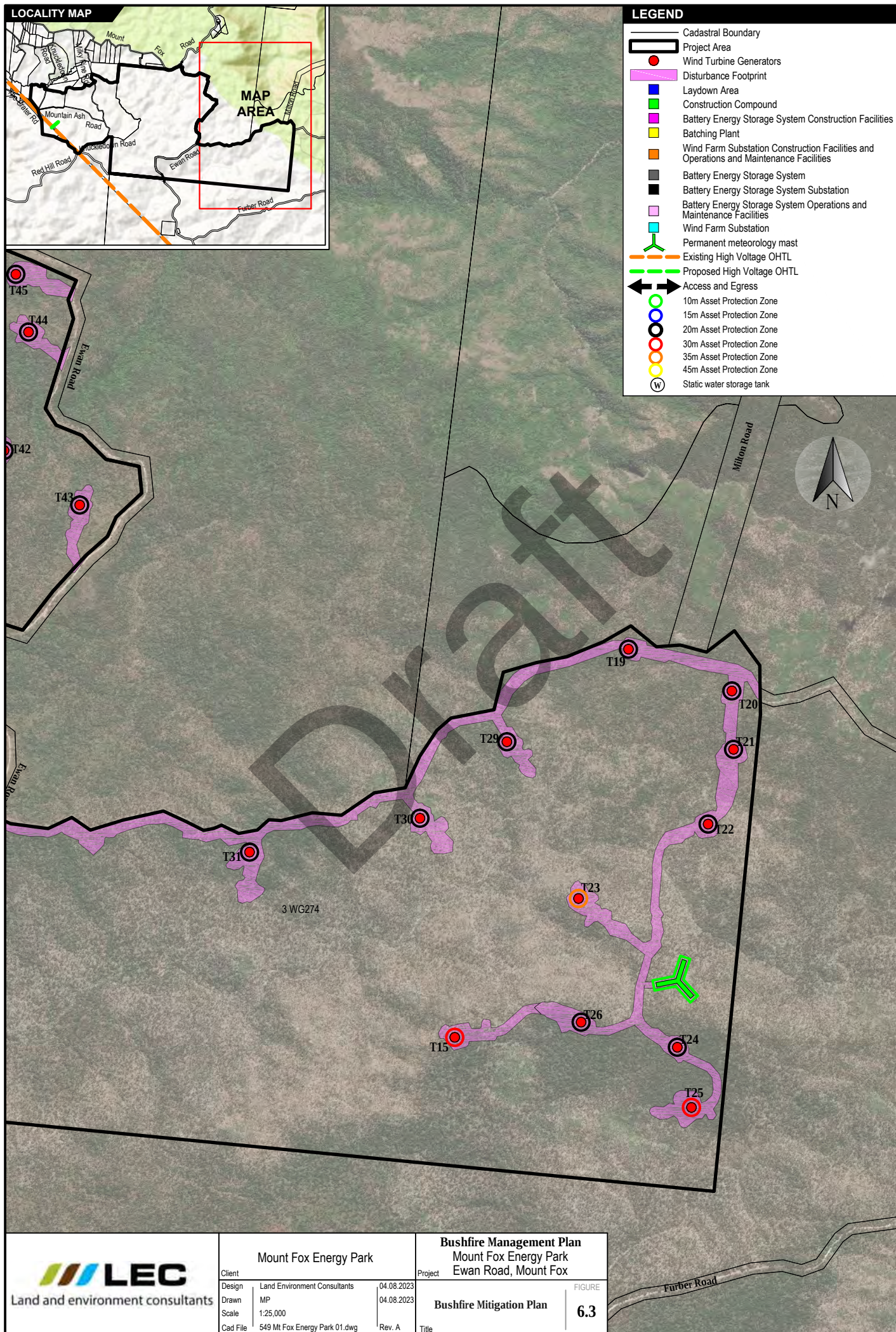
The wind turbine generators must be locked in a static position if advised by the QFES that aerial fire-fighting operations are to be undertaken within the properties hosting the Project. Protocols for the operations and maintenance phase of the Project must be explicit about what party has the authority to lock wind turbine generators in a static position.

#### 6.9.14 Lighting fires

Lighting fires is prohibited within the Project area (unless requested by the QFES or RFB in response to a bushfire emergency, eg backburning containment lines to protect infrastructure).







## 7 Closing

This BMP has been prepared for compliance with condition 11(a) of the development permit as it relates to the amended design for the Project. It has been technically reviewed and approved by a suitably qualified person and is in general accordance with requirements of the SPP bushfire prone area overlay code and Bushfire resilient communities. Its preparation involved an in-field inspection of the Project area and consultation with one of the landowners hosting the Project.

The bushfire hazard assessment confirmed that the Project area is a bushfire hazard area and the construction and operations and maintenance phases of the Project are subject to compliance with the SPP bushfire prone area overlay code. An assessment of compliance with the SPP bushfire prone area overlay code is provided in Appendix 6.

Mitigation measures that must be implemented during the construction and operations and maintenance phases of the Project are specified in Chapter 6. Upon appointment, the construction contractor and the operations and maintenance 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 operations and maintenance contractor to change or deviate from the mitigation measures specified in Chapter 6.

There is an opportunity for refining the APZs specified in Chapter 6 through detailed design and micro-siting of the Project's infrastructure.

Compliance with condition 11(a) of the development permit requires the BMP to be prepared in consultation with the QFES. The draft version of this BMP will be submitted to the QFES for their review and comment. Consideration of QFES comments will be undertaken during the finalisation of this BMP. Compliance with condition 11(b) requires the final version of the BMP to be submitted to Queensland Treasury at [windfarms@dsdmip.qld.gov.au](mailto:windfarms@dsdmip.qld.gov.au). Compliance with condition 11(c) requires that the Project to be constructed and operated in accordance with the final version of this BMP.

## References

Australian Building Codes Board (ABCB) 2019, *National Construction Code Series, Building Code of Australia Class 2 to Class 9 Buildings, Volume 1*, Australian Government and States and Territories of Australia, February 2019

Australasian Fire and Emergency Service Authorities Council Limited (AFAC) 2018, *Wind Farms and Bushfire Operations – Guideline*, Version 3.0, Doctrine identification 2053, 25 October 2018

Electrical Safety Office (ESO) 2020a, *Electrical safety code of practice 2020 – Working near overhead and underground electric lines*, 2 January 2020

Electrical Safety Office (ESO) 2020b, *Electrical safety code of practice 2020 – Works*, 2 January 2020

Electrical Safety Office (ESO) 2021, *Electrical safety code of practice 2021 – Managing electrical risks in the workplace*, 2021

Energy Networks Association (ENA) 2006, *National Guidelines on Electrical Safety for Emergency Service Personnel*, sixth edition 2006, published by Standards Australia

Energy Queensland (EQ) 2023, *Energy Queensland – Vegetation Management Strategy – Strategy G001 Version 2*, accessed online at [https://www.energyq.com.au/\\_data/assets/pdf\\_file/0008/706661/Vegetation-Management-Strategy.pdf](https://www.energyq.com.au/_data/assets/pdf_file/0008/706661/Vegetation-Management-Strategy.pdf), 30 March 2023

New South Wales Department of Industry, Soil Conservation Service (NSW DISCS) 2017, *NSW Rural Fire Service – Fire Trail Design, Construction and Maintenance Manual*, developed by the Soil Conservation Service for the NSW Rural Fire Service, 2017

New South Wales Rural Fire Service (NSW RFS) 2016, *NSW RFS Fire Trail Standard 2016*, Version 1.1, Printed June 2019

Powerlink Queensland (Powerlink) 2018, *Site Selection, Easements and Sites – Guideline*, ASM-GDL-A588593, Version 6.0, 27 June 2018

Queensland Department of State Development, Infrastructure, Local Government and Planning (DSDILGP) 2023, *State Planning Policy Interactive Mapping System*, accessed online at <https://spp.dsdipl.esriaustraliaonline.com.au/geoviewer/map/planmaking>, March 2023

Queensland Department of State Development, Manufacturing, Infrastructure and Planning (DSDMIP) 2019, *Natural hazards, risk and resilience – Bushfire, State Planning Policy – State Interest Guidance Material*, December 2019

Queensland Fire and Emergency Service (QFES) 2019, *Bushfire Resilient Communities Technical Reference Guide for the State Planning Policy State Interest 'Natural Hazards, Risk and Resilience – Bushfire'*, October 2019

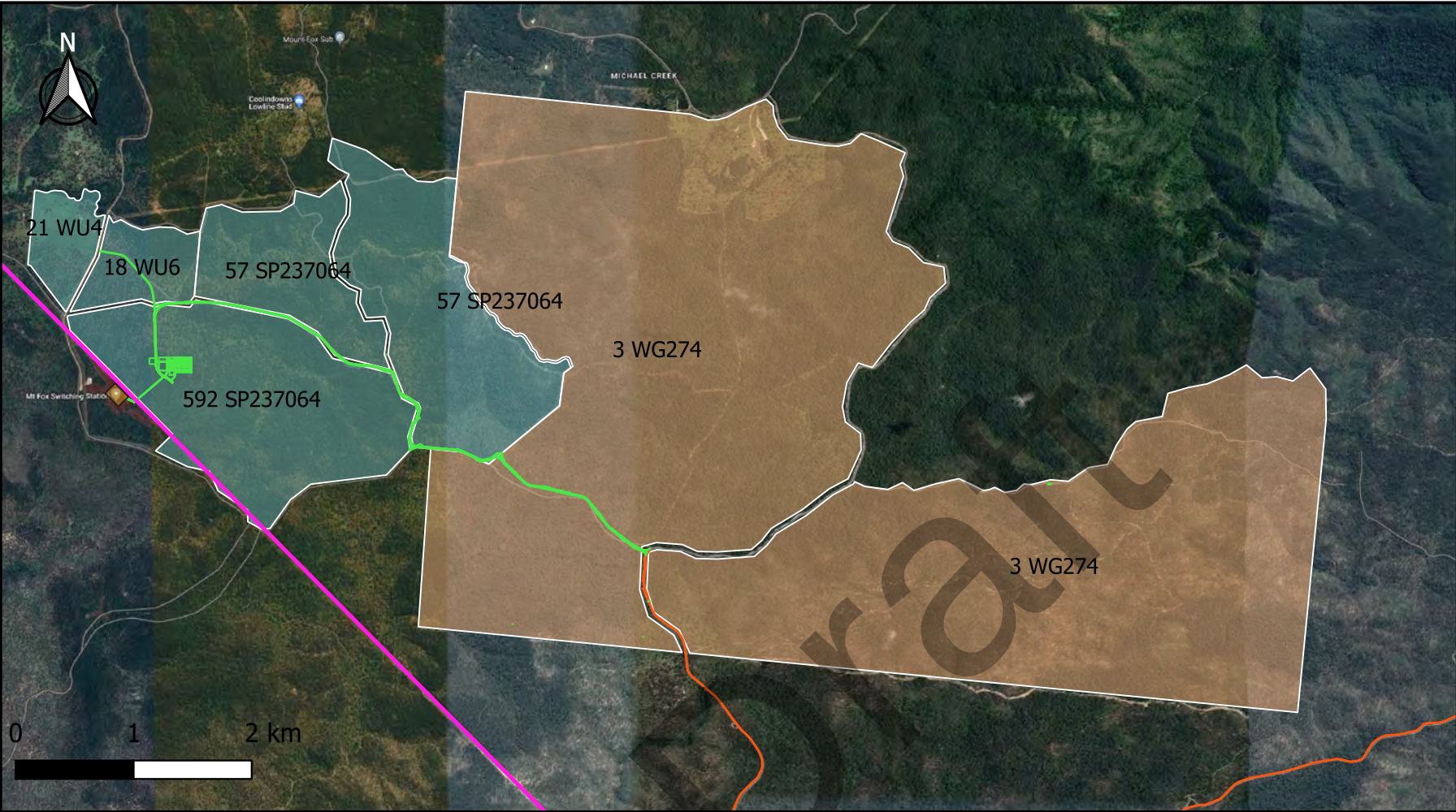
Queensland Fire and Emergency Services (QFES) 2023, *Catalyst - Sustainable development mapping system*, QFES Sustainable Development Unit, accessed online at <https://catalyst.qfes.qld.gov.au/sdu/> via user login, June 2023

Safe Work Australia (SWA) 2023, *Managing risks of hazardous chemicals in the workplace – Code of Practice*, 16 June 2023

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

## Appendix 1 Staging plans

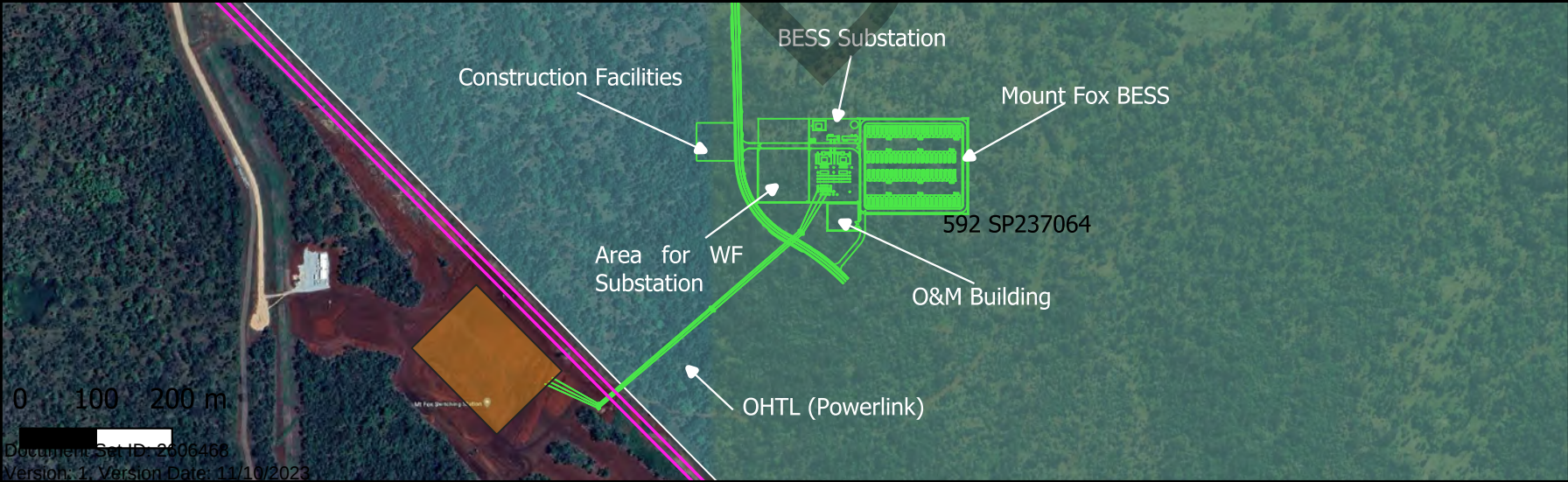
Draft



# Mount Fox BESS Infrastructure

DRAFT

- BESS Infrastructure
- Council Road - existing
- Guybal Munjan Switching Station
- 275kV Powerlink
- Site Boundaries
- Knuckledown Lease
- Furnlea Lease



20 June 2023

MFBS-GEN-DR-100-004

Coordinate System: EPSG 7855  
Scale : 1:25000

Prepared by: AG  
Made with: QGIS 3.6  
File name: 20230608 -Mt Fox\_Master

Mount Fox  
Wind Farm  
Infrastructure

DRAFT

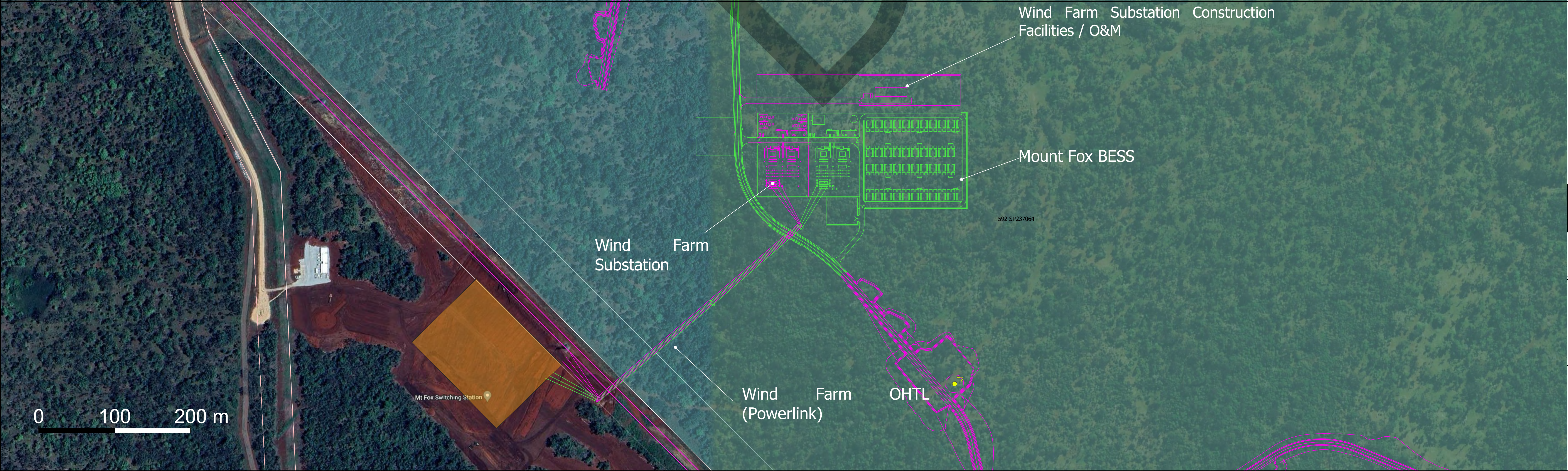
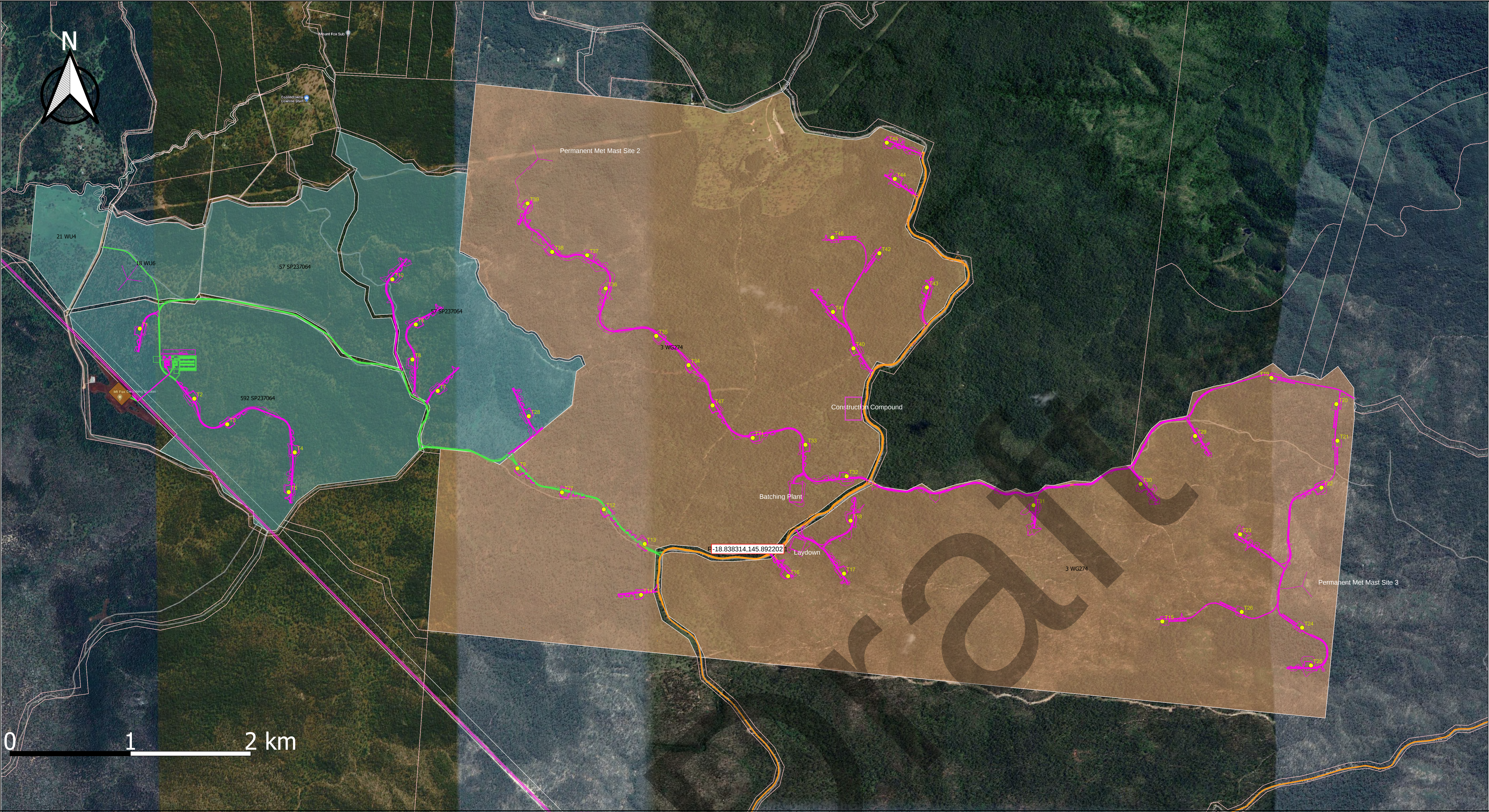
- BESS Infrastructure
- Wind Farm Infrastructure
- Council Road - existing
- 275kV Powerlink
- Site Boundaries
- Knuckledown Lease
- Furnlea Lease
- WTG Locations (rev2)
- Guybal Munjan Switching Station

20 June 2023

MFWF-GEN-DR-100-002

Coordinate System: EPSG 7855  
Scale : 1:25000 (top)

Prepared by: AG  
Made with: QGIS 3.6  
File name: 20230608 -Mt Fox\_Master



## Appendix 2 Summary of site observations

Draft

### Summary of site observations at infrastructure areas

| Infrastructure      | Catalyst VHC                                                                               | Ground truthed VHC | Notes                                        |
|---------------------|--------------------------------------------------------------------------------------------|--------------------|----------------------------------------------|
| <b>Turbines (T)</b> |                                                                                            |                    |                                              |
| T1                  | VHC 9.1 <i>Moist to dry eucalypt open forests on coastal lowlands and ranges (VHC 9.1)</i> | VHC 9.1            | Continuous forest vegetation on 4° slope.    |
| T2                  | VHC 9.1                                                                                    | VHC 9.1            | Continuous forest vegetation on 6° slope.    |
| T3                  | VHC 9.1                                                                                    | VHC 9.1            | Continuous forest vegetation on 3° slope.    |
| T4                  | VHC 9.1                                                                                    | VHC 9.1            | Continuous forest vegetation on 6° slope.    |
| T5                  | VHC 9.1                                                                                    | VHC 9.1            | Continuous forest vegetation on 5° slope.    |
| T6                  | VHC 9.2 <i>Moist to dry eucalypt woodland on coastal lowlands and ranges (VHC 9.2)</i>     | VHC 9.2            | Continuous woodland vegetation on 15° slope. |
| T7                  | VHC 9.2                                                                                    | VHC 9.2            | Continuous woodland vegetation on 10° slope. |
| T8                  | VHC 9.2                                                                                    | VHC 9.2            | Continuous woodland vegetation on 5° slope.  |
| T9                  | VHC 9.1                                                                                    | VHC 9.1            | Continuous forest vegetation on 2° slope.    |
| T10                 | VHC 9.2                                                                                    | VHC 9.2            | Continuous woodland vegetation on 12° slope. |
| T11                 | VHC 9.2                                                                                    | VHC 9.2            | Continuous woodland vegetation on 10° slope. |
| T12                 | VHC 9.1                                                                                    | VHC 9.1            | Continuous forest vegetation on 15° slope.   |
| T13                 | VHC 9.1                                                                                    | VHC 9.1            | Continuous forest vegetation on 4° slope.    |
| T14                 | VHC 9.2                                                                                    | VHC 9.2            | Continuous woodland vegetation on 2° slope.  |
| T15                 | VHC 9.1                                                                                    | VHC 9.1            | Continuous forest vegetation on 13° slope.   |
| T16                 | VHC 10.2 <i>Spotted gum dominated woodlands (VHC 10.2)</i>                                 | VHC 10.2           | Continuous woodland vegetation on 12° slope. |
| T17                 | VHC 9.1                                                                                    | VHC 9.1            | Continuous forest vegetation on 12° slope.   |
| T18                 | VHC 9.2                                                                                    | VHC 9.2            | Continuous woodland vegetation on 12° slope. |
| T19                 | VHC 9.1                                                                                    | VHC 9.1            | Continuous forest vegetation on 9° slope.    |
| T20                 | VHC 9.1                                                                                    | VHC 9.1            | Continuous forest vegetation on 5° slope.    |
| T21                 | VHC 9.1                                                                                    | VHC 9.1            | Continuous forest vegetation on 5° slope.    |
| T22                 | VHC 10.2                                                                                   | VHC 9.1            | Continuous forest vegetation on 5° slope.    |

| Infrastructure | Catalyst VHC                                                                                        | Ground truthed VHC | Notes                                        |
|----------------|-----------------------------------------------------------------------------------------------------|--------------------|----------------------------------------------|
| T23            | VHC 10.2                                                                                            | VHC 9.1            | Continuous forest vegetation on 19° slope.   |
| T24            | VHC 9.1                                                                                             | VHC 9.1            | Continuous forest vegetation on 8° slope.    |
| T25            | VHC 9.1                                                                                             | VHC 9.1            | Continuous forest vegetation on 12° slope.   |
| T26            | VHC 9.1                                                                                             | VHC 9.1            | Continuous forest vegetation on 8° slope.    |
| T27            | VHC 9.2                                                                                             | VHC 9.2            | Continuous woodland vegetation on 7° slope.  |
| T28            | VHC 9.2                                                                                             | VHC 9.2            | Continuous woodland vegetation on 5° slope.  |
| T29            | VHC 9.1                                                                                             | VHC 9.1            | Continuous forest vegetation on 6° slope.    |
| T30            | VHC 10.2 and VHC 28.3<br><i>Shrubland associated with woodlands in coastal locations (VHC 28.3)</i> | VHC 10.2           | Continuous woodland vegetation on 12° slope. |
| T31            | VHC 9.2                                                                                             | VHC 9.2            | Continuous woodland vegetation on 12° slope. |
| T32            | VHC 9.2                                                                                             | VHC 9.2            | Continuous woodland vegetation on 8° slope.  |
| T33            | VHC 9.2                                                                                             | VHC 9.2            | Continuous woodland vegetation on 5° slope.  |
| T34            | VHC 9.2                                                                                             | VHC 9.2            | Continuous woodland vegetation on 8° slope.  |
| T35            | VHC 9.1                                                                                             | VHC 9.1            | Continuous forest vegetation on 10° slope.   |
| T36            | VHC 9.1                                                                                             | VHC 9.1            | Continuous forest vegetation on 10° slope.   |
| T37            | VHC 9.1                                                                                             | VHC 9.1            | Continuous forest vegetation on 16° slope.   |
| T38            | VHC 9.1                                                                                             | VHC 9.1            | Continuous forest vegetation on 15° slope.   |
| T39            | VHC 9.1                                                                                             | VHC 9.1            | Continuous forest vegetation on 9° slope.    |
| T40            | VHC 9.1                                                                                             | VHC 9.1            | Continuous forest vegetation on 12° slope.   |
| T41            | VHC 9.1                                                                                             | VHC 9.1            | Continuous forest vegetation on 8° slope.    |
| T42            | VHC 9.1                                                                                             | VHC 9.1            | Continuous forest vegetation on 5° slope.    |
| T43            | VHC 9.1                                                                                             | VHC 9.1            | Continuous forest vegetation on 4° slope.    |
| T44            | VHC 9.1                                                                                             | VHC 9.1            | Continuous forest vegetation on 7° slope.    |
| T45            | VHC 9.1                                                                                             | VHC 9.1            | Continuous forest vegetation on 5° slope.    |
| T46            | VHC 9.2                                                                                             | VHC 9.2            | Continuous woodland vegetation on 8° slope.  |

| Infrastructure                                                                         | Catalyst VHC                                                                    | Ground truthed VHC | Notes                                       |
|----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|--------------------|---------------------------------------------|
| T47                                                                                    | VHC 9.2                                                                         | VHC 9.2            | Continuous woodland vegetation on 8° slope. |
| <b>Battery Energy Storage System (BESS) Infrastructure</b>                             |                                                                                 |                    |                                             |
| BESS construction facilities                                                           | VHC 9.1                                                                         | VHC 9.1            | Continuous forest vegetation on 8° slope.   |
| BESS operations and maintenance facilities                                             | VHC 9.1                                                                         | VHC 9.1            | Continuous forest vegetation on 8° slope.   |
| BESS                                                                                   | VHC 9.1                                                                         | VHC 9.1            | Continuous forest vegetation on 8° slope.   |
| BESS substation                                                                        | VHC 9.1                                                                         | VHC 9.1            | Continuous forest vegetation on 8° slope.   |
| <b>Wind farm infrastructure</b>                                                        |                                                                                 |                    |                                             |
| Wind farm substation                                                                   | VHC 9.1                                                                         | VHC 9.1            | Continuous forest vegetation on 8° slope.   |
| Wind farm substation construction facilities and operations and maintenance facilities | VHC 9.1                                                                         | VHC 9.1            | Continuous forest vegetation on 8° slope.   |
| Permanent meteorology (met) mast 1 (near T1)                                           | VHC 9.1                                                                         | -                  | Not ground-truthed                          |
| Permanent met mast 2 (near T39)                                                        | VHC 9.1                                                                         | -                  | Not ground-truthed                          |
| Permanent met mast 3 (near T24)                                                        | VHC 9.1 and VHC 29.3<br><i>Healthlands and associated scrubs and shrublands</i> | -                  | Not ground-truthed                          |
| Laydown area (near T16)                                                                | VHC 9.1                                                                         | -                  | Not ground-truthed                          |
| Batching plant (near T33)                                                              | VHC 9.1                                                                         | -                  | Not ground-truthed                          |
| Construction compound (near T40)                                                       | VHC 9.1                                                                         | -                  | Not ground-truthed                          |

## Appendix 3 Photographs of infrastructure areas

Draft



Photograph 1 VHC 9.1 at T1



Photograph 2 VHC 9.1 at T2



Photograph 3 VHC 9.1 at T3



Photograph 4 VHC 9.1 at T4



Photograph 5 VHC 9.1 at T5



Photograph 6 VHC 9.2 at T6



Photograph 7 VHC 9.2 at T7



Photograph 8 VHC 9.2 at T8



Photograph 9 VHC 9.1 at T9



Photograph 10 VHC 9.2 at T10



Photograph 11 VHC 9.2 at T11



Photograph 12 VHC 9.1 at T12



**Photograph 13 VHC 9.1 at T13**



**Photograph 14 VHC 9.2 at T14**



**Photograph 15 VHC 9.1 at T15**



**Photograph 16 VHC 10.2 at T16**



**Photograph 17 VHC 9.1 at T17**



**Photograph 18 VHC 9.2 at T18**



Photograph 19 VHC 9.1 at T19



Photograph 20 VHC 9.1 at T20



Photograph 21 VHC 9.1 at T21



Photograph 22 VHC 9.1 at T22



Photograph 23 VHC 9.1 at T23



Photograph 24 VHC 9.1 at T24



Photograph 25 VHC 9.1 at T25



Photograph 26 VHC 9.1 at T26



Photograph 27 VHC 9.2 at T27



Photograph 28 VHC 9.2 at T28



Photograph 29 VHC 9.1 at T29



Photograph 30 VHC 10.2 at T30



Photograph 31 VHC 9.2 at T31



Photograph 32 VHC 9.2 at T32



Photograph 33 VHC 9.2 at T33



Photograph 34 VHC 9.2 at T34



Photograph 35 VHC 9.1 at T35



Photograph 36 VHC 9.1 at T36



**Photograph 37 VHC 9.1 at T37**



**Photograph 38 VHC 9.1 at T38**



**Photograph 39 VHC 9.1 at T39**



**Photograph 40 VHC 9.1 at T40**



**Photograph 41 VHC 9.1 at T41**



**Photograph 42 VHC 9.1 at T42**



**Photograph 43 VHC 9.1 at T43**



**Photograph 44 VHC 9.1 at T44**



**Photograph 45 VHC 9.1 at T45**



**Photograph 46 VHC 9.2 at T46**



**Photograph 47 VHC 9.2 at T47**



**Photograph 47 VHC 9.1 at the battery energy storage system (BESS), BESS construction facilities, BESS operations and maintenance building, BESS substation, wind farm substation, wind farm substation construction facilities and wind farm operations and maintenance building**

## Appendix 4 Potential bushfire intensity calculations

Draft

### Potential bushfire intensity calculations

| Infrastructure      | VHC      | Potential fuel load (t/ha) <sup>1</sup> | Slope (°) | Potential bushfire intensity (kW/m) | Bushfire hazard class |
|---------------------|----------|-----------------------------------------|-----------|-------------------------------------|-----------------------|
| <b>Turbines (T)</b> |          |                                         |           |                                     |                       |
| T1                  | VHC 9.1  | 24.2                                    | 4         | 22,304                              | High                  |
| T2                  | VHC 9.1  | 24.2                                    | 6         | 25,605                              | High                  |
| T3                  | VHC 9.1  | 24.2                                    | 3         | 20,817                              | High                  |
| T4                  | VHC 9.1  | 24.2                                    | 6         | 25,605                              | High                  |
| T5                  | VHC 9.1  | 24.2                                    | 5         | 23,898                              | High                  |
| T6                  | VHC 9.2  | 17.2                                    | 15        | 24,268                              | High                  |
| T7                  | VHC 9.2  | 17.2                                    | 10        | 17,187                              | Medium                |
| T8                  | VHC 9.2  | 17.2                                    | 5         | 12,172                              | Medium                |
| T9                  | VHC 9.1  | 24.2                                    | 2         | 19,429                              | Medium                |
| T10                 | VHC 9.2  | 17.2                                    | 12        | 19,731                              | Medium                |
| T11                 | VHC 9.2  | 17.2                                    | 10        | 17,187                              | Medium                |
| T12                 | VHC 9.1  | 24.2                                    | 15        | 47,645                              | Very high             |
| T13                 | VHC 9.1  | 24.2                                    | 4         | 22,304                              | High                  |
| T14                 | VHC 9.2  | 17.2                                    | 2         | 9,896                               | Medium                |
| T15                 | VHC 9.1  | 24.2                                    | 13        | 41,504                              | Very high             |
| T16                 | VHC 10.2 | 18                                      | 12        | 21,609                              | High                  |
| T17                 | VHC 9.1  | 24.2                                    | 12        | 38,736                              | High                  |
| T18                 | VHC 9.2  | 17.2                                    | 12        | 19,731                              | Medium                |
| T19                 | VHC 9.1  | 24.2                                    | 9         | 31,493                              | High                  |
| T20                 | VHC 9.1  | 24.2                                    | 5         | 23,898                              | High                  |
| T21                 | VHC 9.1  | 24.2                                    | 5         | 23,898                              | High                  |
| T22                 | VHC 9.1  | 24.2                                    | 5         | 23,898                              | High                  |
| T23                 | VHC 9.1  | 24.2                                    | 19        | 62,789                              | Very high             |
| T24                 | VHC 9.1  | 24.2                                    | 8         | 29,394                              | High                  |
| T25                 | VHC 9.1  | 24.2                                    | 12        | 38,736                              | High                  |
| T26                 | VHC 9.1  | 24.2                                    | 8         | 29,394                              | High                  |
| T27                 | VHC 9.2  | 17.2                                    | 7         | 13,974                              | High                  |
| T28                 | VHC 9.2  | 17.2                                    | 5         | 12,172                              | Medium                |
| T29                 | VHC 9.1  | 24.2                                    | 6         | 25,605                              | High                  |
| T30                 | VHC 10.2 | 18                                      | 12        | 21,609                              | High                  |
| T31                 | VHC 9.2  | 17.2                                    | 12        | 19,731                              | Medium                |
| T32                 | VHC 9.2  | 17.2                                    | 8         | 14,972                              | Medium                |
| T33                 | VHC 9.2  | 17.2                                    | 5         | 12,172                              | Medium                |

### Potential bushfire intensity calculations

| Infrastructure                                                                         | VHC     | Potential fuel load (t/ha) <sup>1</sup> | Slope (°) | Potential bushfire intensity (kW/m) | Bushfire hazard class |
|----------------------------------------------------------------------------------------|---------|-----------------------------------------|-----------|-------------------------------------|-----------------------|
| T34                                                                                    | VHC 9.2 | 17.2                                    | 8         | 14,972                              | Medium                |
| T35                                                                                    | VHC 9.1 | 24.2                                    | 10        | 33,743                              | High                  |
| T36                                                                                    | VHC 9.1 | 24.2                                    | 10        | 33,743                              | High                  |
| T37                                                                                    | VHC 9.1 | 24.2                                    | 16        | 51,049                              | Very high             |
| T38                                                                                    | VHC 9.1 | 24.2                                    | 15        | 47,645                              | Very high             |
| T39                                                                                    | VHC 9.1 | 24.2                                    | 9         | 31,493                              | High                  |
| T40                                                                                    | VHC 9.1 | 24.2                                    | 12        | 38,736                              | High                  |
| T41                                                                                    | VHC 9.1 | 24.2                                    | 8         | 29,394                              | High                  |
| T42                                                                                    | VHC 9.1 | 24.2                                    | 5         | 23,898                              | High                  |
| T43                                                                                    | VHC 9.1 | 24.2                                    | 4         | 22,304                              | High                  |
| T44                                                                                    | VHC 9.1 | 24.2                                    | 7         | 27,434                              | High                  |
| T45                                                                                    | VHC 9.1 | 24.2                                    | 5         | 23,898                              | High                  |
| T46                                                                                    | VHC 9.2 | 17.2                                    | 8         | 14,972                              | Medium                |
| T47                                                                                    | VHC 9.2 | 17.2                                    | 8         | 14,972                              | Medium                |
| <b>Battery Energy Storage System (BESS) Infrastructure</b>                             |         |                                         |           |                                     |                       |
| BESS construction facilities                                                           | VHC 9.1 | 24.2                                    | 8         | 29,394                              | High                  |
| BESS operations and maintenance facilities                                             | VHC 9.1 | 24.2                                    | 8         | 29,394                              | High                  |
| BESS                                                                                   | VHC 9.1 | 24.2                                    | 8         | 29,394                              | High                  |
| BESS substation                                                                        | VHC 9.1 | 24.2                                    | 8         | 29,394                              | High                  |
| <b>Wind farm infrastructure</b>                                                        |         |                                         |           |                                     |                       |
| Wind farm substation                                                                   | VHC 9.1 | 24.2                                    | 8         | 29,394                              | High                  |
| Wind farm substation construction facilities and operations and maintenance facilities | VHC 9.1 | 24.2                                    | 8         | 29,394                              | High                  |
| Permanent meteorology (met) mast 1 (near T1) <sup>2</sup>                              | VHC 9.1 | 24.2                                    | 4         | 22,304                              | High                  |
| Permanent met mast 2 (near T39) <sup>2</sup>                                           | VHC 9.1 | 24.2                                    | 9         | 31,493                              | High                  |
| Permanent met mast 3 (near T24) <sup>2</sup>                                           | VHC 9.1 | 24.2                                    | 8         | 29,394                              | High                  |

### Potential bushfire intensity calculations

| Infrastructure                                | VHC     | Potential fuel load (t/ha) <sup>1</sup> | Slope (°) | Potential bushfire intensity (kW/m) | Bushfire hazard class |
|-----------------------------------------------|---------|-----------------------------------------|-----------|-------------------------------------|-----------------------|
| Laydown area (near T16) <sup>2</sup>          | VHC 9.1 | 24.2                                    | 12        | 38,736                              | High                  |
| Batching plant (near T33) <sup>2</sup>        | VHC 9.1 | 24.2                                    | 5         | 23,898                              | High                  |
| Construction compound (near T40) <sup>2</sup> | VHC 9.1 | 24.2                                    | 12        | 38,736                              | High                  |

Notes

1 Fuel load taken from *Bushfire Resilient Communities Technical Reference Guide for the State Planning Policy State Interest 'Natural Hazards, Risk and Resilience – Bushfire'* (QFES 2019).

2 Infrastructure site not inspected – VHC is based on information in Catalyst and slope measured using the path tool in Google Earth or a slope measured in the field at nearby infrastructure.

Draft

## Appendix 5 Radiant heat exposure assessment

Draft

## Bushfire attack – Turbine (T)1, T2, T3, T4, T5, T9, T13, T20, T21, T22, T29, T42, T43 and T45

- Forest fire danger index - 47
- Vegetation – VHC 9.1 *Moist to dry eucalypt open forests on coastal lowlands and ranges*
- Understorey fuel load – 21 tonnes/hectare (t/ha)
- Total fuel load – 24.2 t/ha
- Effective slope – 6° down slope
- Site slope – 0° slope
- Flame width – 100 metres (m)

Note Inputs used for the radiant heat exposure assessment are in accordance with Section 7.3 of *Bushfire Resilient Communities Technical Reference Guide for the State Planning Policy State Interest 'Natural Hazards, Risk and Resilience – Bushfire* (QFES 2019a) (**Bushfire resilient communities**).



Calculated July 19, 2023, 1:25 pm (MDc v.4.9)

J23050

| Minimum Distance Calculator - AS3959-2018 (Method 2) |              |                                  |                                                |
|------------------------------------------------------|--------------|----------------------------------|------------------------------------------------|
| Inputs                                               |              | Outputs                          |                                                |
| Fire Danger Index                                    | 47           | Rate of spread                   | 1.79 km/h                                      |
| Vegetation classification                            | Forest       | Flame length                     | 14.55 m                                        |
| Understorey fuel load                                | 21 t/ha      | Flame angle                      | 53 °, 63 °, 71 °, 75 °, 77 ° & 82 °            |
| Total fuel load                                      | 24.2 t/ha    | Elevation of receiver            | 5.81 m, 6.48 m, 6.87 m, 7.02 m, 7.08 m & 7.2 m |
| Vegetation height                                    | n/a          | Fire intensity                   | 22,403 kW/m                                    |
| Effective slope                                      | 6 °          | Transmissivity                   | 0.872, 0.853, 0.827, 0.802, 0.788 & 0.727      |
| Site slope                                           | 0 °          | Viewfactor                       | 0.6001, 0.4457, 0.301, 0.2048, 0.1663 & 0.0451 |
| Flame width                                          | 100 m        | Minimum distance to < 40 kW/m²   | 12 m                                           |
| Windspeed                                            | n/a          | Minimum distance to < 29 kW/m²   | 16.1 m                                         |
| Heat of combustion                                   | 18,600 kJ/kg | Minimum distance to < 19 kW/m²   | 23.5 m                                         |
| Flame temperature                                    | 1,090 K      | Minimum distance to < 12.5 kW/m² | 33 m                                           |
|                                                      |              | Minimum distance to < 10 kW/m²   | 39.1 m                                         |

Rate of Spread - Mcarthur, 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

## Bushfire attack – Battery energy storage system (BESS) operations and maintenance facility, BESS, BESS substation, wind farm substation and wind farm operations and maintenance facility

- Forest fire danger index - 47
- Vegetation – VHC 9.1 *Moist to dry eucalypt open forests on coastal lowlands and ranges*
- Understorey fuel load – 21 t/ha
- Total fuel load – 24.2 t/ha
- Effective slope – 8° down slope
- Site slope – 0° slope
- Flame width – 100 m

Note Inputs used for the radiant heat exposure assessment are in accordance with Section 7.3 of Bushfire resilient communities.



Calculated July 22, 2023, 2:51 pm (MDC v.4.9)

J23050

| Minimum Distance Calculator - AS3959-2018 (Method 2) |              |                                              |                                                              |
|------------------------------------------------------|--------------|----------------------------------------------|--------------------------------------------------------------|
| Inputs                                               |              | Outputs                                      |                                                              |
| Fire Danger Index                                    | 47           | Rate of spread                               | 2.05 km/h                                                    |
| Vegetation classification                            | Forest       | Flame length                                 | 16.27 m                                                      |
| Understorey fuel load                                | 21 t/ha      | Flame angle                                  | 53 °, 62 °, 70 °, 74 °, 76 ° & 82 °                          |
| Total fuel load                                      | 24.2 t/ha    | Elevation of receiver                        | 6.49 m, 7.18 m, 7.64 m, 7.82 m, 7.89 m & 8.050000000000001 m |
| Vegetation height                                    | n/a          | Fire intensity                               | 25,719 kW/m                                                  |
| Effective slope                                      | 8 °          | Transmissivity                               | 0.869, 0.849, 0.822, 0.796, 0.783 & 0.723                    |
| Site slope                                           | 0 °          | Viewfactor                                   | 0.6011, 0.4475, 0.3031, 0.2059, 0.1675 & 0.0454              |
| Flame width                                          | 100 m        | Minimum distance to < 40 kW/m <sup>2</sup>   | 13.4 m                                                       |
| Windspeed                                            | n/a          | Minimum distance to < 29 kW/m <sup>2</sup>   | 17.9 m                                                       |
| Heat of combustion                                   | 18,600 kJ/kg | Minimum distance to < 19 kW/m <sup>2</sup>   | 25.9 m                                                       |
| Flame temperature                                    | 1,090 K      | Minimum distance to < 12.5 kW/m <sup>2</sup> | 36.1 m                                                       |
|                                                      |              | Minimum distance to < 10 kW/m <sup>2</sup>   | 42.5 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

## Bushfire attack – T19, T24, T26, T35, T36, T39, T41 and T44

- Forest fire danger index - 47
- Vegetation – VHC 9.1 *Moist to dry eucalypt open forests on coastal lowlands and ranges*
- Understorey fuel load – 21 t/ha
- Total fuel load – 24.2 t/ha
- Effective slope – 10° down slope
- Site slope – 0° slope
- Flame width – 100 m

Note Inputs used for the radiant heat exposure assessment are in accordance with Section 7.3 of Bushfire resilient communities.



Calculated July 19, 2023, 1:45 pm (MDC v.4.9)

J23050

| Minimum Distance Calculator - AS3959-2018 (Method 2) |              |                                  |                                                                           |
|------------------------------------------------------|--------------|----------------------------------|---------------------------------------------------------------------------|
| Inputs                                               |              | Outputs                          |                                                                           |
| Fire Danger Index                                    | 47           | Rate of spread                   | 2.36 km/h                                                                 |
| Vegetation classification                            | Forest       | Flame length                     | 18.25 m                                                                   |
| Understorey fuel load                                | 21 t/ha      | Flame angle                      | 52 °, 62 °, 69 °, 73 °, 75 ° & 81 °                                       |
| Total fuel load                                      | 24.2 t/ha    | Elevation of receiver            | 7.19 m, 8.050000000000001 m, 8.52 m, 8.720000000000001 m, 8.81 m & 9.01 m |
| Vegetation height                                    | n/a          | Fire intensity                   | 29,524 kW/m                                                               |
| Effective slope                                      | 10 °         | Transmissivity                   | 0.866, 0.844, 0.8159999999999999, 0.79, 0.777 & 0.719                     |
| Site slope                                           | 0 °          | Viewfactor                       | 0.6063, 0.4502, 0.3048, 0.2076, 0.1686 & 0.0456                           |
| Flame width                                          | 100 m        | Minimum distance to < 40 kW/m²   | 14.9 m                                                                    |
| Windspeed                                            | n/a          | Minimum distance to < 29 kW/m²   | 20 m                                                                      |
| Heat of combustion                                   | 18,600 kJ/kg | Minimum distance to < 19 kW/m²   | 28.6 m                                                                    |
| Flame temperature                                    | 1,090 K      | Minimum distance to < 12.5 kW/m² | 39.4 m                                                                    |
|                                                      |              | Minimum distance to < 10 kW/m²   | 46.2 m                                                                    |

Rate of Spread - Mcarthur, 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

## Bushfire attack – T12, T15, T17, T25, T37, T38 and T40

- Forest fire danger index - 47
- Vegetation – VHC 9.1 *Moist to dry eucalypt open forests on coastal lowlands and ranges*
- Understorey fuel load – 21 t/ha
- Total fuel load – 24.2 t/ha
- Effective slope – 16° down slope
- Site slope – 0° slope
- Flame width – 100 m

Note Inputs used for the radiant heat exposure assessment are in accordance with Section 7.3 of Bushfire resilient communities.



Calculated July 19, 2023, 1:46 pm (MDc v.4.9)

J23050

| Minimum Distance Calculator - AS3959-2018 (Method 2) |              |                                              |                                                       |
|------------------------------------------------------|--------------|----------------------------------------------|-------------------------------------------------------|
| Inputs                                               |              | Outputs                                      |                                                       |
| Fire Danger Index                                    | 47           | Rate of spread                               | 3.57 km/h                                             |
| Vegetation classification                            | Forest       | Flame length                                 | 26.12 m                                               |
| Understorey fuel load                                | 21 t/ha      | Flame angle                                  | 51 °, 59 °, 66 °, 70 °, 72 ° & 79 °                   |
| Total fuel load                                      | 24.2 t/ha    | Elevation of receiver                        | 10.15 m, 11.19 m, 11.93 m, 12.27 m, 12.42 m & 12.82 m |
| Vegetation height                                    | n/a          | Fire intensity                               | 44,666 kW/m                                           |
| Effective slope                                      | 16 °         | Transmissivity                               | 0.853, 0.828, 0.798, 0.772, 0.761 & 0.706             |
| Site slope                                           | 0 °          | Viewfactor                                   | 0.6137, 0.4592, 0.3121, 0.2123, 0.1723 & 0.0465       |
| Flame width                                          | 100 m        | Minimum distance to < 40 kW/m <sup>2</sup>   | 21.1 m                                                |
| Windspeed                                            | n/a          | Minimum distance to < 29 kW/m <sup>2</sup>   | 27.6 m                                                |
| Heat of combustion                                   | 18,600 kJ/kg | Minimum distance to < 19 kW/m <sup>2</sup>   | 38.3 m                                                |
| Flame temperature                                    | 1,090 K      | Minimum distance to < 12.5 kW/m <sup>2</sup> | 51.2 m                                                |
|                                                      |              | Minimum distance to < 10 kW/m <sup>2</sup>   | 59.1 m                                                |

Rate of Spread - McArthur, 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

## Bushfire attack – T23

- Forest fire danger index - 47
- Vegetation – VHC 9.1 *Moist to dry eucalypt open forests on coastal lowlands and ranges*
- Understorey fuel load – 21 t/ha
- Total fuel load – 24.2 t/ha
- Effective slope – 19° down slope
- Site slope – 0° slope
- Flame width – 100 m

Note Inputs used for the radiant heat exposure assessment are in accordance with Section 7.3 of Bushfire resilient communities.



Calculated July 19, 2023, 1:47 pm (MDC v.4.9)

J23050

| Minimum Distance Calculator - AS3959-2018 (Method 2) |              |                                              |                                                       |
|------------------------------------------------------|--------------|----------------------------------------------|-------------------------------------------------------|
| Inputs                                               |              | Outputs                                      |                                                       |
| Fire Danger Index                                    | 47           | Rate of spread                               | 4.39 km/h                                             |
| Vegetation classification                            | Forest       | Flame length                                 | 31.46 m                                               |
| Understorey fuel load                                | 21 t/ha      | Flame angle                                  | 50 °, 58 °, 64 °, 68 °, 70 ° & 78 °                   |
| Total fuel load                                      | 24.2 t/ha    | Elevation of receiver                        | 12.05 m, 13.34 m, 14.14 m, 14.58 m, 14.78 m & 15.38 m |
| Vegetation height                                    | n/a          | Fire intensity                               | 54,939 kW/m                                           |
| Effective slope                                      | 19 °         | Transmissivity                               | 0.846, 0.819, 0.789, 0.764, 0.753 & 0.698             |
| Site slope                                           | 0 °          | Viewfactor                                   | 0.6185, 0.4649, 0.3162, 0.2147, 0.1743 & 0.047        |
| Flame width                                          | 100 m        | Minimum distance to < 40 kW/m <sup>2</sup>   | 25.1 m                                                |
| Windspeed                                            | n/a          | Minimum distance to < 29 kW/m <sup>2</sup>   | 32.4 m                                                |
| Heat of combustion                                   | 18,600 kJ/kg | Minimum distance to < 19 kW/m <sup>2</sup>   | 44.2 m                                                |
| Flame temperature                                    | 1,090 K      | Minimum distance to < 12.5 kW/m <sup>2</sup> | 58.2 m                                                |
|                                                      |              | Minimum distance to < 10 kW/m <sup>2</sup>   | 66.7 m                                                |

Rate of Spread - McArthur, 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

## Bushfire attack – T8, T14, T28 and T33

- Forest fire danger index - 47
- Vegetation – VHC 9.2 *Moist to dry eucalypt woodland on coastal lowlands and ranges*
- Understorey fuel load – 14.9 t/ha
- Total fuel load – 17.2 t/ha
- Effective slope – 5° down slope
- Site slope – 0° slope
- Flame width – 100 m

Note Inputs used for the radiant heat exposure assessment are in accordance with Section 7.3 of Bushfire resilient communities.



Calculated July 19, 2023, 1:48 pm (MDC v.4.9)

J23050

| Minimum Distance Calculator - AS3959-2018 (Method 2) |              |                                              |                                                        |
|------------------------------------------------------|--------------|----------------------------------------------|--------------------------------------------------------|
| Inputs                                               |              | Outputs                                      |                                                        |
| Fire Danger Index                                    | 47           | Rate of spread                               | 1.18 km/h                                              |
| Vegetation classification                            | Woodland     | Flame length                                 | 9.77 m                                                 |
| Understorey fuel load                                | 14.9 t/ha    | Flame angle                                  | 53 °, 64 °, 72 °, 77 °, 79 ° & 84 °                    |
| Total fuel load                                      | 17.2 t/ha    | Elevation of receiver                        | 3.9 m, 4.39 m, 4.64 m, 4.76 m, 4.79 m & 4.86 m         |
| Vegetation height                                    | n/a          | Fire intensity                               | 10,544 kW/m                                            |
| Effective slope                                      | 5 °          | Transmissivity                               | 0.882, 0.867, 0.846, 0.823, 0.8100000000000001 & 0.741 |
| Site slope                                           | 0 °          | Viewfactor                                   | 0.5957, 0.4392, 0.2949, 0.1987, 0.1618 & 0.0443        |
| Flame width                                          | 100 m        | Minimum distance to < 40 kW/m <sup>2</sup>   | 8.1 m                                                  |
| Windspeed                                            | n/a          | Minimum distance to < 29 kW/m <sup>2</sup>   | 11 m                                                   |
| Heat of combustion                                   | 18,600 kJ/kg | Minimum distance to < 19 kW/m <sup>2</sup>   | 16.3 m                                                 |
| Flame temperature                                    | 1,090 K      | Minimum distance to < 12.5 kW/m <sup>2</sup> | 23.8 m                                                 |
|                                                      |              | Minimum distance to < 10 kW/m <sup>2</sup>   | 28.6 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

## Bushfire attack – T7, T10, T11, T18, T27, T31, T32, T34, T46 and T47

- Forest fire danger index - 47
- Vegetation – VHC 9.2 *Moist to dry eucalypt woodland on coastal lowlands and ranges*
- Understorey fuel load – 14.9 t/ha
- Total fuel load – 17.2 t/ha
- Effective slope – 12° down slope
- Site slope – 0° slope
- Flame width – 100 m

Note Inputs used for the radiant heat exposure assessment are in accordance with Section 7.3 of Bushfire resilient communities.



Calculated July 19, 2023, 1:49 pm (MDC v.4.9)

J23050

| Minimum Distance Calculator - AS3959-2018 (Method 2) |              |                                  |                                                 |
|------------------------------------------------------|--------------|----------------------------------|-------------------------------------------------|
| Inputs                                               |              | Outputs                          |                                                 |
| Fire Danger Index                                    | 47           | Rate of spread                   | 1.92 km/h                                       |
| Vegetation classification                            | Woodland     | Flame length                     | 14.56 m                                         |
| Understorey fuel load                                | 14.9 t/ha    | Flame angle                      | 53 °, 63 °, 71 °, 75 °, 77 ° & 82 °             |
| Total fuel load                                      | 17.2 t/ha    | Elevation of receiver            | 5.81 m, 6.48 m, 6.88 m, 7.03 m, 7.09 m & 7.21 m |
| Vegetation height                                    | n/a          | Fire intensity                   | 17,092 kW/m                                     |
| Effective slope                                      | 12 °         | Transmissivity                   | 0.872, 0.853, 0.827, 0.802, 0.788 & 0.727       |
| Site slope                                           | 0 °          | Viewfactor                       | 0.6007, 0.4461, 0.3013, 0.2043, 0.1665 & 0.0452 |
| Flame width                                          | 100 m        | Minimum distance to < 40 kW/m²   | 12 m                                            |
| Windspeed                                            | n/a          | Minimum distance to < 29 kW/m²   | 16.1 m                                          |
| Heat of combustion                                   | 18,600 kJ/kg | Minimum distance to < 19 kW/m²   | 23.5 m                                          |
| Flame temperature                                    | 1,090 K      | Minimum distance to < 12.5 kW/m² | 33.1 m                                          |
|                                                      |              | Minimum distance to < 10 kW/m²   | 39.1 m                                          |

Rate of Spread - McArthur, 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

## Bushfire attack – T6

- Forest fire danger index - 47
- Vegetation – VHC 9.2 *Moist to dry eucalypt woodland on coastal lowlands and ranges*
- Understorey fuel load – 14.9 t/ha
- Total fuel load – 17.2 t/ha
- Effective slope – 15° down slope
- Site slope – 0° slope
- Flame width – 100 m

Note Inputs used for the radiant heat exposure assessment are in accordance with Section 7.3 of Bushfire resilient communities.



Calculated July 19, 2023, 1:51 pm (MDC v.4.9)

J23050

| Minimum Distance Calculator - AS3959-2018 (Method 2) |              |                                  |                                                                           |
|------------------------------------------------------|--------------|----------------------------------|---------------------------------------------------------------------------|
| Inputs                                               |              | Outputs                          |                                                                           |
| Fire Danger Index                                    | 47           | Rate of spread                   | 2.36 km/h                                                                 |
| Vegetation classification                            | Woodland     | Flame length                     | 17.44 m                                                                   |
| Understorey fuel load                                | 14.9 t/ha    | Flame angle                      | 52 °, 62 °, 70 °, 74 °, 75 ° & 82 °                                       |
| Total fuel load                                      | 17.2 t/ha    | Elevation of receiver            | 6.87 m, 7.69 m, 8.19 m, 8.380000000000001 m, 8.42 m & 8.630000000000001 m |
| Vegetation height                                    | n/a          | Fire intensity                   | 21,023 kW/m                                                               |
| Effective slope                                      | 15 °         | Transmissivity                   | 0.867, 0.846, 0.8179999999999999, 0.792, 0.779 & 0.721                    |
| Site slope                                           | 0 °          | Viewfactor                       | 0.6037, 0.4488, 0.3042, 0.2067, 0.1682 & 0.0455                           |
| Flame width                                          | 100 m        | Minimum distance to < 40 kW/m²   | 14.3 m                                                                    |
| Windspeed                                            | n/a          | Minimum distance to < 29 kW/m²   | 19.2 m                                                                    |
| Heat of combustion                                   | 18,600 kJ/kg | Minimum distance to < 19 kW/m²   | 27.5 m                                                                    |
| Flame temperature                                    | 1,090 K      | Minimum distance to < 12.5 kW/m² | 38.1 m                                                                    |
|                                                      |              | Minimum distance to < 10 kW/m²   | 44.7 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

Bushfire attack – T16 and T30

- Forest fire danger index - 47
- Vegetation – VHC 10.2 *Spotted gum dominated woodlands*
- Understorey fuel load – 17 t/ha
- Total fuel load – 18 t/ha
- Effective slope – 12° down slope
- Site slope – 0° slope
- Flame width – 100 m

Note        Inputs used for the radiant heat exposure assessment are in accordance with Section 7.3 of Bushfire resilient communities.



Calculated July 19, 2023, 1:52 pm (MDc v.4.9)

J23050

| Minimum Distance Calculator - AS3959-2018 (Method 2) |              |                                  |                                                              |
|------------------------------------------------------|--------------|----------------------------------|--------------------------------------------------------------|
| Inputs                                               |              | Outputs                          |                                                              |
| Fire Danger Index                                    | 47           | Rate of spread                   | 2.19 km/h                                                    |
| Vegetation classification                            | Woodland     | Flame length                     | 16.42 m                                                      |
| Understorey fuel load                                | 17 t/ha      | Flame angle                      | 53 °, 62 °, 70 °, 74 °, 76 ° & 82 °                          |
| Total fuel load                                      | 18 t/ha      | Elevation of receiver            | 6.55 m, 7.25 m, 7.71 m, 7.89 m, 7.96 m & 8.130000000000001 m |
| Vegetation height                                    | n/a          | Fire intensity                   | 20,408 kW/m                                                  |
| Effective slope                                      | 12 °         | Transmissivity                   | 0.868, 0.849, 0.821, 0.795, 0.782 & 0.723                    |
| Site slope                                           | 0 °          | Viewfactor                       | 0.6022, 0.4491, 0.3033, 0.2064, 0.1675 & 0.0454              |
| Flame width                                          | 100 m        | Minimum distance to < 40 kW/m²   | 13.5 m                                                       |
| Windspeed                                            | n/a          | Minimum distance to < 29 kW/m²   | 18 m                                                         |
| Heat of combustion                                   | 18,600 kJ/kg | Minimum distance to < 19 kW/m²   | 26.1 m                                                       |
| Flame temperature                                    | 1,090 K      | Minimum distance to < 12.5 kW/m² | 36.3 m                                                       |
|                                                      |              | Minimum distance to < 10 kW/m²   | 42.8 m                                                       |

Rate of Spread - Mcarthur, 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

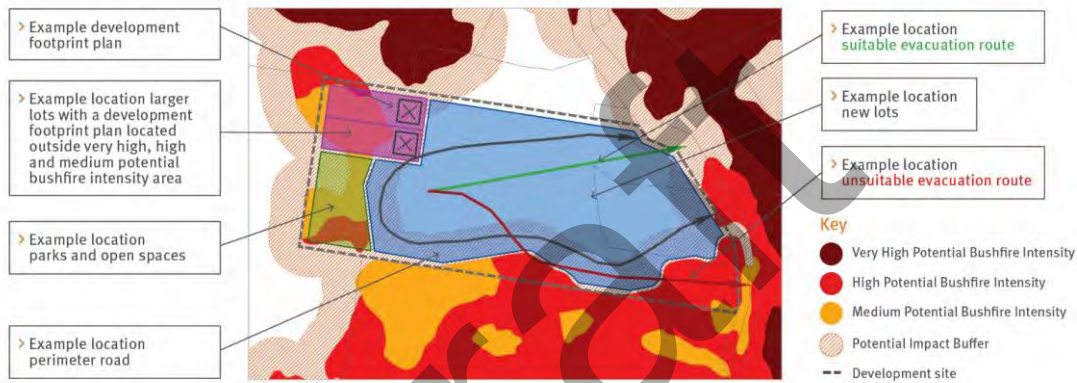
Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

## Appendix 6 State Planning Policy bushfire prone area overlay code assessment

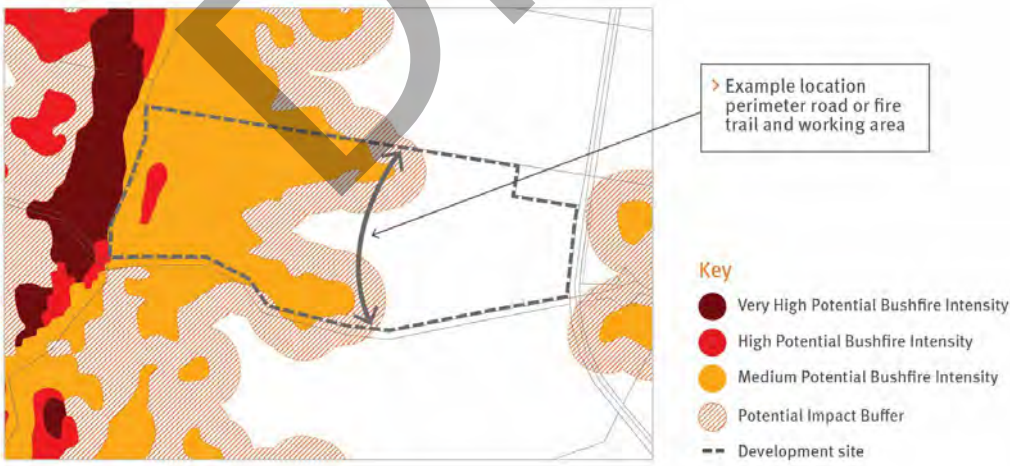
Draft

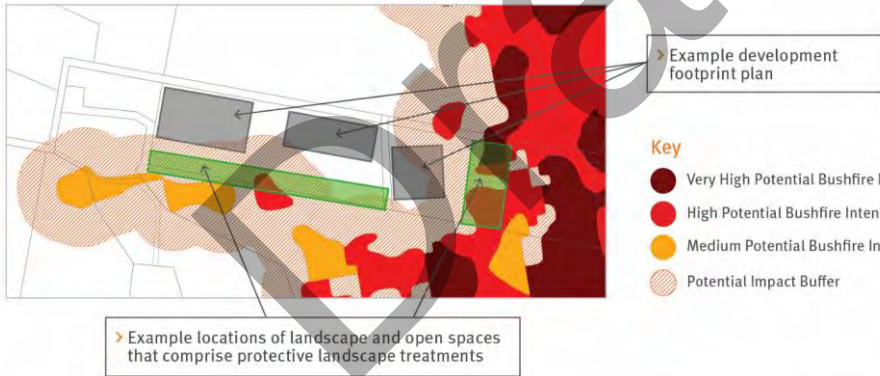
| Performance outcomes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Acceptable outcomes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Compliance assessment |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| <b>Section A</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       |
| <b>Reconfiguring a lot (RaL) – where creating lots of more than 2,000 square metres</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       |
| <b>PO1</b><br>The subdivision layout:<br>(a) enables future buildings to be located away from slopes and land forms that expose people or property to an intolerable risk to life or property; and<br>(b) facilitates emergency access and operational space for firefighters in a reduced fuel area between future buildings and structures and hazardous vegetation, that reduce risk to an acceptable or tolerable level.<br><br>Note – An applicant may seek to undertake a site-level verification of the location and nature of hazardous vegetation and resulting potential bushfire intensity levels, for example where changes in foliage have occurred (e.g. as a consequence of adjoining permanent urban development) or where an applicant seeks to verify the regional ecosystem map inputs. This verification should form part of a bushfire hazard assessment in accordance with the methodology in the QFES <i>Bushfire resilient communities</i> document. The outcomes of this assessment can demonstrate how an alternate solution to the acceptable outcome can deliver an acceptable or tolerable level of risk. | <b>AO1.1</b><br>A development footprint plan is identified for each lot that avoids ridgelines, saddles and crests where slopes exceed 15 per cent.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Not applicable        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>AO1.2</b><br>A development footprint plan is identified for each lot that is separated from the closest edge to the adjacent mapped medium, high or very high potential bushfire intensity area by:<br><br>(a) a distance that is no closer than the distances specified in Table 5 at all development footprint plan boundaries; or<br>(b) a distance that achieves a radiant heat flux level of 29 kW/m <sup>2</sup> or less at all development footprint plan boundaries.<br><br>Note – This separation area is often termed an asset protection zone.<br>Note – The radiant heat flux levels can be established by undertaking a bushfire hazard assessment in accordance with the methodology in the QFES <i>Bushfire resilient communities</i> document. | Not applicable        |
| <b>PO2</b><br>The subdivision layout enables:<br>(a) future buildings to be located as close as possible to property entrances to facilitate safe evacuation during a bushfire event; and<br>(b) future site access to be located and designed to allow safe evacuation of the site by occupants and maintain access by emergency services under critical event conditions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>AO2</b><br>A development footprint plan is identified for each lot that:<br>(a) is located within 60 metres of the street frontage; and<br>(b) sited to enable a route between the development footprint plan and the street frontage with a gradient that does not exceed of 12.5 per cent.                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Not applicable        |
| <b>Section B</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       |
| <b>Reconfiguring a lot (RaL) – where creating lots of 2,000 square metres or less</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       |
| <b>PO3</b><br>The subdivision layout:<br>(a) avoids creating lots on slopes and land forms that expose people or property to an intolerable risk to life or property; and<br>(b) facilitates emergency access and operational space for                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>AO3.1</b><br>The subdivision layout results in lots that are sited so that they are separated from the closest edge to the adjacent mapped medium, high or very high potential bushfire intensity area by:<br>(a) a distance that is no closer than the distances specified                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Not applicable        |

| Performance outcomes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Acceptable outcomes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Compliance assessment |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| <p>firefighters in a reduced fuel area between future buildings and structures and hazardous vegetation, that reduce risk to an acceptable or tolerable level.</p> <p>Note – An applicant may seek to undertake a site-level verification of the location and nature of hazardous vegetation and resulting potential bushfire intensity levels, for example where changes in foliage have occurred (e.g. as a consequence of adjoining permanent urban development) or where an applicant seeks to verify the regional ecosystem map inputs. This verification should form part of a bushfire hazard assessment, in accordance with the methodology in the QFES <i>Bushfire resilient communities</i> document. The outcomes of this assessment can demonstrate how an alternate solution to the acceptable outcome can deliver an acceptable or tolerable level of risk.</p> | <p>in Table 5 at all lot boundaries; or :</p> <p>(b) a distance that achieves a radiant heat flux level of 29 kW/m<sup>2</sup> or less:</p> <p>(i) at the building envelope, if identified at RaL stage; or</p> <p>(ii) where a building envelope is not identified, at all lot boundaries.</p> <p>Note – This separation area is often termed an asset protection zone.</p> <p>Note – The radiant heat flux levels can be established by undertaking a bushfire hazard assessment in accordance with the methodology in the QFES <i>Bushfire resilient communities</i> document.</p> <p>Note – For staged developments, temporary separation areas may be absorbed as part of subsequent stages.</p> <p>Note - Existing cleared areas external to the site may only be used in calculating necessary separation where tenure ensures that the land will remain cleared of hazardous vegetation (for example the land is a road, watercourse or highly managed park in public ownership).</p> |                       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <p><b>AO3.2</b></p> <p>The subdivision layout does not create lots that are within bushfire prone areas and on ridgelines, saddles and crests where slopes exceed 15 per cent (roads and parks may be located in these areas).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Not applicable        |
| <b>Section C</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       |
| <b>Reconfiguring a lot (RaL) – where creating more than 20 lots</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       |
| <p><b>PO4</b></p> <p>The subdivision layout is designed to minimise the length of the development perimeter and number of lots exposed to hazardous vegetation.</p> <p>Note – For example, avoid finger-like subdivision patterns or substantive vegetated corridors between lots.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <p><b>AO4</b></p> <p>No acceptable outcome is prescribed</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Not applicable        |
| <p><b>PO5</b></p> <p>The subdivision layout provides for adequate access and egress and safe evacuation routes, to achieve an acceptable or tolerable risk to people.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <p><b>AO5.1</b></p> <p>The subdivision layout:</p> <p>(a) avoids the creation of bottle-neck points in the movement network within the development (for example, avoids</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Not applicable        |

| Performance outcomes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Acceptable outcomes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Compliance assessment |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <p>hourglass patterns); and</p> <p>(b) ensures the road network has sufficient capacity for the evacuating population.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <p><b>AO5.2</b></p> <p>The subdivision layout ensures evacuation routes:</p> <p>(a) direct occupants away from rather than towards or through areas with a greater potential bushfire intensity; and</p> <p>(b) minimise the length of route through bushfire prone areas.</p> <p>Refer Figure 5.</p>                                                                                                                                                                                                                                                                                                                | Not applicable        |
|  <p>Figure 5 – Subdivision layout and evacuation routes</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                       |
| <p><b>PO6</b></p> <p>The subdivision layout provides adequate buffers between hazardous vegetation and development.</p> <p>Note – An applicant may seek to undertake a site-level verification of the location and nature of hazardous vegetation and resulting potential bushfire intensity levels, for example where changes in foliage have occurred (e.g. as a consequence of adjoining permanent urban development) or where an applicant seeks to verify the regional ecosystem map inputs. This verification should form part of a bushfire hazard assessment, in accordance with the methodology in the QFES <i>Bushfire resilient communities</i> document. The outcomes of this assessment can demonstrate how an alternate solution to the acceptable outcome can deliver an acceptable or tolerable level of risk.</p> | <p><b>AO6.1</b></p> <p>The subdivision layout results in an asset protection zone being located to create a separation area from adjacent mapped medium, high or very high potential bushfire intensity areas.</p>                                                                                                                                                                                                                                                                                                                                                                                                   | Not applicable        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <p><b>AO6.2</b></p> <p>The asset protection zone is comprised of:</p> <p>(a) parks and open spaces; and/or</p> <p>(b) lots greater than 2000 square metres; and/or</p> <p>(c) public roads (termed perimeter roads).</p> <p>Note – Parks and open space may be located within the mapped medium, high and very high potential bushfire intensity areas to create a separation between the development and the balance of the bushfire prone area.</p> <p>Note – Portions of lots greater than 2000 square metres may be located within the mapped medium, high and very high potential bushfire intensity areas.</p> | Not applicable        |

| Performance outcomes                                                                                                                                                                                                                                                                                                                                             | Acceptable outcomes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Compliance assessment |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
|                                                                                                                                                                                                                                                                                                                                                                  | Refer Figure 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |
|                                                                                                                                                                                                                                                                                                                                                                  | <b>AO6.3</b><br>Where the asset protection zone includes lots greater than 2000 square metres a development footprint plan is identified for each lot that is located in accordance with AO1.2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Not applicable        |
| <b>PO7</b><br>Parks or open space provided as part of the asset protection zone do not create additional bushfire prone areas.<br><br>Note –The undertaking of a bushfire hazard assessment, in accordance with the methodology in the QFES <i>Bushfire resilient communities</i> document may assist in demonstrating compliance with this performance outcome. | <b>AO7</b><br>Where the asset protection zone includes parks or open spaces, they: <ul style="list-style-type: none"> <li>(a) comprise only low threat vegetation, including grassland managed in a minimal fuel condition, maintained lawns, golf courses, maintained public reserves and parklands, cultivated gardens and nature strips; or</li> <li>(b) are designed to ensure a potential available fuel load is maintained at less than eight tonnes/hectare in aggregate and with a fuel structure that remains discontinuous.</li> </ul> Note – Minimal fuel condition means there is insufficient fuel available to significantly increase the severity of the bushfire attack, for example short-cropped grass to a nominal height of 10 centimetres. | Not applicable        |
| <b>PO8</b><br>Perimeter roads are accessible for fire-fighting vehicles, to facilitate emergency access and operational space for fire- fighting, maintenance works and hazard reduction activities.                                                                                                                                                             | <b>AO8.1</b><br>Where the asset protection zone includes a perimeter road it: <ul style="list-style-type: none"> <li>(a) has a two-lane sealed carriageway clear of hazardous vegetation; and</li> <li>(b) is connected to the wider public road network at both ends and at intervals of no more than 200 metres; and</li> <li>(c) does not include design elements that may impede access for fire-fighting and maintenance for fire- fighting purposes (for example traffic calming involving chicanes).</li> </ul>                                                                                                                                                                                                                                          | Not applicable        |
|                                                                                                                                                                                                                                                                                                                                                                  | <b>AO8.2</b><br>Where the subdivision contains a reticulated water supply, the road network and fire hydrants are designed and installed in accordance with: <ul style="list-style-type: none"> <li>(a) <i>Fire Hydrant and Vehicle Access Guidelines for residential, commercial and industrial lots</i>, Queensland</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                | Not applicable        |

| Performance outcomes                                                                                                                                                                                                                                                                                                  | Acceptable outcomes                                                                                                                                                                                                                                                                                                                                                                                                                            | Compliance assessment                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                       | <p>Fire and Emergency Services, 2015, unless otherwise specified by the relevant water entity; and</p> <p>(b) the <i>Road Planning and Design Manual 2nd edition</i>, Department of Transport and Main Roads, 2013.</p>                                                                                                                                                                                                                        |                                                                                                                                                         |
| <b>Section D</b>                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                         |
| <b>Reconfiguring a lot (RaL) – where creating additional lots for the purpose of residential development and a reticulated water supply is not provided.</b>                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                         |
| <p><b>PO9</b></p> <p>The subdivision layout provides for perimeter roads or fire trail and working areas that are accessible by the type of fire-fighting vehicles servicing the area, to facilitate emergency access and operational space for fire-fighting, maintenance works and hazard reduction activities.</p> | <p><b>AO9.1</b></p> <p>The subdivision layout includes:</p> <p>(a) a fire trail and working area designed and constructed in accordance with the design parameters in Table 6 that separates the residential lot or development footprint plan from adjacent mapped medium, high or very high potential bushfire intensity areas; or</p> <p>(b) a perimeter road designed and constructed in accordance with AO8.1.</p> <p>Refer Figure 6.</p> | Not applicable                                                                                                                                          |
|  <p>Figure 6 – Siting of fire trail and working area</p>                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                         |
| <b>Section E</b>                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                         |
| <b>Material change of use</b>                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                         |
| <p><b>PO10</b></p> <p>Site layout achieve an acceptable or tolerable risk to people. Landscape or open space provided as part of the development:</p>                                                                                                                                                                 | <p><b>AO10.1</b></p> <p>Site layout places the landscape and open spaces within the site between premises and adjacent mapped medium, high or very</p>                                                                                                                                                                                                                                                                                         | <p><b>Complies with AO10.1</b></p> <p>Asset protection zones (<b>APZs</b>) will be established and maintained around above ground infrastructure as</p> |

| Performance outcomes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Acceptable outcomes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Compliance assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>(a) acts as a buffer between hazardous vegetation and development; and</p> <p>(b) does not create additional bushfire prone areas.</p> <p>Note – An applicant may seek to undertake a site-level verification of the location and nature of hazardous vegetation and resulting potential bushfire intensity levels, for example where changes in foliage have occurred (e.g. as a consequence of adjoining permanent urban development) or where an applicant seeks to verify the regional ecosystem map inputs. This verification should form part of a bushfire hazard assessment in accordance with the methodology in the QFES <i>Bushfire resilient communities</i> document. The outcomes of this assessment can demonstrate how an alternate solution to the acceptable outcome can deliver an acceptable or tolerable level of risk.</p> | <p>high potential bushfire intensity areas.</p> <p>Refer Figure 7.</p> <p><b>AO10.2</b><br/>This landscaping and open space comprises protective landscape treatments that:</p> <p>(a) comprise only low threat vegetation, including grassland managed in a minimal fuel condition, maintained lawns, golf courses and cultivated gardens; or</p> <p>(b) are designed to ensure a potential available fuel load is maintained at less than 8 tonnes/hectare in aggregate and that fuel structure remains discontinuous.</p> <p>Note – Minimal fuel condition means there is insufficient fuel available to significantly increase the severity of the bushfire attack, for example short-cropped grass to a nominal height of 10 centimetres.</p> | <p>specified in Section 6.1 of the bushfire management plan (BMP).</p> <p><b>Complies with AO10.2</b><br/>APZs will be cleared of vegetation and established as a gravel hardstand area or grass area. A gravel hardstand area will be maintained free of weeds and grass cover. Where establishing a gravel hardstand area is not practical, a grass area will be established and maintained free of weeds and woody regrowth and grass cover which has a height of ≤ 30 centimetres (cm).</p>                                                              |
|  <p>Figure 7 – Siting of protective landscape treatments</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <p><b>PO11</b><br/>The development establishes evacuation areas, to achieve an acceptable or tolerable risk to people.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <p><b>AO11</b><br/>If in an isolated location, development establishes direct access to a safe assembly/evacuation area.</p> <p>Note – Guidance on identifying safe evacuation areas is contained in the QFES <i>Bushfire resilient communities</i> document.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <p><b>Complies with AO11</b><br/>Section 6.9.9 of the BMP requires separate emergency response plans to be prepared for the construction and operations and maintenance phases of the Project.</p> <p>The emergency response plans must identify the location of safe assembly/evacuation areas and the access routes to these areas.</p> <p>Section 6.9.9 of the BMP provides guidance for the construction contractor and operations and maintenance contractor to identify safe assembly and evacuation areas. It states that they must have a gravel</p> |

| Performance outcomes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Acceptable outcomes                                   | Compliance assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                       | surface or consist of low cut grass, ie grass slashed to a nominal height $\leq 30$ cm, and must not be located in areas identified as medium, high and very high potential bushfire intensity in Figures 2.1-2.3 of the BMP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>PO12</b><br>If on a lot of over 2,000 m <sup>2</sup> , where involving a new premises or an existing premises with an increase in development footprint, development: <ul style="list-style-type: none"> <li>(a) locates occupied areas as close as possible to property entrances to facilitate safe evacuation during a bushfire event; and</li> <li>(b) ensures vehicular access is located and designed to allow safe evacuation of the site by occupants and maintain access by emergency services under critical event conditions</li> </ul>                                                                                               | <b>AO12</b><br>No acceptable outcome is prescribed.   | <b>Complies with PO12</b><br>Specifications for the minimum standard of vehicle access tracks within the Project area are provided in Section 6.5 of the BMP and are based on the design specifications for category 1 fire-fighter vehicles by the New South Wales Rural Fire Service (NSW RFS 2016).                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>PO13</b><br>Development is located within a reticulated water supply area or includes a dedicated static water supply that is available solely for fire-fighting purposes and can be accessed by fire-fighting vehicles.<br>Note – Swimming pools, farm ponds and dams are not considered reliable sources of static water supply in Queensland due to regular drought events.<br>Note for Local Government – Information on how to provide an appropriate static water supply, may form a condition of a development approval. For further information on preferred solutions refer to the QFES <i>Bushfire resilient communities</i> document. | <b>AO13</b><br>No acceptable outcome is prescribed    | <b>Complies with PO13</b><br>Upon commencement of the construction phase, fire-fighter water storage tanks will be installed at the Battery Energy Storage System (BESS) or wind farm construction facilities and the construction compound. They will remain in place during both the construction and operations and maintenance phases of the Project.<br><br>Design specifications for the fire-fighter water storage tanks are based on guidance in <i>Bushfire Resilient Communities Technical Reference Guide for the State Planning Policy State Interest 'Natural Hazards, Risk and Resilience - Bushfire'</i> (QFES 2019) ( <b>Bushfire resilient communities</b> ) and are provided in Section 6.6 of the BMP. |
| <b>PO14</b><br>Vulnerable uses listed in Table 7 are not established or intensified within a bushfire prone area unless: <ul style="list-style-type: none"> <li>(a) there is an overriding need in the public interest for the new or expanded service the development provides; and</li> <li>(b) there are no other suitable alternative locations within the required catchment; and</li> <li>(c) site planning can appropriately mitigate the</li> </ul>                                                                                                                                                                                         | <b>AO14.1</b><br>No acceptable outcome is prescribed. | <b>Not applicable</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

| Performance outcomes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Acceptable outcomes                                            | Compliance assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>risk (for example, siting ovals for an educational establishment between the hazardous vegetation and structures.</p> <p>Note – The preparation of a bushfire management plan in accordance with the methodology in the QFES <i>Bushfire resilient communities</i> document may assist in demonstrating compliance with this performance outcome</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <p><b>PO15</b></p> <p>Community infrastructure providing essential services listed in Table 7 are not established within a bushfire prone area unless:</p> <p>(a) there is an overriding need in the public interest for the new or expanded service the development provides (for example, there are no other suitable alternative locations that can deliver the required level of service or meet emergency service response times during and immediately after a bushfire event); and</p> <p>(b) the infrastructure can function effectively during and immediately after a bushfire event.</p> <p>Note – The preparation of a bushfire management plan in accordance with the methodology in the QFES <i>Bushfire resilient communities</i> document may assist in demonstrating compliance with this performance outcome.</p>                                                                                                                                        | <p><b>AO15</b></p> <p>No acceptable outcome is prescribed.</p> | <p><b>Complies with PO15</b></p> <p>The BESS and the BESS and wind farm substations could be regarded as community infrastructure providing essential services.</p> <p>In accordance with guidance in Section 9.4 of Bushfire resilient communities, electrical infrastructure at the BESS and the BESS and wind farm substations will have an APZ which is designed to achieve a radiant heat flux level <math>\leq 10</math> kilowatts/square metre (<math>\text{kW/m}^2</math>) at the electrical infrastructure.</p> |
| <p><b>PO16</b></p> <p>Development avoids or mitigates the risks to public safety and the environment from the manufacture or storage of materials listed in Table 7 that are hazardous in the context of bushfire to an acceptable or tolerable level.</p> <p>Note – The preparation of a bushfire management plan in accordance with the methodology in the QFES <i>Bushfire resilient communities</i> document may assist in demonstrating compliance with this acceptable outcome.</p> <p>Editor's note – In addition to the requirements of this code the <i>Work Health and Safety Act 2011</i> and associated Regulation and Guidelines, the <i>Environmental Protection Act 1994</i> and the relevant building assessment provisions under the <i>Building Act 1975</i> contain requirements for the manufacture and storage of hazardous substances. Information is provided by Business Queensland on the requirements for storing and transporting hazardous</p> | <p><b>AO16</b></p> <p>No acceptable outcome is prescribed.</p> | <p><b>Complies with PO16</b></p> <p>Storage or handling of hazardous chemicals during the construction and operations and maintenance phases of the Project will not occur in vegetated areas and will be in accordance with <i>Managing risks of hazardous chemicals in the workplace – Code of Practice</i> (SWA 2023), applicable safety data sheets, and otherwise in accordance with <i>Queensland Work Health and Safety Act 2011</i> and its regulations.</p>                                                     |

| Performance outcomes                                                                                                                                                                                                                                                                                                                                                                                                 | Acceptable outcomes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Compliance assessment                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| chemicals, available at:<br><a href="http://www.business.qld.gov.au/running-business/protecting-business/risk-management/hazardous-chemicals/storing-transporting">www.business.qld.gov.au/running-business/protecting-business/risk-management/hazardous-chemicals/storing-transporting</a> .                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Section F</b>                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Where involving an asset protection zone</b>                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>PO17</b><br>Asset protection zones are designed and managed to ensure they do not increase the potential for bushfire hazard.<br>Note – The preparation of a landscape management plan undertaken in accordance with the methodology in the QFES <i>Bushfire resilient communities</i> document may assist in demonstrating compliance with this performance outcome.                                             | <b>AO17.1</b><br>Landscaping treatments within any asset protection zone comprise only low threat vegetation, including grassland managed in a minimal fuel condition, maintained lawns, golf courses, maintained public reserves and parklands, vineyards, orchards, cultivated gardens, commercial nurseries, nature strips and windbreaks.<br>Note – Minimal fuel condition means there is insufficient fuel available to significantly increase the severity of the bushfire attack, for example short-cropped grass to a nominal height of 10 centimetres.<br>OR | <b>Complies with AO17.1</b><br>APZs will be cleared of vegetation and established as a gravel hardstand area or grass area. A gravel hardstand area will be maintained free of weeds and grass cover. Where establishing a gravel hardstand area is not practical, a grass area will be established and maintained free of weeds and woody regrowth and with grass cover which has a height of ≤ 30 centimetres. |
|                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>AO17.2</b><br>Landscaping management within any asset protection zone maintains a:<br>(a) potential available fuel load which is less than eight tonnes/hectare in aggregate; and<br>(b) fuel structure which is discontinuous.<br>Note – The preparation of a landscape management plan undertaken in accordance with the methodology in the QFES <i>Bushfire resilient communities</i> document may assist in demonstrating compliance with this acceptable outcome.                                                                                             | <b>Complies with AO17.2</b><br>See response to AO17.1.                                                                                                                                                                                                                                                                                                                                                           |
| <b>Section G</b>                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Where planning provisions or conditions of approval require revegetation or rehabilitation</b>                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>PO18</b><br>Revegetation or rehabilitation areas are designed and managed to ensure they do not result in an unacceptable level of risk or an increase in bushfire intensity level.<br>Note – The undertaking of a bushfire hazard assessment in accordance with the methodology in the QFES <i>Bushfire resilient communities</i> document may assist in demonstrating compliance with this performance outcome. | <b>AO18.1</b><br>Required revegetation or rehabilitation:<br>(a) is located outside of any asset protection zone; or<br>(b) maintains a potential available fuel load which is less than eight tonnes/hectare in aggregate and fuel structure which is discontinuous.<br>Note – The preparation of a landscape management plan undertaken in accordance with the methodology in the QFES <i>Bushfire resilient communities</i> document may assist in demonstrating compliance with acceptable outcome                                                                | <b>Not applicable</b><br>The Project does not involve revegetation or rehabilitation.                                                                                                                                                                                                                                                                                                                            |

| Performance outcomes | Acceptable outcomes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Compliance assessment                                                                            |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
|                      | (b).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                  |
|                      | <p><b>AO18.2</b></p> <p>Revegetation or rehabilitation of areas located within mapped medium, high or very high potential bushfire intensity areas, revegetate and rehabilitate in a manner that maintains or reduces the existing fuel load.</p> <p>OR</p> <p>Revegetation or rehabilitation of areas located within the mapped potential impact buffer area, revegetate and rehabilitate in a manner that maintains or reduces the existing fuel load.</p> <p>Note – The preparation of a vegetation management plan undertaken in accordance with the methodology in the QFES <i>Bushfire resilient communities</i> document may assist in demonstrating compliance with this acceptable outcome.</p> | <p><b>Not applicable</b></p> <p>The Project does not involve revegetation or rehabilitation.</p> |

Table 6 – Fire trail and working area design parameters

| Parameter | Provisions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Width     | <p>Contains a width of at least 20 metres including:</p> <ol style="list-style-type: none"> <li>1. A trafficable area (cleared and formed); <ol style="list-style-type: none"> <li>a. with a minimum width of 4 metres that can accommodate a rural firefighting vehicle</li> <li>b. with no less than 4.8 metres vertical clearance from canopy vegetation</li> <li>c. with no adjacent inhibiting embankments or retaining walls</li> </ol> </li> <li>2. A working area each side of the trafficable area: <ol style="list-style-type: none"> <li>a. with a minimum width of 3 metres each side</li> <li>b. cleared of all flammable vegetation greater than 10 centimetres in height</li> </ol> </li> <li>3. The balance (i.e. 10 metre width) managed vegetation area: <ol style="list-style-type: none"> <li>a. sited to separate the trafficable area from adjacent mapped medium, high or very high potential bushfire intensity areas managed vegetation</li> <li>b. comprising managed vegetation clear of major surface hazards.</li> </ol> </li> </ol> |
| Access    | <p>Access is granted in favour of the local government and Queensland Fire and Emergency Services</p> <p>Note – this access is commonly granted in the form of a easement that is to be maintained by the grantor.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Egress    | Contains trafficable vehicle routes in to low hazard areas, every 200 metres                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

Table 7 – Vulnerable uses, community infrastructure for essential services and materials that are hazardous in the context of bushfire hazard

| Group                                                 | Uses                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Vulnerable uses                                       | <i>childcare centre, community care centre, detention facility, educational establishment, hospital, nature-based tourism, relocatable home park, rooming accommodation, residential care facility, resort complex, retirement facility, tourist park</i>            |
| Community infrastructure for essential services       | <i>educational establishment, emergency services, hospital</i>                                                                                                                                                                                                       |
| Hazardous materials in the context of bushfire hazard | <p>Hazardous chemicals that are present at the levels or in the quantities that would constitute the use being a hazardous chemical facility</p> <p>Hazardous materials that are present in the quantities in the Work Health and Safety Regulation, schedule 15</p> |