



Bushfire Management Plan

Gawara Baya Wind Farm

Prepared for Upper Burdekin Wind Farm Pty Ltd

C/- Umwelt (Australia) Pty Limited

Prepared by:

Green Tape
SOLUTIONS



Green Tape Solutions / ABN 20 162 130 627
PO BOX 416 Rockhampton QLD 4700 / PO BOX 282 Morayfield QLD 4506
Telephone: 07 5428 6372 / Mobile 0481 848 033
Email: admin@greentapesolutions.com.au / www.greentapesolutions.com.au

**DISCLAIMER**

Apart from fair dealing for the purposes of private study, research, criticism, or review as permitted under the Copyright Act, no part of this report, its attachments or appendices may be reproduced by any process without the written consent of Green Tape Solutions.

Green Tape Solutions has prepared this report for the sole purposes of the Client. This report is strictly limited to the purpose and the facts and matters stated in it and not apply directly or indirectly and will not be used for any other application, purpose, use or matter. The reproduction, adaptation, use or communication of the information contained within this report may not be used without the written permission of Green Tape Solutions.

In preparing this report we have assumed that all information and documents provided to us by the Client, or as a result of a specific request or enquiry, were complete, accurate and up-to-date. Where we have obtained information from a government register or database, we have assumed that the information is accurate. Where an assumption has been made, we have not made any independent investigations with respect to the matters the subject of that assumption. We are not aware of any reason why any of the assumptions are incorrect.

In this note, a reference to loss and damage includes past and prospective economic loss, loss of profits, damage to property, injury to any person (including death) costs and expenses incurred in taking measures to prevent, mitigate or rectify any harm, loss of opportunity, legal costs, compensation, interest and any other direct, indirect, consequential or financial or other loss.

Document Records - Quality

TITLE	Bushfire Management Plan, Gawara Baya Wind Farm
FILED AS	PR23354_BMP_Gawara Baya WF_VerC

Revision	Date	Details	Prepared by (Initials/Title)	Reviewed by (Initials/Title)	Approved by
Version A	24/04/2024	Draft Report	■■ Ecologist	■■ Environmental Manager	-
Version B	29/05/2024	Final Report	■■ Ecologist	■■ Environmental Manager	Client
Version C	02/10/2025	Amendments to report following design change	■■ Ecologist	■■ Senior Environmental Planner ■■ Manager	Client



Table of Contents

Acronyms and Glossary	1
Executive Summary	4
1 Introduction	6
1.1 Background	6
1.2 Scope of Plan	7
1.3 Qualifications and Experience	7
1.4 Project Location	8
1.5 Project Description	9
1.5.1 Access Tracks	11
1.5.2 Services	12
1.5.3 Overhead Transmission Line	12
1.5.4 Wind Monitoring Masts	12
1.6 Construction Activities	12
1.7 Operating Activities	15
1.8 Decommissioning	15
2 Bushfire Regulatory Framework	16
2.1 National Construction Code	16
2.2 State Planning Policy	16
2.3 Charters Towers Regional Town Plan 2020 (Version 2)	25
2.4 AS 3959-2018 Construction of Buildings in Bushfire Prone Areas	26
3 Bushfire Hazard Assessment	27
3.1 Hazard Assessment	27
3.1.1 Fire Weather Severity	28
3.1.2 Vegetation Hazard Classes	28
3.1.2.1 State-mapped Vegetation Hazard Classes	29
3.1.2.2 State-mapped Regional Ecosystems	32
3.1.2.3 Vegetation Communities	34
3.1.3 Potential Fuel Loads	37
3.1.4 Site and Effective Slope	47
3.1.5 Landform	47
3.1.6 Surrounding Land Use	47
3.2 Bushfire Attack Levels for Infrastructure	48
3.2.1 Bushfire Attack Levels	48
3.2.2 Wind Turbines	62
3.2.3 Power Performance Masts	62
3.2.4 Asset Protection Zones	63
4 Bushfire Management Plan	64
4.1 Agencies / Persons Responsible	65
4.2 Owner Responsibilities	65
4.3 Maintenance of Asset Protection Zone	65
4.4 Siting of Infrastructure	66
4.5 Mowing, Slashing and Mulching	66
4.6 Fire Breaks	67
4.7 Fire-fighting Equipment	67
4.8 Water Supply Tanks	68
4.9 Emergency Services Access	68
4.10 Signage	69
4.11 Turbine Safety	69
4.12 Specific Mitigation Measures	72
5 Roles and Responsibilities	73
5.1 Responsibilities	73
5.2 Employee and Contractor Communication	74
5.3 Storage of Fuels and Hazardous Materials	74
5.4 Consultation	75
5.5 Training, Awareness and Competence	75



6	Emergency Preparedness and Response	76
6.1	Preparedness	76
6.2	Response	76
6.3	Emergency Response Procedures	77
6.4	Emergency Resources and Information Providers	77
6.4.1	Local Radio Stations	77
6.4.2	Charters Towers Region – Disaster Dashboard	77
6.4.3	State Government, QFD – Current Warnings	78
6.4.4	Australian Fire Danger Rating System (AFDRS) and Fire Bans	78
7	Assessment Against the Bushfire Overlay Code	80
8	Audit And Review	92
9	Conclusion	93
10	References	94

TABLES

Table 1: Construction Methodology	13
Table 2: Assessment against Assessment Benchmarks for the SPP Natural Hazards, Risk and Resilience – Bushfire State Interest	18
Table 3: State-mapped Vegetation Hazard Classes within the Project Area	29
Table 4: State-mapped Regional Ecosystems within the Assessment Area	32
Table 5: Potential Fuel Loads for Classified Vegetation within the Assessment Area	38
Table 6: Bushfire Attack Levels	48
Table 7: Quantitative Assessment for Bushfire Risk Management	50
Table 8: Specific Mitigation Measures for Highest Risk Activities	72
Table 9: Roles and Responsibilities Specific to Bushfire Risk Management	73
Table 10: Queensland Fire Department (QFD) Local Resources	77
Table 11: FBI Values To AFDRS	79
Table 12: Assessment Against Charters Towers Regional Town Plan 2020 (Version 2) – Bushfire Hazard Overlay Code	81

FIGURES

Figure 1: Project Area Location	8
Figure 2: Development Footprint	10
Figure 3: Excerpt from SPP IMS – Bushfire Prone Area - North	23
Figure 4: Excerpt from Council's Mapping – Bushfire Prone Area (Source: Council website)	25
Figure 5: State-mapped Vegetation Hazard Classes	31
Figure 6: State-mapped VHC – Site 1 – Site Camp	39
Figure 7: State-mapped VHC – Site 2 – Site Office	40
Figure 8: State-mapped VHC – Site 3 – OM Permanent Laydown	41
Figure 9: State-mapped VHC – Site 4 – Concrete Batching South and South Laydown Area	42
Figure 10: State-mapped VHC – Site 5 – Substation Far North	43
Figure 11: State-mapped VHC – Site 6 - Laydown Area	44
Figure 12: State-mapped VHC – Site 7 – Substation South	45
Figure 13: State-mapped VHC – Site 8 – Laydown Area Far North	46
Figure 14: BAL Map – Site 1 – Site Camp	54
Figure 15: BAL Map – Site 2 – Site office	55
Figure 16: BAL Map – Site 3 – OM Permanent Laydown	56
Figure 17: BAL Map – Site 4 – Concrete Batching Plant and South Laydown	57
Figure 18: BAL Map – Site 5 – Substation Far North	58
Figure 19: BAL Map – Site 6 – Laydown Area	59
Figure 20: BAL Map – Site 7 – Substation South	60
Figure 21: BAL Map – Site 8 – Laydown Area Far North	61
Figure 22: Example of Signage	70
Figure 23: AFAC Signages (Rural Fire Services, 2012)	71
Figure 24: Australian Fire Danger Rating System	78

PLATES

Plate 1: Vegetation Community 1 – <i>Eucalyptus crebra</i> Woodland	36
---	----



Plate 2: Vegetation Community 1 – <i>Eucalyptus crebra</i> Woodland.....	36
Plate 3: Vegetation Community 2 – Mixed Eucalypt Woodlands to Open Forests	37
Plate 4: Vegetation Community 2 – Mixed Eucalypt Woodlands to Open Forests	37



Acronyms and Glossary

Terms	Definitions
AB	Assessment benchmarks
AEP	Annual Exceedance Probability
AFAC	Australasian Fire Authorities Council
AFDRS	Australian Fire Danger Rating System
AGL	Above ground level
AO	Acceptable Outcome
APZ	Asset Protection Zone
AS3959:2018	Australian Standard AS3959:2018 Construction of Buildings in Bushfire-Prone Areas
BAL	Bushfire Attack Level
BHA	Site-specific bushfire hazard assessment
BMP	Bushfire Management Plan
BPA	Bushfire Prone Areas
BRC	Bushfire Resilient Communities Technical Reference Guide for the State Planning Policy State Interest 'Natural Hazards, Risk and Resilience - Bushfire' October 2019
CEMP	Construction Environmental Management Plan
cm	Centimetres
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CTRC	Charters Towers Regional Council
DCCEEW	Department of Climate Change, Energy, the Environment and Water (Cwth)
DESI	Department of Environment, Science and Innovation (Qld)
DNRMMRRD	Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development



Terms	Definitions
DSDILGP	Department of State Development, Infrastructure, Local Government and Planning (now DSDIP) (Qld)
DSDIP	Department of State Development, Infrastructure and Planning (formerly 'DSDILGP') (Qld)
ERP	Emergency Response Plan
FBI	Fire behaviour index
FFDI	Forest Fire Danger Index
FPC	Foliage projective cover
FZ	Flame Zone (BAL)
GTRE	Ground-truthed regional ecosystem
HSE	Health Safety and Environment
km	Kilometres
kW/m	Kilowatts per metre
LGA	Local government area
LiDAR	Light Detection and Ranging
m	Metres
mm	Millimetres
m²	Square metres
MCU	Material Change of Use
Met mast	Meteorological mast
PFI	Potential Fireline Intensity
PO	Performance Outcome
Project	Refers to the area within which development, over- and under-ground services, access tracks and other associated infrastructure may be located.
Proponent	Upper Burdekin Wind Farm Pty Ltd



Terms	Definitions
QFD	Queensland Fire Department (formerly 'QFES')
QFES	Queensland Fire Emergency Services
Qld	Queensland
QSpacial	Queensland Spatial catalogue
RE	Regional ecosystem
RFSQ	Rural Fire Service Queensland
RoL	Reconfiguration of Lot
RVM	Regulated Vegetation Management
SARA	State assessment and referral agency
SDAP	State development assessment provisions
SEMP	Safety and Emergency Management Plan
Site boundary	The extent of the properties that the project is located within
SPP	State Planning Policy
VHC	Vegetation Hazard Class
VM Act	<i>Vegetation Management Act 1999</i> (Qld)
WHS	Work Health and Safety
WTG	Wind Turbine Generator



Executive Summary

This report provides a Bushfire Management Plan for the proposed Gawara Baya Wind Farm, consisting of 68 wind turbines, located 44 km south-west of Ingham in North Queensland, on Lot 3198 SP344602 (the 'Project Area'). This report is predominantly desktop-based and applies earlier ground surveys to the recently updated Development Footprint (August 2025). It identifies bushfire risks and outline strategies to protect people, property and the environment through effective risk management. Key findings from the assessment are in the summary table below.

Summary Table

Infrastructure	Required Radiant Heat Flux	Minimum Setback Distance Required	Compliance Reference
Site 1 – Site Camp	≤ 12.5 kW/m ²	29.1 m	AS 3959:2018 (Table 3.1); NCC Vol. 2; State Bushfire Planning Policy
Site 2 – Site Office	≤ 29 kW/m ²	14.2 m	AS 3959:2018 (Table 3.1); NCC; BRC Technical Guide
Site 3 – OM Permanent Laydown	≤ 29 kW/m ²	20.3 m	AS 3959:2018 (Table 3.1); NCC; BRC Technical Guide
Site 4 – Concrete Batching South and South Laydown	≤ 29 kW/m ²	20.6 m	AS 3959:2018 (Table 3.1); NCC; BRC Technical Guide
Site 5 – Substation Far North	≤ 10 kW/m ²	38.4 m	AS 3959:2018 (Table 3.1); NCC Vol.1
Site 6 – Laydown Area	≤ 29 kW/m ²	15.3 m	AS 3959:2018 (Table 3.1); NCC; BRC Technical Guide
Site 7 – Substation South		45.1 m	AS 3959:2018 (Table 3.1); NCC Vol.1
Site 8 – Laydown Far North	≤ 29 kW/m ²	14.9 m	AS 3959:2018 (Table 3.1); NCC; BRC Technical Guide

The assessment confirms that while substations and workers' accommodation require compliance with BAL construction standards, other infrastructure such as turbines, met masts, and transmission lines are managed primarily through vegetation clearance, access provisions, and maintenance of defendable spaces. Together, these measures ensure compliance with Australian Standard AS3959:2018 Construction of Buildings in Bushfire-Prone Areas, the National Construction Code 2022, and relevant State bushfire policies, providing resilience for both assets and personnel. The recommended bushfire buffer (Asset Protection Zone) distances are measured from the outer edge of



habitable infrastructure or buildings. Note that a Bushfire Attack Level (BAL) 10 (10 kW/m² radiant heat flux) applies to community infrastructure for essential services, of which electricity supply is one.

The detailed assessment and management strategies outlined in this report provide a suitable framework to ensure compliance with statutory bushfire planning requirements, protect key assets, and safeguard personnel during any potential bushfire events that may occur within the Project Area.



1 Introduction

1.1 Background

This Bushfire Management Plan (BMP) has been completed for the construction of the Gawara Baya Wind Farm (hereafter referred as the 'Project').

Upper Burdekin Wind Farm Pty Ltd (the 'Proponent') proposes to develop the Project on the Mount Fox Range approximately 44 kilometres (km) south-west of Ingham, North Queensland, and within the Charters Towers Regional Council (CTRC) local government area (LGA).

Fires have the potential to impact upon life and infrastructure associated with the Project. The fire risk varies throughout the area in which the Project is proposed to be developed, dependent on topography. Bushfire danger season is typically from August/September to December in North Queensland when the dry season is nearing its end and both temperatures and winds are on the increase. Fire is an important landscape function and should be managed in respect to vegetation and human safety.

The Project received approval from State Assessment and Referral Agency (SARA) on the 23rd August 2023 (Reference 2211-32271 SDA) with a change application decision provided by SARA on 24th April 2025 (2408/42181). This BMP addresses Condition 26 of the approval for the Project which requires:

- a) *Prepare a Bushfire Management Plan (BMP) addressing construction and operation activities.*
- b) *The BMP must:*
 - i) *be prepared by a suitably qualified person*
 - ii) *be prepared in consultation with the Queensland Fire and Emergency Services (QFES)*
 - iii) *include a fire hazard analysis*
 - iv) *include evacuation procedures for construction workforce in the event of a bushfire emergency*
 - v) *include mitigation strategies to achieve the development outcomes in Part E of the State Planning Policy July 2017 – Natural Hazards, Risk and Resilience*
 - vi) *details of consultation with all host lot owners.*
- c) *Provide details and confirmation that consultation with QFES has been undertaken to:*

Office of The Assistant Commission

Queensland Fire and Emergency Service

sdu@qfes.qld.gov.au
- d) *Submit the BMP to:*
 - i) *Department of State Development, Infrastructure, Local Government and Planning (DSDILGP) (windfarms@dsdilgp.qld.gov.au)*
 - ii) *Charters Towers Regional Council*
 - iii) *Queensland Fire and Emergency Service (sdu@qfes.qld.gov.au).*
- e) *Operate the development in accordance with the BMP.*



- f) *Maintain a copy of the BMP on-site (for example, at the site office) and ensure all relevant landowners, staff, contractors, workers and site visitors are familiar with the relevant requirements of the BMP.*

Note: Suitably qualified person means a person(s) who has professional qualifications, training, skills and / or experience relevant to area of expertise (bushfire management).

Note: Since these conditions were issued, Queensland Fire and Emergency Service (QFES) is now known as Queensland Fire Department (QFD) and DSDILGP is now known as Department of State Development, Infrastructure and Planning (DSDIP).

1.2 Scope of Plan

The purpose of the BMP is to focus on preventing bushfires within the Project Area and to be prepared should a bushfire be ignited or pass through the wind farm. The BMP provides detailed information regarding the bushfire hazard for the Project Area and outlines mitigation and management measures for the Project Area. In particular, the BMP:

- Identifies a fire hazard analysis;
- Identifies the activities that will be undertaken on the Project Area during the construction and operational phases of the Project, that may present a bushfire risk;
- Provides mitigation strategies to achieve the development outcomes in Part E of the State Planning Policy July 2017 – Natural Hazards, Risk and Resilience; and,
- Provides basic protocols and strategies for managing fires if they originate on the Project Area or in the event of an external wildfire, threatening the wind farm (including permanent and temporary buildings and turbine infrastructure) or nearby properties.

1.3 Qualifications and Experience

The Queensland Fire and Emergency Service (QFES) (now known as Queensland Fire Department (QFD)) Bushfire Resilient Communities Technical Reference Guide for the State Planning Policy State Interest 'Natural Hazards, Risk and resilience – Bushfire' October 2019 ('BRC Technical Guide') (QFES, 2019) provides guidance on suitably qualified people for assessments identified in the BRC Technical Guide. This guidance includes the following recommendations:

- Fine-scale assessment of vegetation communities in accordance with the 'Vegetation Hazard Class' assessment methodology be undertaken by a suitably qualified person with experience in botanical survey methods; and
- Applicant-initiated assessments and reports be prepared or peer-reviewed by suitably qualified and experienced people with degree (AQF Level 8) qualifications in environmental science, environmental management (or an equivalent discipline), demonstrated experience in botanical surveys and spatial analysis methods, including use of geographic information systems (GIS) software); demonstrated experience in the assessment of bushfire hazard and risks or technical qualifications in environmental science, environmental management (or an equivalent discipline) and demonstrated relevant industry experience in the assessment of bushfire hazard and risks for a minimum of five years.

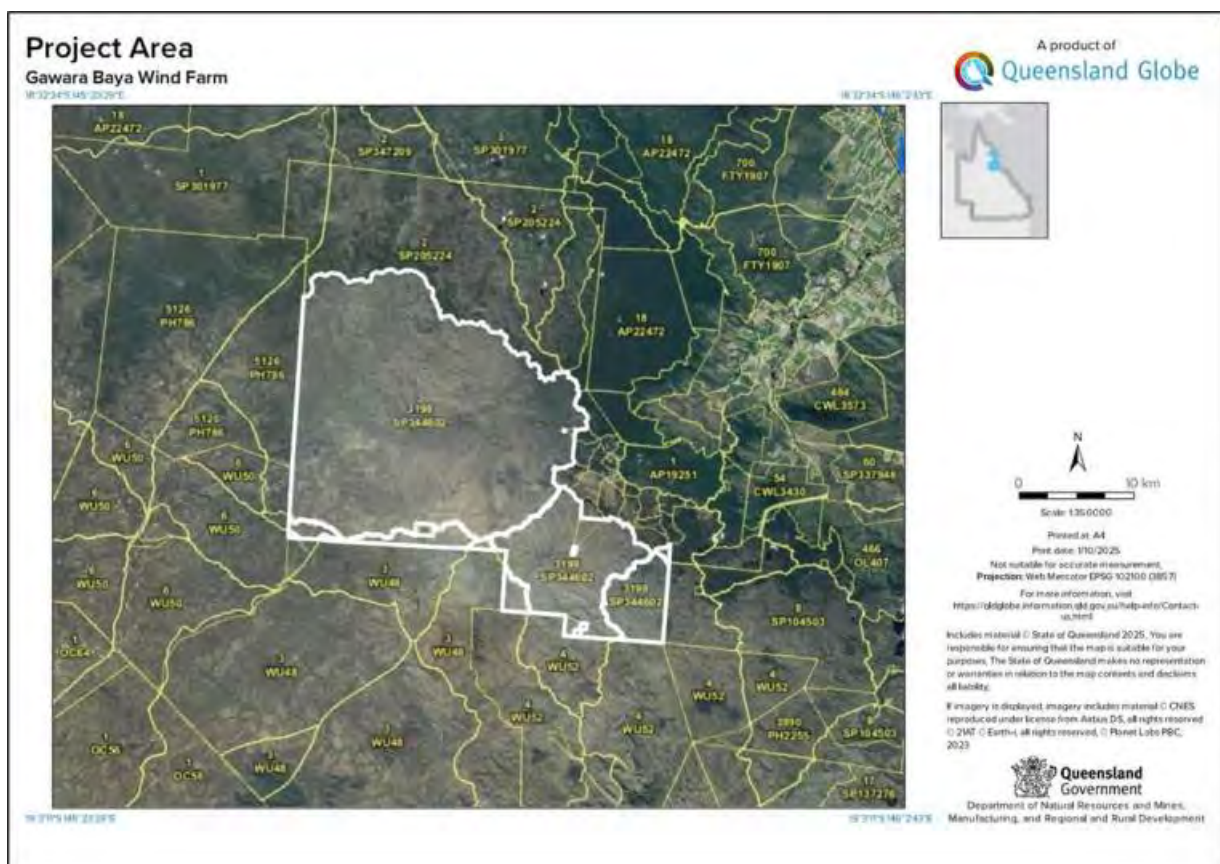
The author of this report meets Council, and QFD criteria as follows:

- possesses knowledge and experience in applying relevant legislation, plans, policies, standards and guidelines relating to bushfire hazard and fire ecology relating to Queensland requirements and North Queensland Coast conditions; and
- has knowledge, experience in botanical survey methods and GIS analysis and at least 5 years' experience in undertaking bushfire hazard assessment and preparing bushfire management plans, including experience in undertaking fine-scale assessment of vegetation communities and application of the QFD Bushfire Hazard Assessment methodology outlined in the BRC Technical Guide; and
- has qualifications and experience in the field of ecology, environmental management or similar to assess and protect site-based and strategic biodiversity values relating to North Queensland Coast.

1.4 Project Location

The Project is located approximately 44 km south-west of Ingham, North Queensland, on the Great Dividing Range and within the CTRC LGA, on Lot 3198 SP344602 (hereon referred to as the 'Project Area'). The Project Area is located on agricultural land with a history of cattle grazing, near Mount Fox. Lannercost State Forest lies to the north-east of the of the Project Area boundary and Girringun Forest Reserve to the south-west of the Project Area boundary. Road infrastructure within or adjacent to the Project Area boundary includes Mount Fox Lava Plains Road, Boundary Road, and Oak Hills Road ().

Figure 1: Project Area Location





1.5 Project Description

Gawara Baya Wind Farm on completion will have up to 68 wind turbine generators (WTG), 11 main buildings across seven (7) sites (the workers camp (site 1) includes 125 units), and associated roads, power line corridors and other infrastructure necessary for construction and operation of the wind farm (the 'site layout' or 'Development Footprint'). Further details are provided in planning and operational reports. **Figure 2** shows the site layout.

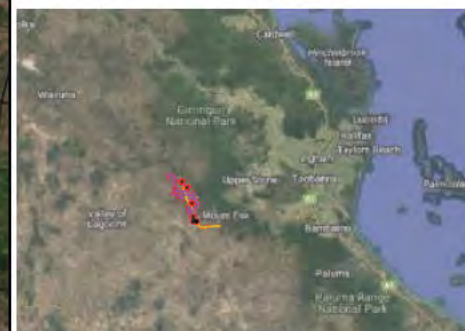
The Project will be constructed in three (3) stages:

- **Construction phase:** is expected to commence in 2025, subject to approvals and commercial considerations. The construction phase is expected to last for a period of approximately 36 months, with approximately 500 staff employed during the peak construction period.
- **Operation phase:** the operational life of the wind farm is expected to be 30 years.
- **Decommissioning:** infrastructure may be repowered with new equipment or decommissioned and the Project Area rehabilitated to facilitate continuation of the current land use (agriculture) or alternative land use.

Figure 2: Site Layout

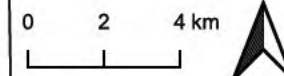
Project: PR23354_Gawara Baya Wind Farm

-  Property Boundary
-  Existing Tracks
-  Development Corridor
-  Site 1 - Site Camp
-  Site 2 - Site Office
-  Site 3 - Operations and Machinery Permanent Laydown
-  Site 4 - Concrete Batching and South Laydown
-  Site 5 - Substation Far North
-  Site 6 - Laydown Area
-  Site 7 - Substation South
-  Site 8 - Laydown Area Far North
-  Wind Turbine Generators



Notes:
 - Survey data by Green Tape Solutions,
 - Site data by Windlab
 - State VHCs by SPP
 - Base map Copyright (c) Qld Globe and its data suppliers.

Created By: 
 Date: 23/09/2025
 Version: 2





1.5.1 Access Tracks

Onsite access tracks layout are designed to utilise the existing topography of the land, avoiding steep areas where possible and minimising the amount of land required. The following design criteria and mitigation measures are applied to the access track layout to mitigate potential impacts:

- The access tracks shall be nominally 6 m wide, which may be expanded to 12 m to accommodate crane and delivery vehicle requirements during construction.
- The maximum gradient of onsite access tracks shall be up to 18% (approximately 10.2°). Most of the wind farm has a general gradient of approximately 8-10° with only a few areas exceeding this.
- There would be regular passing places and turning areas.
- Tracks will be constructed from locally sourced aggregate.
- Tracks will be flush with the ground level, where possible, refer to cross-sections by CBOP.
- The number and design of water course crossings will be in accordance with the waterway plan.
- Track margins will be vegetated to reduce potential sediment-laden run-off.

The following measures shall also apply to access tracks for bushfire hazard mitigation and fire-fighting purposes:

- Vertical clearance of 4.8 metres (m) with 3 m either side of trafficable width (6 – 12 m), cleared of all flammable vegetation greater than 10 centimetres (cm) in height;
- Trails and access tracks are to be capable of accommodating a 10-tonne vehicle;
- Cross-fall of trails and access tracks shall be no greater than 20 degrees. Where a 20-degree cross-fall is unachievable, either an alternate route is to be provided, or the access road is sufficiently formed to prevent erosion and slope instability;
- Drainage and erosion control devices in accordance with prescribed local government standards;
- Designated signage shall be installed in accordance with measures detailed below in **Section 4.10**;
- Gates shall be locked using a system authorised by QFD;
- Fire trails and access tracks shall allow for, and not impede, access for firefighting and maintenance for fire-fighting purposes.

The construction of access tracks will vary depending on localised ground conditions. Conditions impacting construction include the existing vegetation, nature of the topsoil, level of moisture in the ground, geotechnical base, and localised topography. Once the Project has been commissioned, areas other than pavement, that have been disturbed during construction activities will be rehabilitated.



1.5.2 Services

The following services would be available at the wind farm site during operation phase:

- Water – a rainwater tank would be incorporated into the control room design. If water is required for cleaning or other maintenance activities, it will be trucked to site by a commercial operator.
- Telecommunications and internet – communications and mobile phones will be used and a satellite or landline connection may be established in the control room.
- Sewer – an on-site effluent disposal system will be connected to the control room.
- Electricity – electricity will be provided by the wind farm development and the control room may also be connected to mains electricity.
- Use of underground cabling within the road footprint throughout the majority of the Project Area.

Infrastructure will be located in existing cleared areas (including adjacent to existing roads) wherever possible, and in areas of relatively low vegetation density, with planning for cabling underground across the majority of the Project Area.

1.5.3 Overhead Transmission Line

The Development Footprint includes areas where clearing can be avoided, but trimming will be necessary, with maximum vegetation heights specified by:

- Transmission line.
- Mount Fox Lava Plains Road: swept path clearance heights according to the Project's traffic assessment and manufacturer's instructions when transporting blades exceeding 70 m in length.

Within the transmission line, there is vegetation which will need to be trimmed to a specific height as well as areas of vegetation that are already of the correct height (according to Light Detection and Ranging (LiDAR) data) which would need to be monitored and potentially trimmed in future.

1.5.4 Wind Monitoring Masts

Permanent meteorological masts (met masts) will be constructed up to 140 m above ground level (AGL) and will be of steel lattice construction. There will be a total of six (6) met masts installed across the Project Area, with three (3) temporary met masts currently installed on-site, and up to two (2) permanent met masts to be installed and retained for the life of the Project. The temporary met masts will be progressively removed from site during construction, commissioning, and early operation. The met masts will be supported by a series of guy wires anchored to the ground by concrete footings. Bushfire planning for the Power Performance Masts (PPMs) is outlined in **Section 3.2.3**.

1.6 Construction Activities

Construction for the Project will be over a period of approximately 36 months. The Project will involve around 500 staff working within the Project Area during peak construction phase. **Table 1** provides a summary of the relevant construction activities for the Project. Procedures and management plans for all construction activities would be included in a Construction Environmental Management Plan (CEMP) that will be prepared for the Project prior to any works commencing.

Table 1: Construction Methodology

Activity/Phase	Description of Works
Wind turbine generators (WTGs)	- Each turbine will be manufactured offsite in sections and assembled on-site; - Wind turbine generators, materials, and equipment will be delivered to the site by restricted access vehicles where necessary; - A crane hardstand and blade staging area (approx. 3,800 square metres; m²) adjacent to each turbine will be utilised for construction, and will remain as a cleared, functional area for maintenance purposes during operation. - The turbines will be installed by suitable lifting machinery and bolted to the concrete footings.
Construction of WTG footings	- Excavation of soil or rock at each turbine location, by excavators, loaders or similar equipment. - Excavated topsoil will be stockpiled. Some would be reinstated following construction with the surplus used for rehabilitation and Project Area restoration; - Each footing will include conduits for power and control cables; and - The WTG hardstand will remain with pavement surrounding the WTG footing.
Electrical infrastructure Underground cables	Surplus excavated soil will be distributed over surrounding areas and rehabilitated.
Electrical infrastructure Overhead lines	- Overhead line may consist of numerous circuits per structure, more than one pole per structure, and up to two conductors per phase. - The conductors will be supported by porcelain, glass or polymer insulators, which will be mounted to steel poles. - The poles may be spaced up to 1,500 m apart, and potentially supported by stays, and installed on a bored pier concrete footing. - The conductors are expected to have a minimum clearance of 6.7 m over roads and 5.5 m over general terrain. - Access tracks should be located alongside or near the line for access during installation and future maintenance requirements. - Surplus excavated topsoil will be distributed over surrounding areas and rehabilitated, and surplus excavated subsoil will be used in access track construction or stockpiled for removal.

Activity/Phase	Description of Works
On-site access tracks	• WTG access track construction will involve clearing, grading, and removal of topsoil as required, removal of soft material not suitable as a sub-grade, compaction of gravel road base, and provision of drainage. • Excavated topsoil to be stockpiled for Project Area rehabilitation. • Following the completion of construction, areas of land no longer required for access will be rehabilitated to their pre-construction condition.
Local road upgrades	• Existing local roads will be used by construction vehicles for delivery of Project parts. • All roads identified as needing upgrading for construction access will be designed and constructed to relevant engineering standards. • Creek crossings will be upgraded as required including extending existing culverts. Culvert works will include inlet and outlet scour protection. Existing fords may be upgraded.
Met masts	• Will involve construction of concrete footings, erection of mast with supporting guy wires, and installation of monitoring equipment.
Temporary compounds and ancillary facilities including concrete batch plants	• The construction compound will be fenced, and will accommodate transportable office buildings, mess buildings, ablution facilities, and equipment storage areas and containers; power will be provided by diesel generator. • Construction of temporary compounds and ancillary facilities will involve clearing, grading, and removal of topsoil as required, removal of soft material not suitable as a foundation, compaction of gravel road base, and provision of drainage. • Excavated topsoil to be stockpiled for Project Area rehabilitation. • Following the completion of construction, all infrastructure associated with the temporary facilities would be removed and the land will be rehabilitated to its pre-construction condition.



1.7 Operating Activities

Operational activities would include the following:

- Monitoring and control of the wind farm – This would be undertaken both by on-site personnel and via a remote-control system accessed from a central off-site facility and providing real time and historical performance information.
- Maintenance activities – General repair and maintenance of all wind farm infrastructure as well as roads, drainage, and fences. This would also include occasionally responding to faults in the equipment which would be identified through alarms on the monitoring system.

1.8 Decommissioning

At the end of the operational phase, the wind farm would either be decommissioned or repowered with new equipment. In the event of decommissioning, all above ground infrastructure would be removed from the Project Area and a rehabilitation plan would be implemented to reinstate habitat and return the land to its predevelopment condition. Redundant infrastructure would be recycled or otherwise disposed of at approved facilities. Any ground disturbance resulting from the operation and/or infrastructure removal stage would be rectified, and the topsoil of disturbed areas would be re-seeded as per the rehabilitation plan.

If continued operation of the wind farm is the preferred option, a development application would be submitted at that time. It is likely that much of the infrastructure present in the Project Area would be retained and incorporated into the new proposal.

2 Bushfire Regulatory Framework

Management of bushfire hazard in Queensland is considered an integral component of land use planning and development decisions given that such hazards can cause harm to people and social wellbeing, damage to property, and impact the economy and environment.

There are multiple regulatory mechanisms/instruments considered as part of the Project that regulate development to avoid and mitigate potential impacts associated with bushfire hazard:

- National Construction Code (NCC) – given legal effect through the *Building Act 1975* (QLD).
- State Planning Policy (SPP) and associated guidelines (Department of Infrastructure, Local Government and Planning (DILGP), July 2017);
- Charters Towers Regional Town Plan 2020 (Version 2) (Charters Towers Regional Council 2020); and
- Australian Standard AS3959:2018 – Construction of Buildings in Bushfire-prone Areas (AS3959:2018) (Standards Australia, 2018).

2.1 National Construction Code

The NCC sets out requirements for the design and construction of a building in Australia, including minimum required levels for the safety of certain buildings. The NCC has additional requirements for the construction of buildings in designated bushfire-prone areas to address risks posed by bushfire attacks. The NCC has legal effect through the *Building Act 1975* (Qld) and is varied through amendments to the Building Regulation 2006 that adopts the Queensland Development Code (QDC). The Charters Towers Regional Town Plan 2020 (Version 2) Bushfire Hazard Overlay Map designates bushfire-prone areas for the NCC, the Building Regulation 2006 and the QDC.

2.2 State Planning Policy

The SPP identifies the Queensland Government's policies about matters of state interest in land use planning and development. The SPP is a broad and comprehensive statutory planning instrument. It sits above regional plans, standard planning scheme provisions and local government planning schemes within the hierarchy of planning instruments outlined in the Queensland *Planning Act 2016*.

The SPP is supported by the following guidance material:

- The SPP state interest guidance material – Natural hazards, risk and resilience – Bushfire ('SPP guidance') (DSDMIP, 2019), which provides further context to the SPP and explains how the SPP policies can be applied, in particular for local government when making or amending local planning instruments. The SPP guidance is also intended to assist assessment managers and practitioners in applying the SPP assessment benchmarks when state interests have not been integrated into the local planning scheme (where applicable).
- The 'Bushfire Resilient Communities – Technical Reference Guide for the State Planning Policy State Interest – Natural Hazards, Risk and Resilience – Bushfire' ('BRC Technical Guide') (QFES, 2019), which provides technical guidance and policy positions of the Queensland Fire Department (QFD). It includes procedures for undertaking a bushfire hazard assessment (BHA), calculating asset protection zones and preparing a Bushfire Management Plan.



The SPP assessment benchmarks outlined in Part E of the SPP and Section 4.0 of the SPP guidance apply to development to the extent that the development is assessable against a planning scheme and only to the extent that the planning scheme is inconsistent with the SPP.

This bushfire management plan aims to address all relevant assessment benchmarks laid out by the State Planning policy (SPP), Including:

- Development other than that assessed against above, avoids natural hazard areas, or where it is not possible to avoid the natural hazard area, development mitigates the risks to people and property to an acceptable or tolerable level.
- Development supports and does not hinder disaster management response or recovery capacity and capabilities.
- Development directly, indirectly and cumulatively avoids an increase in the severity of the natural hazard and the potential for damage on the Project Area or to other properties.
- Risks to public safety and the environment from the location of hazardous materials and the release of these materials because of a natural hazard are avoided.
- The natural processes and the protective function of landforms and the vegetation that can mitigate risks associated with the natural hazard are maintained or enhanced.

Table 2 outlines the assessment of the Project against the Assessment Benchmarks for the SPP Natural Hazards, Risk and Resilience – Bushfire State Interest.

Table 2: Assessment against Assessment Benchmarks for the SPP Natural Hazards, Risk and Resilience – Bushfire State Interest

Assessment Benchmarks (AB) for the Natural hazards, risk and resilience – Bushfire State Interest		Compliance Assessment
Applicable development – A Development Application for a Material Change of Use (MCU), Reconfiguration of Lot (RoL) or Operational Works within bushfire-prone area		
1	Erosion prone areas within a coastal management district Development does not occur in an erosion prone area within a coastal management district unless the development cannot feasibly be located elsewhere and is: (a) coastal-dependent development; or (b) temporary, readily relocatable or able to be abandoned development; or (c) essential community infrastructure; or (d) minor redevelopment of an existing permanent building or structure that cannot be relocated or abandoned.	Not applicable This assessment benchmark is not applicable to bushfire hazard considerations.
2	Erosion prone areas within a coastal management district Development permitted in (1) above, mitigates the risks to people and property to an acceptable or tolerable level.	Not applicable This assessment benchmark is not applicable to bushfire hazard considerations.
3	Bushfire, flood, landslide, storm tide inundation, and erosion prone areas outside the coastal management district Development other than that assessed against (1) above, avoids natural hazard areas, or where it is not possible to avoid the natural hazard area, development mitigates the risks to people and property to an acceptable or tolerable level.	Complies with AB 3 This BMP provides a site-specific bushfire hazard assessment that confirms the level of bushfire hazard for the Project Area. The proposed development is located within the Potential Impact Buffer area associated with bushfire-prone vegetation surrounding the Project Area.



Assessment Benchmarks (AB) for the Natural hazards, risk and resilience – Bushfire State Interest		Compliance Assessment
Applicable development – A Development Application for a Material Change of Use (MCU), Reconfiguration of Lot (RoL) or Operational Works within bushfire-prone area		
		The mitigation measures outlined in this BMP are sufficient to reduce the risk to a tolerable level (i.e., the level of risk is low enough to allow the exposure to the hazard to continue but high enough to require new treatments or actions to reduce this risk). These measures include: • a minimum separation distance as outlined in Table 7 between the proposed buildings and hazardous vegetation; • establishment and ongoing management of an Asset Protection Zone (APZ) around the development; and • construction of the new infrastructure in accordance with the requirements of AS3959:2018.
4	All natural hazard areas: Development supports, and does not hinder, disaster management response or recovery capacity or capabilities.	Complies with AB 4 Section 4.8 provides details of the water supply. Water supply and available pressure shall be in accordance with the standards specified by the relevant utilities provider to ensure supply and pressure is adequate for fire-fighting requirements. In addition, the specified APZ shall provide defensible space and working area for fire-fighting.



Assessment Benchmarks (AB) for the Natural hazards, risk and resilience – Bushfire State Interest		Compliance Assessment
Applicable development – A Development Application for a Material Change of Use (MCU), Reconfiguration of Lot (RoL) or Operational Works within bushfire-prone area		
5	All natural hazard areas: Development directly, indirectly and cumulatively avoids an increase in the severity of the natural hazard and the potential for damage on the site or to other properties.	Complies with AB 5 The development will not increase the severity or potential to damage to other property. The development layout siting is isolated from other properties and there is therefore no direct increase in severity or risk for damage to other properties. Landscaping treatments shall comprise only low threat vegetation (i.e., cultivated gardens and maintained lawn/turfed areas). Any fences required shall be constructed of non-combustible or fire-retardant materials, with any installed gates to be freely accessed for fire-fighting purposes. The use of mitigation strategies as outlined in Section 4 will further reduce the risk of increasing the severity of bushfires. As such, the Project is compliant with AB 5.
6	All natural hazard areas: Risks to public safety and the environment from the location of hazardous materials and the release of these materials as a result of a natural hazard are avoided.	Complies with AB 6 Section 9.4 of the BRC Technical Guide specifies that all flammable materials and combustibles will be stored in a secure and enclosed area, away from electrical infrastructure, as described in Section 5.3.



Assessment Benchmarks (AB) for the Natural hazards, risk and resilience – Bushfire State Interest		Compliance Assessment
Applicable development – A Development Application for a Material Change of Use (MCU), Reconfiguration of Lot (RoL) or Operational Works within bushfire-prone area		
7	All natural hazard areas: The natural processes and the protective function of landforms and vegetation that can mitigate risks associated with the natural hazard are maintained or enhanced.	Complies with AB 7 The buildings shall be sited as per the minimum separation distances for each site as provided in Table 7. Landscaping treatments within this setback shall comprise only low threat vegetation (species that are naturally fire-resistant or have characteristics that make them less susceptible to fire damage, such as thick bark or the ability to resprout after fire). The APZ will be managed in accordance with the requirements outlined in Section 4.3 of this BMP. These management measures include landscape treatments and management to ensure low-combustibility and low fuel loads.



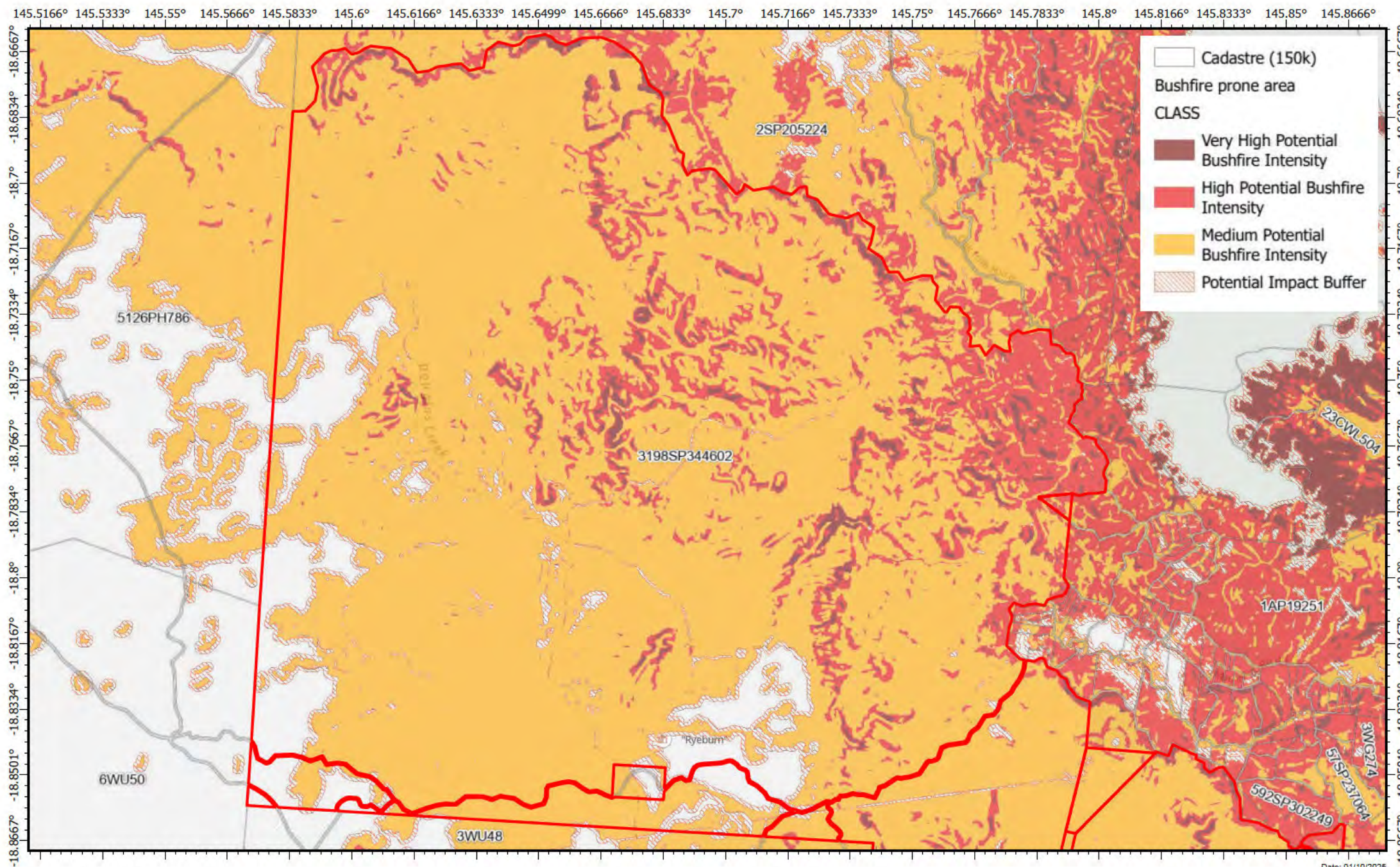
The SPP is supported by a state-wide map of bushfire prone areas (BPA) (also referred to as 'bushfire hazard area') that was developed based on the Commonwealth Scientific and Industrial Research Organisation (CSIRO) modelling of potential fireline intensity using the methodology described by Leonard *et al.* (2014). The SPP defines a BPA as land that is potentially affected by significant bushfires, including vegetation likely to support a significant bushfire and adjacent land that could be subject to impacts from a significant bushfire (i.e. potential impact buffer) and is:

- (a) Identified by a local government in a local planning instrument as a bushfire prone area based on a localised bushfire study, prepared by a suitably qualified person; or
- (b) If the local government has not identified bushfire prone areas in a local planning instrument in accordance with (a) above, shown on the SPP Interactive Mapping System (SPP IMS) as a bushfire prone area.

The BPA mapping identifies areas of Very High (>40,000 kilowatts per metre (kW/m)), High (20,000 – 40 000 kW/m) and Medium (4,000 – 20,000 kW/m) Potential Bushfire Intensity. The Potential Impact Buffer includes all land within 100 metres (m) of any area with a Potential Fireline Intensity (PFI) greater than 4,000 kW/m (i.e., within 100 m of Medium, High or Very High bushfire hazard/potential bushfire intensity). This mapping triggers assessment against the SPP Assessment Benchmarks.

An excerpt from the SPP Assessment Benchmark – BPA mapping published on the SPP Interactive Mapping System is provided in **Figure 3** (Figure 3.1 displays the north of the Project Area, Figure 3.2 displays the south-east of the Project Area). The Project Area is mapped as containing areas of Medium, High, and Very High Potential Bushfire Intensity, and Potential Impact Buffer.

The proposal has been assessed against the SPP, including State Code 23 – Wind Farm Development. The development is consistent with the Code as it avoids siting in areas of unacceptable bushfire risk, provides adequate setbacks and APZs, and is supported by a BHA and BMP. Accordingly, the development maintains the safety of people and property in line with State-level requirements.



Date: 01/10/2025

Figure 3.1: Excerpt from SPP IMS - Bushfire Prone Areas (North)

Disclaimer This map has been prepared with due care based on the best available information at the time of publication. However, the State of Queensland (acting through the department) makes no representations, either express or implied, that the map is free from errors, inconsistencies or omissions. Reliance on information contained in this map is the sole responsibility of the user. The State disclaims responsibility for any loss, damage or inconvenience caused as a result of reliance on information or data contained in this map.



Scale: 1:144,500



Queensland
Government

© The State of Queensland 2025.



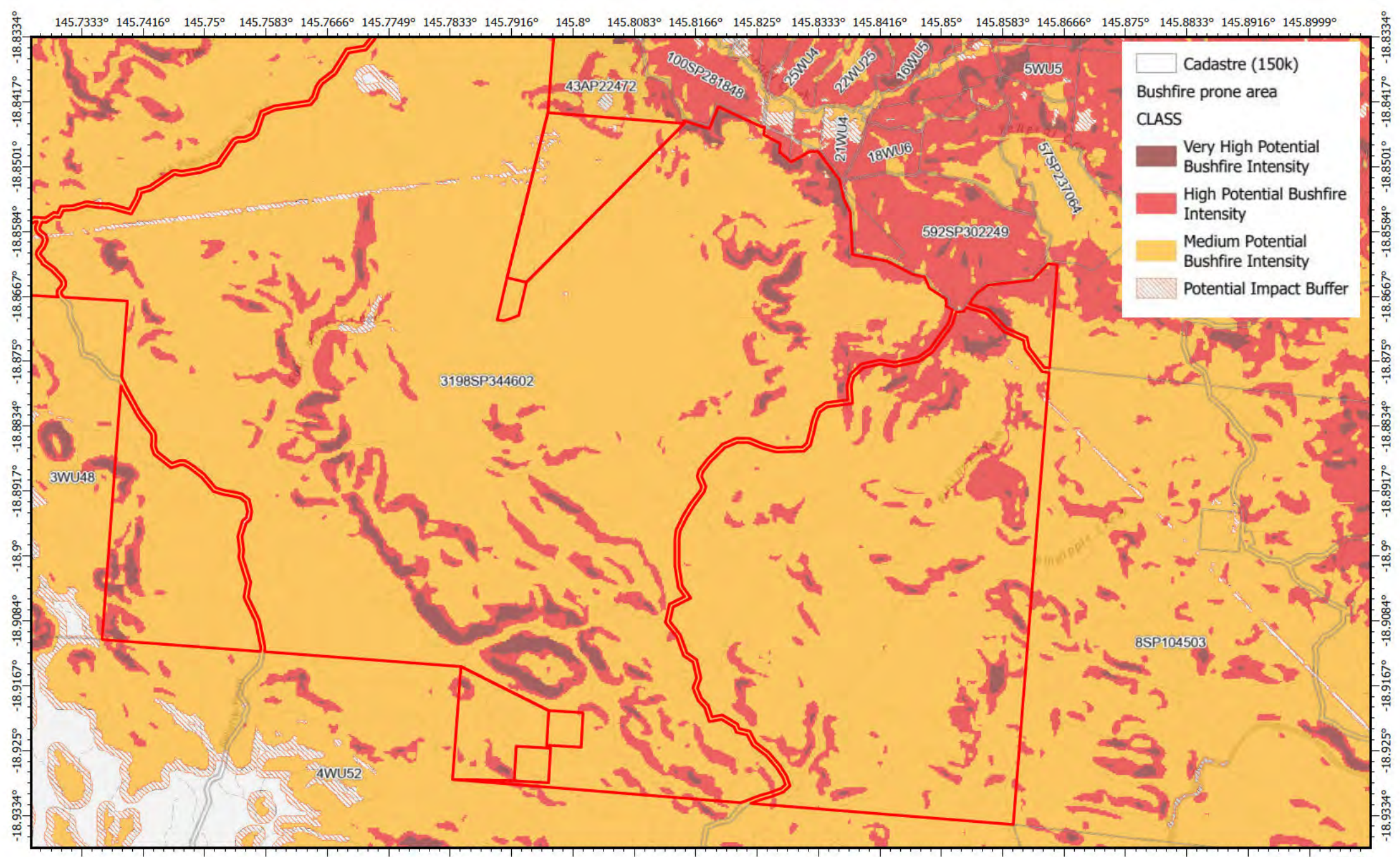


Figure 3.2: Excerpt from SPP IMS - Bushfire Prone Area (South-east)

Disclaimer This map has been prepared with due care based on the best available information at the time of publication. However, the State of Queensland (acting through the department) makes no representations, either express or implied, that the map is free from errors, inconsistencies or omissions. Reliance on information contained in this map is the sole responsibility of the user. The State disclaims responsibility for any loss, damage or inconvenience caused as a result of reliance on information or data contained in this map.



Scale: 1:72,300



Queensland
Government

© The State of Queensland 2025.



Date: 01/10/2025

2.3 Charters Towers Regional Town Plan 2020 (Version 2)

The Project Area is mapped as being within a natural hazard management area (bushfire) under the Charters Towers Regional Town Plan 2020 (Version 2). The Bushfire Hazard Overlay identifies areas of Very High, High, and Medium Potential Bushfire Intensity, as well as Potential Impact Buffer, within the Project Area. An excerpt from the overlay map showing these hazard areas in relation to the proposed development is provided in **Figure 4**.

Under the Charters Towers Regional Town Plan 2020 (Version 2), development within the Bushfire Hazard Overlay must not be placed at unacceptable risk, increase the extent or severity of bushfire, or compromise the safety of people and property. This BMP has been prepared to meet these requirements and to assess the extent and nature of bushfire risk for the site.

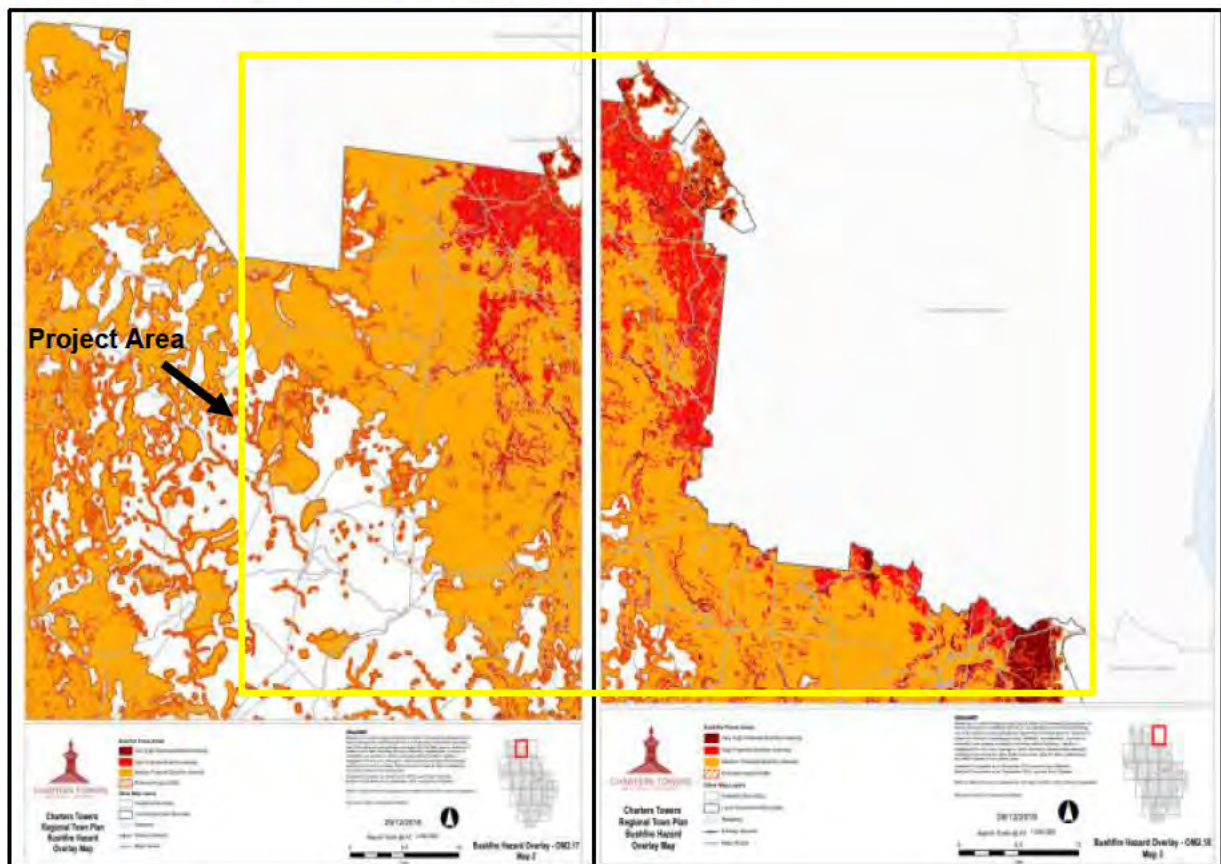


Figure 4: Excerpt from Council's Mapping – Bushfire Prone Area (Source: Council website)



2.4 AS 3959-2018 Construction of Buildings in Bushfire Prone Areas

The Australian Standard *AS3959:2018 Construction of Buildings in Bushfire-Prone Areas* (Standards Australia, 2018) specifies the requirements for the construction of buildings in bushfire-prone areas in order to improve their resistance to bushfire attack. AS3959:2018 applies to those areas where a regulated map (i.e. a planning scheme overlay map) identifies an area as a bushfire prone area (or similar), requiring calculation of Bushfire Attack Level (BAL) in accordance with a methodology outlined in the standard.

AS3959:2018 thus prescribes the construction details for buildings depending on the calculated BAL. The detailed requirements relating to construction methods and materials are typically dealt with as part of building design and enabled via private certification in accordance with the Building Code of Australia.

The National Construction Code (NCC) 2022 published by the Department of Energy and Public Works also contains the building requirements for new or renovated buildings in relation to fire safety of external walls and new housing provisions standards. The NCC 2022 ensures new homes are more energy efficient and meet accessibility standards.

3 Bushfire Hazard Assessment

A site-specific bushfire hazard assessment (BHA) for the Project Area has been undertaken in accordance with the methodology outlined in the BRC Technical Guide. The methodology underpinning the BHA process consists of three stages:

1. An assessment to verify the reliability of existing BPA mapping over the Project Area and land surrounding the Project Area (the 'assessment area').
2. A hazard assessment involving field investigations to ground-truth the accuracy of the BPA mapping for the Project Area, where required. The hazard assessment area must include the development area and all land within 150 m of the Development Footprint.
3. Using the results of the site-specific assessment, the asset protection zone width needed to achieve the requisite radiant heat flux levels is calculated.

Where the precision and/or accuracy of BPA mapping or map input datasets are insufficient (e.g., where there has been changes in land use and vegetation cover within the assessment area), the process enables applicants to create a local-scale BPA map based on the results of the site investigation and to apply modified input variables that reflect changes that have occurred over time. The BHA process adapts the method used to generate the state-wide BPA mapping, described in Leonard *et. al.* (2014) with further refinement to allow for the downgrade and/or filtering of small patches and narrow corridors where needed in accordance with contemporary mapping rules outlined in the BRC Technical Guide (Leonard and Opie, 2017).

Where effective fuel loads have been reduced based on patch size and isolation in accordance with the patch and corridor filtering rules outlined in 4.2.6 of the BRC Technical Guide, reduced effective fuel loads can be used as inputs into a Method 2 BAL assessment.

The assessment has been based on vegetation existing within, adjacent and nearby to the Project Area including any areas subject to revegetation or regrowth, which have been assessed as if these areas have reached their mature state.

3.1 Hazard Assessment

The following steps have been undertaken to assess spatial factors that contribute to potential bushfire intensity for the Project Area and surrounding land:

- **Step 1: Identification of Fire weather severity**

Identification of all Forest Fire Danger Index (FFDI) values estimated at a 1:20 year (5%) Annual Exceedance Probability (AEP) using the Bushfire Hazard Area – Bushfire Prone Area – Inputs dataset from the Queensland Spatial catalogue (QSpatial).

- **Step 2: Identification of Vegetation Hazard Classes**

Assessment of vegetation communities to identify the relevant VHCs using a combination of remnant and pre-clearing regional ecosystem (RE) maps, high-resolution aerial imagery, and a ground-truthed assessment of vegetation present within the project area and within the required assessment area.



- **Step 3: Slope assessment**

Identification of Project Area slope and effective slope, and determination of whether proposed buildings are upslope or downslope of hazardous vegetation using Bushfire Hazard Area – Bushfire Prone Area – Inputs dataset from QSpatial and 10 m LiDAR-derived contour data.

This assessment adopts the State's Vegetation Hazard Class (VHC) and SPP bushfire-prone mapping. As the proposal does not alter the distribution, extent or classification of VHCs within the assessment area, no separate PFI calculation is required. If future design changes modify VHCs or fuel loads, PFI will be remodelled in accordance with Leonard et al. (2014) to demonstrate resulting changes to Potential Bushfire Intensity.

Relevant spatial datasets published by the QFD were accessed via the QSpatial and the Catalyst Fire Management System (Queensland Fire and Emergency Services, 2020).

3.1.1 Fire Weather Severity

North Queensland has a tropical climate with hot, moist summers and warm, mild dry winters. It is subject to influence from monsoonal climate systems and easterly troughs. Annual and seasonal average rainfall are variable, affected by local factors such as topography and vegetation, and broader scale weather patterns, such as the El Niño–Southern Oscillation. Seasonality is not pronounced; however, the 'wet' season generally occurs during the December – April period. The fire danger season usually occurs from late winter to mid-summer (August/September to December) with the greatest danger after a dry winter and spring and when deep, low-pressure systems near Tasmania bring strong, hot and dry westerly winds to the coastal districts (Bureau of Meteorology, 2021). Severe bushfire weather is characterised by days with high temperatures over 35 degrees Celsius, low relative humidity, and winds from the north to north-west.

The FFDI provides an annual accumulated index of fire weather severity (i.e., the potential danger of a bushfire) based on a combination of vegetation dryness, air temperature, wind speed and humidity. The relevant FFDI for the Project Area was derived from the Fire Weather Severity (Forest Fire Danger Index) raster provided as part of the Bushfire Hazard Area – Bushfire Prone Area – Inputs dataset.

The FFDI for the Project Area and surrounding land is classified between **FFDI 44** to **FFDI 46**. A FFDI of 46 is conservatively used throughout this assessment.

3.1.2 Vegetation Hazard Classes

Different types of vegetation communities determine the rate at which dry fuel accumulates. Some vegetation communities protect fuel from drying out in all but extreme bushfire seasons and can then be susceptible to very destructive bushfires. Alternatively, vegetation communities may expose fuels to drying and therefore be frequently available for burning. Frequent bushfires can result in the development of bushfire-tolerant grassy woodlands or grasslands and less destructive bushfire behaviour.

3.1.2.1 State-mapped Vegetation Hazard Classes

VHCs provided within the Bushfire Prone Area – Vegetation Hazard Class spatial dataset was reviewed for the Project Area and surrounding land. **Table 3** details the VHCs mapped within the broader Project Area.

Table 3: State-mapped Vegetation Hazard Classes within the Project Area

VHC	Description
5.1	Notophyll to microphyll vine forests
6.1	Montane Notophyll vine forest and microphyll fern forest
7.1	Semi-evergreen to deciduous microphyll vine forest
8.1	Wet eucalypt tall open forest
9.1	Moist to dry eucalypt open forests on coastal lowlands and ranges
9.2	Moist to dry eucalypt woodland on coastal lowlands and ranges
10.2	Spotted gum dominated woodlands
11.2	Moist to dry eucalypt woodlands on basalt areas
12.2	Dry eucalypt woodlands on sandstone and shallow soils
13.2	Dry to moist eucalypt woodlands on undulating metamorphics and granite
16.2	Eucalyptus dominated woodland on drainage lines and alluvial plains
16.6	Sparsely vegetated areas associated with eucalyptus woodlands on drainage lines
18.2	Dry eucalyptus woodlands on sand or depositional plains
19.2	Low open eucalyptus woodlands dominated by snappy gum, Cloncurry Box or Normanton box
21.2	Melaleuca dry woodlands on sandplains or depositional plains
22.1	Melaleuca open forests on seasonally inundated lowland coastal swamps
28.3	Shrubland associated with woodlands in coastal location
29.3	Heathlands and associated scrubs and shrublands
29.6	Sparsely vegetated areas associated with heathlands, scrubs and shrublands
30.4	Mitchell grass or bluegrass tussock grasslands



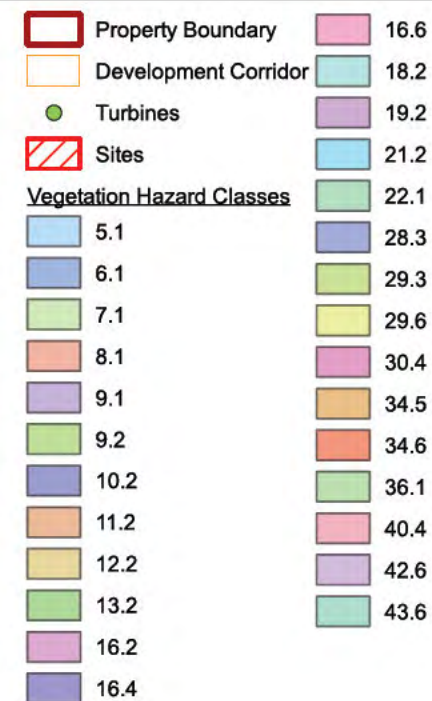
VHC	Description
36.1	Exotic & hardwood plantation
40.4	Continuous low grass or tree cover
42.6	Nil to very low vegetation cover
43.6	Water bodies or very low vegetation cover

The reliability of State-mapped VHCs was assessed through a review of Regulated Vegetation Management (RVM) remnant and pre-clearing RE mapping published by the Queensland Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development (DNRMMRRD).

This report utilises the State-mapped VHCs in accordance with the above, as there is a lack of ground-truthed data available for the relevant sites. The VHCs mapped within the BAL-assessable sites are provided in **Table 4**, while **Figure 5** shows the state mapped Vegetation Hazard Classes within the Project Area.

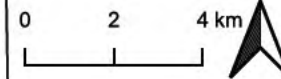
Figure 5: State-Mapped Vegetation Hazard Classes

Project: PR23354_Gawara Baya Wind Farm



Notes:
 - Survey data by Green Tape Solutions,
 - Site data by Windlab
 - State VHCs by SPP
 - Base map Copyright (c) Qld Globe and its data suppliers.

Created By: [Redacted]
 Date: 23/09/2025
 Version: 2



3.1.2.2 State-mapped Regional Ecosystems

The State's remnant RE mapping illustrates that the Project Area has been largely cleared. Areas of mapped REs associated with the assessment area (i.e., 150 m buffer from all sites, power performance masts, and WTGs), including their status under the *Vegetation Management Act 1999* (VM Act) are provided in **Table 4.** Where REs are mapped as heterogeneous polygons (polygons with more than one RE occurring in them), the dominant RE has been calculated for the purpose of this assessment.

Table 4: State-mapped Regional Ecosystems within the Assessment Area

Regional Ecosystem	VM Act Status	RVM Category	Area (ha)	Short Description	Structure Category
11.12.13a	Least Concern	B	6.35	<i>Eucalyptus crebra</i> , <i>Corymbia</i> spp., <i>E. acmenoides</i> woodland on igneous rocks.	Sparse
7.12.24	Least Concern	B	32.1	<i>Eucalyptus portuensis</i> and <i>Corymbia intermedia</i> open forest to woodland (or vine forest with <i>E. portuensis</i> and <i>C. intermedia</i> emergents) on foothills and uplands on granites and rhyolites.	Mid-dense
7.12.29	Least Concern	B	7.38	<i>Corymbia intermedia</i> and/or <i>Lophostemon suaveolens</i> open forest to woodland +/- areas of <i>Allocasuarina littoralis</i> and <i>A. torulosa</i> on uplands on granites and rhyolites	Mid-dense
7.12.30	Least Concern	B and C	53.19	<i>Corymbia citriodora</i> +/- <i>Eucalyptus portuensis</i> woodland to open forest on granite and rhyolite.	Sparse
7.12.34	Least Concern	B and C	59.06	<i>Eucalyptus portuensis</i> and/or <i>E. drepanophylla</i> +/- <i>C. intermedia</i> +/- <i>C. citriodora</i> , +/- <i>E. ranitica</i> open woodland to open forest on uplands on granite.	Sparse
7.12.65	Least Concern	B	0.06	Rock pavement or areas of skeletal soil on granite and rhyolite of dry western or southern areas +/- shrublands to closed forests of <i>Acacia</i> spp. And/or	Other

Regional Ecosystem	VM Act Status	RVM Category	Area (ha)	Short Description	Structure Category
				<i>Lophostemon suaveolens</i> and/or <i>Allocasuarina littoralis</i> and/or <i>Eucalyptus lockyeri</i> subsp. <i>exuta</i> .	
7.5.4	Of Concern	B	8.121	<i>Corymbia intermedia</i> or <i>Melaleuca viridiflora</i> woodland to open forest of uplands on weathered soils of a remnant surface.	Mid-dense
9.11.2	Least Concern	B	23.84	<i>Eucalyptus crebra</i> (or several other ironbark species) +/- <i>Corymbia</i> spp. woodland on shallow texture contrast soils on low metamorphic hills and lowlands.	Sparse
9.11.4	Least Concern	B	20.78	<i>Eucalyptus crebra</i> , <i>Corymbia clarksoniana</i> , <i>C. citriodora</i> subsp. <i>citriodora</i> +/- <i>E. portuensis</i> open forest on shallow soils on metamorphic hills and ranges.	Mid-dense
9.12.19	Least Concern	B	66.06	<i>Eucalyptus crebra</i> or <i>E. granitica</i> +/- <i>Corymbia citriodora</i> subsp. <i>citriodora</i> +/- <i>E. portuensis</i> mixed woodland on igneous hills.	Sparse
9.12.1	Least Concern	B	27.29	<i>Eucalyptus crebra</i> and/or <i>E. xanthoclada</i> and/or <i>E. drepanophylla</i> low open woodland on igneous rocks.	Sparse
9.12.2	Least Concern	B	590.27	<i>Eucalyptus portuensis</i> , <i>Corymbia citriodora</i> subsp. <i>citriodora</i> , <i>E. granitica</i> or <i>E. crebra</i> , <i>C. intermedia</i> or <i>C. clarksoniana</i> mixed woodland on steep hills and ranges on igneous hills close to Wet Tropics boundary.	Sparse
9.5.5	Least Concern	B	102.34	<i>Corymbia clarksoniana</i> , <i>Eucalyptus portuensis</i> , <i>E. crebra</i> and <i>C. citriodora</i> subsp. <i>citriodora</i>	Mid-dense

Regional Ecosystem	VM Act Status	RVM Category	Area (ha)	Short Description	Structure Category
				in mixed open forests on red kandosols on Tertiary surfaces.	
9.7.3	Least Concern	B	29.25	<i>Eucalyptus crebra</i> or <i>E. portuensis</i> +/- <i>Corymbia clarksoniana</i> woodland on lateritised surfaces and edges of Tertiary surfaces.	Sparse
9.8.4	Least Concern	B and C	52.67	<i>Eucalyptus crebra</i> and/or <i>E. tereticornis</i> open woodland on basalt plains.	Very sparse

A one-day survey was conducted within the Project Area in April 2024 by an experienced ecologist and bushfire officer. However, the revised version of this document, in accordance with the updated Development Footprint (August 2025) considers and assesses areas outside of that which was surveyed. Areas of vegetation within the assessment area are assessed in this document using State-mapped VHCs and should therefore be considered indicative.

RVM maps prepared by the DNRMMRRD show that the Project Area is mapped as supporting predominantly remnant vegetation (Category B) and high-value regrowth (Category C), with forty-three (43) REs occurring as both homogenous and heterogenous polygons throughout the Project Area.

3.1.2.3 Vegetation Communities

An earlier seasonal survey was conducted by Ecologica in 2022, who traversed the entire Project Area and identified eight broad vegetation communities within the Project Area. These broad habitat types have been considered as part of the determination of appropriate VHCs within each site assessment area, and include:

- Riparian forest;
- Very open woodland on metamorphics and low hills;
- Open woodland to open forest on granite and tertiary surfaces;
- Woodland on lateritised surface;
- Open forest to woodlands on uplands;
- Open woodland on basalt plains;
- Rock pavements; and
- Open forest with *Allocasuarina* spp. dominant or co-dominant in the canopy.



A combination of survey data from the Ecologica and Green Tape Solutions surveys, and revision of the State-mapped REs outlined in **Table 4** indicate two clear vegetation communities located within the assessment areas.

- Vegetation Community 1: *Eucalyptus crebra* Woodland to Open Woodland;
- Vegetation Community 2: Mixed Eucalypt Woodlands to Open Forests.

The Project Area also supports cleared grasslands dominated by perennial pasture and native grass species with sparsely scattered Eucalypts.

The two (2) vegetation communities which are relevant to this plan due to their proximity to the proposed buildings and infrastructure are described below.

Vegetation Community 1: *Eucalyptus crebra* Woodland to Open Woodland

This vegetation community occurs on shallow soils along ridgelines and hill slopes within the central and southern extent, as well as the far north of the Project Area. The land exhibits moderate disturbance attributed to ongoing grazing and agricultural activities, resulting in alterations to its natural state. Despite these disturbances, the site retains a moderate ecological condition, with vegetation communities exhibiting resilience and capacity for recovery under ongoing land use pressures.

The canopy layer in this community is dominated by narrow-leaved ironbark (*Eucalyptus crebra*), with pink bloodwood (*Corymbia intermedia*) and Queensland blue gum (*Eucalyptus tereticornis*) occurring as associated species (**Plate 1** and **Plate 2**). Canopy height ranges from 18 – 32 m with a foliage projective cover (FPC) of 60 – 80%. The Sub-canopy is a mixture of juvenile *Eucalyptus* and *Acacia* species. The shrub layer within this community was sparse to non-existent largely due to grazing and prolonged drought conditions in the period leading up to the survey. Ground cover was dominated by native and non-native grasses. Boulders of rocks commonly occurred within this vegetation community.

This vegetation community is analogous to the following REs:

- RE 9.8.4 – *Eucalyptus crebra* and/or *E. tereticornis* open woodland on basalt plains;
- RE 9.11.2 – *Eucalyptus crebra* +/- *Corymbia* spp. Woodland on shallow texture contrast soils; and
- RE 9.12.1 – *Eucalyptus crebra* and/or *E. xanthoclada* and/or *E. drepanophylla* low open woodland on igneous rocks.

This community correlates to both VHC 13.2 (Dry to moist eucalypt woodlands on undulating metamorphics and granite) and VHC 11.2 (Moist to dry eucalypt woodland on basalt areas) under the BRC Technical Guide.



Plate 1: Vegetation Community 1 – *Eucalyptus crebra* Woodland



Plate 2: Vegetation Community 1 – *Eucalyptus crebra* Woodland

Vegetation Community 2: Mixed Eucalypt Woodlands to Open Forests

This vegetation community is comprised of typically heterogeneous vegetation communities, dominated by a diverse range of *Eucalyptus* and *Corymbia* species (**Plate 3** and **Plate 4**), aligning with the following REs:

- RE 7.5.4 – *Corymbia intermedia* or *Melaleuca viridiflora* woodland to open forest of uplands on weathered soils of a remnant surface;
- RE 7.12.24 – *Eucalyptus portuensis* and *Corymbia intermedia* open forest to woodland (or vine forest with *E. portuensis* and *C. intermedia* emergents), on foothills and uplands on granite and rhyolite;
- RE 7.12.29 – *Corymbia intermedia* and/or *Lophostemon suaveolens* open forest to woodland +/- areas of *Allocasuarina littoralis* and *A. torulosa* on uplands on granites and rhyolites;
- RE 7.12.30 – *Corymbia citriodora* ± *Eucalyptus portuensis* woodland to open forest on granite and rhyolite;
- RE 7.12.34 – *Eucalyptus portuensis* and/or *E. drepanophylla*, ± *C. intermedia* ± *C. citriodora*, ± *E. granitica* open woodland to open forest, on uplands on granite;
- RE 7.12.65 – Rock pavement or areas of skeletal soil on granite and rhyolite of dry western or southern areas +/- shrublands to closed forests of *Acacia* spp. And/or *Lophostemon suaveolens* and/or *Allocasuarina littoralis* and/or *Eucalyptus lockyeri* subsp. *exuta*;
- RE 9.12.19 – *Eucalyptus crebra* or *E. granitica* +/- *Corymbia citriodora* subsp. *citriodora* +/- *E. portuensis* mixed woodland on igneous hills;
- RE 9.11.4 – *Eucalyptus crebra*, *Corymbia clarksoniana*, *C. citriodora* subsp. *citriodora* +/- *E. portuensis* open forest on shallow soils on metamorphic hills and ranges;
- RE 9.12.2 – *Eucalyptus portuensis*, *Corymbia citriodora*, *E. granitica* or *E. crebra*, *C. intermedia* or *C. clarksoniana* mixed woodland on steep hills and ranges on igneous hills close to Wet Tropics boundary;

- RE 9.12.29 – *Eucalyptus similis* and *E. shirleyi* ± *E. crebra* low open woodland on low granite hills with rocky outcrops;
- RE 9.12.22 – *Eucalyptus drepanophylla*, *Corymbia clarksoniana* or *C. intermedia* and *C. dallachiana* woodland on steep rugged igneous ranges;
- RE 9.5.5 – *Corymbia clarksoniana*, *Eucalyptus portuensis*, *E. crebra* and *C. citriodora* subsp. *citriodora* in mixed open forests on red kandosols on Tertiary surfaces;
- RE 9.7.3 – *Eucalyptus crebra* or *E. portuensis* +/- *Corymbia clarksoniana* woodland on lateritised surfaces and edges of Tertiary surfaces; and
- RE 11.12.13a – *Eucalyptus crebra*, *Corymbia* spp., *E. acmenoides* woodland on igneous rocks.

This community correlates to VHC 9.1 (Moist to dry eucalypt open forests on coastal lowlands and ranges), VHC 9.2 (Moist to dry eucalypt woodland on coastal lowlands and ranges), VHC 10.2 (Spotted gum dominated woodlands), and VHC 13.2 (Dry to moist eucalypt woodlands on undulating metamorphics and granite) under the BRC Technical Guide.



Plate 3: Vegetation Community 2 – Mixed Eucalypt Woodlands to Open Forests



Plate 4: Vegetation Community 2 – Mixed Eucalypt Woodlands to Open Forests

The following vegetation communities have been excluded from the BAL assessment as they meet the criteria for exclusion as low threat vegetation:

- Discontinuous low grass or tree cover (VHC 41.4);
- Nil to low vegetated areas (VHC 42.6) (e.g., roads and buildings) and low-threat vegetation (including grassland maintained in a minimal fuel condition) within the assessment area of each building; and
- Water bodies or very low vegetation cover (VHC 43.6).

3.1.3 Potential Fuel Loads

Fuel loads have been allocated for each VHC to represent the long-unburnt condition that would be typically exhibited 10 years after fire. In accordance with the values provided in Figure 14 of the BRC Technical Guide (QFES, 2019), the potential fuel load values for VHCs within and surrounding the Project Area are as provided in **Table 5**.

Table 5: Potential Fuel Loads for Classified Vegetation within the Assessment Area

VHC	Total potential understorey fuel load (t/ha)	Total overall potential fuel load (t/ha)	Prone type ¹	Fuel continuity ²
9.1 Moist to dry eucalypt open forests on coastal lowlands and ranges	21	24.2	1 Bushfire-prone – Forest or shrub fires	1 Continuous
9.2 Moist to dry eucalypt woodland on coastal lowlands and ranges	14.9	17.2	1 Bushfire-prone –Forest or shrub fires	1 Continuous
10.2 Spotted gum dominated woodlands	15.0	18.0	1 Bushfire-prone –Forest or shrub fires	1 Continuous
11.2 Moist to dry eucalypt woodlands on basalt areas	11.0	13.0	1 Bushfire-prone –Forest or shrub fires	1 Continuous
13.2 Dry to moist eucalypt woodlands on undulating metamorphics and granite	12.8	14.4	1 Bushfire-prone –Forest or shrub fires	1 Continuous
16.2 Eucalyptus dominated woodlands on drainage lines and alluvial plains	11.1	11.6	1 Bushfire-prone – Forest or shrub fires	1 Continuous

Figures 6 to 13 show the VHC mapping for each of the building sites. It is important to note that VHC mapping aligns with State-mapped VHCs and REs, as targeted field surveys have not been undertaken in the majority of areas relevant to the updated Development Footprint.

¹Prone type taken from the VHC_Data sheet of the SPP Bushfire APZ Calculator.

²Fuel continuity type taken from Figure 14 of the QFES BRC Technical Guide.

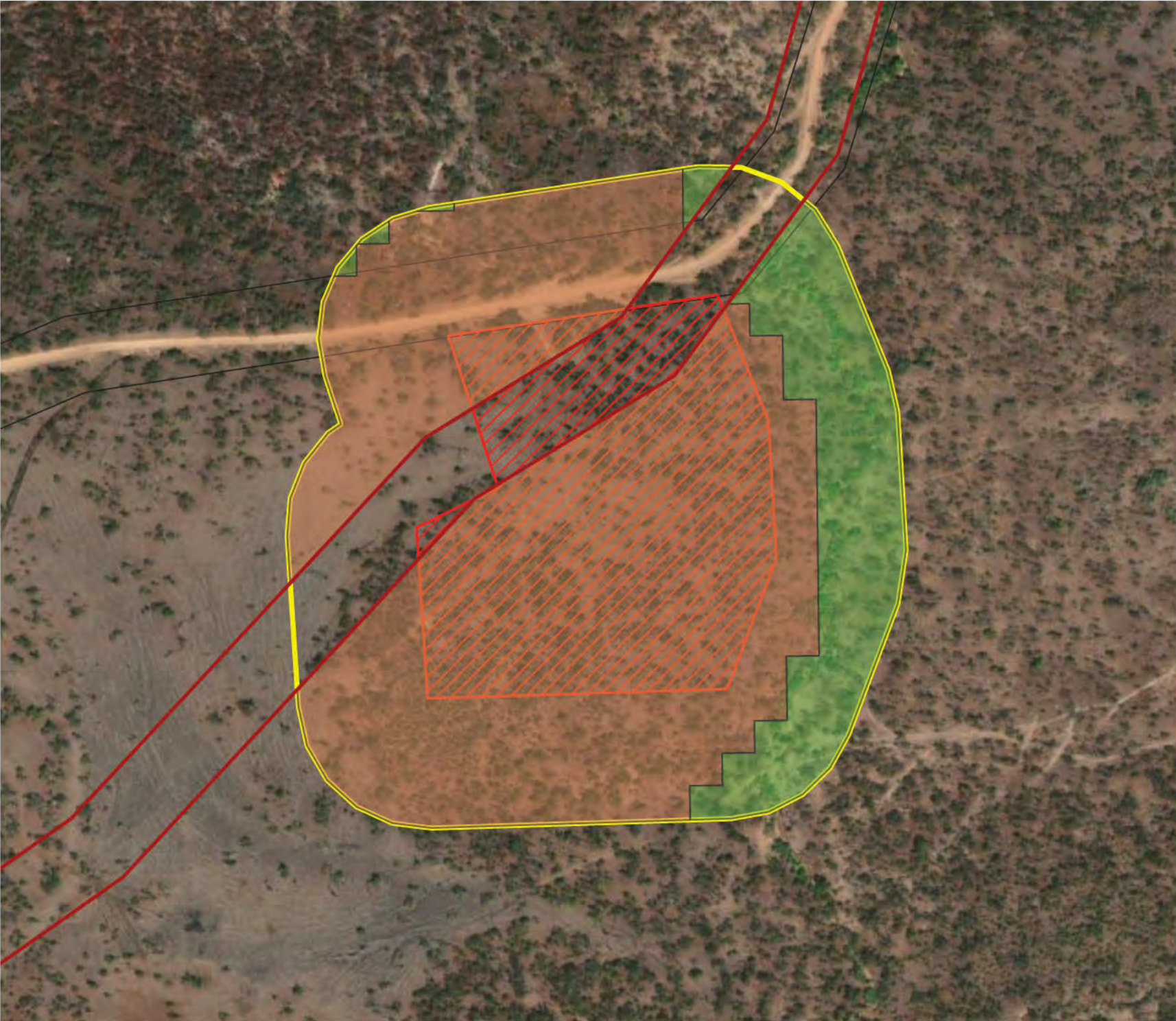


Figure 6: Site 1 Vegetation Hazard Classes

Project: PR23354_Gawara Baya Wind Farm

-  Property Boundary
-  Site 1 100m buffer
-  Site 1 - Site Camp

VHC Site 1

-  9.2
-  11.2
-  13.2

Notes:
- Survey data by Green Tape Solutions,
- Site data by Windlab
- State VHCs by SPP
- Base map Copyright (c) Qld Globe and its data suppliers.

Created By: 
Date: 23/09/2025
Version: 2

0 40 80 m





Figure 7: Site 2 Vegetation Hazard Classes

Project: PR23354_Gawara Baya Wind Farm

-  Property Boundary
-  Site 2 100m buffer
-  Site 2 - Site Office

Site 2 VHC
 11.2

Notes:
- Survey data by Green Tape Solutions,
- Site data by Windlab
- State VHCs by SPP
- Base map Copyright (c) Qld Globe and its data suppliers.

Created By: 
Date: 23/09/2025
Version: 2

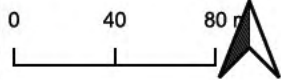


Figure 8: Site 3 Vegetation Hazard Classes

Project: PR23354_Gawara Baya Wind Farm

-  Site 3 - OM Permanent Laydown
-  Site 3 100m buffer

Site 3 VHCs

-  9.2
-  10.2
-  13.2



Notes:

- Survey data by Green Tape Solutions,
- Site data by Windlab
- State VHCs by SPP
- Base map Copyright (c) Qld Globe and its data suppliers.

Created By: 
Date: 23/09/2025
Version: 2

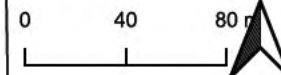


Figure 9: Site 4 Vegetation Hazard Classes

Project: PR23354_Gawara Baya Wind Farm

-  Site 4 - Concrete Batching South and South Laydown
-  Site 4 100m buffer

Site 4 VHCs

-  9.2
-  10.2
-  13.2

Notes:

- Survey data by Green Tape Solutions,
- Site data by Windlab
- State VHCs by SPP
- Base map Copyright (c) Qld Globe and its data suppliers.

Created By: 
Date: 23/09/2025
Version: 2

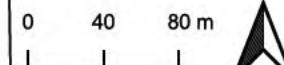


Figure 10: Site 5 Vegetation Hazard Classes

Project: PR23354_Gawara Baya Wind Farm

-  Site 5 - Substation Far North
-  Site 5 100m buffer

Site 5 VHCs

-  9.2

Notes:

- Survey data by Green Tape Solutions,
- Site data by Windlab
- State VHCs by SPP
- Base map Copyright (c) Qld Globe and its data suppliers.

Created By: 
Date: 23/09/2025
Version: 2

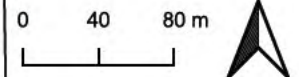


Figure 11: Site 6 Vegetation Hazard Classes

Project: PR23354_Gawara Baya Wind Farm

 Site 6 - Laydown Area

 Site 6 100m buffer

Site 6 VHCs

 9.2

Notes:
- Survey data by Green Tape Solutions,
- Site data by Windlab
- State VHCs by SPP
- Base map Copyright (c) Qld Globe and its data suppliers.

Created By: 
Date: 23/09/2025
Version: 2

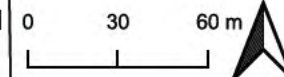


Figure 12: Site 7 Vegetation Hazard Classes

Project: PR23354_Gawara Baya Wind Farm

-  Site 7 - Substation South
-  Site 7 100m buffer

Site 7 VHCs

-  9.2
-  10.2



Notes:

- Survey data by Green Tape Solutions,
- Site data by Windlab
- State VHCs by SPP
- Base map Copyright (c) Qld Globe and its data suppliers.

Created By: 
Date: 23/09/2025
Version: 2

0 40 80 m





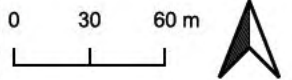
Figure 13: Site 8 Vegetation Hazard Classes

Project: PR23354_Gawara Baya Wind Farm

-  Site 8 - Laydown Area Far North
-  Site 8 100m buffer
- Site 8 VHCs**
 -  9.2

Notes:
- Survey data by Green Tape Solutions,
- Site data by Windlab
- State VHCs by SPP
- Base map Copyright (c) Qld Globe and its data suppliers.

Created By: 
Date: 23/09/2025
Version: 2





3.1.4 Site and Effective Slope

Two slope input parameters are required for the estimation of fire behaviour and separation.

- Site slope is the slope of the ground between the edge of the proposed development (or site boundary) and the edge of hazardous vegetation.
- Effective slope refers to the slope of the land beneath hazardous vegetation. Effective slope is the more important parameter as it has a direct influence on the potential rate of fire spread, fuel consumption and thus, PFI.

For each VHC, the effective slope is determined by assessing the slope beneath classified vegetation (in degrees) which most influences bushfire behaviour and the relative position of land supporting hazardous vegetation in relation to the development, i.e., upslope or downslope. Where there is more than one slope beneath classified vegetation, each slope should be individually assessed, and the worst-case scenario adopted.

No LiDAR data is available for 1 m or 5 m contours for the Project Area. Effective slope has been calculated based on available 10 m contours and the Maximum Landscape Slope raster developed as part of the Bushfire Hazard Area – Bushfire Prone Area – Inputs dataset .

The effective slope for each BAL assessable site is provided in **Table 7**.

3.1.5 Landform

Slope and aspect are the two landform features that have a major influence on bushfire behaviour. The Project Area is located within the Great Dividing Range, which extends along the eastern coast of Australia. The Project Area is part of the McBride volcanic province and is classified as a scoria cone, characterised by its steep slopes and a crater at the summit. This volcanic landform is a prominent feature of the landscape in the region.

Mount Fox is situated within the northern section of the Great Dividing Range in North Queensland. Mount Fox runs south-east to north-west within the Project Area. Lannercost State Forest lies to the north-east of the Project Area boundary, and Girringun Forest Reserve to the south-west of the Project Area boundary. Road infrastructure within or adjacent to the Project Area boundary includes Lava Plains Mount Fox Road, Boundary Road, and Oak Hills Road.

The site elevation is approximately 580 m (1,903 feet) above sea level. The Project Area is located on predominantly agricultural land.

3.1.6 Surrounding Land Use

The existing land use around the Project Area is predominantly rural, characterised largely by cattle grazing. The Project is contained within one lot across one property located approximately 44 km south-west of Ingham, North Queensland, on the Great Dividing Range and within the CTRC LGA. The Project Area is located on agricultural land with a history of cattle grazing. Controlled burning is a standard fire management practice that is currently implemented by the landowners.



By integrating these elements into this BMP, landowners can enhance their ability to mitigate fire risk, protect assets, and promote ecosystem health in agricultural landscapes. Refer to **Section 5.4** for the consultation strategy with the landowners.

3.2 Bushfire Attack Levels for Infrastructure

3.2.1 Bushfire Attack Levels

BALs are used to quantify the levels of attack (radiant heat exposures/flux) that built structures may experience during a fire event. The BAL is defined as 'a means of measuring the severity of a building's potential exposure to ember attack, radiant heat and direct flame contact, using increments of radiant heat expressed in kilowatts per metre squared (kW/m^2), and the basis for establishing the requirements for construction to improve protection of building elements from attack by bushfire' (Australian Standards, 2018).

AS3959:2018 adopts six BAL categories (refer to **Table 6**) which are based on the level of radiant heat flux to which buildings may be exposed to during a bushfire event. This level of heat flux generally relates to the type of vegetation, effective slope, and how far a building is from hazardous vegetation. BALs apply to buildings and any attached or adjacent structure within 6 m of the building. Method 2 modelling indicates facade radiant heat $\leq 10 \text{ kW/m}^2$. Under AS3959:2018, this corresponds to BAL-LOW ($\leq 10 \text{ kW/m}^2$), though this has been referred to as BAL-10 for vulnerable uses.

Table 6: Bushfire Attack Levels

Bushfire Attack Level	Heat Flux Thresholds (kW/m^2)	Predicted Bushfire Attack and Levels of Exposure	Construction Section – AS3959:2018
BAL – LOW / BAL-10	See Clause 2.2.3.2 of AS3959:2018 – Low threat vegetation and non-vegetated areas	There is insufficient risk to warrant specific construction requirements.	4
BAL-12.5	$\leq 12.5 \text{ kW/m}^2$	Significant ember attack, burning debris ignited by windborne embers and radiant heat up to a level of 12.5 kW/m^2 .	3 and 5
BAL-19	$>12.5 - \leq 19 \text{ kW/m}^2$	Greater levels of ember attack, burning debris and radiant heat up to a level of 19 kW/m^2 .	3 and 6
BAL-29	$>19 - \leq 29 \text{ kW/m}^2$	Greater levels of ember attack, burning debris ignited by windborne embers and radiant heat up to a level of 29 kW/m^2 .	3 and 7

Bushfire Attack Level	Heat Flux Thresholds (kW/m ²)	Predicted Bushfire Attack and Levels of Exposure	Construction Section – AS3959:2018
BAL-40	>29 - ≤40 kW/m ²	Greater levels of ember attack, burning debris ignited by windborne embers and radiant heat up to a level of 40 kW/ m ² . Flames from the bushfire front may intermittently contact the house.	3 and 8
Flame Zone – BAL-FZ	≥ 40 kW/m ²	The highest level of bushfire attack as a consequence of direct exposure to flames from the fire front, in addition to heat flux and ember attacked. Greater levels of ember attack, burning debris and radiant heat in excess of 40 kW/m ² . Flames from the bushfire front are likely to engulf part or all of the building.	3 and 9

The BRC Technical Guide requires that radiant heat exposure/BALs are calculated using either the SPP Bushfire APZ calculator (QFES, 2019b), which is the preferred method, or Method 2 of AS3959:2018. Where Method 2 is used, the following inputs are to be used:

- site-specific values for FFDI (Step 1);
- ground-truthed VHCs (Step 2) and their associated fuel loads (provided in Figure 14 of the BRC Technical Guide); and
- site and effective slopes (Step 3).

In accordance with Section 7.6 of the BRC Technical Guide, the flame temperature value in the Method 2 model has been adjusted from the default 1090 degrees Kelvin to 1200 degrees Kelvin. Likewise, the Ambient Temperature value has been adjusted from 34.85 degrees Celsius to 35 degrees Celsius.

The determination of the appropriate BAL rating is based upon parameters such as weather modelling, fire-line intensity, flame length calculations, as well as vegetation and fuel load analysis. The Development Footprint is based on 3D modelling of the civil works for the Project Area. Clearing for firebreaks has been included within the Development Footprint for all built infrastructure other than roads, underground services, and fences. Bushfire buffers have been calculated using LiDAR vegetation height data. The height of trees adjacent to turbines is 10 – 30 m and buffer widths are required to be 1.5 times the height of the tallest adjacent trees.

To achieve compliance with the legislation that regulates development within bushfire prone areas within CTRC, Queensland and Commonwealth governing bodies, structures classified as community infrastructure for essential services, for example the substations and switching yard, requires a minimum distance setback (APZ width) from bushfire prone vegetation by a distance which achieves a radiant heat flux level $\leq 10 \text{ kW/m}^2$. Other infrastructure associated with 'other uses', i.e., the WTGs and the operations and maintenance buildings, to be setback from hazardous vegetation by a distance which achieves a radiant heat flux level $\leq 29 \text{ kW/m}^2$.

The provisions of the NCC 2022 (Volume 1) Part G5 Construction of buildings in bushfire prone areas requires Class 3 (e.g., Worker's accommodation) or Importance Level 3 structures to have a minimum setback from hazardous vegetation by a distance which achieves a radiant heat flux level $\leq 12.5 \text{ kW/m}^2$.

Where multiple VHCs occur within the assessment area for a site, the highest risk (i.e., highest separation distance) BAL, as identified in **bold** and highlighted in **Table 7**, will be utilised for this assessment.

Table 7: Quantitative Assessment for Bushfire Risk Management

ID	Infrastructure ³	Vegetation Classification AS3959-2018	Effective Slope (Degrees)	Overall Surface Fuel Load (t/ha)	Separation Distance from Threat	BAL
1	Site camp	Woodland (VHC 13.2)	5.5 Downslope North-west	14.4	0 m – < 10.2 m	BAL-FZ
					10.2 m – < 13.9 m	BAL-40
					13.9 m – < 20.4 m	BAL-29
					20.4 m – < 29.1 m	BAL-19
					29.1 m – < 100 m	BAL-12.5
		Woodland (VHC 11.2)	5.0 Downslope East	13.0	0 m – < 8.9 m	BAL-FZ
					8.9 m – < 12.1 m	BAL-40
					12.1 m – < 17.9 m	BAL-29
					17.9 m – < 25.9 m	BAL-19
					25.9 m – < 100 m	BAL-12.5
2	Site office	Woodland (VHC 11.2)	8.5 Downslope North-west	13.0	0 m – < 10.5 m	BAL-FZ
					10.5 m – < 14.2 m	BAL-40
					14.2 m – < 20.9 m	BAL-29
					20.9 m – < 29.7 m	BAL-19
					29.7 m – < 100 m	BAL-12.5

³ Additionally, two Battery Energy Storage Systems locations are proposed at each transformer site. These facilities are required to meet BAL-10 separation distance as these are classified as "community infrastructure for essential services" as described in the BRC Technical Guide.

ID	Infrastructure ³	Vegetation Classification AS3959-2018	Effective Slope (Degrees)	Overall Surface Fuel Load (t/ha)	Separation Distance from Threat	BAL
3	Operational and maintenance buildings	Woodland (VHC 13.2)	10 Downslope North	14.4	0 m - < 13.1 m	BAL-FZ
					13.1 m - < 17.6 m	BAL-40
					17.6 m - < 25.5 m	BAL-29
					25.5 m - < 35.7 m	BAL-19
					35.7 m - < 100 m	BAL-12.5
		Woodland (VHC 9.2)	10 Downslope South	17.2	0 m - < 15.2 m	BAL-FZ
					15.2 m - < 20.3 m	BAL-40
					20.3 m - < 29.1 m	BAL-29
					29.1 m - < 40.1 m	BAL-19
					40.1 m - < 100 m	BAL-12.5
		Woodland (VHC 10.2)	9 Downslope North-west	18.0	0 m - < 14.5 m	BAL-FZ
					14.5 m - < 19.5 m	BAL-40
					19.5 m - < 28 m	BAL-29
					28 m - < 38.8 m	BAL-19
					38.8 m - < 100 m	BAL-12.5
4	Concrete Batching South and South Laydown	Woodland (VHC 10.2)	10 Downslope North-east	18	0 m - < 15.3 m	BAL-FZ
					15.3 m - < 20.6 m	BAL-40
					20.6 m - < 29.4 m	BAL-29
					29.4 m - < 40.5 m	BAL-19
					40.5 m - < 100 m	BAL-12.5
		Woodland (VHC 9.2)	4.5 Downslope South-west	17.2	0 m - < 11.3 m	BAL-FZ
					11.3 m - < 15.3 m	BAL-40
					15.3 m - < 22.4 m	BAL-29
					22.4 m - < 31.7 m	BAL-19
					31.7 m - < 100 m	BAL-12.5
5	Substation (Far north)	Woodland (VHC 9.2)	5 Downslope South-east	17.2	0 m - < 11.6 m	BAL-FZ
					11.6 m - < 15.7 m	BAL-40
					15.7 m - < 22.9m	BAL-29
					22.9 m - < 32.4 m	BAL-19
					32.4 m - < 38.4 m	BAL-12.5
					38.4 m - 100 m	BAL-10

ID	Infrastructure ³	Vegetation Classification AS3959-2018	Effective Slope (Degrees)	Overall Surface Fuel Load (t/ha)	Separation Distance from Threat	BAL
6	Laydown area	Woodland (VHC 9.2)	4.5 Downslope North-east	17.2	0 m - < 11.3 m	BAL-FZ
					11.3 m - < 15.3 m	BAL- 40
					15.3 m - < 22.4 m	BAL-29
					22.4 m - < 31.7 m	BAL-19
					31.7 m - 100 m	BAL-12.5
7	Substation south	Woodland (VHC 9.2)	9 Downslope North-west	17.2	0 m - < 14.4 m	BAL-FZ
					14.4 m - < 19.3 m	BAL-40
					19.3 m - < 27.7 m	BAL-29
					27.7 m - < 38.4 m	BAL-19
					38.4 m - < 45.1 m	BAL-12.5
					45.1 m - 100 m	BAL-10
8	Laydown far north	Woodland (VHC 9.2)	4 Downslope North-west	17.2	0 m - < 11 m	BAL-FZ
					11 m - < 14.9 m	BAL- 40
					14.9 m - < 21.9 m	BAL-29
					21.9 m - < 31 m	BAL-19
					31 m - 100 m	BAL-12.5

Performance Outcome (PO) 8 of the Charters Towers Regional Town Plan 2020 (Version 2) specifies that "Development is located and designed to incorporate a bushfire defensible space which achieves separation between buildings, building envelopes and hazardous vegetation necessary to reduce risk to an acceptable or tolerable level". This requires that "Buildings, or building envelopes, are separated by hazardous vegetation by a distance that achieves a radiant heat flux level at any point on the building, or building envelope, respectively that does not exceed:

- (a) 10kW/m² where involving a vulnerable use, essential service uses or hazardous chemical facility use; or
- (b) 29W/m² otherwise.

Workers camps are required to achieve a separation distance to achieve a BAL-12.5. This separation distance will achieve a tolerable risk level as described in the SPP for occupants of workers camps.

Structures such as laydown areas, office buildings, and other ancillary buildings are required to have a minimum setback to achieve BAL-29. Storage of flammable liquids and materials are required to be kept as far as practically possible from bushfire hazards and meet the requirements described in **Section 5.3**.



Substations under the SPP are designated as essential community infrastructure, and therefore must achieve a suitable setback from the hazardous vegetation. As such it must achieve a minimum of BAL-10.

For clarity, the recommended bushfire buffer (Asset Protection Zone) distances are measured from the outer edge of habitable infrastructure or buildings, rather than from the broader approved disturbance area. The mapped disturbance area includes all associated earthworks, access tracks, and carparking, which are not considered ignition-prone structures for the purposes of BAL separation distance calculations.

Figure 14 through to **Figure 21** below show the BAL maps for each of the building sites.



Figure 14: Site 1 Bushfire Attack Levels

Project: PR23354_Gawara Baya Wind Farm

- Property Boundary
- Site 1 - Site Camp
- Site 1 100m buffer
- APZ Site 1

Bushfire Attack Levels

- BAL - 12.5
- BAL - 19
- BAL - 29
- BAL - 40
- BAL - Flame Zone

Notes:
- Survey data by Green Tape Solutions,
- Site data by Windlab
- State VHCs by SPP
- Base map Copyright (c) Qld Globe and its data suppliers.

Created By:
Date: 23/09/2025
Version: 2

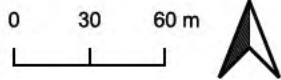




Figure 15: Site 2 Bushfire Attack Levels

Project: PR23354_Gawara Baya Wind Farm

- Property Boundary
- Site 2 - Site Office
- Site 2 100m buffer
- APZ Site 2
- Bushfire Attack Levels**
 - BAL - 12.5
 - BAL - 19
 - BAL - 29
 - BAL - 40
 - BAL - Flame Zone

Notes:
- Survey data by Green Tape Solutions,
- Site data by Windlab
- State VHCs by SPP
- Base map Copyright (c) Qld Globe and its data suppliers.

Created By: [Redacted]
Date: 23/09/2025
Version: 2

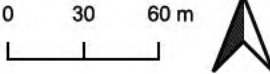


Figure 16: Site 3 Bushfire Attack Levels

Project: PR23354_Gawara Baya Wind Farm

 Site 3 - OM Permanent Laydown

 Site 3 100m buffer

 APZ Site 3

Bushfire Attack Levels

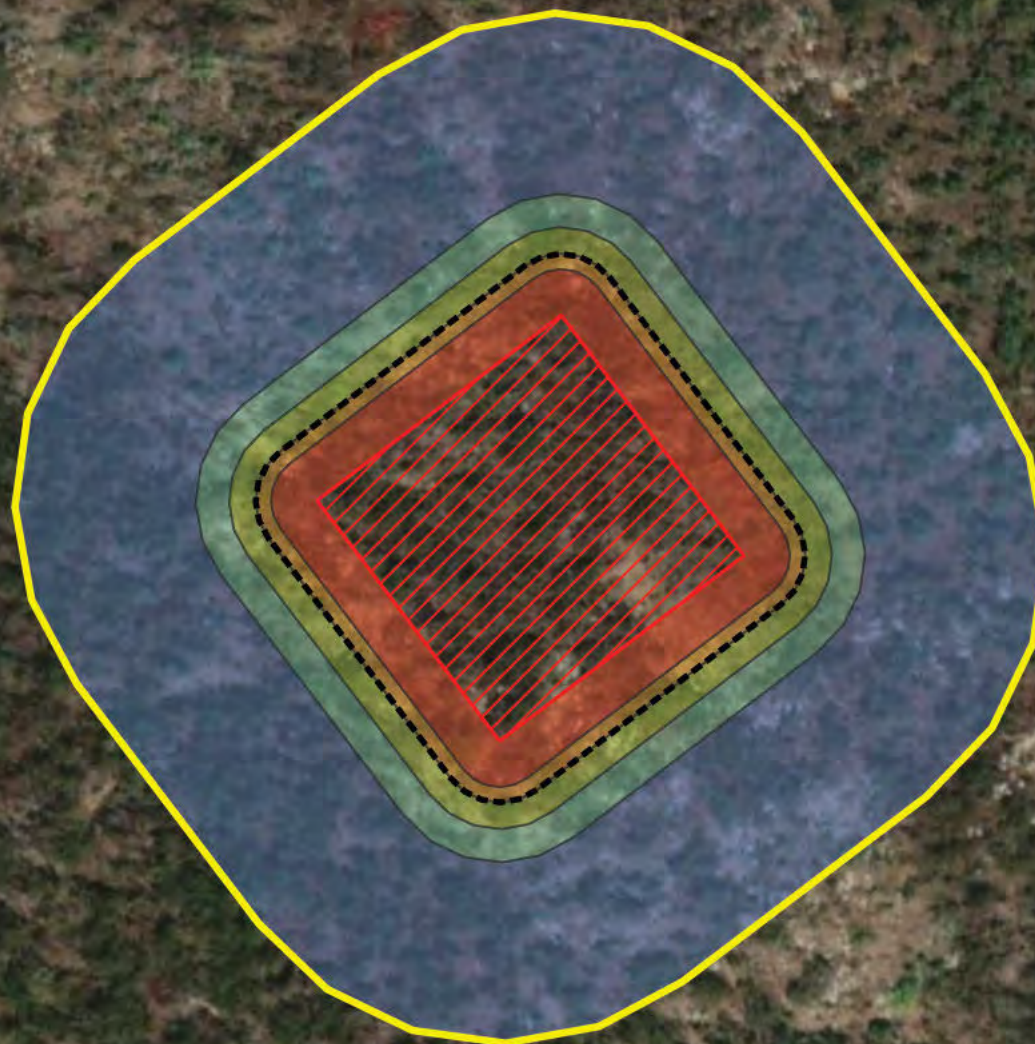
 BAL - 12.5

 BAL - 19

 BAL - 29

 BAL - 40

 BAL - Flame Zone



Notes:

- Survey data by Green Tape Solutions,
- Site data by Windlab
- State VHCs by SPP
- Base map Copyright (c) Qld Globe and its data suppliers.

Created By: 
Date: 23/09/2025
Version: 2

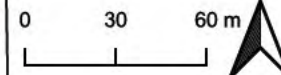


Figure 17: Site 4 Bushfire Attack Levels

Project: PR23354_Gawara Baya Wind Farm

-  Site 4 - Concrete Batching South and South Laydown
-  Site 4 100m buffer
-  APZ Site 4

Bushfire Attack Levels

-  BAL - 12.5
-  BAL - 19
-  BAL - 29
-  BAL - 40
-  BAL - Flame Zone



Notes:

- Survey data by Green Tape Solutions,
- Site data by Windlab
- State VHCs by SPP
- Base map Copyright (c) Qld Globe and its data suppliers.

Created By: 
Date: 23/09/2025
Version: 2

0 30 60 m



Figure 18: Site 5 Bushfire Attack Levels

Project: PR23354_Gawara Baya Wind Farm

 Site 5 - Substation Far North

 Site 5 100m buffer

 APZ Site 5

Bushfire Attack Levels

 BAL - 10

 BAL - 12.5

 BAL - 19

 BAL - 29

 BAL - 40

 BAL - Flame Zone

Notes:
- Survey data by Green Tape Solutions,
- Site data by Windlab
- State VHCs by SPP
- Base map Copyright (c) Qld Globe and its data suppliers.

Created By: 
Date: 23/09/2025
Version: 2

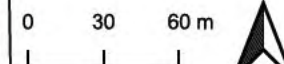


Figure 19: Site 6 Bushfire Attack Levels

Project: PR23354_Gawara Baya Wind Farm

-  Site 6 - Laydown Area
-  Site 6 100m buffer
-  APZ Site 6

Bushfire Attack Levels

-  BAL - 12.5
-  BAL - 19
-  BAL - 29
-  BAL - 40
-  BAL - Flame Zone



Notes:

- Survey data by Green Tape Solutions,
- Site data by Windlab
- State VHCs by SPP
- Base map Copyright (c) Qld Globe and its data suppliers.

Created By: 
Date: 23/09/2025
Version: 2

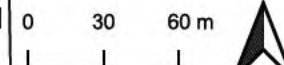


Figure 20: Site 7 Bushfire Attack Levels

Project: PR23354_Gawara Baya Wind Farm

 Site 7 - Substation South

 Site 7 100m buffer

 APZ Site 7

Bushfire Attack Levels

 BAL - 10

 BAL - 12.5

 BAL - 19

 BAL - 29

 BAL - 40

 BAL - Flame Zone

Notes:
- Survey data by Green Tape Solutions,
- Site data by Windlab
- State VHCs by SPP
- Base map Copyright (c) Qld Globe and its data suppliers.

Created By: 
Date: 23/09/2025
Version: 2

0 30 60 m



Figure 21: Site 8 Bushfire Attack Levels

Project: PR23354_Gawara Baya Wind Farm

-  Site 8 - Laydown Area Far North
-  Site 8 100m buffer
-  APZ Site 8

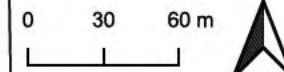
Bushfire Attack Levels

-  BAL - 12.5
-  BAL - 19
-  BAL - 29
-  BAL - 40
-  BAL - Flame Zone

Notes:

- Survey data by Green Tape Solutions,
- Site data by Windlab
- State VHCs by SPP
- Base map Copyright (c) Qld Globe and its data suppliers.

Created By: 
Date: 23/09/2025
Version: 2





3.2.2 Wind Turbines

WTGs within the Project Area are considered Class 10b structures under the NCC and are not habitable buildings. Under the BRC Technical Guide methodology, they are therefore required to meet a minimum of BAL-10 construction standards. Given the number of turbines (up to 68) and their uniform design, individual BAL assessments have not been undertaken for each WTG; instead, BAL-10 is applied as a consistent design criterion across all turbines. This ensures adequate bushfire resilience without necessitating turbine-by-turbine calculations. Substations and the operations building, however, have been separately assessed against AS3959:2018, with site-specific BAL outcomes applied.

Within 100 m of WTG sites, the following Vegetation Hazard Classes (VHCs) were recorded: 9.1, 9.2, 10.2, 12.2, 13.2, and 11.2. Of these, VHC 9.2 represented the dominant and highest-threat class, present in ~65% of turbine assessment areas (44 sites). VHC 10.2 was dominant at 11 sites (16%), and VHC 13.2 at 10 sites (15%). Two sites were dominated by VHC 12.2, and one site by VHC 11.2.

Effective slopes across turbine sites and their 100 m buffers range from 4° to 19°. While a dwelling assessment under AS3959:2018 would require site-specific BAL calculations based on VHC, slope, and distance, turbines are non-habitable structures. Consistent with the BRC Technical Guide, they are therefore assigned a uniform BAL-10 standard irrespective of vegetation type or slope. This approach delivers a conservative and defensible outcome without requiring broadscale APZs.

Although AS3959:2018 links BAL-12.5 with specific separation distances for habitable buildings and BAL-10 for essential community infrastructure adjacent to woodland vegetation, WTGs achieve compliance differently. Their non-combustible construction and the cleared hardstand at the base of each tower satisfy the BAL-10 performance requirement, meaning no additional APZs are required.

However, for the purpose of this report, a uniform APZ has been modelled using the most conservative inputs (slope of 19° and VHC 10.2). Based on these parameters, the recommended APZ distance to meet BAL-10 standards is 67.7 m. It is important to note however that these are not requirements under AS3959:2018 unless an associated class 10a structure is present.

3.2.3 Power Performance Masts

Power performance masts, or met masts, are non-habitable, ancillary structures and therefore do not trigger AS3959:2018 BAL construction requirements, which apply to buildings under the NCC (Classes 1, 2, 3 and 10a). Accordingly, a standalone met mast is not subject to BAL assessment, as it is a Class 10b building. Bushfire risk is managed through siting and operational controls, e.g., maintaining a low-fuel zone around the base, managing access, selecting non-combustible materials and cable conduits, and embedding emergency procedures consistent with local bushfire guidelines (e.g., the BRC Technical Guide). If any associated building is proposed (e.g., a switch room that meets the definition of a Class 10a building), that building must be assigned a BAL and constructed to AS3959:2018 at the determined level, while the met mast itself remains outside the scope of BAL construction provisions.

To achieve a tolerable outcome, a distance that achieves a radiant heat flux level of 29kW/m² or less surrounding the met masts should be maintained as the APZ at each met mast according to the BAL calculations. The tolerable calculation to achieve a BAL-29 rating for each met mast is recommended to ensure APZ continuity regardless of the adjacent hazardous vegetation.



The APZ surrounding the updated met mast 1 (southern) should be maintained as a distance of 28.9 m from the met mast itself and supporting guy wires, and the APZ surrounding met mast 2 is to be maintained as a distance of 21 m from the met mast itself and supporting guy wires. It is important to note however that these are not requirements under AS3959:2018 unless an associated class 10a structure is present.

3.2.4 Asset Protection Zones

The use of an APZ is the most effective defence against flame and radiant heat and to a lesser extent, ember attack. The APZ incorporates defendable space and allows for managing heat intensities at the building surface. Appropriate vegetation management measures shall be required to manage fine fuels, which have the greatest influence on the spread of a conventional flame front-driven bushfire (Queensland Government and CSIRO, 2020).

An APZ has been established around the proposed infrastructure to ensure that they achieve and maintain a minimum separation distance as outlined in **Table 7** to achieve a the specified **BAL 29** as per **Figure 15, Figure 16, Figure 17, Figure 19, Figure 20** and **Figure 21** above. Substations are required to achieve a BAL-10 as these are classed as Essential Community Infrastructure, as shown in **Figure 18** and **Figure 20** above, whilst the workers camp (Site 1) is required to achieve a BAL-12.5 as shown in **Figure 14**. WTGs, as discussed in **Section 3.2.2**, do not require an APZ, though a conservative calculation based upon worst-case slope and VHC was calculated to be 67.7 m as required to meet BAL-10 standards.

This area is to be maintained as an area that is effectively free of flammable material to provide defendable space and for managing heat intensities at the building surface.



4 Bushfire Management Plan

The SPP requires that where it is not possible to avoid a BPA, development mitigates bushfire risk to people and property to an acceptable or tolerable level. This can be achieved through development design and siting, hazard reduction practices and emergency mitigation measures for any buildings bordering potentially bushfire-susceptible vegetation. These practices and measures include fuel reduction and management, road infrastructure to provide safe access and egress, appropriate building design and construction standards, procedures for fighting bushfires, and fire intensity reduction management measures.

The development does not seek to mitigate bushfire hazard through additional vegetation clearing beyond the Development Footprint and shall contain all bushfire management and mitigation measures within the Development Footprint.

Management and mitigation measures for the Project are informed by the Health Safety and Environment (HSE) policy as well as relevant statutory and regulatory obligations including:

- Queensland SPP – State interest guideline: Natural hazards, risk and resilience;
- *Work Health and Safety Act 2011*, and Work Health and Safety (WHS) Regulation 2011;
- *Fire and Emergency Services Act 1990*;
- National Standard for the Storage and Handling of Workplace Dangerous Goods;
- Australian Dangerous Goods Code;
- AS3959:2018 Construction of buildings in bushfire-prone areas;
- NCC – Building Code of Australia 2022;
- AS/NZS ISO 31000:2009 Risk Management; and
- Charters Towers Regional Town Plan 2020 (Version 2).

To assist in reducing the bushfire risk in the Project Area, the following mitigation measures are to be implemented:

- Implementation of the BMP that addresses matters required by the SPP State interest for natural hazards;
- Reinstate any existing fire breaks within the Project Area, if they are damaged during construction;
- Ensuring that new buildings meet the specifications and requirements of AS3959:2018, where applicable;
- Providing suitable ingress and egress to the Project Area and escape routes; and
- Preparing and implementing an Emergency Response Plan (ERP) for the construction phase of the Project in consultation with local emergency management and disaster management groups.



4.1 Agencies / Persons Responsible

The responsible fire authority is the Rural Fire Service Queensland (RFSQ). The Project Area is located within the Mount Fox Rural Fire Brigade region. It is recommended that consultation be undertaken with QFD, the local RFSQ brigade, and any other relevant land manager (e.g., the department within CTRC responsible for bushland reserve management).

It is the responsibility of the proponent to ensure that the relevant measures required by this plan are in place prior to inspection by the building certifier, and to ensure that measures are in place prior to enacting the approval, and for the duration of the specified use of the premises. Furthermore, it is the responsibility of the proponent to ensure that a copy of this report is always on hand at the site.

4.2 Owner Responsibilities

It is the responsibility of the relevant land manager to maintain the Project Area in accordance with the conditions outlined in this report. The land manager responsibilities include:

- Establish and maintain an APZ between permanent built structures and bushfire-prone vegetation across sites stated in **Table 7**. The APZ is to be managed in accordance with the measures outlined in **Section 4.3**;
- Ensure all access routes remain clear of obstacles to enable effective emergency vehicle access and egress;
- Ensure no burning is to be undertaken within the Project Area without a Permit to Burn as issued by the local Fire Warden (and approval if required, in writing, from CTRC); and
- Confirm that the storage or handling of hazardous chemicals on the premises must not result in an unacceptable risk to people, property and the environment. Hazardous chemicals should not present a risk to or impose upon emergency services when responding to an emergency or evacuation.

Further roles and responsibilities are outlined in **Section 5**.

4.3 Maintenance of Asset Protection Zone

The APZ should be established surrounding buildings and identified using the BAL assessment for minimum separation distances, as provided in **Table 7**. As an example, the proposed site office requires a BAL 29, and as such the APZ will have a minimum width of 14.2m, as specified to meet the BAL 29 requirement. APZ's for each site are included in **Figures 14 – 21**. The recommended bushfire buffer (Asset Protection Zone) distances are measured from the outer edge of habitable infrastructure or buildings, rather than from the broader approved disturbance area.

The APZ will have the following characteristics:

- the APZ is to be maintained as an area free of flammable material to provide defensible space and for managing heat intensities at the building surface;
- all buildings and structures except fencing, swimming pools or metal/concrete water tanks are to be excluded from the APZ;
- any fencing is to be constructed from non-combustible materials;



- flammable objects must not be located within 6 m of any building or combustible structure;
- all trees are to have lower limbs removed up to a height of 2 m above the ground;
- trees and shrubs must not overhang or touch any elements of buildings;
- canopy trees identified for retention can be retained over a managed understory;
- landscaping treatments within the APZ shall comprise only low threat vegetation, including lawn areas managed in a minimal fuel condition (i.e. ≤ 100 mm nominal height as specified in AS3959:2018) and species that are of low combustibility (i.e., species with high leaf moisture content, low volatile oil content, absence of shedding bark, low production of leaf litter etc.);
- plants should be arranged to minimise vertical and horizontal connectivity of plant material;
- shrubs must not be located under the canopy of trees or within 3 m of dwelling;
- plants greater than 100 mm in height must not be placed within 3 m of a window or glass feature of the building;
- individual and clumps of shrubs must not exceed 5 m² in area and must be separated by at least 5 m; and
- mulches within any landscaped areas are to be non-combustible.

Regular maintenance of the APZ should be undertaken to remove fuels and debris, particularly prior to and during the fire season (i.e., late Winter to early Summer). This must include regular vegetation management and maintenance where necessary and practicable (e.g., grass slashing, weed removal, etc.) and removal of debris and rubbish.

4.4 Siting of Infrastructure

In accordance with the SPP (and associated SPP guidance material) and the Charters Towers Regional Town Plan 2020 (Version 2), the proposed design has considered the following key principles when siting development:

- Utilising land that is predominantly cleared to minimise ecological impacts to native vegetation;
- Maximising where practicable building frontage setbacks from any hazardous vegetation; and
- Siting of buildings so that elements of the development that are least susceptible to fire are situated closest to the bushfire hazard (e.g., driveways, parking areas, and protective landscape treatments).

4.5 Mowing, Slashing and Mulching

Slashing and mulching are economical methods of reducing fuel around buildings. However, for these methods to be effective, the cut material must be removed or allowed to rot well before the bushfire season starts. Grass needs to be kept short and mowed regularly around the buildings. Slashing and tithering are only practical in some situations.

Roads and access tracks shall be maintained so as to be cleared of all flammable vegetation greater than 10 cm in height.



Where large mature vegetation is to be cleared and stockpiled, suitable locations and areas are required to be identified prior and mapped during the pre-construction site investigation phase. These areas are required to be:

- a) Approved by the landholder;
- b) Outside of the watercourse buffer area (10 m for stream order 1-2 regulated watercourses under the VM Act, and 25 m for stream order 3 and higher);
- c) Outside of areas identified as high ecological value as determined by state-mapping and/or relevant ecological reports or surveys;
- d) Stockpile sites will be located outside of mapped bushfire hazard areas where practicable;
- e) Cleared vegetation stockpiling should minimise the likelihood of fires spread and provide separation which allows for firefighting intervention;
- f) Cleared vegetation, specifically larger materials designed for use in rehabilitation areas, are not to be stacked or placed against mature trees, habitat trees, or semi-mature trees; and,
- g) Stockpile boundary limits should be permanently marked to identify limits, maintain separation distances and control stockpile volume.

4.6 Fire Breaks

As much of the Project infrastructure is located in existing cleared areas, access tracks can be readily maintained as fire breaks and defensible spaces, which will assist in arresting any fires coming from surrounding properties. Where existing fire-breaks are impacted by clearing or other construction activities, they will be reinstated to their original condition as soon as practicable.

4.7 Fire-fighting Equipment

Fire-fighting equipment such as fire extinguishers must be provided and available within each building in the Project Area. Temporary site offices and the permanent building will be fitted with smoke detectors and appropriate fire extinguishers. Carbon dioxide fire extinguishers are recommended within the offices due to practicality and suitability within working environments. All habitable and occupied buildings shall comply with the *Building Fire Safety Management Tool & Advisory Notes* (QFES, 2021). This document is designed to assist owners and occupiers in managing their compliance with the *Fire and Emergency Services Act 1990* and the Building Fire Safety Regulation 2008.

All Project vehicles must be equipped with a fire extinguisher and a two-way radio. Fire extinguishers carried in vehicles and used in other operational equipment must be Dry Chemical Powder units with a minimum capacity equivalent to 9 kg. These extinguishers should be either ABE type (suitable for Class A, B and E fires – ordinary combustibles, flammable liquids, and electrical equipment) or BE type (suitable for Class B and E fires – flammable liquids and electrical equipment).

All fire extinguishers will be tested on a six (6) monthly basis. To comply with the fire extinguisher testing requirements under Australian Standards AS1851/2012 and section 10 of the Building Code of Australia.

Adjacent to the water tanks (as detailed in **Section 4.8**) will be a fire hose reel (30 m) and a diesel pump to provide coverage in and around the buildings. Designated signage to assist fire-fighters with locating equipment shall be installed in accordance with **Section 4.10**.



4.8 Water Supply Tanks

An adequate supply of water is essential for fire-fighting purposes when considering all forms of development. As reticulated water supply is not available within the Project Area, at least one 5,000 litre water tank must be available for fire-fighting purposes at all habitable infrastructure (ie camps and site offices), located centrally and easily accessible. The 5,000L firefighting water tank requirement applies to habitable or operational buildings, including any control or switchroom buildings located at substations. Where substations consist only of outdoor equipment without enclosed buildings, the requirement for static water tanks does not apply; fire protection is instead provided through vegetation management, access provisions, and equipment-specific fire safety systems.

The location of the water tank shall be located within 50 m of each building. The storage tanks shall be of non-combustible construction and fitted with a 65 mm outlet completed with a 65 mm ball valve and Stortz coupling, or the preferred connections as approved by the local QFD.

The tank water level must be monitored at regular intervals, e.g., monthly, and maintained at a minimum of 5,000 litres.

4.9 Emergency Services Access

Property and internal access roads will enable safe access, egress and defensible space for emergency services. Traffic that will require access to the Project Area includes light vehicles, semi tippers or truck and dog combinations. The access roads and manoeuvring areas throughout the Project Area need to ensure safe access for vehicles.

The following identifies road widths and design aspects to enable safe access for vehicles in accordance with PO6 of the Charters Towers Regional Town Plan 2020 (Version 2), and relevant SPP and QFD guidance material. These documents specify the following attributes for emergency access tracks:

- Have a minimum cleared width of 6 m, a formed width of 4 m;
- Dead end roads incorporate a minimum 12 m outer radius turning circle, and be clearly sign posted as a dead-end and direct traffic away from the hazard;
- A minimum vertical clearance of 4.8 m to any overhanging obstructions (including tree branches) with 3 m either side of trafficable width. Roads and access tracks shall be maintained so as to be cleared of all flammable vegetation greater than 10 cm in height;
- Internal roads provide a loop road around any office or incorporate a turning circle with a minimum 12 m outer radius;
- Curves have a minimum inner radius of 6 m and are minimal in number to allow for rapid access and egress;
- The minimum distance between inner and outer curves is 6 m;
- The cross-fall is not more than 20 degrees. Where a 20 degrees cross-fall is unachievable, either an alternate route is to be provided or the access road is sufficiently formed to prevent erosion and slope instability;
- Drainage and erosion control devices shall be installed in accordance with prescribed local government standards;



- Access road shall be designed to carry a fully laden QFD tanker of 10 tonnes (gross vehicle mass);
- All onsite access roads are to provide safe, all-weather access for fire fighters while employees and contractors are evacuating the Project Area;
- Gates shall be locked using a system authorised by QFD; and
- Directional signage will be installed to identify major tracks and the most direct route to the site office and emergency egress points, as well as access points, gates, etc. Signage be installed in accordance with **Section 4.10**.

Consideration needs to be given to the safety of employees and contractors occupying the Project Area during an incident. It may be safer to remain within the Project Area and seek shelter in a safe place. A designated assembly area will be nominated greater than 300 m from the nearest significant bushfire hazard and greater than 100 m from major electrical infrastructure.

4.10 Signage

Signage shall be installed to assist fire-fighters with locating operational points in the event of a fire, e.g., fire-fighting equipment, water services/points, access points, gates and tracks, etc. Required signage information shall include water points, gates, normal hazards (e.g., high voltage hazards) and provide trail information, e.g., no through roads, etc. All symbology used on signage is to be in accordance with the standard National Hazards Symbology set prepared by the Australasian Fire Authorities Council (AFAC).

Examples of QFD-endorsed signage and the AFAC symbology set are provided in **Figure 22** and .

4.11 Turbine Safety

Lightning protection devices will be installed in the turbines with remote shut down of turbines available if necessary.

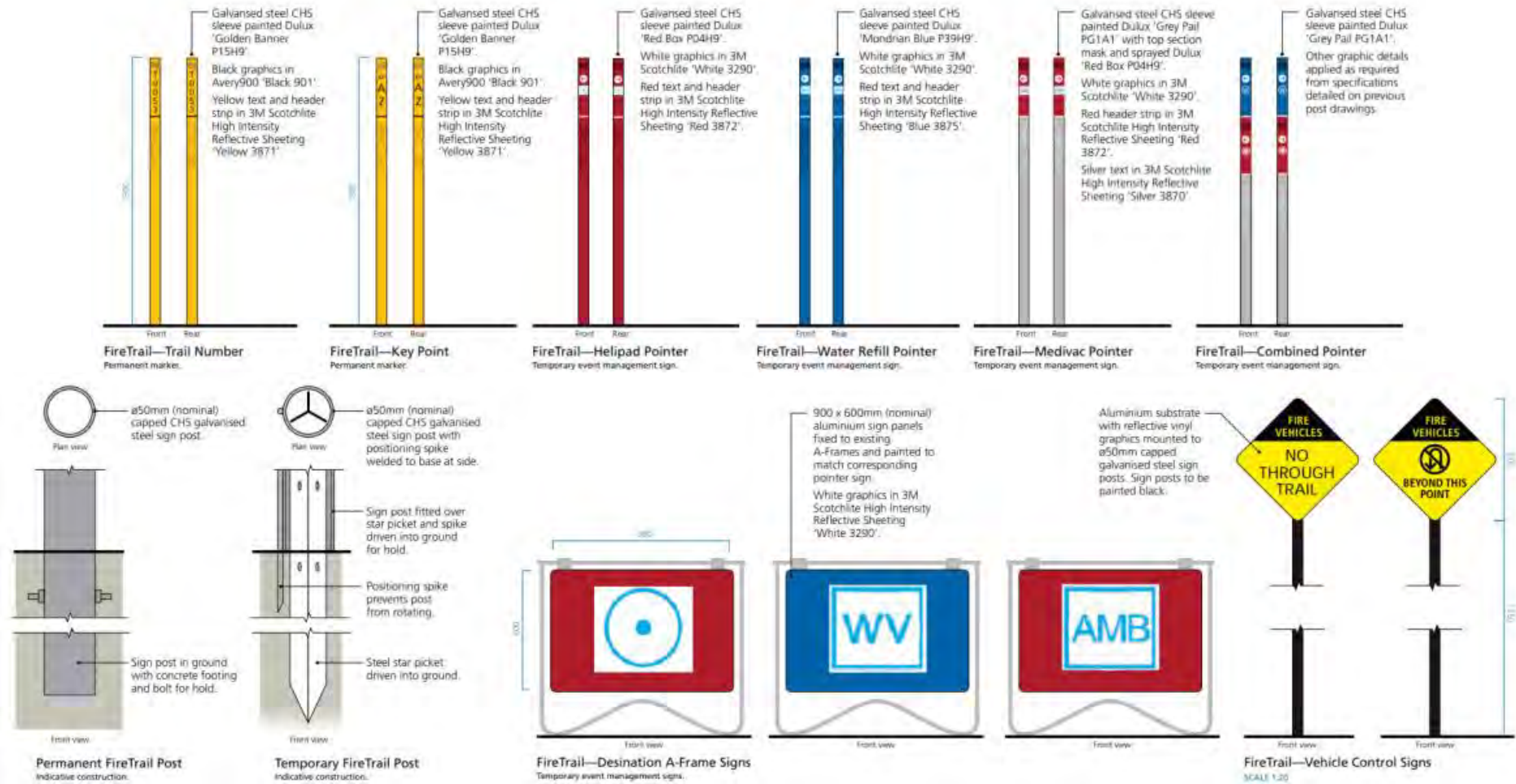


Figure 22: Example of Signage



NAME		SYMBOL	NOTES
PREDICTED (fire edge)			Show DTG
GOING (fire edge)			Show DTG
CONTAINED (fire edge)			Show DTG
INACTIVE (fire edge)			Show DTG
EMERGENCY ALERT AREA			Show DTG
PROPOSED CONTROL LINE		X—X—X—X—X—X—	Draw on far side of feature
COMPLETED CONTROL LINE		X X X X X X X X X X	Show DTG
PROPOSED BACKBURN			Draw on near side of feature
COMPLETED BACKBURN			Show DTG
BACKBURN BURNING IN			Use Burnt Area polygon to show progress at DTG
TRACK			A pre-existing track not otherwise marked (ie farm tracks).
MACHINE CUT TRACK			A track cut in by plant for the current incident.
RED – FIRE	BLACK – OPERATIONS	BLUE – WRITING and ASSETS	
Operational	Proposed/ Unconfirmed	Assets	
NAME	COLOUR	SYMBOL	NOTES
Fire Origin (Unconfirmed)	Red		Show DTG
Fire Direction	Red		Show DTG
Wind Direction	Blue		Show DTG
Spot Fire	Red		Isolated fire ahead of main fire
Hot Spot	Red		Particularly active fire or smoldering fuels
Burnt Area	Black		Burnt area of current incident
Previously Burnt Area	Black		Show month and year
Aerial Ignition	Red		Proposed path to be treated. Complete circle when done.
Divisional Boundary	Blue		Use geographical names
Sector Boundary	Blue		Use alphabetical names

NAME	SYMBOL	NAME	SYMBOL
Access Point		Airbase (Fixed wing and helicopter base)	
Ambulance Location		Assembly Area	
Base Camp		Control Centre (Incident Management Team location)	
Control Point		Divisional Command	
Escape Route (Add arrow to show safe exit)		Evacuation Area	
Evacuation Centre		Fire Fighting Vehicle	
Helibase (Helicopter only base)		Helipad	
Hydrant Point		Livestock	
Medical		Mobile Weather Station	
Plant		Police Vehicle	
Portable Communications		Property Damage	
RAFT Crew		Refuge Area	
Road Closure		Sector Command	
SES Vehicle		Smoker On Ground	
Smoker Standing		Staging Area (Annotate with class of Staging Area)	
Tree Down		Water Point	
Water Point Helicopter (Helicopter water supply)		Water Point Vehicle (Firefighting water supply)	
Asset		Asset – Defendable	
Asset – Not Defendable		Asset – Potentially Defendable	
Threatened Asset		Asset – Flora	
Asset – Historic Site (Building or Structures)		Asset – Fauna	
Indigenous Site		Asset – Hazmat	
The use of colours is recommended but optional.			

Figure 23: AFAC Signages (Rural Fire Services, 2012)

Note: DTG refers to Date-Time Group, which records the day, time, time zone, month, and year. For example, 10:51 hrs on 4 November 2024 (UTC) would be written as: 041051Z NOV 24

4.12 Specific Mitigation Measures

A hot work permit system will be implemented to control the use of welding, thermal or oxygen cutting, heating, grinding, and the use of explosive power tools. These activities carry the highest fire risk for the Project Area and could result in ignition or explosions. Mitigation measures for the highest risk activities is provided in **Table 8**.

Table 8: Specific Mitigation Measures for Highest Risk Activities.

Risk	Mitigations
Hot works (welding, thermal or oxygen cutting, heating, grinding and the use of explosive power tools)	- Notifying all staff at prestart of total fire ban days. - Basic training in inductions of risks and controls, ensuring they are understood. - Only qualified and competent staff to use welding equipment. - All hot work requires a hot work permit.
Vehicle use (and other equipment with internal combustion engines)	- Vehicles will typically be confined to designated tracks and parking. If a detour is required, avoid areas of long grass. - No idling of engines permitted when parked, excepting brief periods, e.g., for opening and closing of gates. - Vehicles and machinery will be maintained and in good working order. - Refuelling of large machinery will occur within the Project Area. Fuel used would be diesel only and refuelling shall occur away from vegetated areas. - All vehicles must carry a fire extinguisher.
Smoking	- Smoking is only permitted in designated smoking areas, in the compound, or hardstand area. - A suitable container will be provided for butts to be disposed of in a safe manner.
Use of flammable materials	Materials will be stored and handled appropriately.
Controlled burning (burning in situ prior to clearing or mechanical removal, stockpiling, and burning)	- Monitor weather conditions for optimal burn times. - Establish buffer zones and firebreaks. - Monitor weather conditions for optimal burn times.

5 Roles and Responsibilities

5.1 Responsibilities

Table 9 outlines the roles and responsibilities specific to the BMP for the Project.

Table 9: Roles and Responsibilities Specific to Bushfire Risk Management

Roles	Responsibilities	Authority
Consortium Director	Responsible for providing the required resources to complete the required tasks and to facilitate company corporate support.	Authority to limit and stop works.
Project Manager	- Determining sequence and interaction of processes. - Ensure communications and reporting framework in place. - Ensure the goals of the BMP are achieved. - Report incidents to HSE Manager for review and reporting to agencies, as required. - Ensure mitigation plans are appropriate and resourced. - Manage the operational QFD liaison.	- All aspects of the environmental performance of the Project. - Stop work orders.
Site Manager	- Report incidents to Project Manager. - To ensure timely delivery of corrective actions. - Ensure BMP is communicated and implemented. - Responsible for compliance with all applicable environmental legislation and contract obligations.	- Authority to require environmental actions be undertaken. - Delegates tasks as required. - Stop work orders.
Site Engineers and Construction Supervisors	Oversee the implementation of all environmental management plans, mitigation measures and monitoring programs.	- Authority to require environmental actions to be undertaken by construction crews. - Stop work orders
HSE Advisor	- Responsible for the implementation and maintenance of BMP during construction. - To report incidents to Site Manager.	Implementation of stop work orders in the case of an emergency.

Roles	Responsibilities	Authority
	- To implement corrective actions. - Monitor corrective actions - Comply with regulations within BMP - Ensure training is delivered and appropriate. - Keep records of training, incident reports, daily diaries etc.	- Reports to Site Manager. - Stop work orders.
Onsite Construction Staff	- Ensure goals of, and mitigation measures in the BMP are implemented. - Identify and proactively report incidents. - Receive training.	- Suggest Stop Work orders. - Stop work permitted if action deemed unsafe or can cause potential bushfire.

Table notes: All personnel shall have authority to stop work if a situation occurs where an action is deemed to be unsafe and can or may cause harm to people or the environment.

5.2 Employee and Contractor Communication

All employees and contractors must be contactable at all times while working within the Project Area (and away from the main office). Means of communication may be by way of mobile phone, two-way radio (closed channel), satellite phone or GPS trackers installed on company vehicles.

Any employees and contractors entering the Project Area shall be inducted and made aware of the emergency evacuation procedures. Contractors may, for example, also be issued with a GPS tracker for the duration of their activities within the Project Area.

5.3 Storage of Fuels and Hazardous Materials

A variety of hazardous materials will be on site and will be stored in accordance with standard separation requirements. Some examples include epoxy resins and construction adhesives, brake fluid and other equipment maintenance chemicals, welding equipment and associated gasses and surface preparation chemicals, flocculants and pH correction chemicals (acids and bases), chlorine (oxidising agent) for preliminary disinfection of potable water lines in the camp. It is also likely that blasting materials will be stored on site.

Section 9.4 of the BRC Technical Guide specifies that all materials that are flammable and combustible will be stored in a secure and enclosed area away from any electrical infrastructure and achieve a APZ to meet a heat flux level of 10 kW/m².

Worksafe Queensland provides further guidance regarding the safe storage and management of hazardous chemicals at <https://www.worksafe.qld.gov.au/safety-and-prevention/hazards/hazardous-chemicals>. The safe storage and handling of flammable and combustible liquids is covered by requirements in Chapter 7.1 of the WHS Regulation (hazardous chemicals).



5.4 Consultation

Prior to and during the construction phase of the Project, consultation with the SARA and QFD will be undertaken and informed by this report. This is to ensure that the QFD is familiar with the Project Area in the case of an emergency and that adaptable mitigation measures are in place. The primary contact persons for liaison will be the Site Manager and HSE Advisor.

The consultation program arranged with the QFD will be implemented during all stages of the development. This program will include a copy of the BMP being made available to the QFD, fire drills and fire inspections of the development. The appropriate timing and frequency of these measures will be discussed with the QFD.

The Site Manager is to liaise with the landowner to manage the bushfire risk and hazard reduction strategies, including any burns that the landowner was planning to complete during the Project, and any changes in management required if the property is de-stocked and the bushfire hazardous fuel loads increase.

Within three months after commencement of construction, the HSE Adviser should offer to the QFD and other emergency services a familiarisation visit to the Project Area and explanation of emergency service procedures, and training to all employees in relation to suppression of fires and rescue.

Prior to and during the construction phase of the Project, consultation with all relevant land holders is to be undertaken to discuss bushfire risks, available resources and mitigation measures to be undertaken.

5.5 Training, Awareness and Competence

Training will be provided to all personnel, in the following forms:

- Project induction: the induction must give general evacuation instructions and first response instruction.
- Pre-start meetings.

Records of induction and training will be kept including the training carried out, dates, participant names and trainer details. Inductees will be required to sign-off that they have been informed of the environmental issues and that they understand their responsibilities.

Staff working within the Project Area shall be trained and aware of:

- The site ERP; and,
- Emergency contacts for the QFD.



6 Emergency Preparedness and Response

6.1 Preparedness

The Project ERP and evacuation procedures, including associated documentation and signage shall be prepared in accordance with the guidelines outlined by the QFD.

The ERP shall also include a Safety and Emergency Management Plan (SEMP) that addresses construction and operations, and including the following information at a minimum:

- A hazard analysis and risk assessment undertaken in accordance with AS/NZ ISO 31000:2018 Risk Management Principles and Guidelines and the Charters Towers Disaster Management Plans.
- Evacuation plans for the construction and operation phases of the development
- Safety management plans and emergency response procedures prepared in consultation with the State and regional emergency service providers and provide an adequate level of training to staff who will be tasked with emergency management activities.

The ERP will be prepared once the detailed design of the wind farm has been completed. The ERP must be updated to include a Fire and Evacuation Plan once the initial site infrastructure is constructed. The QFD website at www.fire.qld.gov.au provides fire emergency guidelines which may provide a useful reference for future updates to the ERP.

Consultation on both the BMP (with RFSQ) and the SEMP (with Fire and Rescue Service) for this development are located in the QFD Northern Region and are outlined in **Table 10**.

6.2 Response

If a fire starts within the Project Area, staff trained to extinguish fires can attempt to do so with a fire extinguisher or fire blanket if they assess that it is safe to do so at the time. If the fire cannot be safely extinguished with a fire extinguisher, the following QFD procedure will be followed.

- Assess the fire situation.
- If there is any doubt regarding whether there is a fire situation, the QFD should still be called.
- Ensure the safe evacuation of all occupants from the whole of the Project.
- Account for all occupants at the assembly area.
- Ensure occupants do not attempt to re-enter the whole of the Project until it is safe to do so.
- Meet the QFD and advise them of any information relevant to the situation.

If a fire occurs adjacent to the Project Area, site personnel will assess the fire situation in consultation with adjacent landholders and contact the QFD and other relevant authorities to report the fire. The contractor shall continue to assess and monitor the fire situation. If the fire has the potential to move into the Project Area and impact upon infrastructure or human and environmental values, the contractor shall implement emergency response procedures and liaise with adjacent landholder, QFD and other relevant authorities where necessary.

6.3 Emergency Response Procedures

An onsite emergency evacuation plan should be developed and be made accessible to all personnel to implement in the event of a bushfire emergency. In the event of a pending bushfire emergency, assistance is to be obtained by dialling 000 and evacuating all personal to a safe evacuation zone within the Project Area.

Suitable signs shall be erected throughout the Project Area that details the evacuation procedures, meeting points and egress routes. These will be used to identify to people the various egress routes available within the Project Area (including distances from each sign to the safety evacuation meeting point) in the event of an approaching bushfire. **Table 10** illustrates local QFD Resources.

Table 10: Queensland Fire Department (QFD) Local Resources

Queensland Fire Department	
Regional	
Northern Region Head Quarters	QFD Court House Complex Cnr Church & Aland Street CHARTERS TOWERS QLD 48204 PH: 07 4796 9082
Rural Fire Service Brigades	
Mount Fox Fire and Warden District	PH: 0410 127 007
Mount Fox Rural Fire Brigade	N/A

6.4 Emergency Resources and Information Providers

6.4.1 Local Radio Stations

- 4nsa - 89.9 FM
- 4SDB - 89.3 FM
- 4TTT - 91.9 FM
- OCR FM - 96.5 FM
- Rainbow FM - 89.3 FM

6.4.2 Charters Towers Region – Disaster Dashboard

The CTRC operates a Disaster Dashboard. The platform provides information regarding emergency news, road conditions, weather warnings and power outages, accessible at: <https://getready.charterstowers.qld.gov.au/>

It is also recommended for the workers that frequent the Project Area are signed up to the “Opt-In Notifications” to receive SMS messages from CTRC regarding information on arising local disasters, severe weather, and emergency events within the CTRC.

6.4.3 State Government, QFD – Current Warnings

The QFD publishes the current warnings and incidents across Queensland. This is available on the website (<https://www.fire.qld.gov.au/Current-Incidents>).

In the event of a bushfire emergency, do not rely on a single source of information, check multiple places to stay up to date.

6.4.4 Australian Fire Danger Rating System (AFDRS) and Fire Bans

In response to the recommendations provided in the 2020 Royal Commission into National Natural Disaster Arrangements, Australian Fire Danger Rating System (AFDRS) was introduced across Australia as a systemised approach as a generational change to effectively provide evidence and communicated risks across Australia.

The new system incorporates a wider range of fire behavioural models and up to date data to provide four (4) fire danger ratings (**Figure 24**). That is applicable for a broader range of landscapes within Australia. The AFDRS signs are posted in suitable locations across Queensland and Australia.

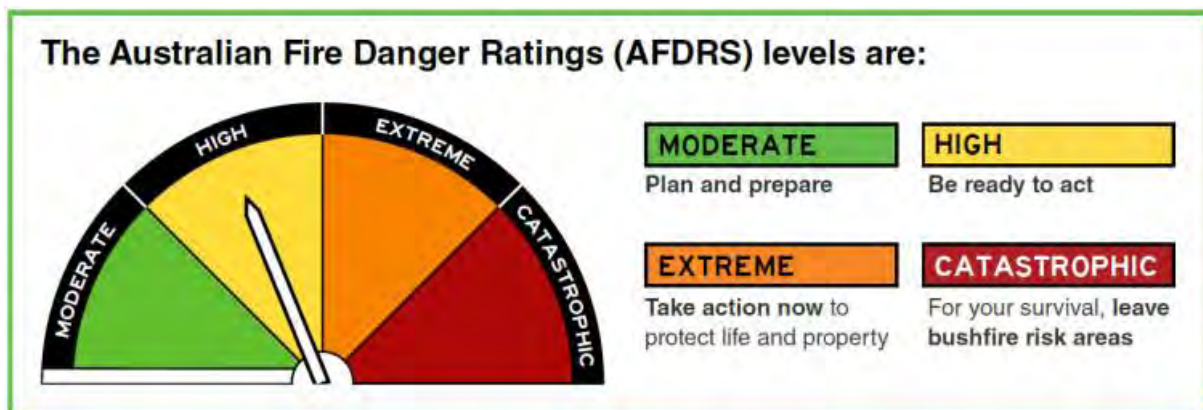


Figure 24: Australian Fire Danger Rating System

AFDRS utilised the data published by the Australian Bureau of Meteorology to inform the danger rating for a particular region across Australia. The fire behaviour index (FBI) is a model based on findings from McArthur, A.G. (1967). FBI is a scale of potential fire behaviour that ranges from 0 to 100 and above. The FBI informs the operational decisions of QFD, including the implementation of a total fire bans within the region. **Table 11** illustrates the conversion of FBI to the ratings under the Australian Fire Danger Rating System (AFDRS).

The fire danger ratings can be accessed at <https://www.fire.qld.gov.au/prepare/bushfire/fire-danger-ratings>



Table 11: FBI Values To AFDRS

Fire Behaviour Index	Australian Fire Danger Rating System
0 to 11	No rating
12 to 23	Moderate
24 to 49	High
50 to 99	Extreme
100 +	Catastrophic

It is required under this BMP, that works including but not limited to; mowing, slashing, grinding or any other mechanical operations (including tub grinders) that may produce substantial heat or sparks within bushfire prone or high vegetation areas of the Project Area is prohibited as a safety precaution on any day that has a fire danger rating of Extreme (FBI 50 or above). Works involving the use of mechanical operations will cease where the fire danger rating within the Project Area is FBI 50 or above.

Fire Ban Areas are imposed on both local/regionally or by the by the State, when predicted weather conditions informed by the FBI indicate that if a fire may occur, that it would be difficult to control and pose high danger to communities and life. The authority to declare Fire Ban Areas are under the provisions of the *Fire and Emergency Services Act 1990*. Operations of work that may promote risks that increase the likelihood of ignition should be reduced on total fire ban days as a precautionary approach.



7 Assessment Against the Bushfire Overlay Code

The Project Area is mapped within the Charters Towers Regional Town Plan 2020 (Version 2) Bushfire Hazard Overlay, which triggers a response to the Bushfire Hazard Overlay Code Performance Outcomes (PO), and Acceptable Outcomes (AO) where feasible. An assessment against this code is provided in **Table 12**.

Table 12: Assessment Against Charters Towers Regional Town Plan 2020 (Version 2) – Bushfire Hazard Overlay Code

Performance Outcomes		Acceptable Outcomes	Compliance Assessment
Site suitability			
PO1	Development maintains the safety of people and property. <i>Editor's note – A site specific bushfire hazard assessment and management plan is required to demonstrate compliance with this performance criterion. Refer to the Natural hazards Town plan Policy.</i>	No acceptable outcome is nominated.	Compliant with PO1 The proposed development is supported by this BMP, containing a BHA. This plan demonstrates that bushfire risk to people and property can be effectively mitigated, as per Sections 4, 5 and 6. All Class 3 structures (Site 1 – Site Camp) are located to achieve a minimum setback from hazardous vegetation such that the radiant heat flux does not exceed 12.5 kW/m², consistent with NCC 2022 Volume 1 Part G5, as well as BAL-12.5 requirements under AS3959:2018. The BMP provides for defensible space, vegetation and fuel management, and safe vehicle access for both occupants and emergency services. Evacuation arrangements and site-specific emergency procedures ensure the safety of workers accommodated onsite in accordance with WHS obligations.

Performance Outcomes		Acceptable Outcomes		Compliance Assessment
				Accordingly, the development maintains the safety of people and property by siting infrastructure outside areas of unacceptable bushfire exposure via the establishment of APZs as per Table 7 and Section 3.2 , incorporating bushfire-resilient design measures, and implementing management practices that reduce risk to an acceptable level.
PO2	Development does not result in a higher concentration of people living, working or congregating in a bushfire prone area unless it can be demonstrated: (a) there is an overriding community need in the public interest; and (b) no other site is suitable and reasonably available.	AO2	The following uses are not located on land within a high to very high bushfire hazard area: (a) Agricultural supplies store; (b) Bulk landscape supplies; (c) Club; (d) Community use; (e) Food and drink outlet; (f) Function facility; (g) Garden centre; (h) Market; (i) Nature based tourism; (j) Outdoor sport and recreation; (k) Rural industry; (l) Rural workers accommodation;	Complies with PO2 The proposed development relates to infrastructure for the purpose of a wind farm, including a temporary workers camp, operations facilities, wind turbines, substations, met masts and associated services. While a workforce will be present in medium and high bushfire intensity areas, this is directly linked to the construction and operation of critical renewable energy infrastructure. This represents an overriding community need in the public interest through contributions to Queensland's renewable energy and emission reduction targets.

Performance Outcomes		Acceptable Outcomes		Compliance Assessment
			(m) Renewable energy facility; (n) Tourist park; and (o) Wholesale nursery.	This BMP confirms that the siting of the camp and associated infrastructure achieves sufficient setbacks under Method 2 Minimum Distance Calculations (see Table 7) to limit radiant heat flux to an acceptable level, and thus ensuring the safety of workers within on-site accommodation. Alternative sites are not suitable or readily available for this development. Infrastructure must be located within the Project Area to ensure operational efficiency and safety. As such, the proposal does not result in an unacceptable concentration of people in a bushfire-prone area, and therefore satisfies PO2, providing an overriding community need, with an absence of alternative siting options.
Siting of development				
PO3	The siting, layout and design of development avoids or mitigates the risks associated with bushfire hazard through: (a) being situated on that part of the site that has the lowest level of bushfire risk;	No acceptable outcome is nominated		Complies with PO3 The Bushfire Hazard Assessment (BHA) and Bushfire Management Plan (BMP) confirm that all built elements of the development are located on the lowest risk parts of the site available for efficient operation, with infrastructure achieving setbacks that limit radiant heat flux to acceptable levels in accordance with AS 3959 and the NCC 2022 Part G5.

Performance Outcomes		Acceptable Outcomes		Compliance Assessment
	(b) fire mitigation measures that do not adversely impact on areas having high environmental values. <i>Editor's note—</i> (a) a site specific bushfire hazard assessment and management plan is required to demonstrate compliance with this performance criterion. Refer to the Natural hazards TPP; (b) buildings in a bushfire hazard area must meet the requirements of AS3959-2009 – the Australian Standard for the Construction of Buildings in Bushfire Prone Areas and the requirements of the Building Code of Australia.			The layout incorporates fire mitigation measures such as APZs, and safe vehicle access without adversely affecting areas of high environmental value. Accordingly, the siting, layout, and design of the development mitigate bushfire risk while balancing environmental protection and compliance with statutory requirements.
Water supply				
PO4	Development in areas with a reticulated water supply has adequate flow and pressure for fire fighting purposes at all times.	AO4	The water supply network has a minimum sustained pressure and flow of at least 10 litres per second at 200kPa.	Not Applicable The Project Area is not serviced by a council reticulated water network. Dedicated on-site water that is safely located and freely accessible for fire-fighting purposes will be supplied.

Performance Outcomes		Acceptable Outcomes		Compliance Assessment
PO5	Development in areas without a reticulated water supply has an appropriate dedicated water supply for fire-fighting purposes, that is safely located and freely accessible for fire-fighting purposes at all times.	AO5	Development involving a gross floor area greater than 50m² where a reticulated water supply is not available is: (a) provided with an easily accessible fire resistant on-site water storage of not less than 5,000 litres (e.g. concrete tank with fire brigade fittings, in-ground swimming pool, dam fed by a permanent water source) that is within 100m of the development; and (b) has a hard-standing area allowing a heavy rigid fire appliance safe access to within 6m of the storage facility. <i>Editor's note— Plastic water tanks are not considered to be fire resistant.</i>	Complies with PO5 The development will provide a dedicated on-site water supply for fire-fighting purposes, with tanks and outlets located in safe, accessible positions that are available to emergency services at all times (refer to Section 4.8). This BMP includes provisions for storage, pumping, and maintenance arrangements to ensure the supply remains reliable and fit for purpose in the absence of a reticulated network, thereby satisfying the intent of the PO.
Roads, fire access trails and firebreaks				
PO6	Roads and fire access trails are designed and constructed to: (a) enable efficient access to buildings and structures for fire-fighting purposes for emergency services; and (b) swift evacuation in emergency situations.	AO6.1	Roads and fire access trails are designed and constructed to: (a) have a maximum gradient of 12.5%; (b) a minimum cleared width of 6m and a minimum formed width of 4m; (c) provides passing and turning areas for fire-fighting appliances at intervals of not less than 500m;	Complies with PO6 The development has been designed to provide a safe and functional internal road and access network that enables efficient fire-fighting access for emergency services and swift evacuation for workers and contractors in the event of a bushfire (refer to Section 4.9).

Performance Outcomes		Acceptable Outcomes		Compliance Assessment
			(d) have a vehicular access at each end to roads or a bushfire trail; and (e) not involve any cul-de-sac.	The layout includes appropriately sized access roads, turning areas, and loop arrangements to ensure fire appliances can manoeuvre easily and without obstruction. In addition, access roads are constructed to an all-weather standard, with load capacity suitable for QFD appliances, vertical clearance maintained, and directional signage and gates designed in accordance with QFD requirements. These measures, together with ongoing maintenance identified in the BMP, ensure the road network supports both emergency response and safe evacuation, thereby satisfying the intent of the PO.
		AO 6.2	Development has direct access to an evacuation route with a potential fire intensity exposure no greater than 2kw/m². <i>Editor's note– The distance from hazardous vegetation to achieve 2kw/m² is generally:</i> <i>58m in a very high bushfire hazard areas;</i> <i>52m in a high bushfire hazard area; and</i> <i>44m in a medium bushfire hazard area.</i>	
		AO 6.3	Development incorporates an area of managed vegetation that separates lot boundaries from hazardous vegetation by a distance of: (a) 20m to a high or very high bushfire risk area; or (b) 10m to a medium risk bushfire area and includes a fire access trail. <i>Editor's note–</i> <i>(i) hazardous vegetation is identified through a site specific bushfire hazard assessment. Refer also to the Natural hazards TPP;</i>	

Performance Outcomes		Acceptable Outcomes		Compliance Assessment
			(ii) any fire access trail is secured by public ownership or an access easement in favour of Charters Towers Regional Council and the Queensland Fire and Rescue Service.	
PO7	Development provides for adequate fire breaks that minimise bushfire hazard by: (a) separating hazardous vegetation from development areas; and (b) facilitating access for firefighting and emergency vehicles. <i>Editor's note— A site specific bushfire hazard assessment and management plan is required to demonstrate compliance with this performance criterion. Refer to the Natural hazards TPP.</i>	No acceptable outcome is nominated.		Complies with PO7 The development incorporates fire breaks (refer to Section 4.6) and fuel-managed areas (refer to Section 4.3) that clearly separate hazardous vegetation from built infrastructure and activity areas. These buffers are designed in accordance with the findings of the BHA and the BMP, ensuring setbacks sufficient to reduce radiant heat exposure and limit the potential for ember attack. In doing so, the fire breaks provide a defensible space that minimises bushfire hazard to workers, infrastructure, and operations. In addition, the fire breaks are designed to facilitate access for firefighting and emergency vehicles, with widths and clearances consistent with QFD guidance to allow safe and efficient manoeuvring of appliances. These measures support both bushfire suppression activities and evacuation arrangements, thereby being compliant with the PO.

Performance Outcomes		Acceptable Outcomes		Compliance Assessment
PO8	Development is located and designed to incorporate a bushfire defensible space which achieves separation between buildings, building envelopes and hazardous vegetation necessary to reduce risk to an acceptable or tolerable level.	AO 8.1	Buildings, or building envelopes, are separated by hazardous vegetation by a distance that achieves a radiant heat flux level at any point on the building, or building envelope, respectively that does not exceed: (a) 10kW/m² where involving a vulnerable use, essential service uses or hazardous chemical facility use; or (b) 29W/m² otherwise. <i>Editor's note— The radiant flux levels and separation distances are to be established in accordance with hazard assessments. Where a separation distance is proposed to be achieved by utilising existing, cleared developed areas external to the site, certainty must be established (through tenure or other means) that the land will remain cleared of hazardous vegetation. For staged development, temporary separation distances, perimeter roads or fire trails may be absorbed as part of subsequent stages.</i>	Complies with AO 8.1 All buildings are sited with setbacks from hazardous vegetation in accordance with Table 7, that ensure radiant heat flux does not exceed the required thresholds. Exposures are limited to ≤10 kW/m² for vulnerable or essential uses (such as substations), ≤12.5 kW/m² for workers accommodation camps, and ≤29 kW/m² for all other uses, as confirmed in the BHA.
		AO 8.2	Development ensures buildings or building envelopes are separated from adjacent buildings or building envelopes by a minimum distance of 8m.	

Performance Outcomes		Acceptable Outcomes		Compliance Assessment
Hazardous materials				
PO9	The potential for the release of hazardous materials as a result of a bushfire event is avoided.	AO9	Development involving the production or storage of hazardous materials is not located within a high or very high bushfire hazard area.	Complies with PO9 The development provides for the secure storage and management of hazardous materials, as outlined in Section 5.3, in accordance with Section 9.4 of the BRC Technical Guide, WorkSafe Queensland guidance, and Chapter 7.1 of the WHS Regulation. Flammable and combustible substances, including resins, fuels, gases, and treatment chemicals, will be stored in enclosed and secure facilities separated from electrical infrastructure, with asset protection zones established to achieve a heat flux level not exceeding 10 kW/m². These measures ensure that in the event of a bushfire, hazardous materials are not subject to ignition sources or excessive radiant heat, thereby avoiding the potential for release. The proposed storage and handling arrangements therefore satisfy the intent of the PO by maintaining the safety of people, property, and the environment.

Performance Outcomes		Acceptable Outcomes		Compliance Assessment
Reconfiguration of a lot				
PO10	Additional lots avoid the risk of bushfire hazard to: (a) personal and property safety; and (b) increased risk of damage to assets. <i>Editor's note— A site specific bushfire hazard assessment and management plan may demonstrate that the site is not within a bushfire hazard area or has a low degree of bushfire risk. Refer also to the Natural hazards TPP.</i>	AO10	New lots (including rear lots) do not occur in a bushfire prone area.	Not applicable The proposed development does not involve a reconfiguration of lot.
PO11	Development for essential community infrastructure is located, designed and sited to: (a) protect the safety of people during a bushfire; (b) not increase the exposure of people to the risk from a bushfire event; and	No acceptable outcome is nominated.		Not applicable The proposed development does not involve a reconfiguration of lot.



Performance Outcomes		Acceptable Outcomes	Compliance Assessment
	(c) function effectively during and immediately after bushfire events. <i>Editor's note— A site specific bushfire hazard assessment and management plan is required to demonstrate compliance with this performance criterion. Refer to the Natural hazards TPP.</i>		



8 Audit And Review

This BMP is a controlled working document that is to be updated and revised to reflect adaptive management and constructive feedback. Some sections of the BMP may be modified, new procedures may be implemented, and responsibilities altered, depending on feedback and application.

This BMP will only ever be modified in consultation with and upon the agreement of all relevant stakeholders, including the QFD and/or SARA. This agreement allows for changes to the plan scope, as determined through consultation and the acceptance by the Principal Contractor. That is, where further actions are deemed necessary or where actions can be reduced in scope.



9 Conclusion

This report provides BHA and BMP for the Gawara Baya Wind Farm, located 44 km south-west of Ingham in North Queensland. The Project Area's bushfire mapping ranges from Medium to High Potential Bushfire Intensity, to some areas of Very High Potential Bushfire Intensity due to the surrounding environment. Bushfires can ignite due to a range of causes, including natural and human influences. The provisions outlined in this BMP are designed to mitigate both the risk of bushfire and the probability of a fire starting within the Project Area.

The risk of a bushfire occurring is considered moderate, given the surrounding environment of predominantly Eucalypt woodland and open woodland, set within a sparsely populated rural setting. The construction works supply potential ignition sources that increase the risk of a bushfire occurring, and naturally occurring ignition sources.

The results of this desktop assessment provide minimum setback distances for infrastructure to meet a radiant heat flux of $\leq 10 \text{ kW/m}^2$ for community infrastructure for essential services, $\leq 12.5 \text{ kW/m}^2$ for workers accommodation camp, and $\leq 29 \text{ kW/m}^2$ for all other infrastructure, as detailed in **Section 3.2**. These setback distances meet AO 8.1 of the Charters Towers Regional Town Plan 2020 (Version 2) as outlined in **Table 12**.

Whilst WTGs are not habitable buildings, they are required under the BRC Technical Guide to meet a minimum of BAL-10 construction standards. A conservative uniform minimum setback distance, based upon worst case scenarios provides a calculated minimum setback distance of 67.7 m, though their BAL-10 performance standard is achieved through non-combustible construction material and the cleared hardstand at the base of each WTG. Power Performance Masts are not subject to AS3959:2018 BAL assessment, with the cleared pads and vegetation management near the base of the masts considered sufficient to mitigate bushfire risk.

This plan outlines the required attributes for emergency access tracks (see **Section 4.9**) in accordance with PO6 of the Charters Towers Regional Town Plan 2020 (Version 2) Bushfire Hazard Overlay Code, and relevant SPP and QFD Guidance Material. Implementation of these requirements will provide for the egress of site occupants and support access by Rural Fire Service 4WD vehicles.

This bushfire assessment follows the BRC Technical Guide, using QFD-published inputs (FFDI and fuel loads) and the QFD VHC system. The project complies with the SPP Natural Hazards, Risk and Resilience Assessment Benchmarks and the Charters Towers Regional Town Plan (2020) Bushfire Hazard Overlay Code, with mitigation measures such implementation of APZ, installation of fire equipment and water tank, provision of emergency services access, installation of signages, training of personnel and the preparation of an EPR across the Project Area for the duration of the Project will ensure appropriate management of the bushfire risks.



10 References

AUSTRALIAN STANDARDS 2018. AS 3959-2018 Construction of Buildings in Bushfire-prone Area. *Construction of Buildings in Bushfire-prone Area*. Sydney: Council of Standards Australia.

BOM. 2019. *Bureau of Meteorology, Observations* [Online]. Available: <http://www.bom.gov.au/vic/observations/index.shtml?ref=hdr> [Accessed].

DSDMIP 2019. State Planning Policy State Interest Guidance Material - Natural Hazards, Risk and Resilience - Bushfire, December 2019. *In*: DEPARTMENT OF STATE DEVELOPMENT, M., INFRASTRUCTURE AND PLANNING (ed.).

LEONARD, J., OPIE, K., NEWNHAM, G. & BLANCHI, R. 2014. A new methodology for State-wide mapping of bushfire prone areas in Queensland. *In*: LEONARD, J., NEWNHAM, G. & BLANCHI, R. (eds.) *A report to the Queensland Fire and Emergency Services*,. Brisbane.

Commonwealth of Australia and the States and Territories 2022, National Construction Code, Building Code of Australia, Australian Building Codes Board.

Queensland Fire and Emergency Services (QFES) 2019. Bushfire Resilient Communities - Technical Reference Guide for the State Planning Policy State Interest 'Natural Hazards, Risk and Resilience - Bushfire', October 2019. *In*: (QFES), Q. F. A. R. S. (ed.).

Queensland Fire and Emergency Services (QFES). *Building Fire Safety Management Tool and Advisory Notes*. Version 5. Effective May 2021. Available at: <https://www.fireriteservices.com.au/wp-content/uploads/2023/11/QFES-Building-Fire-Safety-Management-Tool-and-Advisory-Notes.pdf>

RURAL FIRE SERVICES 2012. New National Mapping Symbology for Incidents. 2012.

SDSIP 2014. State Planning Policy - July 2014. *In*: DEPARTMENT OF STATE DEVELOPMENT, I. A. P. (ed.). Brisbane

STANDARDS AUSTRALIA 2009. AS 3959-2018 Construction of Buildings in Bushfire-prone Area. *Construction of Buildings in Bushfire-prone Area*. Sydney: Council of Standards Australia.

WorkSafe Queensland 2024, Hazardous Chemicals. [Online] Available at <https://www.worksafe.qld.gov.au/safety-and-prevention/hazards/hazardous-chemicals>.