



BUSHFIRE HAZARD ASSESSMENT AND MANAGEMENT PLAN

235 – 353 MILL ROAD, YABULU
(3RP743037)

TECHNICAL REPORT 7-50-28

*Technological Solutions for Sustainable
Natural Resource Management*



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STATEMENT OF QUALIFICATION

This Bushfire Hazard Assessment Report has been prepared by Marcia Griebenow. I have 20 years' experience in bushfire management and environmental management, practicing in Victoria, New South Wales and Queensland. I have a Bachelor of Environmental Science (Management) from Charles Sturt University, and the Postgraduate Diploma in Bushfire Protection from the University of Western Sydney.

I am suitably qualified and experienced to undertake Bushfire Hazard Assessment and prepare recommendations for bushfire management planning and construction requirements in bushfire prone areas.



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1. INTRODUCTION

Ecosystems Management (Aust) Pty Ltd (EMA) has been engaged to undertake a Bushfire Hazard Assessment for Lot 3 on Plan RP743037 in Yabulu to support a material change of use application to enable use of the property as a private event venue.

According to the Townsville City Council Bushfire Hazard Mapping, the subject lot is identified as being within a Medium bushfire hazard area. Under the Townsville City Council planning scheme, land encumbered under the Bushfire Hazard mapping overlay must have a Bushfire Hazard Assessment conducted to ensure that the development does not increase the risk to life, property, community and the environment in accordance with the purpose of the Bushfire Hazard Overlay Code. Where sufficient hazard is identified, a Bushfire Management Plan is required to manage the identified risk.

This bushfire hazard assessment is prepared with regard to:

- 8.2.2 – *Bushfire Hazard Overlay Code* of the Townsville City Council Planning Scheme,
- State Planning Policy guidance material

2. PROPOSED DEVELOPMENT

The proposal is for the material change of use of the property for the development and operation of an event venue. The venue is designed to cater primarily to wedding events, with the proposed development providing a covered entertainment area, food servery and toilet block, with an associated service shed and carparking area.

3. DEVELOPMENT APPROVAL AND CONDITIONS

Development approval is sought under state planning legislation. The relevant planning scheme under state planning legislation is the Townsville City Council Planning Scheme (Townsville City Plan, 2014). This Bushfire Management Plan addresses the requirements 8.2.2 – Bushfire Hazard Overlay Code.

3.1. STATE PLANNING POLICY

The State Planning Policy (SPP) addresses development in relation to the risk from natural hazards, by establishing planning constraints based on a statewide risk assessment. Where local government planning schemes do not prepare a bushfire hazard overlay code specifically for their LGA, planning controls default to the statewide hazard mapping and the SPP requirements for development in bushfire prone areas.

The Queensland Government has produced a technical manual (**Bushfire Resilient Communities** (QFES, 2019)) to support the state planning policy, describing the methodology used for statewide hazard mapping and providing a guideline for preparing localized bushfire hazard area maps.

3.2. PLANNING SCHEME

The property is encumbered by the Bushfire Hazard Overlay (Planning scheme map OM02.0), and therefore requires assessment against the Bushfire Hazard Overlay Code. Figure 1 shows the subject property with reference to the Bushfire Hazard Overlay.

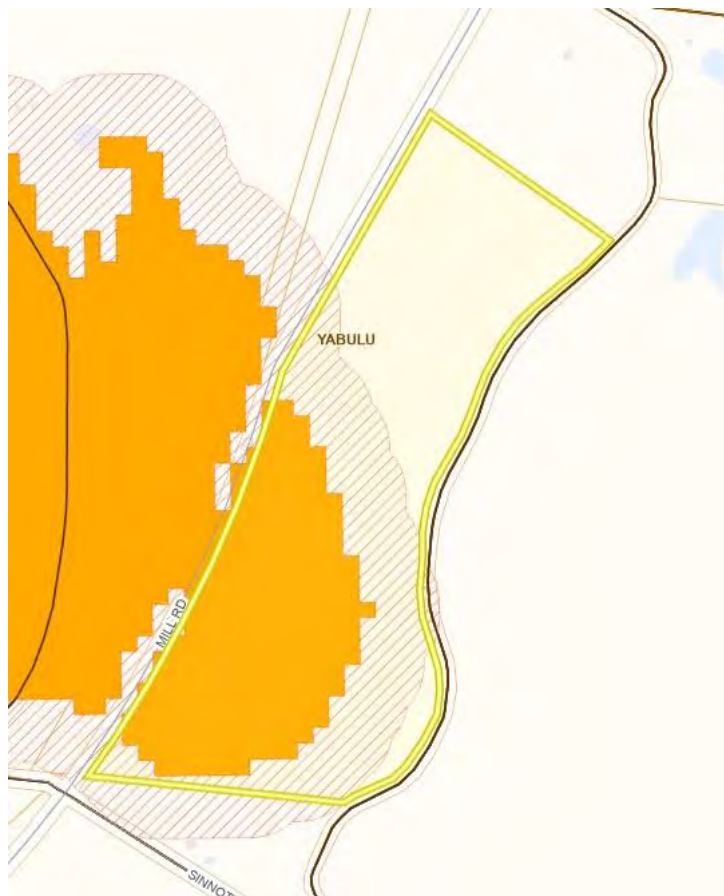


FIGURE 1 SUBJECT SITE WITH MEDIUM BUSHFIRE HAZARD (TCC, 2014)

3.3. AUSTRALIAN STANDARDS

The City Plan recommends consideration of AS3959-2009 (Construction of buildings in bushfire prone areas) (SAA, 2011) when evaluating the bushfire hazard for a development application. The standard has been reviewed with a major revision was released in 2018, and was subsequently amended in 2020. AS3959-2018 is further referred to in this bushfire hazard assessment. AS3959 defines levels of construction for dwellings, aimed at achieving construction resilience to the impacts of bushfire intensity and behaviour. AS3959 is called up by the National Construction Code (NCC, 2019), under the *Building Act 1975*, when constructing a dwelling in a *designated bushfire prone area*, and generally has little to do with evaluating the bushfire hazard associated with development approvals for reconfiguration of a lot or material change of use. State planning policy technical guidance material provides the necessary methodology for evaluation of bushfire hazard in the context of addressing risk associated with planning approvals, and subsequently, the methodology described in AS3959 will not be referenced further in this hazard assessment and management plan.

4. BUSHFIRE HAZARD ASSESSMENT

This section contains the information required to complete the Bushfire Hazard Assessment. Principal factors influencing fire behaviour are bushfire fuels, fire weather and topography (slope).

Fire will spread faster, with higher intensity, when travelling upslope. Conversely, rate of spread and potential intensity is lower when traveling downhill. High fuel loads (particularly fine fuels such as grass and small (< 6mm diameter) twigs and branches) will promote a faster rate of spread and higher intensity than a lower fuel volume; longer grass will promote higher intensity and rate of spread than shorter grasses.

4.1. SITE DESCRIPTION

4.1.1. LOCATION

The subject site is comprised of a single Lot totalling 37.39ha, located 24km west of Townsville City centre. The subject site is accessed from Mill Road, which connects closely to the Bruce Highway to the north as the main transport link for the area (see Site Location Map in Appendix A).

To the north and south the subject site is bordered directly by rural land parcels, featuring natural vegetation contiguous with that on the subject site, with minor areas of maintained vegetation encapsulating residential structures present on each site. The subject site is bounded to the east by the riverine corridor for Healy Creek. Beyond this to the east, the rural land parcel is significantly larger, with the majority of the parcel utilised for grazing, and being largely cleared to support this. The road reserve for Mill Road bounds the subject site to the west, featuring highly managed vegetation and a well maintained, unsealed road surface only adjacent to the subject site. Beyond the road reserve to the east are further rural land parcels, with primarily natural vegetation cover. The community of Bluewater is located 7.5km to the west. The high voltage powerline network has a number of connected easements in the Bluewater/ Yabulu/ Lynham area, with one such easement less than 1km to the west of the subject site.

The subject site in Yabulu is identified as being on the periphery of the Townsville City area, within a contiguous zone of rural land parcels utilised for a mix of commercial agriculture and recreational and hobby farming activities, within a flat plains area. The flat plains landscape extends to the north, east and south of the subject site, however, to the west the landscape rapidly transitions into the foothills sloping up to the Paluma Range.

4.1.2. PROPOSED DEVELOPMENT AND OPERATION

The proposal is for development of an events venue at the subject site designed to primarily cater to weddings. The proposed design featuring a covered entertainment area, food servery and toilet block, with an associated service shed and carparking area. The proposed development will be sited within an approved area of vegetation managed to provide a natural scenic aesthetic as shown in Figure 2 and Figure 3. Additional parking areas will be provided along the fire break 50m either side of the property entrance.

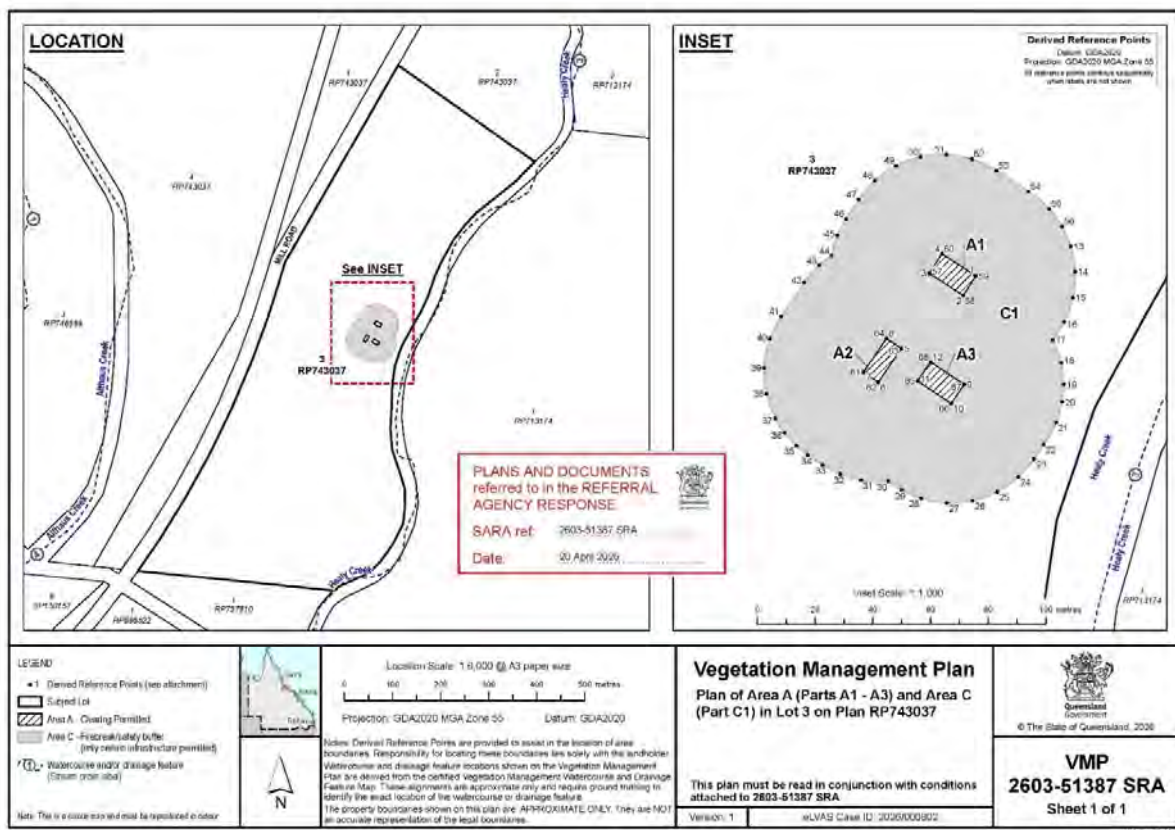


FIGURE 2 APPROVED VEGETATION MANAGEMENT PLAN DEFINING THE EVENT AREA EXTENT (SARA 2026)



FIGURE 3 INDICATIVE OPERATIONAL SITE PLAN (TREVOR HOLLEY, 2026)

4.2. TOPOGRAPHY AND HYDROLOGY

The subject site is located within a rural suburb of the Townsville area, situated separately to the west of the main urban agglomeration. The subject site and surrounding area to the north, east and south is characterised by the Townsville Plains regional land type, with flat land encompassing the site for an extended distance. To the west the landscape rapidly transitions into the foothills of the Paluma Range, with the closest area of significant foothill slope beginning 850m to the west of the subject site, and the Paluma Range itself beginning 2.6km to the west of the site.

The subject site itself and the assessment area for the proposed development is almost entirely flat, with areas of localised slope associated only with the banks of Healy Creek (see Topography and Hydrology Map in Appendix A).

Slope is consistent across the majority of the subject site and across the proposed events venue area, within a range of 1 to 2 degrees. The slope associated with the banks of Healy Creek features slope typically ranging from 10 to 25 degrees across a limited slope run of 15m.

Healy Creek runs along the entirety of the eastern boundary of the subject site, draining north to Althaus Creek as part of the Black drainage basin, before ultimately entering Halifax Bay.

To accurately reflect the influence of slope on bushfire behaviour across the landscape, a smoothed slope model (as specified in Leonard et al 2014) it utilised for bushfire hazard calculations. This may exclude very localised slope areas that may be shown in the Topography and Hydrology Map in Appendix A which would have no effect on bushfire hazard.

4.3. FIRE WEATHER

Fire weather refers to the suite of conditions that contribute to the propagation of bushfire. This includes temperature, humidity, rainfall, days since rain and wind. The nearest Bureau of Meteorology weather station is Townsville Aero (Station number 032040, located at Townsville Airport (BOM, 2026)).

The site is within the dry tropics region of northern Queensland. This area is characterised by wet summers and dry winters. The wet season may commence as early as November, and officially ends in April. The fire season is usually recognised as the period from June, until the commencement of the wet season (which may be variable).

4.3.1. TEMPERATURE

Mean maximum temperatures occur in December (31.6 °C), and mean minimum temperatures occur in July (13.8 °C) (Figure 4).

4.3.2. HUMIDITY AND RAINFALL

The climate can generally be classified as humid, with the minimum humidity occurring in June with a mean 3pm relative humidity of 51%, and with mean 3pm humidity reaching a maximum in February at 67% (Figure 5).

Rainfall is lowest during July, August and September, with 67% of the annual rainfall occurring in January, February and March (Figure 5). Significant drying of grasses and increased leaf drop can be observed throughout September and October, as soil moisture declines. Evaporation (Figure 6) increases towards the end of the dry season as daily temperatures and solar exposure increase. Low humidity and increased drying from wind exacerbates grass and fine fuel curing through the dry season.

4.3.3. WIND

The predominant winds throughout the year are from the north east and east (Figure 7). These winds are moist, rather than dry, and therefore have a lesser drying effect on fine fuels in the region. Occasionally dry winds come from the west and south west; however, these are less common and do not persist for more than a couple days at a time. Wind strength is highest towards the end of the dry season, increasing the rate at which fine fuels may dry (Figure 5).

Wind direction and strength is also a consideration for fire suppression in terms of bushfire behaviour. A bushfire will travel quicker in strong winds, and potentially demonstrate higher intensity due to the increase in air availability to the seat of the fire. Higher strength winds through September to November can increase fire danger across the Townsville region.

4.3.4. CONTINENTAL EFFECTS OF SEASONAL VARIATION

While climate averages provide an overview of the weather characteristics contributing to identified fire seasons, and annual trends that influence the general expected severity of a given season, nationwide weather patterns effect the extreme fire weather conditions experienced from time to time in different parts of the country.

While the conditions generally experienced in the region can be described as dry, with hot summers and cold winters, widespread national weather patterns such as prolonged drought or persistent rainfall deficits, particularly in the interior, can influence the weather in all regions, resulting in the occurrence of extreme conditions that can (and have) resulted in Severe and Extreme fire weather conditions (using the now superseded QFES fire danger rating system), such as those experienced in the summer of 2018 - 19 (Mills, 2019). Mills paper discusses current research into fire weather trends in south east and coastal Queensland, acknowledging a recent trend in increasing extreme conditions over the last 20 years. This intimates that bushfire management planning should be conservative to minimise underestimation of risk associated with development.

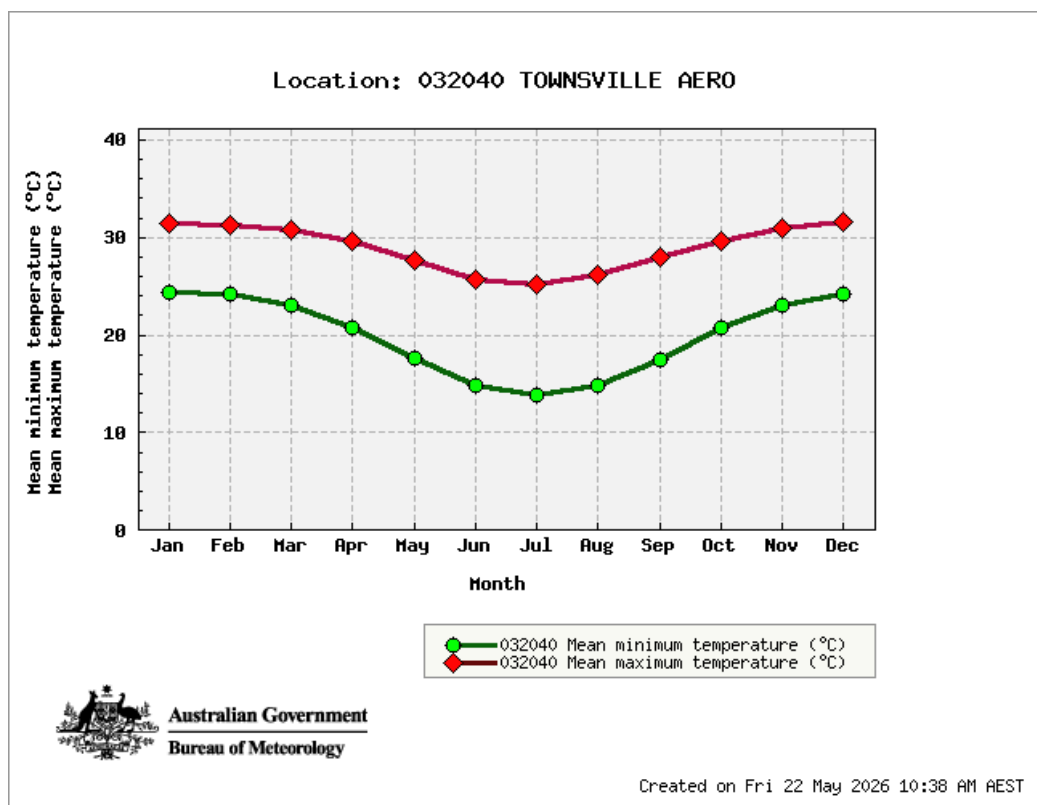


FIGURE 4 MEAN MAX AND MEAN MIN TEMPERATURES FOR TOWNSVILLE AERO (STATION 032040) (BOM, 2026)

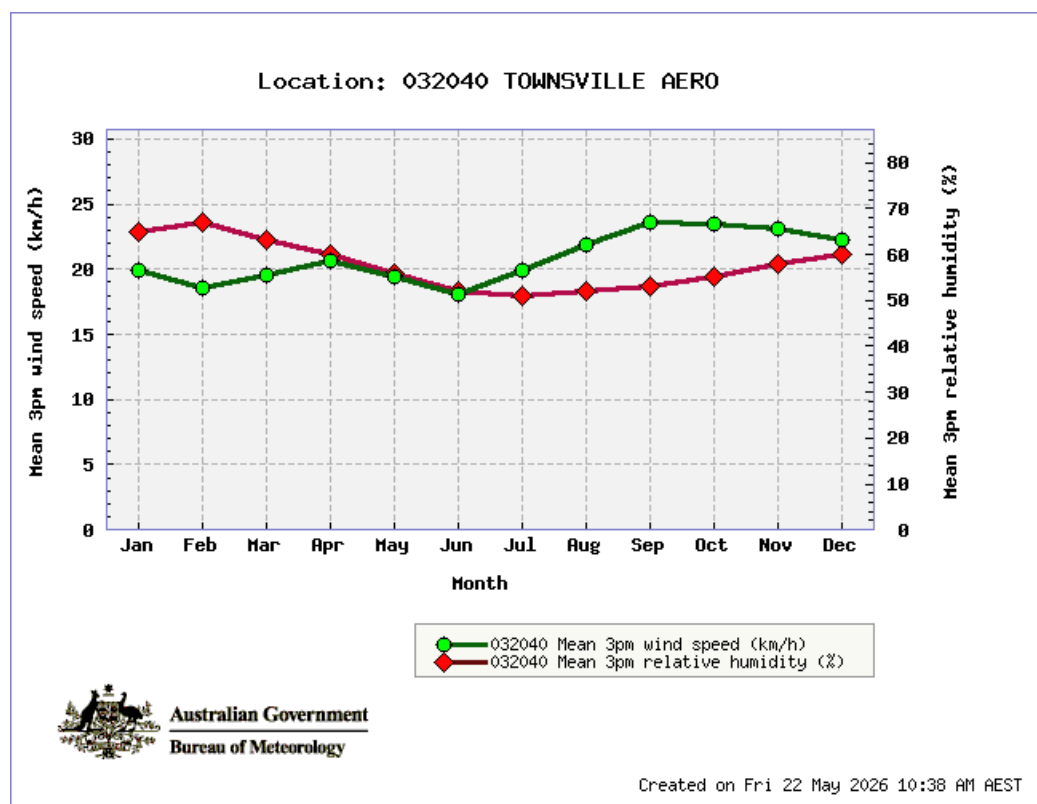


FIGURE 5 MEAN 3PM RH AND MEAN 3PM WIND SPEED (STATION 032040) (BOM, 2026)

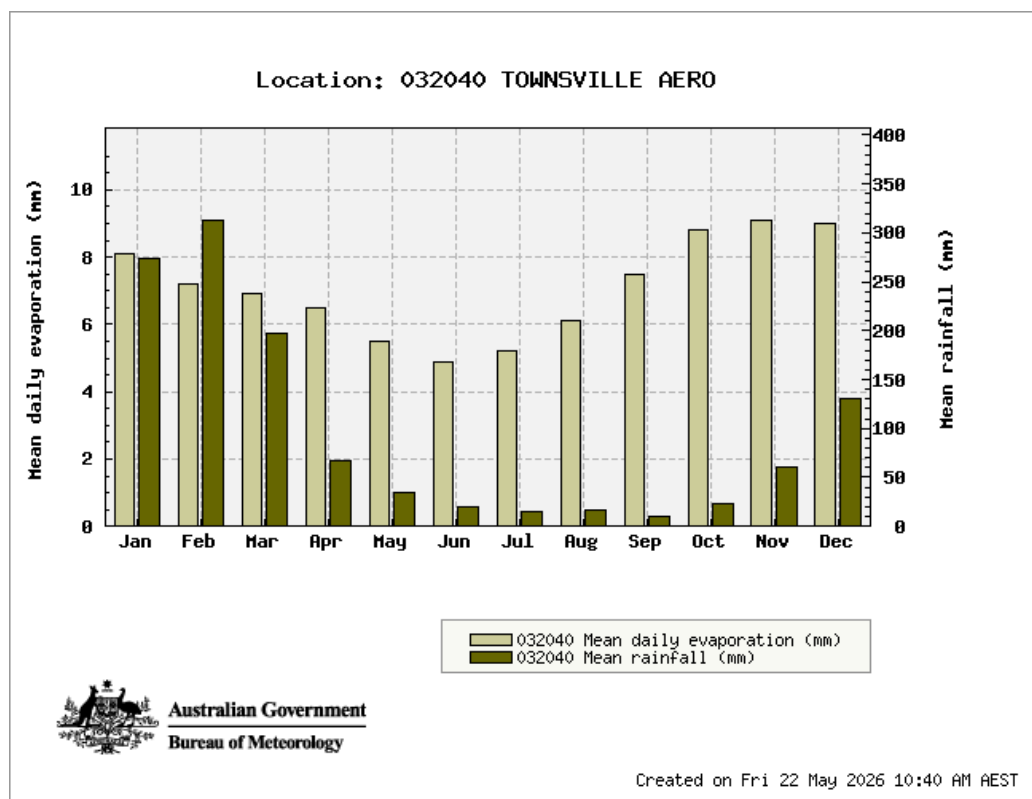


FIGURE 6 MEAN DAILY EVAPORATION (MM) AND MEAN MONTHLY RAINFALL (STATION 032040) (BOM, 2026)

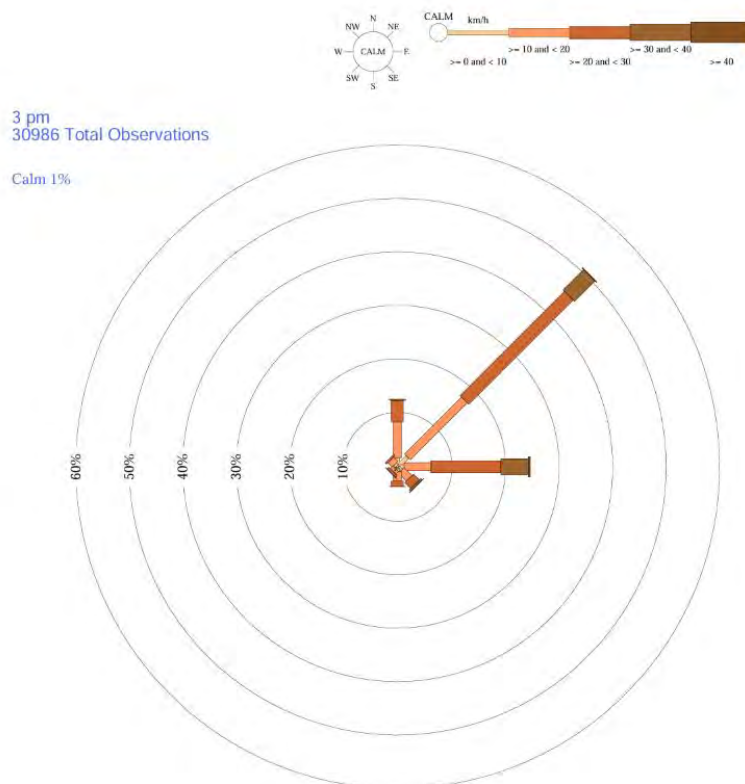


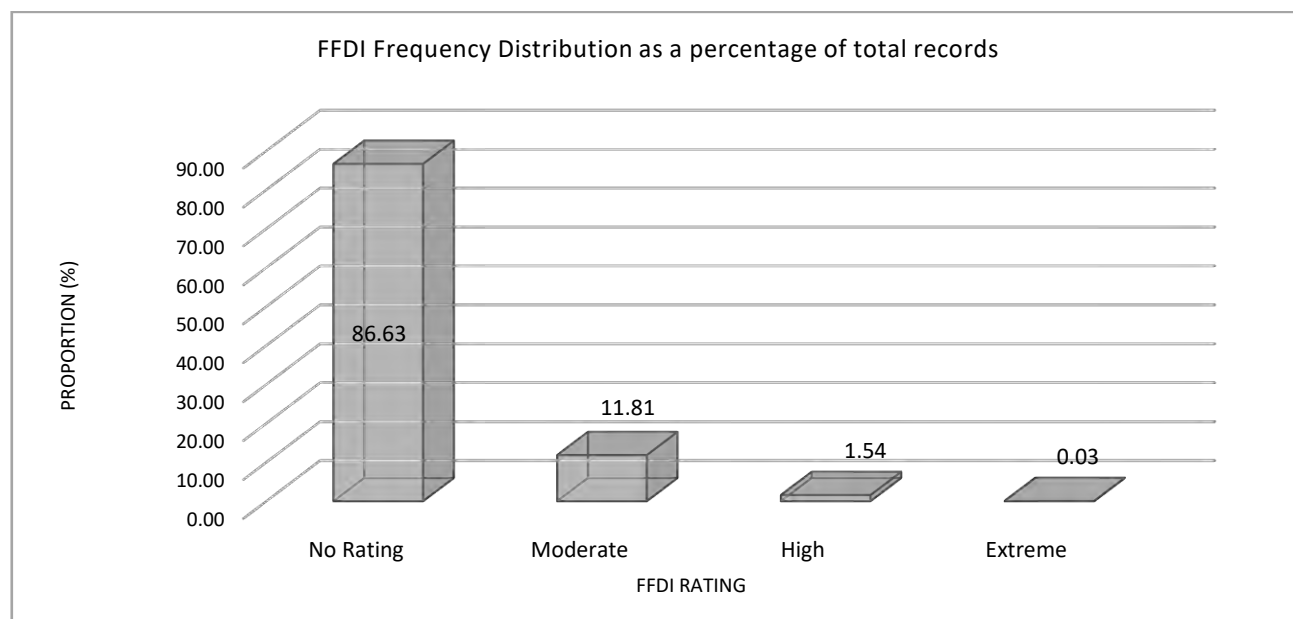
FIGURE 7 ROSE OF WIND DIRECTION VERSUS WIND SPEED IN KM/H (01 NOV 1940 TO 10 FEB 2026) (STATION 032040). (BOM, 2026)

4.3.5. FIRE DANGER INDEX

The Fire Danger Index (FDI) was developed to provide an indicator to fire managers of the probability of being able to contain and extinguish a fire once it started in a forest environment. FDI is calculated using inputs including recent rainfall, soil dryness, temperature, humidity and windspeed. The higher the FDI, the lower the probability of containment or extinguishment within 24 hours of the fire starting.

AS3959-2018 identifies an applicable FDI of 40 for Queensland, which falls into the classification of High fire danger under the Australian Fire Danger Rating System (AFDRS). Fire hazard modelling in Queensland by CSIRO (Leonard et al, 2014) has mapped FDI across the state. FDI varies across the Townsville LGA, from 48 in the north, to 59 in the south. An FDI of 53 applies to the subject site in Yabulu, which is Extreme on the AFDRS, therefore modelling is considered conservative, and consistent with recommendations from Mills (2019.)

It is noted that tropical climates exhibit different fire behaviour and fire weather characteristics to southern parts of Australia, with less frequent occurrences of extreme fire weather conditions. Subsequently, a review of historical fire weather data (Lucas, 2009) shows that while High (FDI 24 < 49) and Extreme (FDI 50 < 99) fire weather does occur in the Townsville area, these are infrequent and not prolonged occurrences (Graph 1 shows frequency distribution of FFDI over 43 years of records, according to the AFDRS). There are no records of fire weather reaching the classification of 'Catastrophic' or an FDI exceeding 100, which is experienced more frequently in southern parts of Australia and is correlated with the occurrence of significant bushfire events in the southern states. This observation is supported by research undertaken by Tropical Savannas CRC (2001), for various locations across northern Australia including Rockhampton (QLD) and Katherine (NT), which both have similar annual rainfall to Townsville.



GRAPH 1 FFDI FREQUENCY DISTRIBUTION

4.4. VEGETATION AND BUSHFIRE FUELS

Vegetation structure and arrangement are significant drivers of fire behaviour. Fuel hazard is described as the combined effect of fine surface fuels, elevated fuels and bark hazard in the ignition and propagation of fire. Traditional methods of fuel assessment require the individual assessment of all three fuel types to determine the Potential Fuel Load (PFL), described in tonnes per hectare (tph). This fuel weight can then be used to determine the potential fire intensity (PFI) in terms of kW/m.

The methodology endorsed by the Queensland Government is described in the technical reference guide ***Bushfire Resilient Communities*** (QFES, 2019). This methodology builds on the state wide bushfire hazard modelling method published by CSIRO in 2014 (Leonard et al. 2014). Leonard et al identified potential total bushfire fuel loads for Queensland Herbarium regional ecosystem vegetation classifications and aggregated these into Vegetation Hazard Classes (VHC) (which also includes the canopy fuel weight), and was subsequently refined with detailed vegetation bushfire fuel data in 2017 (Newnham et al. 2017).

Vegetation hazard class mapping considers horizontal connectivity of bushfire fuels; VHCs with a continuous fuel load generally supports continuous flame spread, whereas VHCs with discontinuous fuels may interrupt or retard the progress of a fire front. In terms of crown fire development, vegetation communities with little to no elevated fuels connecting surface fuels to bark and canopy fuels will limit the potential for crown fire development, whereas significant volumes of near surface fuels (grasses >1m high) and elevated fuels promote flame advancement into the canopy. Small patches of higher fuel load VHCs within a larger landscape of lower fuel load VHCs (up to 1ha), will locally increase fire intensity and rate of spread, however, will not significantly influence the overall bushfire hazard in the wider landscape.

Broad Vegetation Groups (BVG) and Vegetation Hazard Classes (VHC) within or adjacent to the subject site are listed in Table 1. The potential fireline intensity is calculated (using flat ground) to provide context to the influence of fuel load on potential intensity.

TABLE 1 BVG AND VHC ASSOCIATED WITH THE SUBJECT SITE

Broad Vegetation Group	BVG Description	Vegetation Hazard Class	Class Description	Total PFL (tph)	Potential Fireline Intensity (kW/m)
9e	Open forests, woodlands and open woodlands dominated by <i>Corymbia clarksoniana</i> (grey bloodwood) (or <i>C. novoguineensis</i> or <i>C. intermedia</i> (pink bloodwood) or <i>C. polycarpa</i> (long-fruited bloodwood)) frequently with <i>Erythrophleum chlorostachys</i> (red ironwood) or <i>Eucalyptus platyphylla</i> (poplar gum) predominantly on coastal sandplains and alluvia	9.2	Moist to dry eucalypt woodland on coastal lowlands and ranges	17.2	10,415
21a	<i>Melaleuca</i> spp. dry woodlands to open woodlands on sandplains or depositional plains - Open forests and woodlands dominated by <i>Melaleuca quinquenervia</i> (swamp paperbark) in seasonally inundated lowland coastal areas and swamps	21.1	<i>Melaleuca</i> dry open forest on sandplains or depositional plains	14.9	7816
	Very low vegetation cover to moderate tree cover	40.4	Low grass or tree cover in rural areas	5	880
Very high (potential intensity) 40,000+ kW/m High (potential intensity) 20,000 – 40,000 kW/m 3. Medium (potential intensity) 4,000 – 20,000 kW/m 4. Low Hazard < 4,000 kW/m					

*Potential Fireline Intensity is calculated using the methodology in *Bushfire Resilient Communities* (QFES, 2019)

4.4.1. BUSHFIRE FUEL HAZARD

A site evaluation of bushfire fuel hazard was undertaken across the subject site. This was conducted to validate the vegetation mapping and modelled PFL across the site. The results of field assessment are summarised in Table 2.

Vegetation hazard class mapping has been evaluated against aerial photography and considered in the context of the field assessment results. Generally, the vegetation within 100m of a site is considered for vegetation hazard assessment.

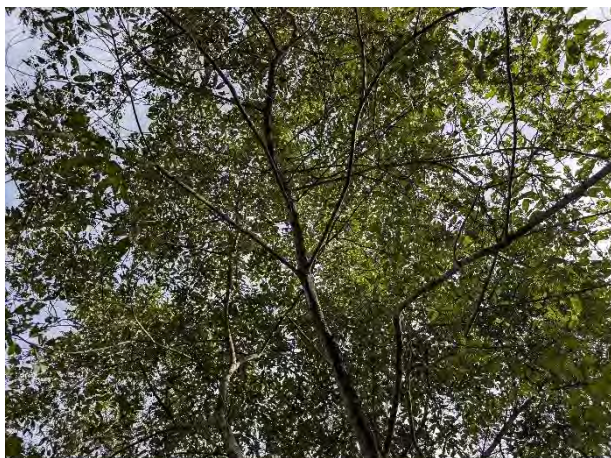
VHC mapping has been edited to more accurately reflect vegetation structure and extent in the landscape surrounding the subject area. It is noted that the available aerial photography was captured in November 2019, and following the inspection of the site and its surrounding area is regarded as accurately representing the current land use and condition of the area. Vegetation hazard class mapping is shown in the Vegetation Hazard Class map in Appendix A, depicting the post development landscape, as clearing and maintenance of vegetation present will occur across the subject site to enable development and ongoing use.

While there are small areas of varying vegetation cover dispersed across the landscape, many are limited to 1 hectare in size or lower, or are formed as narrow corridors less than 100m in width within another vegetation type. These small

patches and corridors do not materially influence the likely bushfire behaviour associated with the dominant vegetation type, and have therefore not been mapped individually in the vegetation hazard class mapping, but have been aggregated with the surrounding dominant vegetation type as appropriate.

Additionally, small patches of vegetation less than 1ha and narrow corridors of vegetation less than 75m in width surrounded by area of no or discontinuous bushfire fuels have been excluded in their entirety as per the methodology specified in *Leonard, J., Opie, K. (2017) Estimating the potential bushfire hazard of vegetation patches and corridors. CSIRO, Australia.*

TABLE 2 FUEL HAZARD ASSESSMENT SUMMARY

9.2 (17.2 tph)	Within the assessment area this only occurs in a small area to the south west of the proposed development, however, this vegetation hazard class extends across the south west of the subject site, and is present to the west beyond the Mill Road road reserve. This woodland is consistent with the vegetation hazard class, retaining an open woodland structure with a typical overstory of low density mature and immature eucalypts. <i>Eucalyptus creba</i> and <i>Corymbia dallachiana</i>, <i>Corymbia tessellaris</i> and <i>Eucalyptus platyphylla</i> are the most prevalent overstory species in the assessment area. The groundcover, however, is comprised predominantly of non-native species, with non-native common weed species being the dominant groundcover. The understory is typically representative, with some invasive shrubby species, such as <i>Ziziphus mauritiana</i> present.
 PLATE 1. VIEW SOUTH INTO WOODLAND VEGETATION, FEATURING MATURE TREES AND WEED DOMINATED GROUND COVER	 PLATE 2. VIEW EAST INTO WOODLAND VEGETATION, FEATURING REGROWTH AND WEED DOMINATED GROUND COVER
 PLATE 3. VIEW GROUND COVER WITHIN WOODLAND	 PLATE 4. VIEW OF CANOPY COVER WITHIN WOODLAND
Mapped VHC (PFL)	Observations / Discussion

20.1 (14.9 tph)	This vegetation type is the dominant natural vegetation type throughout the assessment area, and is contiguous across the majority of the subject site. This vegetation type further continues to the north and south of the subject site following the Healy Creek riverine corridor. This woodland is consistent with the vegetation hazard class, with <i>Melaleuca viridiflora</i> and <i>Melaleuca dealbata</i> being abundant throughout the assemblage. There is some transition with the adjacent 9.2 hazard class vegetation to the south west, with <i>Eucalyptus creba</i> and <i>Corymbia dallachiana</i>, <i>Corymbia tessellaris</i> and <i>Eucalyptus platyphylla</i> present within the canopy, with these species being widely distributed throughout the vegetation assemblages in the Townsville region. Groundcover is variable to the ongoing management of the subject site, with unmanaged areas comprised predominantly of non-native species, with non-native common weed species being the dominant groundcover. Ongoing management is, however, proving successful in reestablishing native grass groundcover, and this is expected to increase over time. For the purposes of assessing hazard these areas are regarded as being VHC 20.1 woodland.
 PLATE 5. VIEW NORTH OF THE PROPOSED DEVELOPMENT INTO ADJACENT WOODLAND VEGETATION WITH GRASS GROUNDCOVER	 PLATE 6. VIEW EAST INTO WOODLAND COMPRISING THE RIPARIAN BUFFER, WITH GROUNDCOVER DOMINATED BY WEED SPECIES
 PLATE 7. VIEW SOUTH ALONG THE SITE BOUNDARY SHOWING CONTIGUOUS EXTEND OF WOODLAND VEGETATION	 PLATE 8. VIEW OF REPRESENTATIVE GROUNDCOVER THROUGHOUT THE MAJORITY OF THE ASSESSMENT AREA
40.4 (5.0 tph)	The defined vegetation management area is representative of this vegetation hazard class, being comprised of highly managed vegetation with low bushfire fuel loads despite retained canopy trees. Within the wider landscape this is also identified for the rural agricultural land parcel to the east, and for managed vegetation within the Mill Road road reserve.



PLATE 9 VIEW EAST INTO THE PROPOSED DEVELOPMENT, WITH HIGHLY MANAGED VEGETATION



PLATE 10 VIEW SOUTH INTO THE PROPOSED DEVELOPMENT, WITH HIGHLY MANAGED VEGETATION



PLATE 11. VIEW VIEW WEST ALONG THE ACCESS TO THE PROPOSED DEVELOPMENT, WITH MANAGED VEGETATION ALONG ITS EXTENT



PLATE 12. VIEW NORTH ALONG MILL ROAD, WITH HIGHLY MANAGED VEGETATION

4.5. FIRE HISTORY AND IGNITION SOURCES

QPWS fire history mapping is available through the Queensland Spatial Catalogue. This data includes records from 1937 in the wider local area, and from 1930 across Qld, and shows that the subject site has not been subject to an uncontrolled fire or unplanned burn in this time. This dataset generally focuses on fires within the public land estate, or fires that originate within the public land estate, and therefore does not provide a definitive fire history record for this location, however due to the proximity to the Paluma Range National Park (to the west of the subject site) and Clemant State Forest (to the west of the subject site) there is potential that any widespread bushfire event has been recorded.

The QPWS fire history shows infrequent fire events occurring within a 5km radius of the subject site, associated with the Clemant State Forest to the south west of the subject site, with a total of 2 unplanned burns within the dataset timeframe in 2011 and 2018. Both events were 2.7km from the subject site at their closest point.

The Northern Australian Fire Information service (NAFI) conducts satellite image analysis for fire scars, developing a 24-year dataset showing fire history across northern Australia. This data is mapped on a 250m grid, consistent with the resolution of the satellite imagery use. The NAFI data shows the site has been subject to one burn event within the 24-year observation period during 2011. Bushfire events are seen to be overall contained to the west of Mill Road, typically associated with the Clemant State Forest area, with no fire events occurring to the east, north east or south east of the subject site.

Bushfire in the area is typically associated with either natural ignitions during the dry season, or with planned burns for bushfire fuel management. It is acknowledged that some significant fire events in the regional context have been

associated with negligent or malicious ignition. Other potential sources of ignition are likely to be associated with operational activities involving earthworks machinery, construction activities (including hot work) and vegetation management activities (slashing, etc.).

No other evidence of bushfire in relation to the subject site was identified.

4.6. BUSHFIRE HAZARD

Bushfire prone land is defined as land that could support a significant bushfire, or be subject to significant bushfire attack (Leonard et.al. 2014). Bushfire attack manifests as ember attack, radiant heat impact and/or direct flame attack.

The degree of severity of bushfire behaviour or bushfire attack is described in terms of Potential Fire-line Intensity. Potential Fire-line Intensity is calculated using inputs describing vegetation fuel loads (tonnes per hectare [tph]), slope (degrees) and FFDI as a descriptor of likely weather conditions thus:

$$FI = 0.62 W^2 FFDI \exp (0.069\theta) \quad (\text{Equation 1})$$

Where:

FI = Fireline Intensity (kW/m)

W = Potential Fuel Load (tph)

θ = Maximum Landscape Slope (degrees)

FFDI = Fire Weather Severity

The bushfire hazard class is derived by classifying the resultant Potential Fire Line Intensity output from the hazard modelling process (Table 3).

TABLE 3 BUSHFIRE HAZARD CLASSES CORRESPONDING TO POTENTIAL FIRE-LINE INTENSITY (FROM LEONARD ET.AL. 2014).

<i>Potential Bushfire Intensity Class</i>	<i>Potential Fire-line Intensity</i>
1. Very high (potential intensity)	40,000+kW/m
2. High (potential intensity)	20,000 – 40,000kW/m
3. Medium (potential intensity)	4,000 – 20,000kW/m
4. Low Hazard	< 4,000 kW/m

Bushfire hazard classification or threat level across the property and within the surrounding landscape (in terms of potential bushfire intensity) is Medium to High (see Modelled Bushfire Hazard map in Appendix A). The subject site is currently considered bushfire prone, but the proposed development will result in the developed areas (including the entirety of the subject site as per the final design) being regarded as Low Hazard. Adjacent land parcels do additionally feature areas of Medium and High bushfire hazard, which should be considered in development. During staged development, and following completion of the proposed development, areas of the site will be within the 100m potential impact buffer of an area mapped as bushfire prone (medium).

The median potential fireline intensity associated with the mapped Medium Bushfire Hazard vegetation associated with the site is 6464 kW/m, which is within the low range of values classified as Medium bushfire hazard (4000 kW/m to 20,000 kW/m).

4.6.1. ASSET PROTECTION ZONE CALCULATION

Bushfire Resilient Communities (QFES, 2019) identifies a minimum radiant heat flux level for new development of 29 kW/m² or less at the development footprint boundaries, where adjacent to medium, high or very high bushfire hazard.

The Asset Protection Zone calculator has been used to establish the potential radiant heat flux impact on site infrastructure for high and medium bushfire hazard vegetation hazard classes.

The maximum heat flux exposure (which defines the minimum asset protection zone distance) can be calculated using the *SPP-Bushfire-APZ-Width-Calculator.xlsm* produced by QFES. The QFES APZ calculator is issued with the following disclaimer by QFES:

DISCLAIMER: Fire-line intensity and radiant heat calculations where effective slope exceeds 20 degrees (downslope) or 15 degrees (upslope) may be unreliable. In these locations, specialist assessment is warranted.

Please note that this calculator has been modified to enable low intensity heat flux values to be identified, even when the associated vegetation type is typically identified as low risk and would otherwise be regarded as BAL-LOW.

These calculations identify the minimum acceptable asset protection zone for each identified vegetation class, they do not stipulate the BAL construction requirements of AS3959. Future dwellings developed within these new lots may be required to be independently assessed under AS3959 if within 100m of bushfire prone vegetation.

TABLE 4 ASSET PROTECTION ZONE CALCULATOR – VHC9.2

Bushfire Asset Protection Zone Width Calculator			
VARIABLE DESCRIPTION	VARIABLE	UNITS	VALUE
<i>Input Values</i>			
FIRE WEATHER SEVERITY	FDI		53.00
VEGETATION HAZARD CLASS	VHC	-	9.2 Moist to dry eucalypt woodland on coastal lowlands and ranges
REMNANT STATUS	-	-	Remnant
SLOPE TYPE (UPSLOPE OR DOWNSLOPE)	ST	-	Downslope
EFFECTIVE SLOPE UNDER THE HAZARDOUS VEGETATION	eSlope	degrees	2.00
SLOPE BETWEEN SITE AND HAZARDOUS VEGETATION	θ	degrees	2.00
DISTANCE OF THE SITE FROM HAZARDOUS VEGETATION	d	m	15.00
<i>Output Values</i>			
SURFACE FUEL LOAD	-	t/ha	11.40
NEAR SURFACE FUEL LOAD	-	t/ha	3.50
BARK FUEL LOAD	-	t/ha	1.30
ELEVATED FUEL LOAD	-	t/ha	1.00
TOTAL OVERALL FUEL LOAD	W	t/ha	17.20
TOTAL SURFACE FUEL LOAD	w	t/ha	14.90
POTENTIAL FIRE LINE INTENSITY	I	kW/m	10358
RADIANT HEAT FLUX	q	kW/m ²	28.66
BUSHFIRE ATTACK LEVEL (AS 3959-2018)	BAL	-	BAL 29

TABLE 5 ASSET PROTECTION ZONE CALCULATOR – VHC21.1

Bushfire Asset Protection Zone Width Calculator			
VARIABLE DESCRIPTION	VARIABLE	UNITS	VALUE
<i>Input Values</i>			
FIRE WEATHER SEVERITY	FDI		58.00
VEGETATION HAZARD CLASS	VHC	-	21.1 Melaleuca dry open forest on sandplains or depositional plains
REMNANT STATUS	-	-	Remnant
SLOPE TYPE (UPSLOPE OR DOWNSLOPE)	ST	-	Downslope
EFFECTIVE SLOPE UNDER THE HAZARDOUS VEGETATION	eSlope	degrees	2.00
SLOPE BETWEEN SITE AND HAZARDOUS VEGETATION	θ	degrees	2.00
DISTANCE OF THE SITE FROM HAZARDOUS VEGETATION	d	m	12.00
<i>Output Values</i>			
SURFACE FUEL LOAD	-	t/ha	7.80
NEAR SURFACE FUEL LOAD	-	t/ha	3.70
BARK FUEL LOAD	-	t/ha	1.40
ELEVATED FUEL LOAD	-	t/ha	2.00
TOTAL OVERALL FUEL LOAD	W	t/ha	14.90
TOTAL SURFACE FUEL LOAD	w	t/ha	11.50
POTENTIAL FIRE LINE INTENSITY	I	kW/m	6464
RADIANT HEAT FLUX	q	kW/m ²	28.84
BUSHFIRE ATTACK LEVEL (AS 3959-2018)	BAL	-	BAL 29

4.6.2. BUSHFIRE SCENARIO

The site is located in an overall highly managed rural landscape, characterised by rural residential, grazing, agricultural, and recreational land uses. The historical record confirms the presence of bushfire in the immediate regional landscape to the west of the subject site, with bushfire typically within the Clemant State Forest, and occasionally encroaching into adjacent land parcels. The subject site has been subject to only one burn event in recent records, with the lack of physical evidence indicating that a severe burn did not occur.

The absence of impacts from large-scale bushfire events to the subject site or its immediate surrounding area is attributable to the development and increased maintenance of land within the periphery of the Townsville City area. Mill Road provides a de facto fire break between the subject site and vegetated areas contiguous with the Clemant State Forest.

The proposed development area is considered to be encompassed by medium bushfire hazard, with the proposed development area itself being low hazard, but located within the 100m potential impact buffer for medium bushfire prone vegetation.

The bushfire season is considered to peak in September and October, when mean daily evaporation increases and mean 3pm humidity is at its lowest for the year. Wind direction during these months is dominant from the north east, with a smaller proportion of strong winds from the north and from the east. This gives a consistent likelihood of bushfire front development directed generally to the south west.

The proposed development is located locally within an area of almost entirely flat land, with no areas of relevant slope in close proximity to the proposed development area. This will result in the uniform rate of spread of any bushfire front in relation to the prevailing wind, with limited acceleration or deceleration to the rate of spread in the final approach of any bushfire front.

From the historical context, bushfire is able to approach the subject site from the west and south west under certain conditions, with a fire front moving from the Clemant State Forest through contiguous natural vegetation. In approaching the subject site this bushfire front would be moving against the prevailing wind which would serve to retard the development of the flaming front and rate of spread. Further to this, Mill Road acts as a functional fire break to limit spread into the subject site. As such, any bushfire event proceeding in this manner will progress slowly and should afford significant warning and evacuation time if required. High voltage powerline easements provide opportunities for fire fighting agencies to undertake active protection measures such as back burn operations in the event of a landscape level bushfire approaching from the west.

Other potential scenarios for bushfire attack, are associated with a lower risk profile due to the subject site being encompassed by low hazard rural agricultural land to the north, east and south. The Healy Creek watercourse also provides an additional firebreak to the north and east along the site boundary.

In the context of likely ignition sources, accidental ignitions are most likely associated with roadways or rural activities that entail 'hot work', or use of ground engaging implements. In context of the site, the public road network does not provide access to any areas of high bushfire risk in proximity to the subject site, and there is only a narrow area where the road network comes into contact with medium bushfire risk vegetation to the north east of the subject site. As such, there is a reduced risk of potential ignition relevant to the subject site.

Overall, the subject site is in a favourable location with a low probability of the likely bushfire scenario occurring.

5. RISK ASSESSMENT

Risk Assessment requires identification of hazard, determination of likelihood, vulnerability and consequence. A matrix is used to derive risk, based on these factors. The process used in this risk assessment is documented in the **Queensland Emergency Risk Management Framework (QERMF) Risk Assessment Process Handbook** (QFES, 2018). The use of a risk matrix also facilitates the evaluation of management measures to demonstrate risk reduction.

The risk matrix implemented in the **QERMF** rates risk from Very Low (0) to Catastrophic (13). The risk assessment for proposed use rates at 4 (Low), prior to implementation of bushfire management measures, and risk is reduced to 3 (Very Low) and after evaluation of bushfire management measures.

Table 6 addresses the risk posed by bushfire, firstly in the absence of any mitigation measures, and then demonstrates the risk reduction based on proposed measures, which are detailed on the Bushfire Management Plan map.

HAZARD

Hazard is the identification of potential, regardless of any other factors.

The preliminary hazard assessment undertaken as part of this Bushfire Hazard Study for the condition of the site has identified **Low Hazard** for the proposed development area, and **Medium Hazard** for all adjacent areas within the 100m assessment area, with the significant contributing factor to this hazard being vegetation classification.

LIKELIHOOD

Likelihood is a description of the probability of an event occurring. It is commonly presented in terms of Annual Exceedance Probability (AEP), based on the number of events that have occurred over a period of time. In order to establish likelihood for identified at risk assets, fire history information is necessary. Fire history indicates one burn affecting the subject site or the immediate local area in the 24 year record period from 2000 to 2024. As such, an Annual Exceedance Probability (AEP) of 1% to <10% applies to the site, with the overall likelihood being **Unlikely**.

VULNERABILITY

Vulnerability is an assessment of the resilience of a community or asset to the identified hazard. It considers service interruption and reconstruction capacity and cost, options for evacuation, topographical features as barriers to addressing the hazard, occupant capacity for preparedness and response, and emergency services capacity.

- The proposed development does constitute essential infrastructure.

- The proposed development does not add any permanent population to the subject site, with the temporary population generated by the use of the site for events being limited in scale (approx. 100 persons), time of residence (single day or weekend use), and able to be excluded if site conditions are subject to hazard.
- The proposed development will be situated in a low hazard area within a flat, well-managed landscape, and is able to provide suitable setbacks to reduce any radiant heat flux to less than 29kW/m².
- The subject site has a single route of egress from the immediate area, but is in close proximity to the Bruce Highway as the main transport route for the area, then providing multiple routes of egress from the local landscape.
- The wider Townsville area has sufficient emergency facilities to cope with a significant bushfire event if it occurs, and firefighting services are able to mobilise in the area to prevent ingress of bushfire into residential areas.

In the absence of any measures, the property is considered to have **Very Low** vulnerability to the impacts of bushfire.

CONSEQUENCE

The consequence is a description and measure of the impact of a potential event on people, finance and economy, community, public administration and the environment. The degree of interruption of daily routines, loss of life or property, cost of recovery and resources required for this, and continuation of services (such as electricity and waste management), and damage to environmental values is evaluated on a scale of severity. Mitigation measures should be aimed at reducing this consequence.

In the event of a bushfire, it is likely that the threat will be known ahead of time, and able to be evacuated or actively defended if necessary. As such it is likely that only minor injuries may occur, if any. Bushfire would result in a short-term interruption to the commercial use of the site, with any disruption lasting less than one year for the reconstruction of any impacted buildings and the restoration of the amenity of the site. A bushfire event would not result in decreased community connectivity, but may result in emotional or psychological impacts due to damage and temporary disuse of the site. Bushfire impacts at this site would not affect public administration. Minor damage to environmental values may occur, but no ecosystems or species of significance are identified within the subject site.

The Consequence of bushfire impact at the site (in the absence of any mitigation measures) is considered to be **Minor**.

Mitigation measures are discussed in the next section, and the risk assessment is summarised in Table 6.

5.1. MITIGATION MEASURES

5.1.1. ASSET PROTECTION ZONE AND STRATEGIC FUEL MANAGEMENT

The principal measure is to create distance between the proposed development and bushfire prone vegetation to ensure that the radiant heat flux generated is 29kW/m² or lower. This is achieved by managing bushfire fuels (via mowing/slashing of ground level vegetation, and removal of fallen deadwood) in the immediate vicinity of the development, with the intent to reduce the bushfire hazard of the adjacent vegetated areas.

The minimum distance required for strategic bushfire fuel management required to achieve this for this site is:

- 15.0m for VHC 9.2 Eucalypt Woodland;
- 12.0m for VHC 21.1 Melaleuca dry open forest.

Irrigation of grassed areas within the APZ to establish and maintain a green belt will provide protection from ember attack and low intensity fire in surface fuels approaching from outside the property.

5.1.2. WATER SUPPLY

The subject site is to be supplied by bore water, with a water tank to be installed as part of the proposed development.

This static water supply must be serviced by a firefighting pump to ensure adequate volume and pressure for firefighting purposes, with couplings compatible for use by RFS.

If this water supply is to be utilised as part of the commercial supply, it must be ensured that there is a minimum of 10,000L retained in reserve at all times for firefighting purposes. This is typically achieved by siting separate outlets on

the static supply to ensure domestic or commercial use is unable to draw from the reserve volume. Water supply points must be accessible for Rural Fire Service vehicles.

5.1.3. ACCESS AND EGRESS

The proposed development is identified as establishing direct driveway access that is suitable for firefighting access and facilitating emergency egress.

It is recommended that the strategic fuel management zone encompasses this egress, to ensure safe evacuation from the site if required.

5.1.4. BUILDING MAINTENANCE AND LANDSCAPING

It is important that bushfire maintenance be conducted for all sites in bushfire prone landscapes. This includes appropriate placement of landscaping features, annual site maintenance including removal of any leafy debris accumulated on low pitched roofs and in gutters, and removal of any green waste generated from landscape maintenance of the operational area.

TABLE 6 RISK ASSESSMENT

	Risk Assessment Prior to Controls						Risk Assessment after Implementation of Measures				
Development	Hazard	Likelihood	Vulnerability	Consequence	Risk	Mitigation Measures	Hazard	Likelihood	Vulnerability	Consequence	Residual Risk
Events Venue	Medium	Unlikely	Low	Minor	Low (4)	- APZ and SFMZ areas maintained at 15m for VHC 9.2 eucalypt woodland, and 12.0m for VHC21.1 continuous grass and tree cover in rural areas. - The subject site is to be provided with a static water supply, equipped with firefighting pump and fittings. - New driveway to access the development directly, and be suitable for emergency egress and emergency vehicle access. - Access route to be encompassed by strategic fuel management zone. - All landscaping and planting to be undertaken with regard to low hazard planting choices.	Low	Unlikely	Very Low	Minor	Very Low (3)

6. BUSHFIRE HAZARD OVERLAY CODE

Townsville City Council Planning Scheme Overlay Code 8.2.2 defines the performance criteria for developments relating to bushfire hazard mitigation, and identifies acceptable outcomes. These performance criteria and acceptable outcomes are described in Table 7. Management actions are described to achieve the performance criteria.

TABLE 7 TOWNSVILLE CITYPLAN 2014 OVERLAY CODE 8.2.2 PERFORMANCE CRITERIA

Performance outcomes	Acceptable outcomes		Solution
PO1 Development maintains the safety of people and property.	No acceptable outcome is nominated.		The size and design of the proposed vegetation management area approved by SARA is sufficient to allow for a suitable setback from adjacent medium hazard bushfire prone vegetation. APZ calculations show that required setback distances can be achieved for all areas, ensuring that the radiant heat flux to all areas is 29kW/m² or lower. The bushfire history shows a single occurrence of bushfire within the subject site and areas adjacent, with the bushfire scenario indicating that a bushfire front is unlikely to impact the site. Any bushfire approaching as a result of the potential bushfire scenario has a low likelihood of reaching its full potential fireline intensity and rate of spread, and afford substantial warning and evacuation time as required. The proposed development does not propose any vulnerable use, and all new structures and access routes will be required to be constructed to the appropriate standard, including essential safety measures for the nature of the defined use.
PO2 Highly vulnerable development does not occur in high hazard areas unless there is an overriding need for the development in the public interest and no other site is suitable and reasonably available for the proposal.	AO2 The following uses are not located in a high bushfire hazard area: - child care centre; or - detention facility; or - educational establishment; or - emergency services; or - hospital; or - industry activities involving manufacture or storage of hazardous materials in bulk; or	- multiple dwelling; or - residential care facility; or - retirement facility; or - relocatable home park; or - rooming accommodation; or - shopping centre; or - short-term accommodation; or - telecommunications facility; or - tourist park; or - tourist attraction; or - transport depot; or - utility installation.	The proposed use does not constitute highly vulnerable development.

Performance outcomes	Acceptable outcomes	Solution
PO3 Development mitigates the risk of bushfire hazard through the siting and design of the development. Editor's note—In demonstrating compliance with this performance outcome, applicants should be aware that setbacks and buffers for fire management purposes are in addition to any buffers or setbacks required for ecological purposes and are located outside of areas of ecological significance to the greatest extent possible. Regard should also be given to AS3959-2009.	No acceptable outcome is nominated.	The size and design of the proposed vegetation management area approved by SARA is sufficient to allow for a suitable setback from adjacent medium hazard bushfire prone vegetation. APZ calculations show that required setback distances can be achieved for all areas, ensuring that the radiant heat flux to all areas is 29kW/m² or lower. The bushfire history shows a single occurrence of bushfire within the subject site and areas adjacent, with the bushfire scenario indicating that a bushfire front is unlikely to impact the site. Any bushfire approaching as a result of the potential bushfire scenario has a low likelihood of reaching its full potential fireline intensity and rate of spread, and afford substantial warning and evacuation time as required. The surrounding landscape of the subject site is beneficial in mitigating risk of bushfire due to the high degree of management resulting in discontinuous bushfire fuels, and the presence of maintained road corridors and HV easements resulting in de facto firebreaks separating the site from the nearest major bushfire risk in the landscape and providing anchor points for active bushfire response. The proposed development does not propose any vulnerable use, and all new structures and access routes will be required to be constructed to the appropriate standards, including essential safety measures for the nature of the defined use.
PO4 Development provides for an adequate and accessible water supply for firefighting purposes.	AO4.1.1 The development is connected to a reticulated water supply where within a water supply area. OR AO4.1.2 Where outside a water supply area a tank water supply is provided, at least one tank is within 100m of a class 1, 2, 3 or 4 building which has fire brigade fittings.	The development is to be provided with a static water supply located centrally within the proposed development. A 10,000L supply is to be dedicated for firefighting purposes, equipped with a firefighting pump and fire brigade fittings, and accessible for fire fighting vehicles.

Performance outcomes	Acceptable outcomes	Solution
PO5 Public safety and the environment are not adversely affected by the detrimental impacts of bushfire on hazardous materials manufactured or stored in bulk.	AO5 Development does not involve the manufacture or storage of hazardous materials within a high or medium bushfire hazard area as identified on overlay map OM-02.	The development does not involve the manufacture or storage of hazardous materials
PO6 Facilities with a role in emergency management and vulnerable community services are able to function effectively during and immediately after bushfire events.	No acceptable outcome is nominated.	The proposed development does not involve emergency management or vulnerable community services, nor is it involved in the support of these functions.
PO7 Additional lots are not created in bushfire hazard areas.	AO7 Development does not involve the creation of additional lots in areas mapped as high or medium hazard on overlay map OM-02.	N/A – the proposed development does not involve the creation of additional lots.
PO8 Development is designed to allow for efficient emergency access to buildings for fire-fighting appliances, including by avoiding long, narrow access arrangements. Editor's note—PO8 and PO9 will be relevant where development is located adjacent or near to hazard areas.	No acceptable outcome is nominated.	The property access will be upgraded to facilitate safe and efficient access and egress, including establishing a SFMZ along the access driveway. The access to the property is directly onto Mill Road, and is consistent with the nature of property access for rural properties.
PO9 Development provides a fire break which also facilitates adequate	AO9.1 Lot boundaries and development sites are separated from hazardous vegetation by a distance of 20m where adjacent to high hazard areas and 10m where adjacent to medium hazard.	N/A – the proposed development does not involve the creation of additional lots.

Performance outcomes	Acceptable outcomes	Solution
access for firefighting and emergency vehicles, and safe evacuation. Editor's note—PO8 and PO9 will be relevant where development is located adjacent or near to hazard areas.	AO9.2 The separation area mentioned in AO9.1 contains a fire access trail that: • has a minimum cleared and formed width of 6m; • has vehicular access at each end; • provides passing bays and turning areas for fire-fighting appliances; and are either located on public land, or within an access easement that is granted in favour of council and QFRS.	N/A – the proposed development does not involve the creation of additional lots.
	AO9.3 Roads and trails: have a maximum gradient of 12.5%; and do not involve a cul-de-sac. Editor's note—Applicants should also be aware that Part 9 of the planning scheme sets out additional requirements for the construction of roads and other operational works associated with reconfiguration.	N/A – the proposed development does not involve the creation of additional lots.

7. BUSHFIRE MANAGEMENT PLAN

A bushfire management plan (BMP) has been prepared, defining current mitigation measures, and to advise minimum recommended measures for future operational use. Operational bushfire management measures are shown in Appendix A – **Bushfire Management Measures**.

The **Queensland Disaster Management Guideline** (QFES, 2017) utilises and defines the Prevention, Preparedness, Response and Recovery (PPRR) approach to natural hazard risk identification, mitigation, response and recovery. The guideline is written to address disaster management from the State level to the Local Government level, and should be applied in general terms to maintain consistency with emergency response organisations and enable integration with local government bushfire management planning where relevant.

7.1. PREVENTION

Prevention is the prescription and implementation of measures to reduce the likelihood of an event occurring or reducing the severity of an event should it occur. In addressing prevention, the specific hazard must be identified to develop objective, measurable and achievable mitigation measures.

7.1.1. SITE DESIGN

Appropriate site design is principal in reducing the likelihood or severity of a bushfire event. This is achieved by strategic placement of roads and asset protection zones to provide adequate separation distances or defensible space for infrastructure subject to bushfire hazard. Defensible space requirements are relevant to the degree of hazard and explicit radiant heat impacts modelled on identified hazard.

7.1.2. FUEL MANAGEMENT MEASURES

FUEL MANAGEMENT ZONES

Fuel management zones are areas within the landscape that are managed to minimise or remove bushfire fuels, providing a defensible space, and linear separation from the main bushfire threat. Fire breaks may be located within Asset Protection Zones.

FIRE BREAK / FIRE TRAIL

A fire break is a strategically located linear fuel break intended to obstruct the path of a fire, provide an anchor point for back burning and active fire suppression. Fire breaks may be located close to assets (such as around a property boundary) or may be located in a strategic location in the landscape (such as at the foot of a slope) to inhibit the passage of a fire into difficult terrain or a higher risk area.

STRATEGIC FUEL MANAGEMENT ZONE

Strategic fuel management zones (SFMZ) are areas around an asset where fuels are managed by slashing, mowing or fuel reduction burning to minimise the total volume of fine fuels with two primary objectives:

- reducing the likelihood of a fire igniting and developing, and
- in the event a fire does develop, minimising potential rate of spread and intensity of a going fire.

Fire breaks may be classified as SFMZs, as they are frequently associated with fire management access trails that facilitate both maintenance activities and active fire suppression.

ASSET PROTECTION ZONE

Asset Protection Zones are areas closer to an asset, where landscaping and fuel management is quite intensive, and consists of tree maintenance, lawn maintenance, selective removal or placement of large plants (trees and shrubs) to minimise canopy connectivity. The objectives of the APZ are:

- Provide separation distance from the bushfire hazard
- Provide a defensible space where active fire suppression may be undertaken.
- An area from where backburning may be conducted

FUEL MANAGEMENT TECHNIQUES

There are numerous fuel management techniques that can be applied across a site to achieve fire prevention and preparedness objectives, described in detail in Table 8. These techniques can be applied to varying degrees, in specific ways or as general prescriptions dependent on the nature of the site and the hazard.

TABLE 8 FUEL MANAGEMENT TECHNIQUES

Action	Description
Slashing	Slashing is the maintenance of grasses to a height of 10cm or less. This can be achieved with a tractor drawn slasher or with brush cutters (whipper snipper) in areas with limited or difficult access.
Mowing / Whipper Snipping	Mowing is a more managed 'lawn' state, maintained at a height 5cm or less.
Raking or manual removal of fine fuels	Raking and removal of fine dead fuels <6mm in diameter.
Lopping / pruning	Removal of low hanging branches, thinning of canopy, selective removal of branches overhanging buildings or connecting the canopy with other trees.
Ploughing / Grading	Preparation of mineral earth fire breaks by ploughing / grading. Erosion management may be required either by surface sheeting with stable cover material (gravel) or hard landscaping permanent access features (walking trails).
Grazing	Grazing is an effective fuel reduction technique for large areas of grass fuels. The most effective application is to stock with a high number of beasts for a short period (days) to knock down the bulk of fine fuels.
Fuel Reduction Burning	Hazard reduction burning is a method of removing ground litter and fine fuels by fire. Hazard reduction burning of vegetation is often used by land management agencies for broad area bush fire control, or to provide a fuel reduced buffer around urban areas.

7.2. PREPAREDNESS

Preparedness is the implementation of operational management plans to achieve the prevention objectives. Annual maintenance prior to the commencement of the fire season, training, community awareness and where appropriate, mutual aid agreements between organisations and agencies with common interests in asset protection and community safety that may work together across tenure in the event of a disaster event.

7.2.1. FIRE BREAKS AND FUEL MANAGEMENT STRATEGY

The fuel management strategy is shown on the **Bushfire Management Measures** map in Appendix A.

TABLE 9 FIRE BREAKS

Fire Break	Specification
Boundary Fire Break	5m slashed or graded fire break within 10m of the boundary as permitted by local topography. - Maintain surface fuel less than 10cm through dry season. - Removal of dead trees and danger trees within tree length of boundary. Danger trees are trees with ground hollows likely to fall over if burnt.
Internal Fire Break	5m slashed or graded fire break along internal fence line. Gates to be installed as practical for site operational access.

TABLE 10 ASSET PROTECTION ZONES (APZ)

APZ	Specification
Operational Area APZ	- The designated vegetation management zone approved by SARA – minimum 12m from all structures. - Maintain surface fuel less than 10cm through dry season. - Remove fine fuels including leaf drop and fallen limbs throughout the fire season, through raking and manual removal, slashing/mulching/ mowing. - Irrigate lawn areas where practical and water supplies permit

TABLE 11 STRATEGIC FUEL MANAGEMENT ZONES (SFMZ)

SFMZ	Specification
Access SFMZ	• Within 12m of the edge of the Access Driveway. • Maintain surface fuel less than 30cm through dry season. • General vegetation maintenance and removal of dead/dry vegetation throughout the dry season to prevent buildup of fine fuels. • Removal of tree limbs to 2m above ground level for 3m either side of the Access Driveway

General landscape maintenance on a regular basis is essential to maintaining a property in a bushfire prone landscape. The property should be maintained to minimise tropical weed grasses (grader grass and guinea grass), and promote native grasses including kangaroo grass (*Themeda triandra*), cockatoo grass (*Alloteropsis semialata*) and black spear grass (*Heteropogon contortus*).

7.2.2. WATER SUPPLY, ACCESS AND EGRESS

WATER SUPPLY

Primary water supply for firefighting is provided via a water storage tank, shown on the **Bushfire Management Measures** map in Appendix A.

ACCESS – EMERGENCY SERVICES AND INCIDENT RESPONSE

Access to the site is via Mill Road. The existing driveway within the property facilitates emergency services access. The boundary fire break provides through access around the boundary of the site for suppression and fuel management activities.

ACCESS – EMERGENCY EGRESS

Emergency egress is via the access driveway exiting on to Mill Road. This provides rapid access to the Bruce Highway to the north.

7.2.3. AWARENESS, RESPONSE TRIGGER AND EVACUATION PLAN

Bushfire preparation includes identifying pre-conditions for response readiness and triggers for enactment of response measures. All commercial premises within a bushfire prone landscape should have a fire plan, identifying preparation and response measures to be undertaken at the property scale.

AWARENESS

Site operations must monitor the fire danger ratings as issued by the QFES. Readiness should increase with the FDR according to Table 12. Readiness includes making the necessary preparations regarding operational safety and implementation of site fire plans.

TABLE 12 AFDR AND READINESS

Australian Fire Danger Rating		Readiness level	Action
FDI	Messaging		
0-11	No rating	-	Nil Required
12-23	Moderate	Alert: Monitor public notifications and ensure preparations are complete	Ensure all mitigation measures are in place. Proceed with normal site operations
24-49	High		Ensure all mitigation measures are in place. Proceed with normal site operations, be prepared to enact fire plan if incident impacts property or immediate surrounds during hosted event.
50-99	Extreme	Lean Forward: Be prepared to enact fire plan in the event of an incident.	Proceed with normal site operations, be prepared to enact fire plan if incident impacts Yabulu, Bluewater, Black River or Lynham areas during hosted event.
100+	Catastrophic	Stand Up: Enact fire plan	Avoid hosted events in catastrophic fire danger conditions.

RESPONSE TRIGGER

The response trigger for implementation of fire plans may be the issuing of Catastrophic fire danger rating forecast, occurrence of a bushfire incident in the immediate area, or an incident within the property.

EVACUATION AND SHELTER IN PLACE

Evacuation should be considered as the primary response, and if evacuation is to occur, the decision to leave must be made early.

If advised to evacuate by the authorities, this should be considered the safest course of action.

The operator of the site should establish emergency procedures in regard to the specific use of the site as an Events Venue, including an evacuation plan. Materials available through Townsville City Council's Disaster Management Dashboard website will step the operator through this process.

7.3. RESPONSE

Bushfire response is generally considered the specific actions in response to an immediate bushfire threat, either from outside the site or within the site.

Where fire outside the site threatens the site, the objective is to prevent it from entering the property, where fire occurs within the site, the objective is to protect other site assets, and prevent the spread of the fire outside of the site.

7.3.1. IGNITION SOURCE ON SITE

It is considered that an ignition onsite will be triggered by a specific activity associated with maintenance, operation of the site or failure of site infrastructure.

Site management should be made aware of the ignition to provide an opportunity to suppress the fire before it becomes uncontrollable.

- Report the emergency to 000, and secure the site until emergency services arrive.
- Ensure all guests and non-essential personnel are able to take shelter at a predetermined muster point.
- Attempt direct attack methods if possible (direct water application or extinguisher) or contain with a mineral earth fire break if possible.

7.3.2. IGNITION SOURCE OFF SITE

Where a fire approaches the property from the surrounding landscape, it is considered that this will be a larger, more active fire, and defensive strategies are more appropriate (asset protection and personal safety).

- Report the emergency to 000.
- **Operational fire plan is to make safe and evacuate** – Evacuate all visiting guests utilising the events area if safe to do so.
- **Enact fire suppression systems where installed** - Enact active fire protection through use of sprinklers and hoses appropriate to the site owner's level of capability.

7.3.3. RURAL FIRE SERVICE

In regards to bushfire response, the volunteer Rural Fire Service is the primary response agency. For structural fires, the nearest QFR brigade is Woodlands Fire Station (this is a permanent brigade).

The site is located within the Black River and District rural fire service district - contact details for emergency reporting and direct brigade contact are listed below in Table 13.

TABLE 13 EMERGENCY AND FIRE STATION CONTACT DETAILS

To report a bushfire, or for any other emergency	000
General enquiries – Black River and District (Rural Fire Service)	0407 175 003
Public education, property bushfire management plans, planned burn permits etc.	
Woodlands Fire Station - QFR	07 4775 9200

7.4. RECOVERY

Disaster recovery can be complex and sometimes a lengthy process. It is described simply as the restoration of normal operations.

Recovery of the site from a bushfire event will depend on the level of impact on the landscape, equipment and infrastructure:

1. Ensure fire area is safe and extinguished (burn area blacked out)
2. Identify damage to assets or infrastructure
3. Reinstatement of essential services (water, electricity) as necessary
4. Secure hazards in work area or public access areas (removal of any hazards caused by bushfire (burnt trees at risk of falling over, etc.)
5. Reinstatement of bushfire hazard mitigation measures that were damaged or expended during the fire event
6. Safe access and egress from the site is re-established

8. CONCLUSIONS & RECOMMENDATIONS

8.1. BUSHFIRE HAZARD ASSESSMENT AND RISK ASSESSMENT

An assessment of the site and its surrounding environment has demonstrated a bushfire hazard across the proposed development area is Low following the proposed development, with areas of Medium bushfire hazard encompassing the development resulting in the entirety of the proposed development area being within the 100m potential impact buffer identified for the closest classified vegetation. The development site is nevertheless identified as being in a suitable and advantageous position in the landscape for minimising the risk and impacts of bushfire, and is able to achieve suitable separation distance from all classified vegetation to ensure a less than 29kW/m² heat flux impact to all aspects of the development.

The risk assessment identifies that the proposed use and the nature of the proposed development at the subject site carries a low degree of risk (based on current management and condition of the site), with risk reduced to very low where mitigation measures are undertaken. The application of fit for purpose mitigation measures effectively minimises the risk associated with bushfire at the site, through separation distance from native vegetation, and bushfire fuel minimisation within the operational site and adjacent to the access route.

Establishing the proposed development according to bushfire management measures, and engagement with local bushfire brigades will ensure the establishment of a safe and well prepared community.

8.2. BUSHFIRE HAZARD OVERLAY CODE

The proposal is demonstrated to comply with the Bushfire Hazard Overlay Code.

8.3. BUSHFIRE MANAGEMENT PLAN

A Bushfire Management Plan has been prepared for this site. Bushfire management measures are intended to be simple and achievable.

The bushfire management plan identifies fuel management measures appropriate to the nature of the landscape, occupancy and activities at the subject site, in the context of the pertinent bushfire scenario. Bushfire management measures primarily consist of maintaining existing fire breaks, property access, and establishing the asset protection zone and strategic fuel management zones as defined in the bushfire management plan. Responsible land management will achieve appropriate risk mitigation for the described use.

8.4. RECOMMENDATIONS

The following recommendations are made to support the development of the site, achieve bushfire hazard mitigation with minimal impact to future occupants of the development, and ensure the development meets the objectives of the Bushfire Hazard Overlay Code:

- The operator of the site should establish emergency procedures in regard to the specific use of the site as an Events Venue, including an evacuation plan. Materials available through Townsville City Council's Disaster Management Dashboard website will step the operator through this process.
- Undertake property protection measures to minimise bushfire risk annually, including clearing roofs and gutters of debris, disposing of dead and dried landscaping material regularly, and ensuring grass ground cover across the operational areas of the subject site is <10cm during the fire danger season.

8.4.1. BUSHFIRE MANAGEMENT PLAN

Implementation of the bushfire management as prepared and detailed in Section 7 will provide for safety of visitors to the site and assist in identifying the bushfire risk in advance of high hazard conditions.

8.4.2. LANDSCAPING – PLANT SELECTION

Plant selection for bushfire prone areas should avoid species containing high concentrations of flammable oils (eucalypt and palm species), and preference evergreen species less prone to annual dry season leaf drop. Consideration should be given to species which exhibit a habit or form that allows for separation from surrounding plants, either vertically or horizontally. For example, some conifer species grow branches from ground level, allowing flame contact from burning ground litter, and providing vertical connectivity. Preference should be given to species that have a clean trunk and clearly separated head of vegetation where there is risk of ignition from ground or surface vegetation (such as underneath or adjacent to elevated decks and floor structures).

General guidance for bushfire resilient building and landscaping is available online from the Queensland Reconstruction Authority:

https://www.qra.qld.gov.au/sites/default/files/2020-12/QRA_Bushfire_building_guideline.PDF

The Country Fire Authority publication 'Landscaping for Bushfire' provides a comprehensive guide for landscape planning and plant selection. It can be accessed online:

<https://www.cfa.vic.gov.au/plan-prepare/how-to-prepare-your-property/landscaping>

It is recommended that these documents be reviewed during the landscape planning for this site. While the CFA publication is produced by Victorian authorities and describes southern plant species, the plant form and type selection criteria can be applied to local and tropical plants with equal relevance. This assists in identifying the most appropriate amenity plantings and landscaping materials suited to development in a bushfire prone landscape.

RESOURCES

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APPENDIX A – MAPS

BUSHFIRE HAZARD ASSESSMENT

235 - 353 Mill Road, Yabulu
(3RP743037)

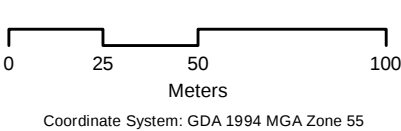
SITE LOCATION

Legend

- Property Boundaries
- 3RP743037
- Roads
- Watercourses
- Assessment Area
- Vegetation Management Plan Area

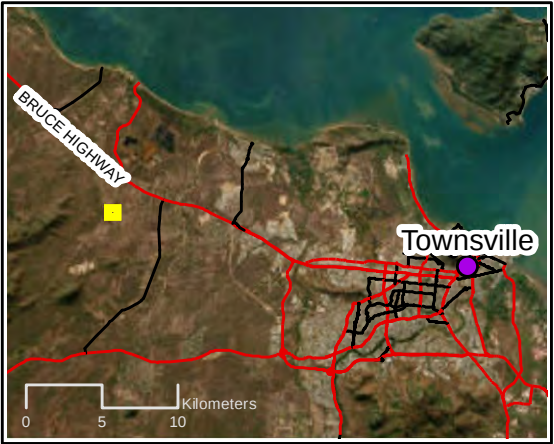
Proposed Site Infrastructure

- Entertainment Grassed Area
- Food Servery
- Service Shed
- Toilet Block
- Grassed Carparking/Access



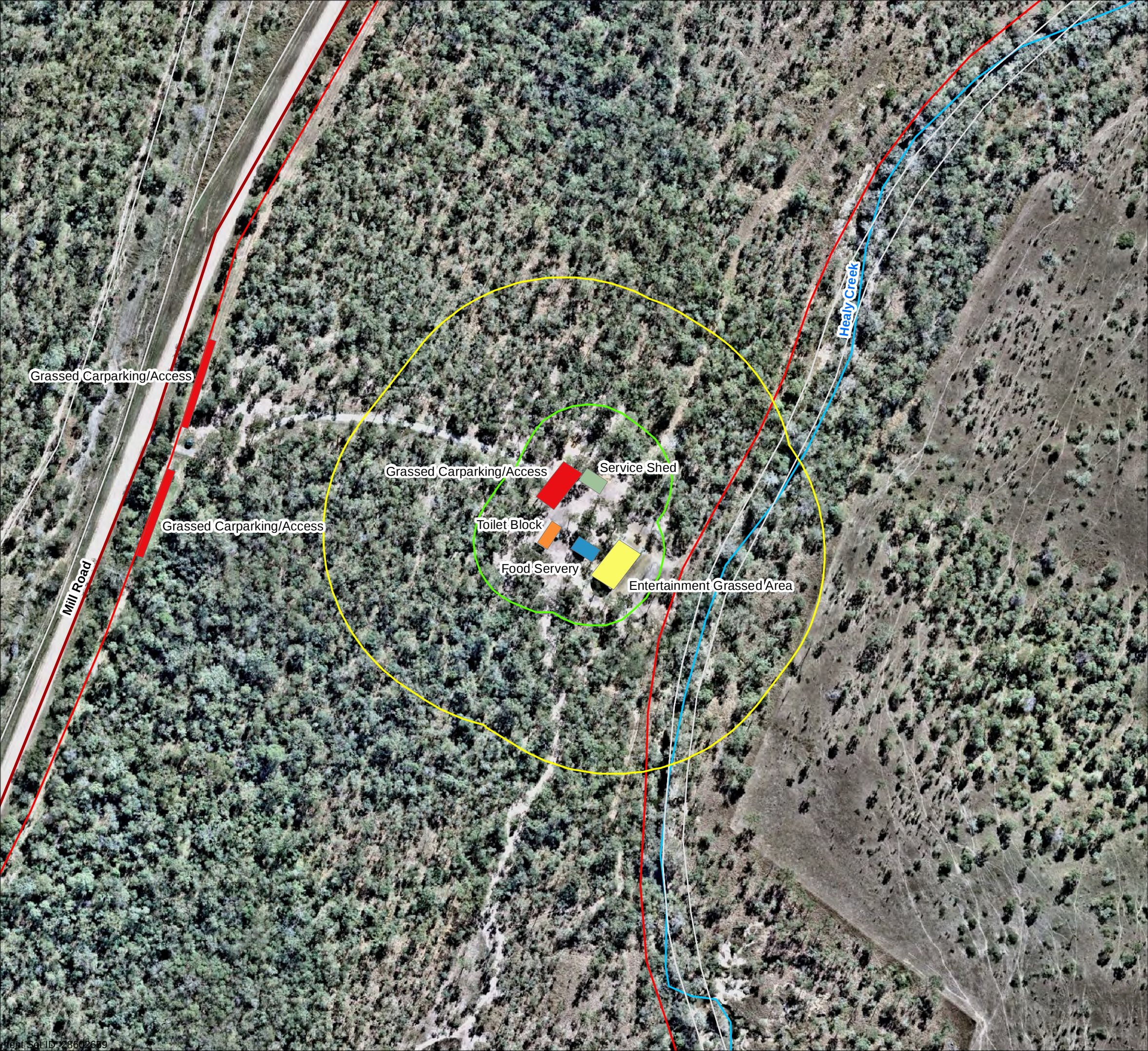
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BUSHFIRE HAZARD ASSESSMENT

235 - 353 Mill Road, Yabulu
(3RP743037)

TOPOGRAPHY AND HYDROLOGY

Legend

Property Boundaries

3RP743037

Contours (5m)

Watercourses

Assessment Area

Entertainment Grassed Area

Food Servery

Service Shed

Toilet Block

Grassed Carparking/Access

Slope (Degrees)

0 - 5

5 - 10

10 - 15

15 - 20

>20 degrees

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BUSHFIRE HAZARD ASSESSMENT

235 - 353 Mill Road, Yabulu
(3RP743037)

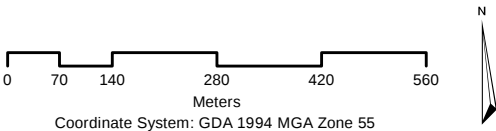
VEGETATION
AND BUSHFIRE FUELS

Legend

- Property Boundaries
- 3RP743037
- Proposed Development
- Assessment Area

Vegetation Hazard Classes

- 40.4 Low grass or tree cover in rural areas (5tph)
- 21.1 Melaleuca dry open forest on sandplains or depositional plains (14.9tph)
- 9.2 Moist to dry eucalypt woodland on coastal lowlands and ranges (17.2tph)
- 22.1 Melaleuca open forests on seasonally inundated lowland coastal swamps (28.4tph)



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BUSHFIRE HAZARD ASSESSMENT

235 - 353 Mill Road, Yabulu
(3RP743037)

FIRE HISTORY

Legend

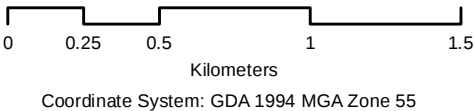
- Proposed Development
- Assessment Area
- Highway (Arterial Road)
- Local

Fire Frequency (2000 to 2024) (NAFI, 2025)			
1	4	7	10
2	5	8	
3	6	9	

Time Since Burnt (years) (2000 to 2024) (NAFI, 2025)			
24	14	8	3
20	13	7	2
16	11	5	1
15	10	4	

Fire History (QPWS 2026)

- Planned Burn
- Unplanned Burn



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Fire Frequency and Time since last burn from NAFI (2023)
Fire History (QPWS) © State of Queensland (Department of Environment and Science), 2023
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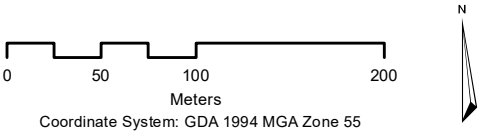
BUSHFIRE HAZARD ASSESSMENT

235 - 353 Mill Road, Yabulu
(3RP743037)

BUSHFIRE HAZARD MODEL

Legend

- Property Boundaries
- 3RP743037
- Proposed Development
- Assessment Area
- Bushfire Hazard Model**
 - Low Potential Bushfire Intensity (<4000kW/m)
 - Medium Potential Bushfire Intensity (4,000 – 20,000kW/m)
 - High Potential Bushfire Intensity (20,000 – 40,000kW/m)
 - Potential Impact Buffer (100m)



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BUSHFIRE HAZARD ASSESSMENT

235 - 353 Mill Road, Yabulu
(3RP743037)

BUSHFIRE MANAGEMENT MEASURES

Legend

- Property Boundaries
- 3RP743037
- Name
- Entertainment Grassed Area
- Food Servery
- Service Shed
- Toilet Block
- Grassed Carparking/Access
- Roads
- Watercourse

MITIGATION MEASURES

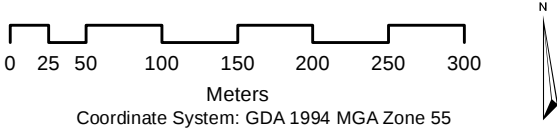
- Boundary Firebreak - 5m wide slashed or graded fire break
- Internal Fence and Firebreak - Indicative Location
- Access Driveway
- Property Access Point from Mill
- Water Tank - minimum 10,000L reserved for firefighting purposes

Asset Protection Zone

- Maintain surface fuel <10cm through dry season. Removal of dead and dry vegetation through dry season. Irrigate.

Strategic Fuel Management Zone

- Removal of dead and dry vegetation through dry season (12m each side of driveway).
- Remove tree branches <2m from the ground (3m each side of driveway).



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