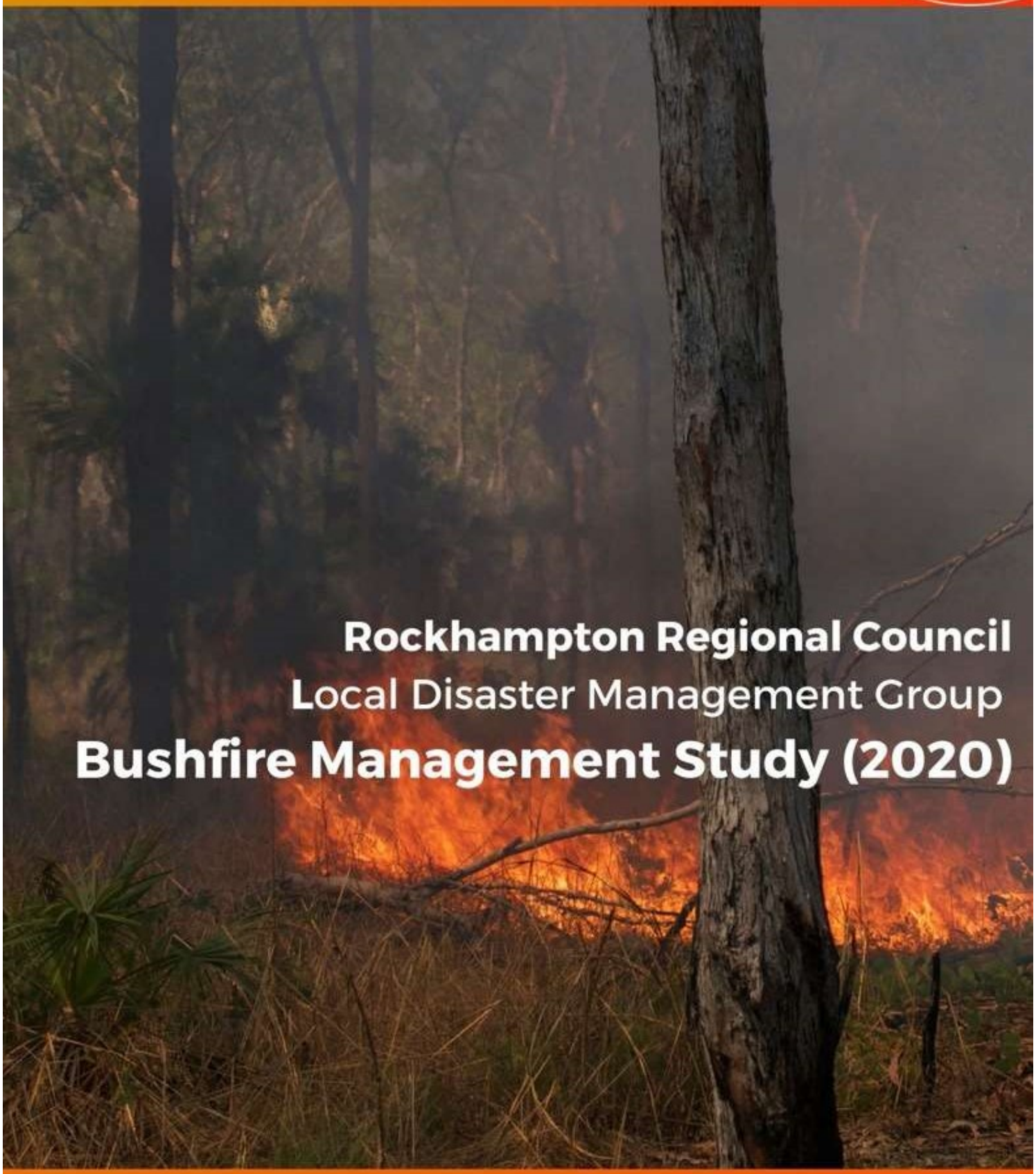
DISASTER MANAGEMENT



# Rockhampton Regional Council
## Local Disaster Management Group
# Bushfire Management Study (2020)

QRESILIENCE

Rockhampton Regional Council

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# Rockhampton Region Bushfire Management Study (2020)


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**Fitzroy Northern Area** ..... Error! Bookmark not defined.

**Kabra** ..... Error! Bookmark not defined.

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**Bajool/Marmor** ..... Error! Bookmark not defined.

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This document was endorsed by the Rockhampton LDMG on Friday 19th February 2021.



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# 1 List of Acronyms

| | | | |
|---|---|---|---|
| AEP | Annual Exceedance Probability | LDCC | Local Disaster Coordination Centre |
| AFMG | Area Fire Management Group | LDMG | Local Disaster Management Group |
| BAU | Business as Usual | LDMP | Local Disaster Management Plan |
| BCP | Business Continuity Plan | LMF | Lessons Management Framework |
| BEP-MA | Bushfire Evacuation Plan – Mount Archer | LRG | Local Recovery Group |
| BEP-MM | Bushfire Evacuation Plan – Mount Morgan | LSC | Livingstone Shire Council |
| BMP | Bushfire Management Plan | LSFMG | Locality Specific Fire Management Group |
| BoM | Bureau of Meteorology | MoU | Memorandum of Understanding |
| CHSC | Central Highlands Shire Council | NCC | National Construction Code |
| CO | Civil Operations (RRC) | NDIS | National Disability Insurance Scheme |
| CoGC | City of Gold Coast | PIC | Public Information Capability |
| CSIRO | Commonwealth Scientific and Industrial Research Organisation | PO | Parks Operations (RRC) |
| DCHDE | Department of Communities, Housing and Digital Economy | PPRR | Prevention, Preparedness, Response, Recovery |
| DIDRR | Disability Inclusive Disaster Risk Reduction | QBP | Queensland Bushfire Plan |
| DDC | District Disaster Coordinator | QDMA | Queensland Disaster Management Arrangements |
| DDMG | District Disaster Management Group | QDMC | Queensland Disaster Management Committee |
| DES | Department of Environment and Science | QERMF | Queensland Emergency Risk Management Framework |
| DMG | Disaster Management Group | QFES | Queensland Fire and Emergency Services |
| DMU | Disaster Management Unit | QPS | Queensland Police Service |
| DoR | Department of Resources | QPWS&P | Queensland Parks and Wildlife Service and Partnerships |
| DTMR | Department of Transport and Main Roads | QRA | Queensland Reconstruction Authority |
| FDI | Fire Danger Index | QSDMP | Queensland State Disaster Management Plan |
| FFDI | Forest Fire Danger Index | RFS | Rural Fire Service (QFES) |
| FDR | Fire Danger Rating | ROC | Regional Operations Centre |
| FRS | Fire and Rescue Service (QFES) | RRC | Rockhampton Regional Council |
| GFDI | Grass Fire Danger Index | SDCC | State Disaster Coordination Centre |
| GIS | Geographic Information System | SES | State Emergency Service |
| ICC | Incident Control Centre | SPP | State Planning Policy |
| IGEM | Inspector General Emergency Management | WRC | Whitsunday Regional Council |
| LDC | Local Disaster Coordinator | | |



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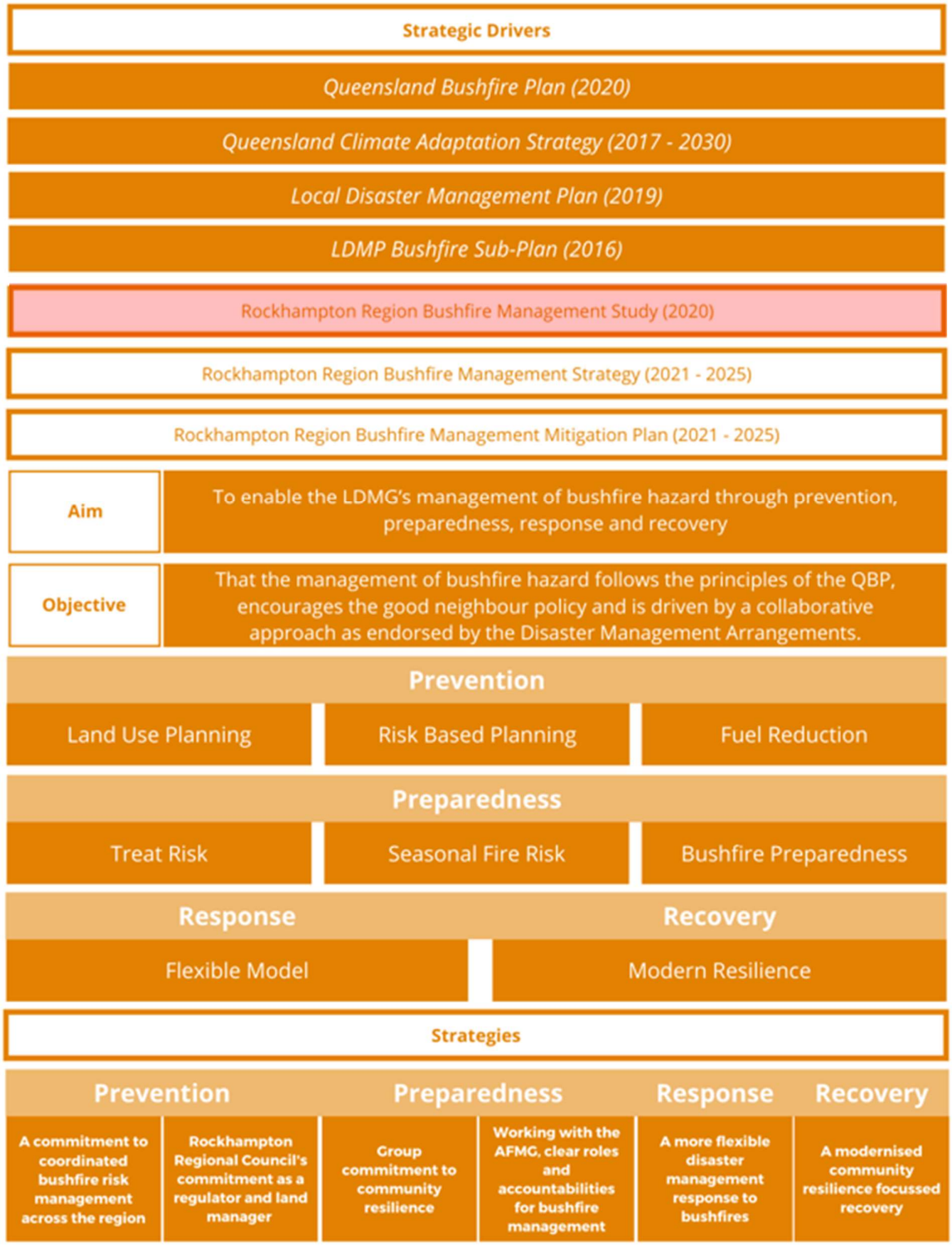
# 2 Bushfire Management Governance

The Rockhampton Region Bushfire Management Study (2020) sits within the Rockhampton Region Local Disaster Management Group (LDMG) governance structure as outlined below.




Rockhampton Region LDMG Bushfire Management Study Governance Structure



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# 3 Executive Summary

The Rockhampton Regional Council LDMG Bushfire Management Study (The Study) was commissioned by Rockhampton Regional Council (RRC) to examine bushfire management practices occurring across the Region and identify pathways to manage future risk. The Study has been informed by the *Queensland Climate Adaption Strategy (2017 – 2030)*, the *Queensland Bushfire Plan (2020)* (QBP) and incorporates the changes the QBP introduces to the hazard-specific bushfire arrangements across Queensland.

In 2020, the LDMG began the process of utilising the Queensland Emergency Risk Management Framework (QERMF) to identify and manage its disaster management risk. The QERMF provides a risk assessment methodology that can be used within disaster management planning at all levels of Queensland's Disaster Management Arrangements (QDMA). As part of the QERMF process, the bushfire hazard for the Rockhampton Region has been calculated with an Annual Exceedance Probability (AEP) of **59%**. This places bushfire risk at the upper end of the "**Likely**" category.

Some of the factors that determine the likelihood of a bushfire impacting communities in the Rockhampton Region include:

- Expected fire weather conditions (historic, most recent and future – based on climate change predictions).
- Fuel structure, load, re-accumulation rates, and topography.
- Potential sources of ignition.

Bushfire Risk Profiles have been developed for each community and are noted in *Table 1*.

| Community Risk Rating for Rockhampton Region | |
|---|---|
| Mount Archer Summit | EXTREME |
| Mount Archer – Frenchville and Norman Gardens | VERY HIGH |
| Mount Archer – Lakes Creek and Koongal | VERY HIGH |
| Mount Morgan area | VERY HIGH |
| Fitzroy Northern Area (Alton Downs, Dalma, Garnant, Glenroy, Morinish, Morinish South, Nine Mile, Pink Lily, Ridgelands and South Yaamba) | VERY HIGH |
| Kabra | VERY HIGH |
| Stanwell | VERY HIGH |
| Wycarbah | VERY HIGH |
| Westwood | VERY HIGH |
| Gracemere | HIGH |
| Bouldercombe | MEDIUM |
| Bajool/Marmor | MEDIUM |
| Gogango | LOW |

*Table 1: Community Risk Ratings*

This Study finds the most vulnerable communities to be the Mount Archer area (Mount Archer, Frenchville, Norman Gardens, Lakes Creek and Koongal) and the Mount Morgan area (Moongan, Leydens Hill, Baree, Walterhall, The Mine, Struck Oil, Limestone, Nine Mile Creek, Walmul, Trotter Creek, Fletcher Creek, Wura, Oakey Creek, Boulder Creek localities), based on the bushfire prone land and development adjacent to it, with the consequences of bushfires within these areas identified as significant.

Goodedulla National Park is a 26,025ha reserve on the northwest boundary of the Rockhampton Region. The reserve is managed by Queensland Parks and Wildlife Service and Partnerships (QPWS&P). Fires coming from the reserve present significant risk to the broader Fitzroy Northern Area communities, as documented above. Alongside the Mount Archer and Mount Morgan areas, this is one of three areas which are focused on for the first five years of the implementation of this plan through mitigation actions.

Firefighting capability across the Region is strong and serviced primarily through the Queensland Fire and Emergency Services (QFES) streams of response; these being Fire and Rescue Service (FRS), located at North and South Rockhampton, and Rural Fire Service (RFS) brigades at Gracemere and Mount Morgan, and is supported by QPWS&P and Department of Resources (DoR). These supporting agencies primarily work on hazard reduction activities but may also be called in to undertake low-risk



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firefighting operations.

Research conducted as part of the Study indicates the main ignition sources for fires across the Region to be:

- Escaped Burns from private property hazard reduction
- Arson
- Careless activity on very high fire danger days.

The research also noted an increased ignition risk in the Mount Morgan area due to fire fascination and arson.

Community feedback data provided to the Study yielded insights into community preparedness. There is general bushfire awareness in the local communities, yet despite this, the awareness is not at a level that the community fully comprehends issues such as the risk of bushfire, the devastating effects, and the impact that weather has on fire and bushfire conditions.

Finally, the Study outlines the roles and responsibilities of bushfire management stakeholders to ensure stakeholder engagement is focused on those accountable and ensures that the LDMG structure is in line with the updated accountabilities under the QBP.

As a result of the Study, a Bushfire Management Strategy (2021-2025) and Bushfire Management Mitigation Plan (2021-2025) have been produced and should be read in conjunction with this Study.

The Bushfire Management Strategy (2021-2025) provides a regional and strategic assessment of bushfire risk, identifies priority areas of risk and outlines nine pathway actions to be taken across the four phases of disaster management – Prevention, Preparedness, Response and Recovery, signifying the commitments required of the LDMG.

The Bushfire Management Mitigation Plan (2021-2025) is a five-year plan that provides the LDMG direction on actions to reduce the overall risk across the Region through a range of measures aligned with the QBP focus areas below. As the actions are completed, and the Plan undergoes review at the end of its tenure, other locations may then be classed as higher risk, and focused on in the next iteration of the Plan.


# 4 The Bushfire Management Study Approach

The Study was conducted between July and October 2020. It involved seven weeks of onsite consultation across the Region, and five weeks of desktop research.

Initial and follow up workshops and interviews were held with key stakeholders. Members of the LDMG, Rockhampton Fire Management Group, Rockhampton District Disaster Management Group (DDMG) and Rockhampton Disability Inclusive Disaster Risk Reduction (DIDRR) group were engaged. The full list of stakeholders is found in Annex A.



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Field visits were conducted in consultation with:

- Staff from Queensland Parks and Wildlife Service and Partnerships (QPWS&P)
- Staff from the Department of Resources (DoR).

Field visits were made to:

- Mount Archer
- Mount Morgan
- Kabra
- Stanwell
- Bajool
- Bouldercombe.

Engagement with stakeholders included trying to get an understanding of their issues, what was going well, what the challenges were, and what opportunities exist. All stakeholders involved were forthcoming with information and this is represented in the Study.

Community consultation was also conducted through a regional survey. This survey was available through RRC's social media channels and sought community understanding of bushfire risk and their experience of past events. The data was studied and is represented throughout the Study. In addition, local volunteer groups from the State Emergency Service (SES) and Fitzroy Rural Fire Group were asked to provide information.

# 5 Methodology

Throughout the study period, observations were taken in line with the *Inspector General Emergency Management (IGEM) Lessons Management Framework (LMF)*. Observations were recorded throughout interviews and then combined with desktop research for validation. From there, a number of insights were formed which then represent statements and findings within this review.

In the second on-site consultation period, validation workshops were held with key stakeholders including:

- RRC Parks Operations
- QPWS&P
- DoR
- Queensland Police Service (QPS)
- RRC Planning and Regulatory Services

From this validation, further refinement was made to the Study, the Bushfire Management Strategy (2021-2025) and Bushfire Management Mitigation Plan (2021-2025).

# 6 Regional Overview

Located in the heart of Central Queensland, the Rockhampton Region lies on the Tropic of Capricorn. It shares boundaries with Livingstone Shire to the north, the Pacific Ocean to the east, Gladstone Regional Council area and Banana Shire to the south and Central Highlands Regional Council to the west.

The LDMG area of responsibility covers three urban centres: Rockhampton, Gracemere and Mount Morgan. In addition to these urban centres, smaller townships exist at:

- Bajool
- Bouldercombe
- Kabra
- Marmor
- Stanwell
- Gogango
- Westwood.

Rockhampton functions as the major service centre for business and employment, and the smaller townships provide an opportunity for people to live a productive and sustainable rural lifestyle, with easy access to the services of the larger urban centres.



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Known for its relaxed lifestyle, outdoor living and natural beauty, the Rockhampton Region's population as of 2019 was 81,512 (.iD Community Demographic Resources, 2020), mostly located in the urban areas and is forecast to grow to 113,096 by 2036 (RRC, 2020a).

In order to sustain such a population, the Region offers varied employment opportunities, with healthcare and social assistance representing the highest share of jobs. The Region is transforming into a major economic and lifestyle hub for the broader Central Queensland Region.

The Region makes a vital contribution to the growth of Central Queensland, Queensland and Australian economies, with approximately $5.014 billion gross regional product as of 30 June 2015.

Major features of the Region include the Rockhampton Airport, CQ University, Stanwell Power Station, Gracemere Saleyards, Dreamtime Cultural Centre, Stockland shopping centre, Rockhampton Central Business District, Rockhampton Heritage Village, Rockhampton Botanic Gardens, Fitzroy River, national parks, Gracemere Industrial Area and Mount Morgan.

The reliable water supply provided by the Fitzroy River (Australia's second largest catchment) supports current and future economic opportunities and lifestyle. The Fitzroy River is a dominant natural feature for the Region, as it moves from expansive areas of productive pastoral and agricultural land in the west through to the Fitzroy River delta in the east.

The diversity of landscapes, lifestyles, economic opportunities and communities contribute to this Region being one of the most diverse in all of Queensland. The individual characteristics of the 60 localities and suburbs have shaped the unique character of the Rockhampton Region (RRC, 2020a).

# 7 Ecology

Research shows there are over 1,174 different types of plant species in the Rockhampton Region. A complete list of these is provided by the Department of Environment and Science (DES) (DES, 2013).

Historically, most of the Region contained eucalyptus woodlands and open forests. There were also large areas of acacia-dominated vegetation, rainforests and scrubs, mangrove and saltmarsh, together with small areas of melaleuca woodlands.

Over time, more than half the local government area has been cleared or partially cleared for a range of rural and urban land uses, particularly grazing on native pastures. Nearly all of the melaleuca woodland has been cleared (DES, 2017).

Across the Region remnant ecological areas now sees the predominance of:

- Eucalypt open forest
- Eucalypt woodlands to open forests
- Wetlands
- Mangroves and Saltmarshes.

From a fire perspective, the breaking up of the landscape through clearing provides advantages for controlling forest fires. There is still however, a significant risk to the areas of steep terrain with remnant forested areas in proximity to urban areas, which requires the LDMG to continue to focus on bushfire risk now and into the future.



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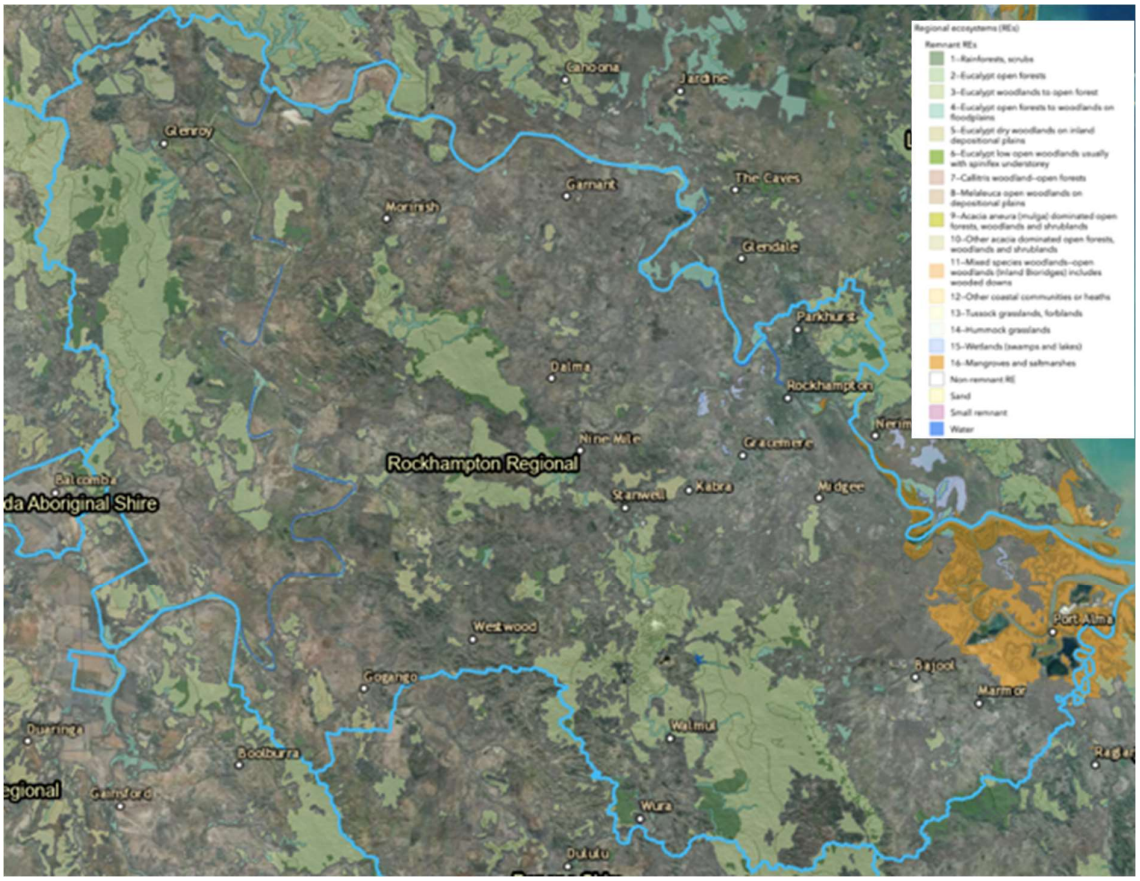


Rockhampton Region Ecology Types Source: DoR

# 8 Topography

Fire moves faster uphill. For every 10 degrees increase in slope, a fire will double in speed. This is because the slope provides a similar effect to the wind, effectively laying the flames down into the slope and pre-heating the vegetation, allowing it to more rapidly ignite (Department of Environment and Water, 2020).

Aerial inspections across the Region show areas of open farming land met with ground level open forest, through to steep areas of topography such is the case at Mount Archer and Mount Morgan.

Example of Topography across the region – Mount Morgan. Source: DoR

From a fire management perspective, this is important to note, as much of the community across the Region live close to the elevated areas, which increases fire risk due to the speed at which it will spread. Of the highest risk is the community located at the summit of Mount Archer, at 650m above sea level.



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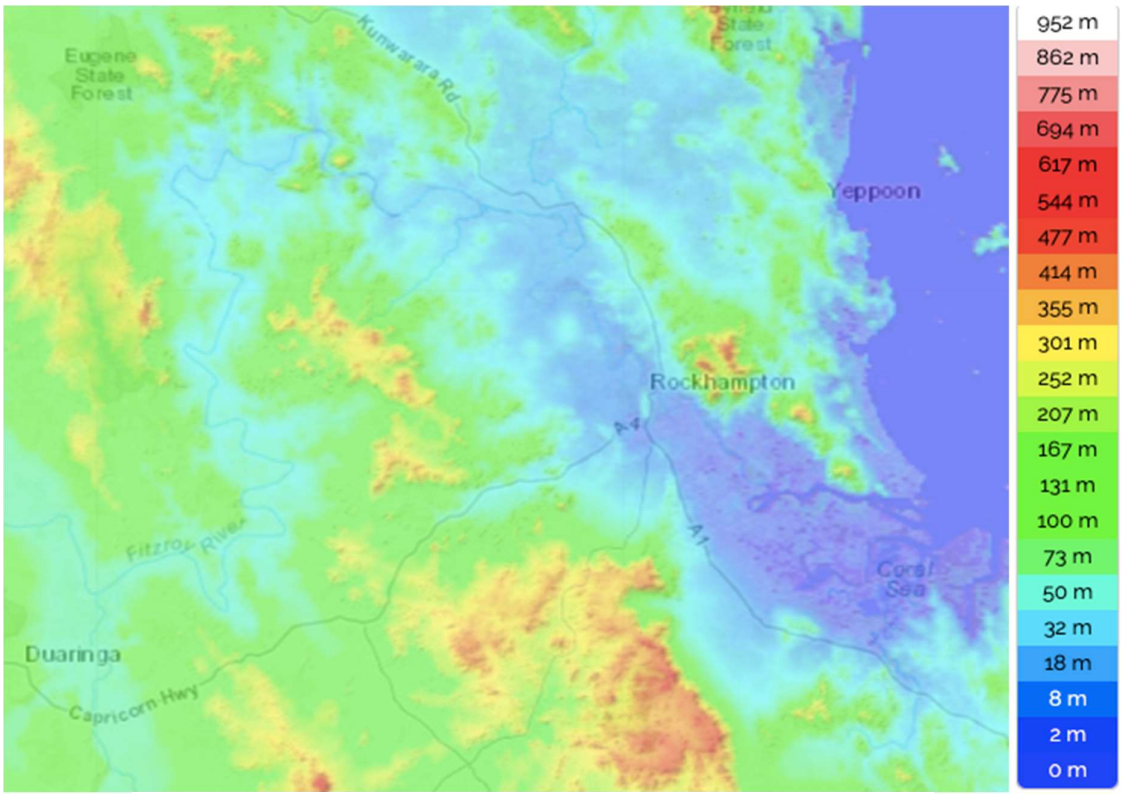


Topography across the region. Source: Topographic Maps Online

# 9 Climate

## 9.1 Climatic Overview

The Rockhampton climate can be classified as subtropical. The Region is situated on the Tropic of Capricorn and lies within the southeast trade wind belt. It is too far south to experience regular north west monsoonal influences, and too far north to gain much benefit from higher latitude cold fronts.

Rockhampton's average annual rainfall is a little over 800mm. Rainfall averages suggest a distinct wet and dry season, with the wet generally December to March, and the dry June to September.

The Bureau of Meteorology (BoM) state that typical daytime temperature ranges are 32° - 22° Celsius in the summer /wet season, and 23° - 9° Celsius in the winter/dry season.

The prevailing winds are predominantly southeastern, but during spring and summer, late afternoon northeast sea breezes give some relief from the higher temperatures. During winter and early spring, the high-pressure systems of the sub-tropical ridge can be far enough north to replace the southeast trade winds with southwesterly winds behind the trough systems that split the high cells.

Rockhampton lies within the cyclone risk zone and the area is subject to summer thunderstorms. There is a high incidence of winter and early spring fogs. Maximum temperatures in the low to mid 40's have been recorded in October to March. Minimum temperatures as low as zero degrees have been recorded during winter (BoM, 2020a).

This climate presents a bushfire risk period August – November each year (prior to the typical wet season).



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## 9.2 Climate Change

*"Extreme weather has already become more frequent and intense because of climate change; further global warming over the next 20 to 30 years is inevitable. Globally, temperatures will continue to rise, and Australia will have more hot days and fewer cool days. Sea levels are also projected to continue to rise. Tropical cyclones are projected to decrease in number but increase in intensity. Floods and bushfires are expected to become more frequent and more intense. Catastrophic fire conditions may render traditional bushfire prediction models and firefighting techniques less effective."* (Finding 23) (The Royal Commission, 2020)

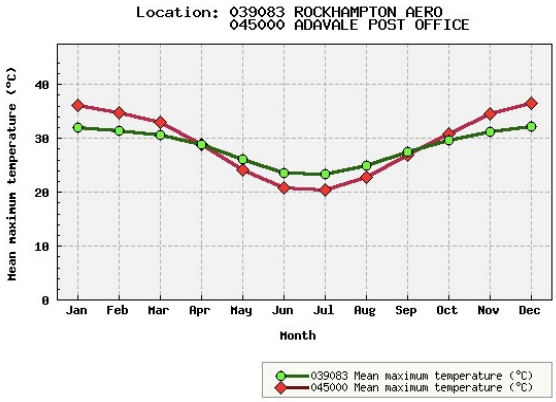

Bushfire Forest Fire Danger Index (FFDI) >90th Percentile. Source: BoM

The emergency management sector stands to be continually challenged by changes to the frequency, intensity, distribution and duration of acute events, major disasters and long-term climate-related stressors. Importantly, the climate is already changing, and the need to incorporate climate change into the comprehensive approach across prevention, preparedness, response and recovery is paramount (QFES, 2020a).

There is no doubt that climate change is impacting the Rockhampton Region. In 2019, DES released a climate outlook for the Region, and, from a bushfire management perspective, the key findings were that the Region can expect (DES, 2019):

- Higher temperatures
- Hotter and more frequent hot days
- Fewer frosts
- More intense downpours.

The outlook provided the following predictions:




20-year average across Rockhampton - Mean Maximum Temperature to 2016. Source: BoM

- Minimum, maximum, and average temperatures are projected to continue to rise. For the near future (2030), the annually averaged warming is projected to be between 0.4 and 1.5°C above the climate of 1986–2005. By 2070, the projected range of warming is 1.0 to 3.8°C, depending on future emissions. The Region's current summer average temperature is 27°C. This could rise to over 28°C by 2030 and to over 30°C by 2070.
- There is likely to be a substantial increase in the maximum temperature reached on the hottest days, an increase in the frequency of hot days, and an increase in the duration of warm spells.
- A substantial decrease in the frequency of frost-risk days is projected by the end of the century.
- Bushfires are a result of fuel dryness, lack of soil moisture, hot, dry and windy conditions.
- Across the Region, when and where fire does occur, the evidence indicates that fire behaviour will be more extreme.
- Evidence suggests that climate change conditions predicted for the Region will see increased frequency of fires with greater intensity. (DES, 2019):

Stakeholders discussed their concerns in relation to these trends with windows of opportunity for hazard reduction burns potentially hindered by the predicted substantial decrease in frosts, with particular impact in and around Mount Morgan.

There is significant relationship with the weather, to the severity and frequency of which fires, and more catastrophic fire conditions, can occur across the Region, and in fact, Australia. The Queensland



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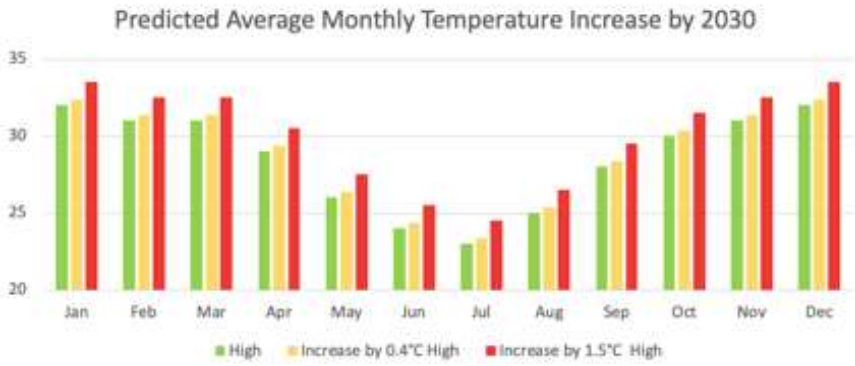
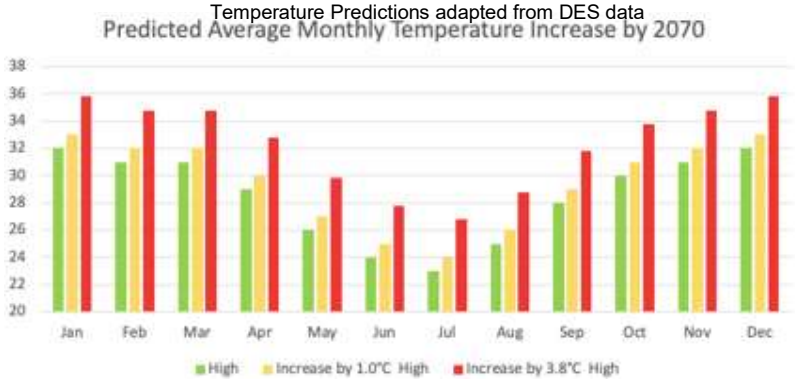
Climate Adaptation Strategy outlines the changes that are occurring within the environment and the effects this will have on natural disasters. (DES, 2019).

With Australia warming by 1°C since 1910, and with most of this increase occurring since 1950, the effects of predicted rapid warming could prove catastrophic with increased intensity of heatwaves, longer drought periods and more severe weather (DES, 2019). Eight of Australia's top ten warmest years on record have occurred since 2005.




Temperature Predictions adapted from DES data




Temperature Predictions adapted from DES data

Day and night temperatures are rising, increasing the number of heat-related events with an increased length and severity of the fire seasons, especially in southern and eastern Australia.

The endemic flora and fauna are particularly vulnerable to projected climate change. For communities to suppress the risk of the increasing likelihood of more severe events, prevention, preparedness, response and recovery efforts will need to become more dynamic to suit the changing conditions.

Fire weather is a measure of fuel load dryness, and hot, dry and windy conditions. Across the Region, when and where a fire does occur, there is high confidence that fire behaviour will be more extreme.

# 10 Rockhampton Region Community Profile

The following statistics have been drawn from the RRC Community Demographic Data (.iD Community Demographic Resources, 2020).



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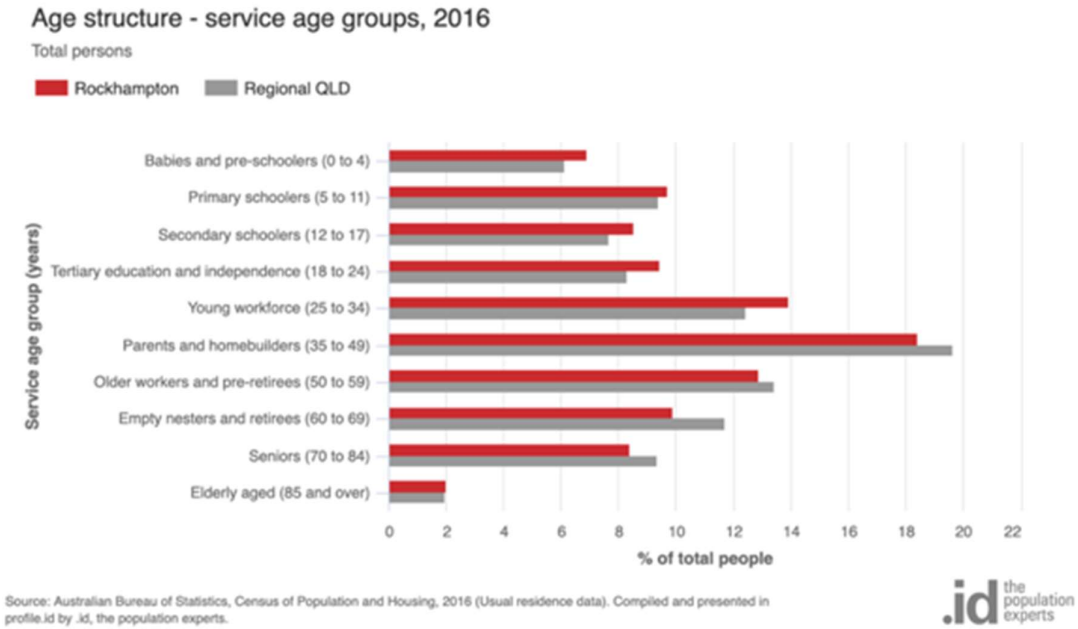
## 10.1 Age

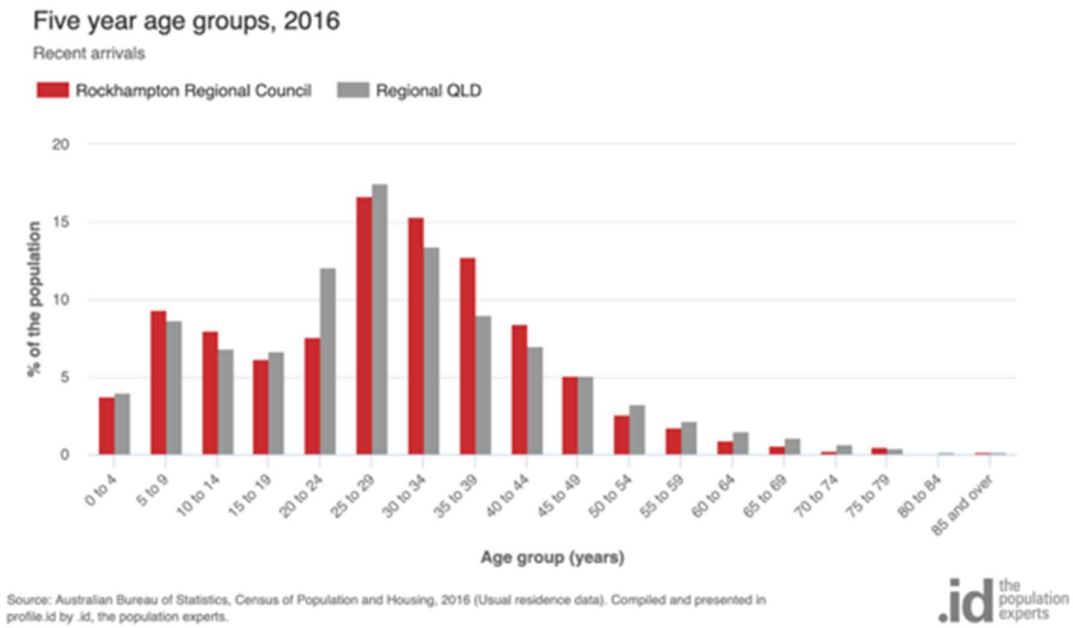
The estimated total population of 81,512 (2019), segmented by age group is as follows:




Total Population across age groups – Rockhampton Region. Source: .id

It is important to note from this data that there is a significant proportion (~45%) of the population aged between 0-17, and 60 and over. It is likely that this group will need assistance from family, community support groups or government, before, during and after a fire.

## 10.2 New Arrivals in the Community, by Age Group:




New Arrivals in the Community. Source: .iD

Across the Region, 1,796 people arrived in Australia within the five years prior to 2016. The largest of these age groups are adults aged 25-29. Those who have recently moved to the Region may not have experience with, or the knowledge and/or understanding of bushfires and bushfire risk.



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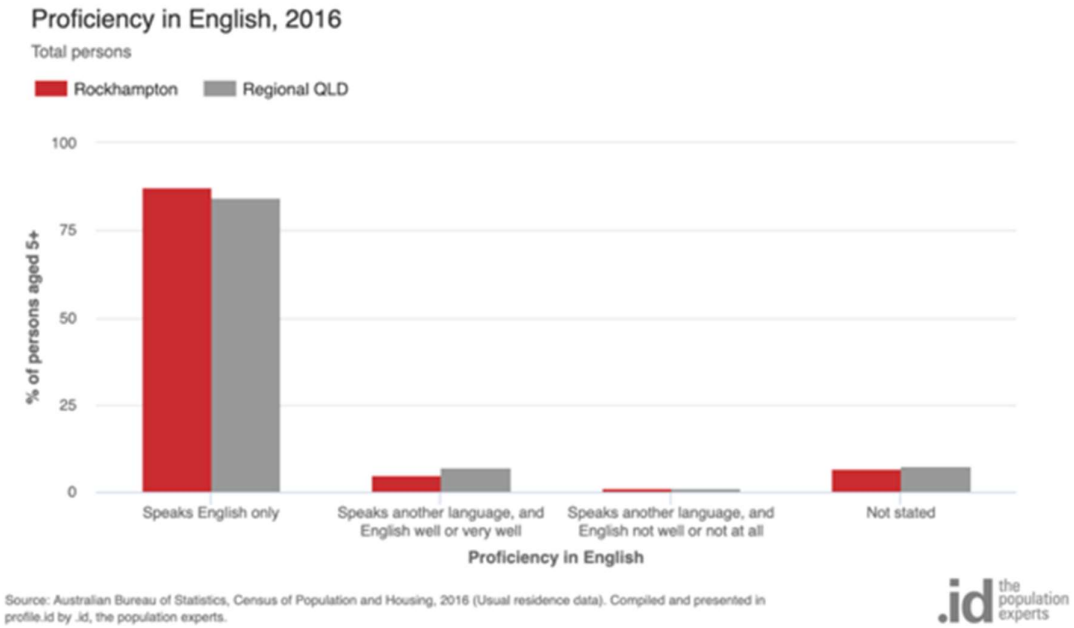
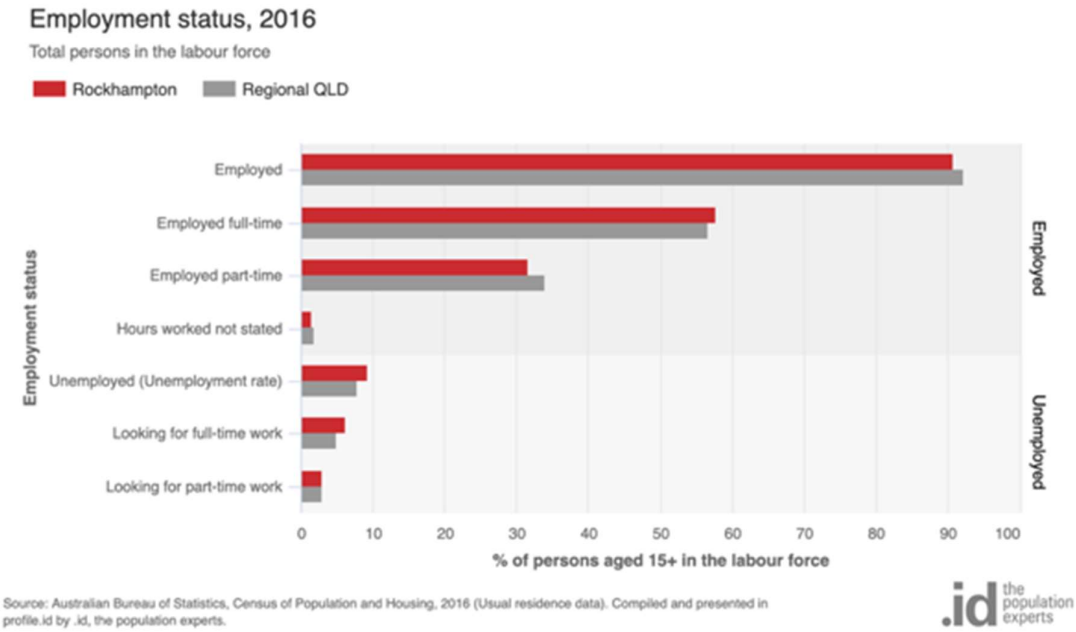
## 10.3 Language




Proficiency in English – Bushfire Messaging. Source: .iD

While it appears to be a small percentage (1.3%), it is important to note that 849 people have difficulty understanding English. This is an important consideration as the LDMG will need to consider how to either produce information in various languages and information that addresses any linguistically diverse groups within communities to ensure that bushfire messages before, during and after fires are understood.

## 10.4 Employment




Employment across the Rockhampton Region. Source: .iD

As shown in the previous graph, 90.8% of the population of Rockhampton Region are employed. Within the Study it was found that many people commute to work in the major centres across the Region, and therefore people may not be home during the day if fires occur, and/or may want to return to get belongings. This is important as this has an impact on the transport corridors used for evacuation.



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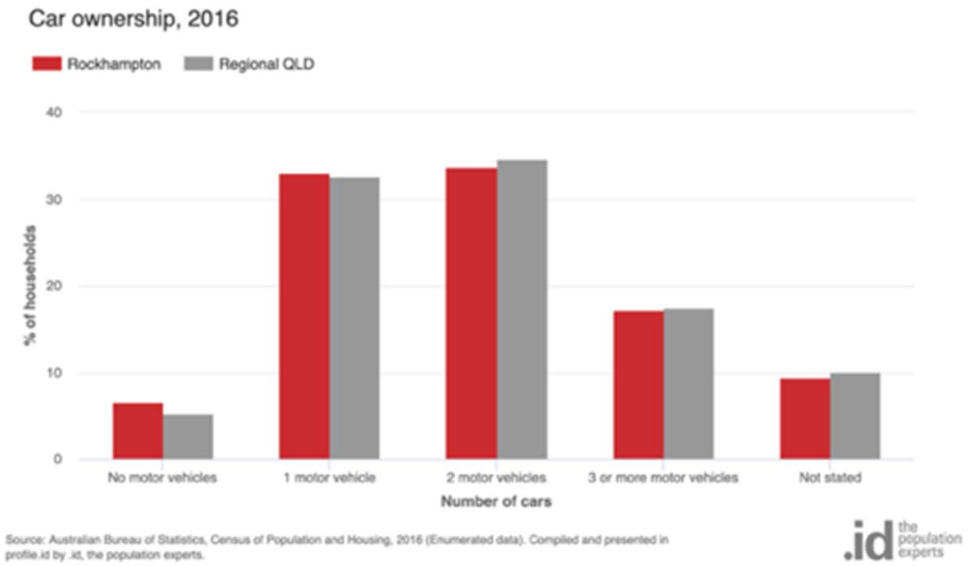
## 10.5 Transport




Access to Vehicles across the Rockhampton Region. Source:.iD

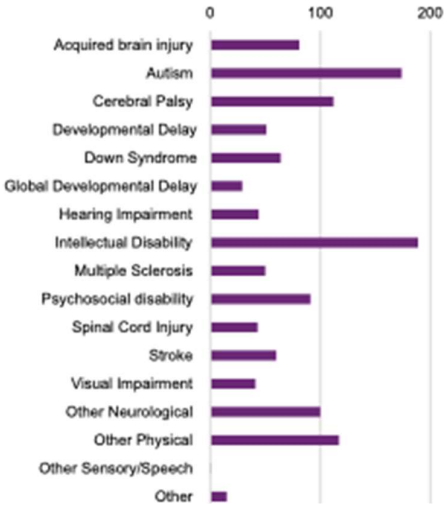
There is a relatively high number (6.6%) of the population without vehicles. In the event there is a need for evacuation, it is likely that this sector of the community will be reliant on other transport arrangements being available, if they are within designated evacuation zones.

## 10.6 Community with Disabilities

The data provided by the National Disability Insurance Scheme (NDIS) shows the range of the community across the Rockhampton Region with some form of disability or impairment.

During the Study, it was noted that RRC, on behalf of the LDMG, is committed to the Disability Inclusive Disaster Risk Reduction group (DIDRR). This group is increasing the integration of those most vulnerable in the community with RRC and various support organisations. The group is identifying how communities and organisations can best work with this vulnerable cohort to ensure their safety and welfare is managed.

The work of this group is critical to inform the LDMG to prevent injury or loss of life of those within this demographic. Leading edge work is occurring to support those requiring assistance in developing personal emergency plans and influencing care organisations to develop Business Continuity Plans (BCP). Intelligence from the Rockhampton DIDRR group would be of extreme benefit to feed into operational planning and strategies of the LDMG prior to and during events.




Disability Statistics across the Rockhampton Region (2019). Source: NDIS

# 11 Bushfire Risk Based Planning

## 11.1 Bushfire Prone Area Mapping

During 2014, the Commonwealth Scientific and Industrial Research Organisation (CSIRO) led a collaborative approach across the state and redefined the methodology for the calculation of bushfire prone land in Queensland.

This new methodology was developed to overcome a number of known limitations with the methodology described in Queensland's previous *State Planning Policy 1/03: Mitigating the Adverse Impacts of*



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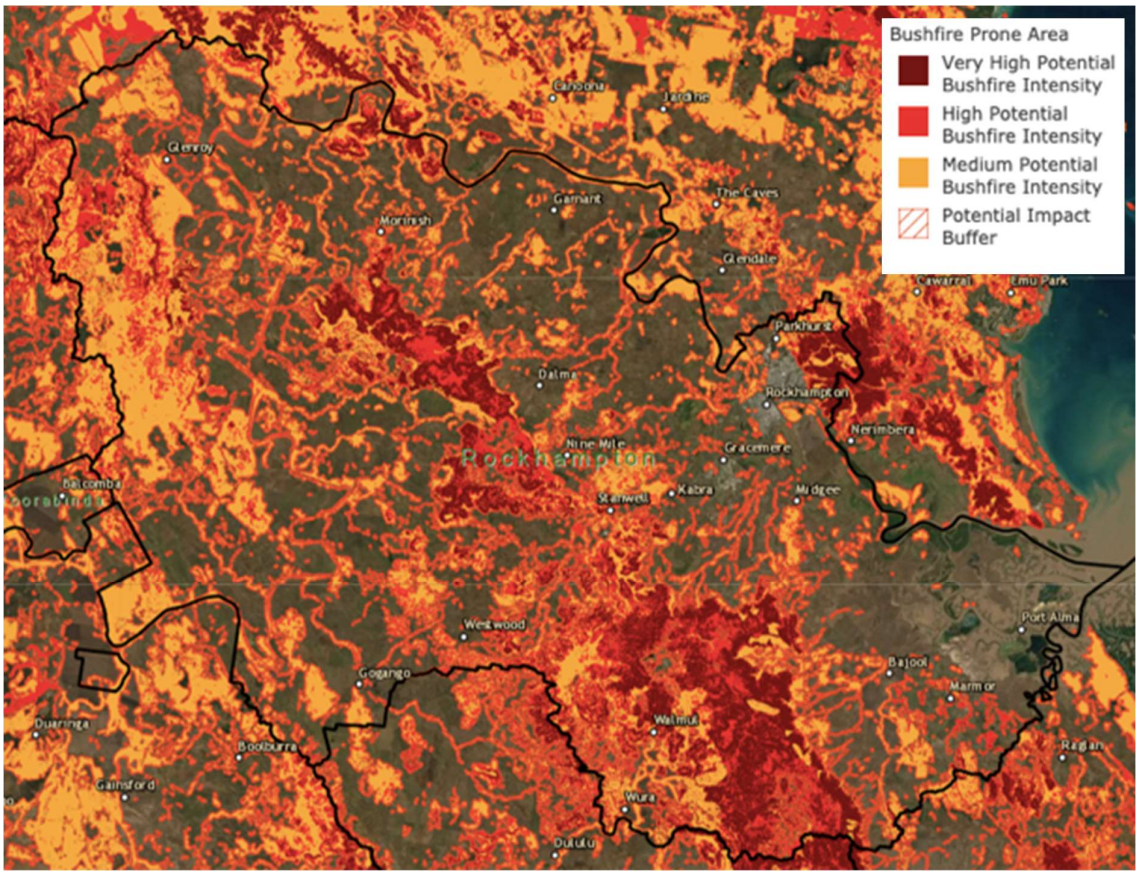
*Flooding, Bushfires and Landslides (SPP 1/03).* These limitations included the failure to account for regional variation of bushfire weather severity and an ambiguous weighting of hazard according to topographic aspect. (CSIRO, 2014).

In summary, the factors in determining bushfire prone land consider:

- Landscape Slope (Topography)
- Potential Impact Buffer (to assets)
- Vegetation types and hazard classes
- Potential fuel loading
- Fire weather severity
- Potential Impact Buffer.

As the lead agency for bushfire, QFES is responsible for bushfire prone mapping, and the Study considers the most current dataset released in 2017. The following map indicates Potential Bushfire Prone areas within the Region.




Rockhampton Region Bushfire Prone Area Mapping. Source: QFES (2017)

To localise this mapping, RRC further refines the data available from QFES with the addition of local information and corrections of state-wide mapping (for example, stakeholders advised that often roundabouts and other similar infrastructure is mapped as bushfire prone areas at the macro level).

RRC makes this information available to the public as overlay mapping in the Rockhampton Region Planning Scheme (*Rock e plan)* to provide the most accurate information for people already living in the Region or who are seeking to purchase and develop land.

# 12 Fuel Load Measurements Across the Region

Fire is influenced by three important factors: weather, topography and fuel. The principle of reducing the risk of rate, height and spread of a bushfire by reducing the amount of fuel available to be burned, is well established and supported.



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Throughout the Region, there is a multi-agency approach to fuel reduction prior to bushfire season. Site based assessments are carried out annually and assist in determining the responsibility, location, and timing of reduction activities.

The fuel load is a measure of how much fuel is present and available to burn with a different focus on the vegetation. For grassed areas, fuel load on the ground is considered. In forest areas, fuel load on the ground, elevated in the understory, and bark fuel needs to be considered. It is a combination of these fuels together that determines the overall forest fuel load. Crown fuels are not included in calculations but may be considered under certain conditions.

When fuel load is estimated, only items below a diameter of 6 millimeters are considered. Everything above this threshold is classified as coarse fuel and not considered as a contributor to instantaneous fire behaviour. Coarse fuel contribution is more relevant when reference is being made to a fire's residence time as it will continue to burn after a fire front has passed. The unit of measure used for fuel load is tonnes per hectare (t/ha) (New South Wales RFS, 2020).

The relationship between fuel levels and fire behaviour is important. The more ground fuel a fire can consume, the more energy it can produce. With that energy, more ground fuel is then conducive to fire travel through the canopy (known as crowning). In addition to crowning, it allows spot fires to be pushed ahead of the main fire front.

Fuel load measurements across the Region will never remain static. They will change based on mitigation activities, natural disasters and wildfire impact. An example of this was identified during the Study. A sample of fuel loading was taken in the area behind Norman Gardens and estimated to be 9t/ha. A later visit to the site found that QPWS&P had carried out hazard reduction in the area, and the fuel load had been reduced to 0t/ha.

For the purpose of The Study, the information from a coordinated field measuring program using the Department of Sustainability and Environment's '*Overall Fuel Hazard Assessment Guideline*' (CSIRO, 2014) was applied. This is shown in *Table 2.* The vegetation types are shown below with **potential fuel loading.** These are applied further in the Bushfire Management Mitigation Plan within the priority mitigation areas.

| Vegetation Class | Potential Fuel Load (t/ha) |
|---|---|
| **Melaleuca communities** | **33** |
| **Open forests / woodlands – shrubby** | **30** |
| **Tall open forests** | **28** |
| **Heath communities** | **27** |
| **Exotic and hardwood plantations** | **26** |
| **Cypress and Casuarina communities** | **20** |
| **Open forests / woodlands – grassy** | **19** |
| **Acacia communities** | **10** |
| **Coastal, fringing and dune communities** | **8** |
| **Riparian and fringing communities** | **8** |
| **Native grasslands, sedgelands and bald** | **5** |
| **Mixture of rural classes – mainly grassland** | **5** |
| **Cropping and horticulture** | **5** |
| **Dry vine forest and vine thickets** | **5** |
| **Hoop Plantations** | **5** |
| **Mixture of urban classes** | **3** |
| **Rainforest** | **1** |
| **Mangroves and saltmarshes** | **1** |
| **Sparse ground cover** | **1** |
| **Water bodies** | **0** |

*Table 2: Potential fuel load by vegetation class*



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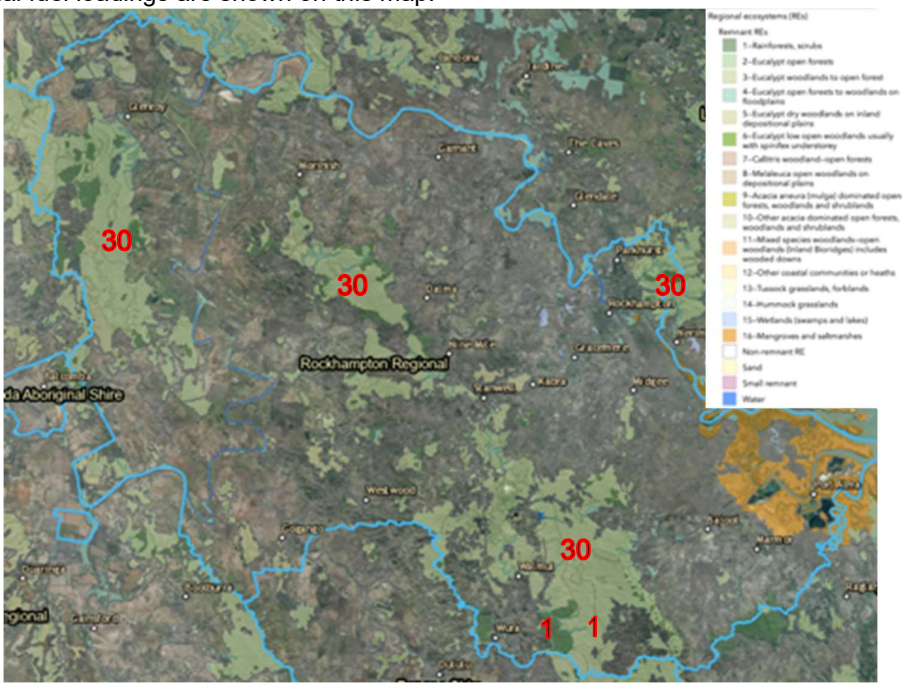
The potential fuel loadings are shown on this map.




Potential fuel loads across the Rockhampton Region.

## 12.1 Risk Profiling

Under the 2012 Rockhampton Regional Council Natural Hazards Risk Assessment, the approach to the management of risk taken by the LDMG was a process based on the *AS/NZS ISO 31000 Risk Management Standard.*

The QERMF was endorsed in August 2017 by the Queensland Disaster Management Committee (QDMC) as Queensland's approach to disaster risk management and it complements existing and widely recognised risk management standards. Disaster management stakeholders may use this approach in conducting their risk assessments.

In 2020, the LDMG began the process of utilising the QERMF to identify and manage its disaster management risk.

The QERMF provides a risk assessment methodology that can be used within disaster management planning at all levels of Queensland's Disaster Management Arrangements (QDMA). The process applies a standardised and internationally recognised approach to the prioritisation, mitigation, and management of risk. This includes the consistent identification and passage of residual risk between levels of the QDMA to directly inform planning and resource allocation and to promote active communication, cooperation and coordination (QFES, 2017).

By implementing the QERMF, the LDMG gains a greater understanding of their risk. The QERMF process applies a higher level of analysis to vulnerability and in doing so, the LDMG can better understand the impact and consequences of bushfire on Rockhampton Region's communities.

The QERMF articulates the risk as the *"percentage chance of the event occurring once in a year, which determines likelihood."* (QFES, 2017).

In applying the QERMF at the regional level, for the hazard of bushfire, the final score produces the Annual Exceedance Probability (AEP) as **59% (likely)** that this will occur once a year, based on the current trend. In line with the QERMF handbook, this score was used by examining the data in the QERMF Risk Assessment Tool, along with a range of desktop research to determine the history of bushfire across the Region and making an assessment of how many fires had impacted the Region over a certain time period.



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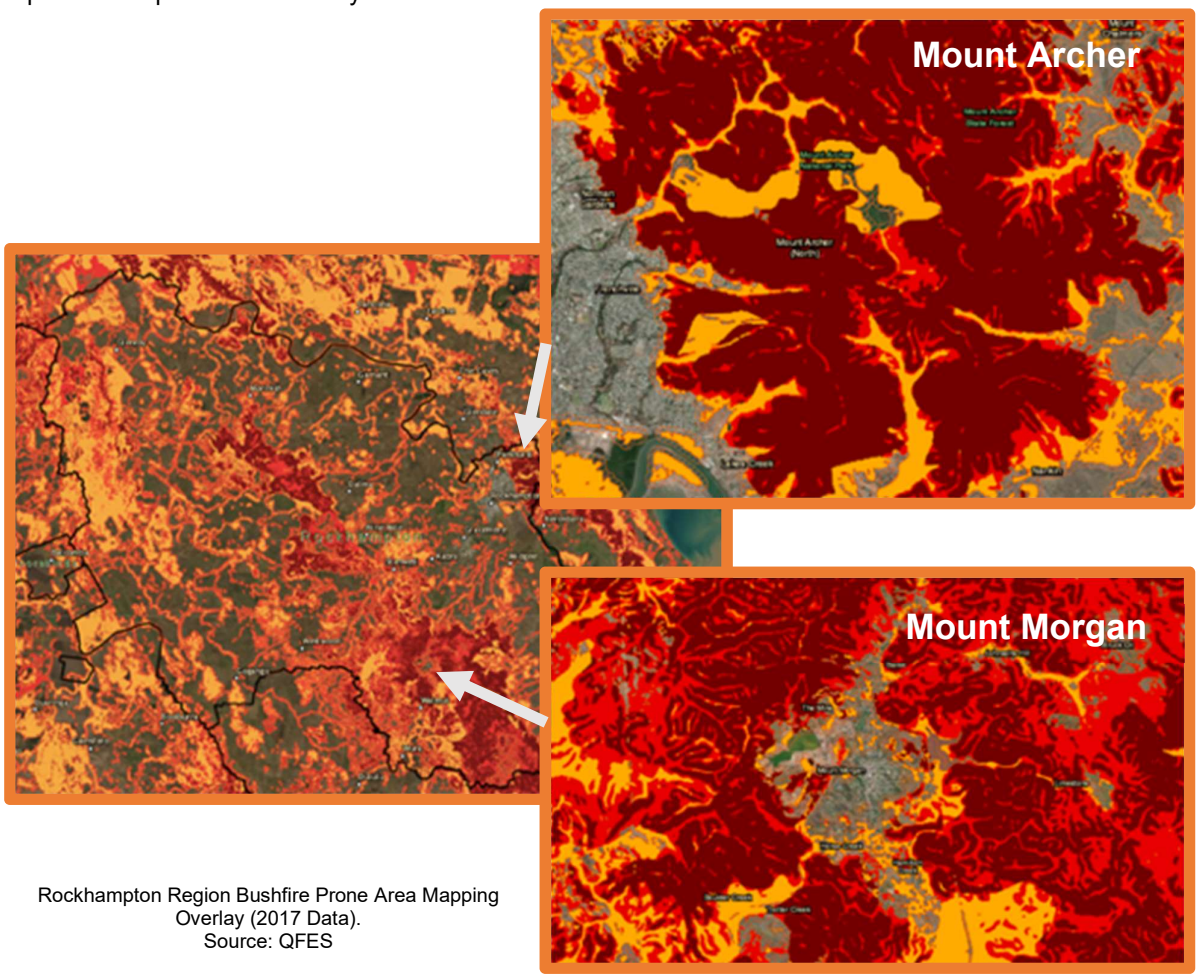
| Likelihood | Annual exceedence probability (AEP) | Average recurrence interval (ARI) (indicative) |
|---|---|---|
| Almost certain | 63% per year or more | Less than 1 year |
| Likely | 10% to <63% per year | 1 to <10 years |
| Unlikely | 1% to <10% per year | 10 to <100 years |
| Rare | 0.1% to <1% per year | 100 to <1000 years |
| Very rare | 0.01% to <0.1% per year | 1000 to <10,000 years |
| Extremely rare | Less than 0.01% per year | 10,000 years or more |

QERMF Risk Assessment. Source: QFES

## 12.2 High Risk Bushfire Communities Across Rockhampton

Using the above methodology and applying the focus of the LDMG on the impact and consequence of bushfire on the community, the data is clear that the two highest risk areas for the LDMG are the Mount Archer and Mount Morgan areas. This is also supported in research by fire history and arson trends that have been identified. Goodedulla National Park was identified as the third highest risk area, for its potential impact on the Fitzroy Northern Area communities.




Rockhampton Region Bushfire Prone Area Mapping Overlay (2017 Data).
Source: QFES

Key areas of risk across these regions derive from a mixed land tenure of:

- Roadside Vegetation
- Significant National Park assets
- High fire frequency rural lands
- Farming land



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- State Forest
- Unallocated State Land.

These lands are managed by private landowners, member agencies of the LDMG, and other landowners and managers.

From an LDMG perspective, considering the community risk profiles for the Mount Archer area and Mount Morgan area, the consequences of bushfires within these areas are significant.

From an evacuation perspective, research and interviews conducted with stakeholders show that residents from the Mount Archer area would likely need to be moved through the City to the Rockhampton Showgrounds, and that residents from the Mount Morgan area would likely move to one of the local schools.

Given that 23,635 residents live in the Mount Archer area (Mount Archer, Frenchville, Norman Gardens, Koongal and Lakes Creek localities) and 2,928 live in the Mount Morgan area (Moongan, Leydens Hill, Baree, Walterhall, The Mine, Struck Oil, Limestone, Nine Mile Creek, Walmul, Trotter Creek, Fletcher Creek, Wura, Oakey Creek, Boulder Creek localities) as per the 2016 Census, this represents approximately 32% of the population who could be directly or indirectly impacted by bushfires. This is an important consideration for the LDMG.

Based on the assessment of the risk for these communities, RRC, on behalf of the LDMG, recently developed localised evacuation plans for the Mount Archer and Mount Morgan communities:

- Bushfire Evacuation Plan – Mount Archer (BEP-MA)
- Bushfire Evacuation Plan – Mount Morgan (BEP-MM).

Using the methodologies as discussed in Bushfire Prone Land Mapping, the rationale on why these two communities are determined to be the highest risk are shown in *Table 3:*

| Bushfire Prone Factor | Mount Archer | | Mount Morgan | |
|---|---|---|---|---|
| **Landscape Slope (Topography)** | ✓ | The Berserker Ranges and Mount Archer itself lend itself to a high degree of slope, particularly to the summit. | ✓ | The sloping ranges of Boulder Creek, Spring Downs, Wild Horse, Gainsford, Ferndale, Car-Lyn and Glen Garry provide a valley system around Mount Morgan which is conducive to fire spread. |
| **Potential Impact Buffer (to assets)** | ✓ | The QFES mapping of assets and buffer zones exists along the western edge of Norman Gardens all the way through to Lakes Creek. | ✓ | The QFES mapping of assets and buffer zones exists through Struck Oil, around Mount Morgan itself and down to Nine Mile. |
| **Vegetation types and hazard classes** | ✓ | Eucalypt – Open Forest. Whilst tree canopy is not heavy, there is potential for crown fires to occur. | ✓ | Eucalypt – Open Forest. Whilst tree canopy is less than at Mount Archer, the potential for ember attack within the valley system is greater. |
| **Potential fuel loading** | ✓ | 1-30 t/ha | ✓ | 1-30 t/ha |
| **Fire weather severity** | ✓ | BoM data shows days of very high to extreme fire danger days in the past 5 years. | ✓ | BoM data shows days of very high to extreme fire danger days in the past 5 years. |
| **Potential Impact Buffer** | ✓ | Exists along the urban interface and at the summit. | ✓ | Exists within the town and in remote areas outside of the town. |

*Table 3: High Risk Rationale – Bushfire Management – Rockhampton Region*



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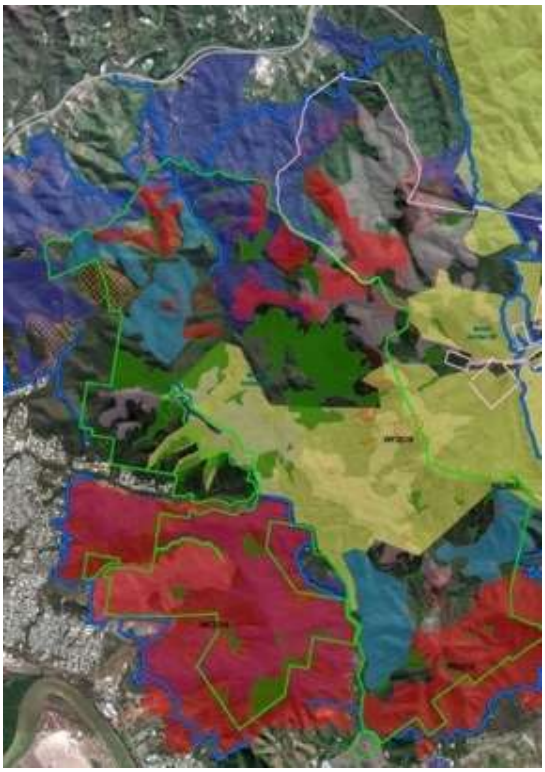
From a critical infrastructure perspective, there is significant community, telecommunications and power assets in both locations which could be impacted by fire.

The Mount Archer summit is the highest risk area within the Region when considering community consequence. The 2009 fire was the largest of the Region in recent history, engulfing much of Mount Archer and the Berserker Ranges and destroying one residential property. Other fires in 2018 and 2019 were of significance and led to 'Prepare to Leave' messages being issued to the community. The communities reflected on their stories during the development of the recent BEP-MA, and some of this feedback is featured throughout this report.

Evidence suggests many of the bushfires which have developed in the Mount Archer and Berserker Ranges area are the result of arson, recreational campfires or escaped controlled burns. Stakeholders who have spent many years firefighting on Mount Archer and the Berserker Ranges advised that the September school holidays has the most significant increase in fire frequency and activity.

Across the Mount Archer and Berserker Ranges area, agencies undertake a range of activities to mitigate bushfire risk, including:

- QFES conducts regular community education activities.
- QPWS&P conducts mosaic hazard reduction burning in a 1:4-year ratio and attempts to reduce fuel on ridgelines annually.
- RRC maintains Pilbeam Drive to a condition that is conducive to it being an evacuation route.
- QPWS&P installed wet line on Pilbeam Drive which can slow fire spread.
- QPWS&P undertakes studies of fire-scar activity across the Mount Archer area, with the last three years shown in the image to the right.
- QPWS&P and RRC undertake strategic fire trail and access works.



Mount Archer and Berserker Ranges Burn Scars (2016-2019). Source: QPWS&P

Stakeholders spoke about the effectiveness of the above mitigation programs in reducing the bushfire risk across Mount Archer and the Berserker Ranges. Evidence of this can be seen through the loss of only one asset throughout the 2009, 2011, 2018 and 2019 bushfire seasons and proves the capability of crews from the QFES and QPWS&P in controlling fires in the Region.

Whilst Goodedulla does not have a community per se, there is a high risk of it impacting neighbouring communities in the Fitzroy Northern Area. Stakeholders provided evidence that there is mitigation occurring in the area, and good cooperation with neighbours. The reserve is shared by Central Highlands Regional Council (CHRC) and there is a potential for high fuel loads at time. Campers in the reserve present a risk during heightened fire danger in addition to fire spread outside the reserve and into the communities to the east.

# 13 Potential Ignition Sources for Fires

Research conducted as part of the Study, and stakeholder interviews, indicate the main ignition sources for fires across the Region are:

- Escaped Burns from private property hazard reduction
- Arson
- Careless activity on very high fire danger days.



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Stakeholders spoke about careless activities, such as welding or pile burning, that occur across the community on very high and above fire danger days, which then escape and start fires.

QPS advised, and supported by research, that there is an increased ignition risk in the Mount Morgan area with arson, and fire fascination.

Research shows that people have been prosecuted and fined for all of these activities.

# 14 Bushfire History across the Region

Research was undertaken to find data to confirm the risk score from the QERMF. Reviews of previous studies, media reports, fire scars (which do not delineate between hazard reductions or fires), and available Geographic Information System (GIS) layers to determine bushfire history, occurred.

The hills and sloping land surrounding Mount Morgan, from Bouldercombe in the north to Fletcher Creek in the south, experienced significant fires in the 2005, 2009, 2010, 2011 and 2012 fire seasons (RRC, 2014).

*"Since 2014, fires have continued to increase across the region, with the most recent fires occurring in 2018 and 2019. The most significant fire, from a potential community consequence perspective, in recent times was the Kabra – Stanwell fire in 2019.*

*The Stanwell, Kabra and Gracemere areas are primarily grazing land. Some pastures, however, were suffering from a grass disease and conditions were generally dry. Although Gracemere had not been drought declared, the town had received well-below average rainfall in 2018. On 25th November 2018, the RRC area was experiencing an extreme heatwave with the temperature reaching 41.5°C.*

*In Stanwell, a previously extinguished fire on private property reignited on 26th November and QFES assistance was requested. A fire ban was issued for the Rockhampton local government area from 01:00hrs on 27th November 2018.*

*On 28th November, under 'Catastrophic' conditions, the fire quickly became uncontrollable. Aircraft were used for water bombing and to collect information for predictive modelling. These aerial assets were available due to QFES' arrangements with the National Aerial Firefighting Centre.*

*By the afternoon of 28th November, the fire was advancing in the direction of Gracemere and its 11,300 residents. The combination of low humidity, below average rainfall, dry pastures, above average temperatures, and very high winds created an ideal environment for the rapid spread of the fire.*

*QFES Fire Behaviour Analysts, in partnership with other agencies, used predictive analytic modelling software to map the potential path of this fire. In this case, the BoM provided predictive weather information, which QFES used to produce the overlays within simulation products. The modelling showed the fire was likely to impact the Gracemere township, particularly from ember attack, by 17:00hrs that day.*

*At 15:16hrs on 28th November, QFES advised that evacuating the town was necessary to prevent loss of life. Thousands of residents heeded the advice and chose to leave. The predictive analytics imagery was released to the media to support a greater understanding of the need for evacuation.*

*The predictive analysis conducted by the QFES Fire Behaviour Analysts indicated the fire would not impact Rockhampton, therefore preventing unnecessary disruption of the Rockhampton community from evacuation"* (QFES, 2019).



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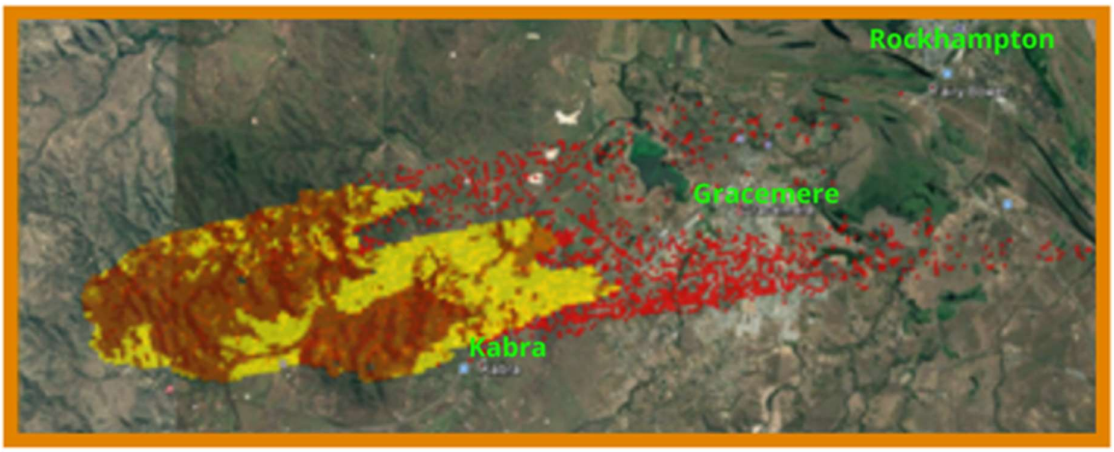


Further details from the research conducted regarding major fires over the past 11 years are found in Annex B.

Bushfire Risk Profiles, which factors in fire history, have been developed for each community and are provided at Annex D.

# 15 Community Understanding of Bushfire Risk

*"Individuals and communities play a role in their own preparedness, but governments should educate people and provide accessible information to help them make informed decisions and take appropriate action. This is necessary because managing disaster risk is inherently complex."* (Finding 10) (The Royal Commission, 2020)

Initially, as part of the Study, community engagement was to occur through a range of face-to-face community meetings. Due to the constraints of COVID-19 this was not possible but fortunately there was sufficient data available from previous community engagement activities to determine the communities' level of their understanding of bushfire risk. Reviews were conducted on the following information:

- Data collected from the 2020 Community Engagement Survey – Bushfire Evacuation Plan – Mount Archer *(n=29)*
- Data collected from the 2019 Operation Knock Knock (conducted 4th August 2019 by QFES in Gracemere) *(n=66)*
- Data collected from a Community Survey conducted by RRC as part of research for the Study and QERMF project *(n=35)*. Respondents to this survey were from:
    - Allenstown
    - Berserker
    - Bouldercombe
    - Depot Hill
    - Frenchville
    - Gracemere
    - Kabra
    - Koongal
    - Norman Gardens
    - Rockhampton
    - Parkhurst
    - West Rockhampton
- Data from IGEM *Report 2: 2018-2019 The 2018 Queensland Bushfires Review (n=301)*

Based on this data the evidence shows there is general bushfire awareness in the communities. Despite this, the awareness is not at a level that demonstrates the community fully understands. Issues such as the risk of bushfire, it's devastating effects, and the impact that weather has on fire, needs better awareness.



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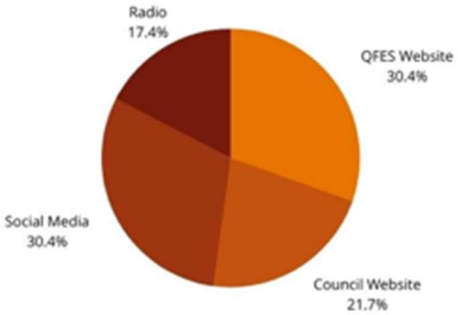
Residents from Gracemere remain anxious about the threat of bushfire. This was demonstrated on 5th October 2020 when a small grassfire broke out and burnt towards fence lines. Research showed residents advising the media they had packed a box and left. Given there was no official advice from QFES that evacuation was necessary, this is considered another marker for the lack of community understanding of the bushfire risk.

Breakdown of the data from the above examples is shown here.

## 15.1 Data Overview

### 15.1.1 Preparedness

- In the 12 months prior to the 2018 fires, 51% of residents within Gracemere recall getting advice on bushfire preparedness, while 43% did not, and 6% were unsure.
- Of the 51% of Gracemere residents who did receive information, 32% felt very confident and 38% were confident that they would be able to prepare for a bushfire based on that information. It had no impact on 30% of the community.
- 69% of the Gracemere community reported they did not have a bushfire plan. 29% of the community said they a bushfire plan prior to the fire, with, 2% unsure.

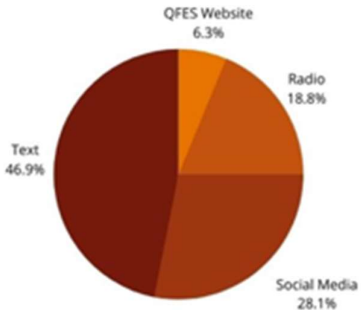


Information Source most used by the community – preparedness.
Source: QFES

- 68% did not have a bushfire evacuation kit, 31% of Gracemere respondents stated they had a kit, and 1% were unsure.
- In one study, over 50% of Mount Archer residents indicated a lack of understanding about what fire ratings mean or how these relate to risk.
- In Mount Archer, only 8% of survey respondents felt they were not prepared for bushfire.
- 39% of respondents to the Study's Community Survey listed bushfire as a risk to them and their community.
- 54% of respondents to the Study's Community Survey felt that natural disasters, such as bushfires, will increase in the future.
- 51% of respondents to the Study's Community Survey undertake preparatory activities for bushfire on their properties.
- 23% of respondents to the Study's Community Survey reported they live in a bushfire area and reported having a bushfire plan.

### 15.1.2 Response

- 60% of Gracemere Residents used bushfire advice during the bushfires, 29% did not, and 11% were unsure if they did or not.
- There was confusion regarding the ratings and their application to conditions rather than fires themselves, for example: *"Evacuation will be necessary in case of severe fires"* indicates the respondent thinks the rating is about a fire, not conditions.
- In the Mount Archer study, Councillors reported that there was community confusion about the meaning of warnings.
- 98% of residents in Gracemere understood the intent of the Emergency Alert Message, however only 66% took action on receipt of these messages.



Information Source most used by the community – Gracemere Fire.
Source: QFES

- 35% of Gracemere Residents had an understanding of their local evacuation plans – where and when to go.

### 15.1.3 Recovery

- 70% of residents in Gracemere reported getting sufficient information to return home and transition back to normal and into a recovery phase.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# 16 LDMG Bushfire Management Accountability

The Study outlines the roles and responsibilities of bushfire management stakeholders to ensure stakeholder engagement focused on those accountable for actions under the Bushfire Management Strategy (2021-2025) and Bushfire Management Mitigation Plan (2021-2025). This also ensures that the LDMG structure is in line with the updated accountabilities under the QBP.

## 16.1 Prevention

The LDMG's role is to:

- Ensure fire management groups interact with the LDMG to facilitate effective bushfire management across all phases.

A key priority for Fire Management Groups is the presentation of the below to their relevant disaster management group (QFES, 2020b):

1. Seasonal bushfire risk outlook
2. Identified areas of bushfire risk
3. Mitigation activities planned and undertaken
4. Residual risk remaining at the conclusion of mitigation activities. LDMGs will use this information to inform the Local Disaster Management Plan (LDMP) and manage areas of residual risk in relation to bushfire.

The focus of Fire Management Groups was considered and discussed at length with stakeholders during the study. The QBP discusses the ability for Locality Specific Fire Management Groups (LSFMGs) to be formed based on geography across Queensland. This is a new concept which seeks to provide a more localised planning framework for bushfire management.

During the Study, stakeholders advised that there is a strong desire to pursue the establishment of a number of these LSFMGs. The two areas identified initially were Mount Archer and Mount Morgan.

The Study identified ambiguity in the governance arrangements and clarification was sought from the Office of the Assistant Commissioner, Rural Fire Service, QFES, who advised:

- Any LSFMG that is established requires a Chair.
- LSFMGs do not require a QFES officer to be the Chair, they are the exception.
- To appoint a chair of an LSFMG, a letter to the Commissioner, QFES is required outlining the nominated Chair's qualifications/suitability to perform the role. There also needs to be endorsement from the Chair of the relevant Area Fire Management Group (AFMG) and this endorsement should also be included in the letter.
- Before LDMG, the LSFMG reports to the AFMG. The Chair of the AFMG liaises with the relevant LDMG.

A stakeholder meeting was held during the study period between QPWS&P, RRC and QFES where the LSFMGs were discussed. QFES noted that they are currently developing localised governance arrangements for LSFMGs. There was a strong commitment from stakeholders at this meeting to trial a LSFMG at Mount Archer in the near future.

RRC Disaster Management Unit (DMU), Civil Operations (CO) and Parks Operations (PO) representatives should continue to attend FMGs. This is based on their KPIs to mitigate fire risk and land management responsibility.

## 16.2 Response

Some bushfires may result in Queensland's Disaster Management Arrangements being enacted. Activation of these arrangements is not dependent, on a disaster declaration, it is determined by the respective disaster management group (DMG) in accordance with their plans. In this situation, **QFES remains the primary agency for bushfire response** and coordinates with the disaster management groups that have activated (QFES, 2020b).



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### 16.2.1 Incident vs. Community Consequence Management

In the event that a disaster is declared, pursuant to the *Disaster Management Act 2003*, the relevant **disaster management group is responsible for managing the bushfire event**. QFES provides the firefighting capability to enable the disaster management group to effectively manage the event (QFES, 2020b).

As these statements could be misinterpreted, clarification was sought from the Office of the Assistant Commissioner, Rural Fire Service, QFES, who advised:

- The change is reflected in the shift in responsibility for the event from QFES to the LDMG. This responsibility is the same as that which rests with the LDMG when a disaster is declared in response to a cyclone/flood/severe weather event.
- Within the bushfire context, visibly/practically there would be little change.
- Whilst the LDMG is ultimately responsible for managing the event (bushfire), they will be reliant on the specialist skills, knowledge and equipment provided by other agencies, such as QFES.

### 16.2.2 Public Information

Public Information, separate to warnings, is coordinated by Public Information Officers stationed at operation centres at the incident, regional and state level.

Coordination and consistency of public information is a key element for response and is enabled through liaison of operation centres coordinating the firefighting response and relevant disaster management groups and their coordination centres.

In the event that a **disaster declaration is made, responsibility for Public Information shifts to the relevant disaster management group**.

At the State level this may result in the activation of the Crisis Communication Network and the Public Information Capability (PIC) within the State Disaster Coordination Centre (SDCC).

As these statements could be misinterpreted as the LDMG is responsible for running the fire after a disaster declaration, clarification was sought from the Office of the Assistant Commissioner, Rural Fire Service, QFES, who advised:

- Location of Public Information Officers: they will be located in both the Incident Control Centre (ICC)/ Regional Operation Centre (ROC) and the Local Disaster Coordination Centre (LDCC), as there will need to be a link between the locations. They will work in very close collaboration to ensure a suitable level of coordination.
- Emergency Alerts: irrespective of whether a disaster is declared or not, the responsibility for Emergency Alerts **remains with Queensland Fire and Emergency Services**. The Local Disaster Coordinator can request, through the QFES Advisor (usually the Emergency Management Coordinator, QFES), for an Emergency Alert campaign to be delivered. In making the decision to request an Emergency Alert, the Local Disaster Coordinator (LDC) should be consulting with the Incident Controller.
- Responsibility for managing the event, as established by the *Disaster Management Act 2003*, does not mean the LDMG/LDCC needs to undertake all required functions. QFES has well-practiced protocols for bushfire warnings and Emergency Alerts and should be applied and highlighted in a local plan. The focus should be on coordination and consistency of messaging between QFES and the LDMG. This can be achieved by clearly articulating the role of each entity with respect to the Public Information and Emergency Alert, in the relevant plan, achieving the responsibility mandate.

### 16.2.3 Evacuation Management

- In a bushfire response, where a disaster declaration has not been made, the Incident Controller is responsible for making the decision to evacuate, pursuant to the *Fire and Emergency Services Act 1990*. This decision should be made in consultation with other supporting agencies and relevant DMGs (if activated), when possible.
- In the event that an emergency situation is declared pursuant to the *Public Safety Preservation Act 1986*, the QPS Emergency Commander authorises any necessary evacuation, in consultation with other supporting agencies and relevant DMGs (if activated).



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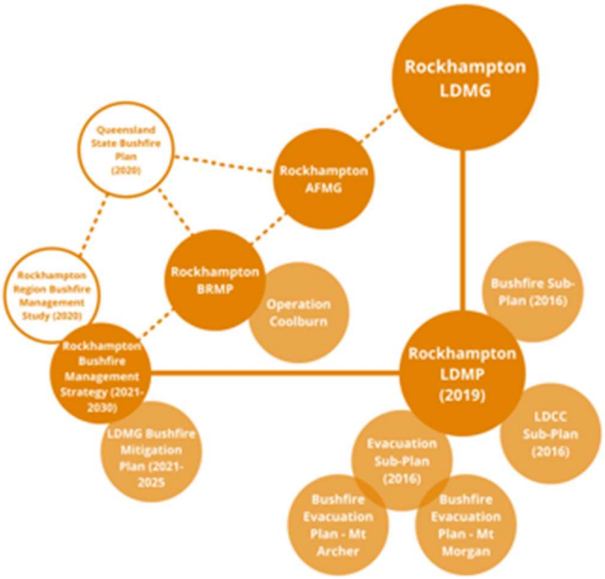
- In the event that a disaster is declared, the District Disaster Coordinator (DDC) authorises any directed evacuations and exercises any statutory powers pursuant to the *Disaster Management Act 2003*, which are required to enable the evacuation. This is done in consultation with the LDC of the relevant LDMG and other supporting agencies. (QFES, 2020b)

### 16.2.4 Management approaches

During the study period, stakeholders showed a good understanding of their roles and responsibilities. What comes with this is also is the acknowledgement of the QBP and additional focus prescribed on the relationship between the LDMG by QFES.

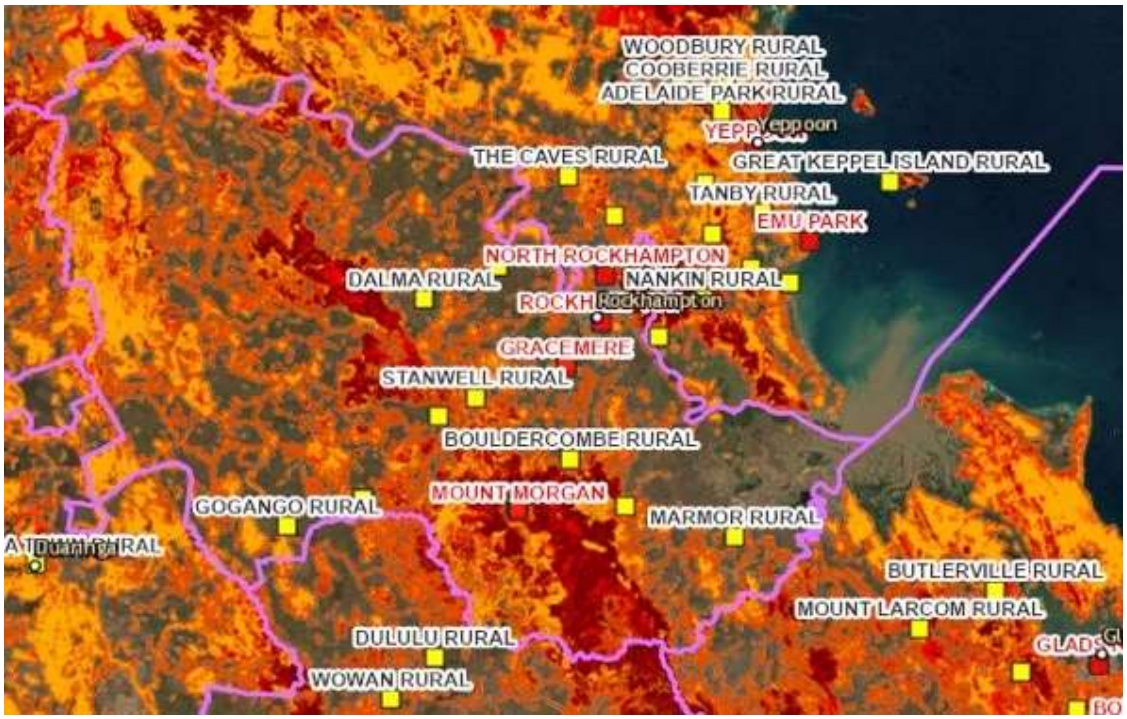
Agency and disaster management groups develop plans under the Governance Arrangements for the Rockhampton LDMG, shown in this image.




Rockhampton Region Bushfire Planning Arrangements and Groups

# 17 Fire Fighting Capability Across the Region

The LDMG area is serviced primarily through the QFES streams of response, these being Fire and Rescue Service (FRS), located at North and South Rockhampton, Gracemere and Mount Morgan; and Rural Fire Service (RFS) brigades, as identified on the map below.




Map of Fire and Rural Fire Stations across the Region. Source: QFES

In addition to QFES, firefighting capability exists within:

- QPWS&P
- DoR.



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These agencies primarily work on hazard reduction activities but may also be called in to undertake low-risk firefighting operations.

The Study also notes the increased aviation capability that QFES can provide, including a large air tanker, in Bundaberg. This could assist with major fires in the Region, with less than one-hour dispatch time (note: longer turn-around time due to loading requirements).

# 18 Bushfire Activities aligned with the QBP

The following section looks at the current activities related to bushfire management that the Rockhampton LDMG membership agencies are undertaking, aligned to the QBP.

## 18.1 Land Use Planning

Land Use Planning and development has the greatest potential to implement prevention and mitigation measures and facilitate the response to bushfire (QFES, 2020b).

Research indicates Land Use Planning and Development Assessment in Queensland is administered under the *Planning Act 2016* and the *Planning Regulation 2017*. This is further detailed in the *State Development Assessment Provisions, State Planning Policy (SPP)*.

RRC currently provides the planning and development scheme, which sets RRC's intention for future development over the next 20 years, in its Rockhampton Region Planning Scheme.

The Study also reviewed RRC's neighbouring councils' planning schemes of:

- Livingstone Shire Council (LSC)
- Central Highlands Shire Council (CHSC).

RRC appears to use the same technology as LSC and CHSC for the *e plan.* It is a user-friendly system that allows the community to view the planning scheme and access information on land use and rules, including bushfire prone land.

Incorporated into the Rockhampton Region Planning Scheme is the bushfire hazard overlay map and code that provides detailed information on areas of land within the Rockhampton Region which have been, or could be, impacted by a bushfire. It also seeks to ensure that new development and redevelopment either avoids, or becomes increasingly resilient to, bushfire. This will be achieved by:

- Progressively reducing the intensity of development in bushfire hazard areas over time.
- Clearly specifying the appropriate bushfire protection measures required for new development.
- Avoiding further subdivision of land for urban use in bushfire hazard areas, where risk cannot be mitigated by design, siting and layout.
- Protecting and retaining bushfire hazard areas that contribute to the natural environment and landscape through their environmental and scenic amenity values.

The Study found that Land Use Planning was in line with the code, however the application of bushfire consequence management is not directly considered when zoning land for public use.

When zoning land, surrounding land parcels need to be considered through the development lens. For example, the Mount Morgan Mountain Bike Trail currently being constructed by RRC, has potential to be opened to the community, however, has limited ability to be closed during extreme or catastrophic fire dangers.

Ensuring that land surrounding public use areas are available to construct fire access lines or trails, from both a zoning and environmental aspect, is important.

Stakeholders advised that there are plans to update the land use planning maps in 2021.

## 18.2 Development Control

RRC has an approved the Rockhampton Region Planning Scheme. This Scheme supports bushfire mitigation strategies through Land Use Planning and development. It currently applies to all those seeking to purchase and/or develop land across the Region.



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RRC provides an online mapping portal (*Rockhampton e Plan*) to assist people making decisions in relation to land use and planning. The Study found that the application of the code and standard is being performed well and notes the work programmed for 2021 which is to update the bushfire planning policy and bushfire prone land mapping.

A common requirement for approval of Development Applications is for the developer to provide a Bushfire Management Plan (BMP). This needs to be in line with RRC's *SC6.5 – Bushfire Management Planning Scheme Policy*, of which some of the conditions include:

- Identifying strategies for mitigating the impacts of bushfire on life, property and the environment. This includes identifying specific risk factors associated with the development, planning for the separation of at-risk elements and potential hazards, and providing access and treatments to facilitate an effective response to bushfire.
- The identification and mitigation of bushfire hazard risk by a qualified technical expert.
- Once the score has been determined, a qualified person is then required to develop a BMP which includes, at a minimum, the requirement to consult with RRC, the responsible RFS and/or FRS, and managers of adjacent parks or reserves (RRC, 2020).

BMPs for development applications consider:

- Likely fire direction
- Environmental values which may be affected by mitigation, appropriate evacuation routes or safety zones
- Nature of activities to be conducted on the site
- Likely number of residents on site, in the case of bushfire warnings and evacuation options
- A plan for mitigating risks for bushfire on the site (RRC, 2020).

When comparing the bushfire planning policy of RRC to LSC and CHRC, the RRC policies appear to provide more guidance to those developing, however does not explicitly define the tolerable risk that RRC will accept.

The *Australian Standard 3959 – Construction of buildings in bushfire-prone areas* is a reference point in relation to the technical specifications on sound bushfire prone development.

RRC localises these arrangements through the Rockhampton Region Planning Scheme and the bushfire overlay code details self-assessable and assessable provisions for:

- Types of development allowed
- Access requirements for evacuation and emergency services purposes
- Firefighting water supply requirements.

Stakeholders also raised concerns regarding the currency of the BMPs. BMPs are conducted at a point in time, generally when a development application is approved. They are not reviewed over time, nor when land tenure changes.

There is opportunity to further explore this with the 2021 review of the Bushfire Policy. There is an opportunity to adopt a requirement for the BMP to be updated upon sale of the land. This is beneficial for both bushfire resilience and education, particularly where the person buying the property is new to the area and may not be aware of the bushfire risks.

Building within the bushfire prone area is legislated in the *Building Act 1975 Queensland Development Code*, which is also informed by the National Construction Code (NCC).

## 18.3 Land Management

Land ownership across the Rockhampton Region is dispersed across a number of entities, however, the bushfire management responsibilities are the same for all. Under the QBP, land managers have the following preventative functions:

- Identify bushfire risk on their property
- Enact mitigation strategies such as reducing fuel load, clearing, and maintaining fire trails (QFES, 2020b).

*The Fire and Emergency Services Act, 1990* outlines the responsibilities of land managers, which includes:



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- Immediately taking all reasonable steps to extinguish or control a fire
- Reporting the existence and location of a fire
- Complying with requirements from the Commissioner, QFES to reduce the risk of fire occurring on the premises.

Additionally, the LDMG has the responsibility to:

- Coordinate bushfire risk-mitigation strategies for the local government area, in consultation with the AFMG
- Manage residual bushfire risk
- Report residual bushfire risk to the Rockhampton Region DDMG, where appropriate. (QFES, 2020b)

*"Governments also own and manage land, property and other assets, including state forests and national parks, government buildings, and some critical infrastructure. Governments must manage risks to these assets, just as businesses and individuals must manage risks to their own assets."* (Finding 9) (The Royal Commission, 2020)

### 18.3.1 Hazard Reduction

Based on research, the following are examples of hazard reduction techniques, with some advantages and disadvantages of each, and their application across the Rockhampton Region. This is shown at *Table 4* below:

| Technique | Advantages | Disadvantages |
|---|---|---|
| **Prescribed Burning**<br><br>***A Permit to Light Fire is required to undertake a planned burn except where a legislative exemption applies*** | • Reduces the risk of bushfire impacts on adjacent assets.<br>• Reduces the size and intensity of bushfires in the landscape.<br>• Maintains, promotes or inhibits ecological processes.<br>• Controls weeds.<br>• Supports economic activities such as timber production and pasture regeneration. | • Can be resource-intensive to plan and execute and can take a significant amount of time to consider the environmental impacts.<br>• If poorly planned, can become a wildfire in itself.<br>• Less effective, unless coordinated with other activities by neighbouring land managers.<br>• Can cause significant environmental damage if not conducted correctly. |
| **Mechanical Treatments** | • Large areas can be treated with smaller efforts than burning.<br>• Can reduce an ignition risk and be a control option (roadside slashing to reduce ignition, and then slashing or thinning around a surrounding asset to reduce risk to assets).<br>• Large resource pool to draw from, with numerous contractors performing the service. | • Depending on winter and spring conditions, regrowth can occur quickly, and may require repetitive treatment.<br>• Terrain can be problematic due to access, e.g., for machinery etc.<br>• If conducted in the wrong conditions, this treatment option can cause wildfire with the potential ignition of a fire from machinery. |
| **Grazing** | • Multi-purpose application – feed for stock, and reduction of fuel.<br>• Effective for farmland and other similar areas across the Region.<br>• Normally conducted by people with local knowledge in a mosaic pattern – feed versus growth model. | • Limited use in some land parcels due to regulations.<br>• Can impact negatively on ecological systems and environmental damage if it occurs in the wrong environment. |



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| | | |
|---|---|---|
| **Vegetation Management**<br><br>***Administered by DoR*** | • Reduces, or changes fuel types to create either a break between fire or connected vegetation.<br>• Changes to vegetation type, for example, QPWS&P has planted fire-resistant grass around the base of the houses at the summit of Mount Archer. | • Can be a highly emotive community issue between farming and environmental community.<br>• Vegetation management legislation enables activities to be undertaken in both prevention and response phases and are further explained in the *Clearing for Fire Management Guide* (Queensland Government). |

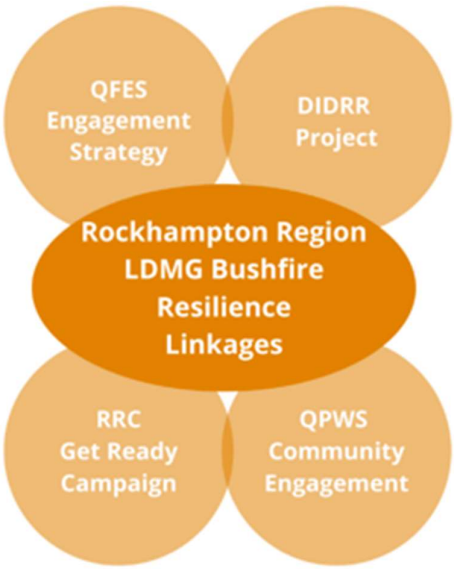
*Table 4: Bushfire Mitigation Advantages and Disadvantages – Rockhampton Region*

### 18.3.2 Recovery

The LDMG will continue to work with community leaders to mature the community resilience program and support community-led recovery where possible.

The Study identified that the LDMG understands the roles and responsibilities in relation to the Queensland Recovery Plan (2017), and the important role that agencies, such as the Queensland Reconstruction Authority (QRA) and Department of Communities, Housing and Digital Economy (DCHDE), play in assisting the LDMG in transitioning to recovery with the Local Recovery Group (LRG).

The Queensland Government response to the *IGEM Efficacy of Recovery Review (2019)* looked at the recovery arrangements across the state. The LDMG aspires to working with the State Government to further explore these findings, in particular:




Rockhampton Region Bushfire Resilience Linkages

- The LDMG will continue to work with community leaders to mature the community resilience program and support community-led recovery where possible.
- Using the IGEM findings as guidance, the LDMG has aspires to planning for a more community-focused, resilience-building approach to recovery from bushfires and other LDMG managed hazards.

Using the IGEM findings as guidance, the LDMG has committed to planning for a more community-focused, resilience-building approach to recovery from bushfires and other LDMG managed hazards.

Acknowledging that QFES and QRA are responsible for providing guidance, the LDMG will continue to review the *Recovery Sub-Plan (2016)* ensuring that the methodology is aligned with this modern recovery approach.

Through the Bushfire Management Strategy (2021-2025), the LDMG recognises the differences between recovery in the bushfire context (as it is quite new to the Queensland context) versus a more traditional recovery which has occurred in the past. The LDMG commits to address this with decision making at the LDMG and LRG level.



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With the implementation of the LSFMGs, individuals in the community could be identified to assist in embedding recovery at the local level when managing bushfire events.

All landowners across the LDMG should be working towards applying the principles QPWS&P Good Neighbour Policy. The objectives of this policy are to:

- Promote co-operation and exchange of information between landholders and QPWS&P.
- Establish guidelines for positive relationships between QPWS&P, neighbours and local communities that are based on mutual respect, understanding and recognition of the rights and responsibilities of all landholders.
- Clearly outline the approach of QPWS&P on a range of land management issues needing co-operative management, including fire management, control of pest plants and feral animals, management of native animals and the use of pesticides and other substances. (QPWS&P, 2010).


# 19 Relevant Studies Considered

As part of this study, and to benchmark outcomes for The Study, consideration was given to the following:

- *The QBP.*
- *The IGEM 2018-2019 Report 1 – Review of Efficacy of recovery governance.*
- *The IGEM 2018-2019 Report 2 – The 2018 Bushfires Review.*
- *The IGEM 2019-2020 Report 1 – The Queensland Bushfires Review 2019-20.*
- *QFES Bushfire Prevention & Preparedness Current & future state analysis: January 2019.*
- *The Royal Commission into National Natural Disaster Arrangements. The Royal Commission Report 2020*.
- *Rockhampton Bushfire Strategy (2014).*
- *RRC Natural Hazards Risk Assessment (2012).*
- *Firescape Science Bushfire Risk Assessment – Mount Archer Locality (2014).*
- *Frazer Coast Bushfire Strategy (2010).*
- *City of Gold Coast (CoGC) Bushfire Management Plans (2010).*
- *Whitsunday Regional Council (WRC) Bushfire Management Policy (2018).*
- *Livingstone Shire Council (LSC) recent bushfire media releases.*

Whilst these reviews do not reflect current arrangements, some of the thematic analysis was able to be used to influence outcomes of this report. Examples include:

- The concept of a bushfire working group, which the CoGC establishes to coordinate bushfire management. This group is across local and state government. The study suggests a RRC Working Group contained within Council is more appropriate for RRC at this stage of bushfire management maturity.
- The level of involvement across the Prevention, Preparedness, Response and Recovery (PPRR) cycle which WRC currently undertakes as part of its policy has informed the Study. An example where the Study takes a different approach from this policy is in the area of fuel reduction. The WRC policy states, *"Council will delegate the lighting of hazard reduction burns to trained rural fire brigade groups or staff from the QFES".* The Study suggests that this is not aligned to the responsibility of landowners under the *Fire and Emergency Services Act, 1990* and therefore, a different approach is recommended throughout the associated Strategy and Mitigation Plans (2021-2015), which also recognises the LSC approach as discussed further.
- Some recommendations outlined in the *Rockhampton Bushfire Strategy (2014)* had already been implemented, such as:
    - Formalising the cooperative arrangements between QPWS&P and RRC through a Memorandum of Understanding (MoU).



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        - It should be noted that during consultation of the Study, stakeholders discussed extensively how this document is not performing the way it was intended. Despite this, mitigation works continue to occur on the ground.
- An example of a recommendation that has not yet been implemented is:
    - Establishment of a Rockhampton (Rural) Fire Brigade group to participate in the management of the urban iZone.
        - The Study supports this recommendation due to the terrain, access and additional firefighting capacity for the high risk which faces Mount Archer, along with contemporary research in relation to urban volunteering.

# 20 Conclusion

This Bushfire Management Study (2020) was conducted over a four-month period. The support and input from agencies enabled the Study to capture actions that are going well across the Region, and those which can be improved.

The Study was informed by climate change data, and how it is impacting the Region now, and into the future:

- 20-year averages are showing a 3ºC increase, which is directly linked to conditions conducive to fire ignition and spread.
- The 50-year trend is provided which could see an additional 1- 3.8ºC increase.

Higher temperatures and an increase in frequency of 'hot' days across the Rockhampton Region will heighten the risk of bushfire prone conditions. The need for hazard reduction techniques and adequate mapping of at-risk areas is of high priority. There are good measures in place at the time of this study, but evaluation of these measures will need revision as climatic conditions change.

Analysis of the community profile of the Region, bushfire prone land mapping, and risk profiling determined that the areas at most risk of bushfire are Mount Archer and adjacent localities and Mount Morgan and adjacent localities. QFES noted that they are currently developing localised governance arrangements for LSFMGs to support these two areas and this study found there was a strong commitment from stakeholders to first trial a LSFMG in the Mount Archer area in the near future.

Community understanding of bushfire risk was also analysed and it identified that, whilst there is general bushfire awareness across the community, comprehension of specific risks and impacts is lacking.

The QBP introduces new hazard-specific bushfire arrangements across Queensland. This study has analysed these changes against current arrangements and clarifies the subsequent impacts to the Rockhampton Region LDMG prevention, planning, response and recovery to bushfires.

From this Study, the Bushfire Management Strategy (2021 – 2025) and Bushfire Management Mitigation Plan 2021-2025 have been produced.

The implementation of the Bushfire Management Strategy (2021 – 2025) will deliver an evidence-based approach to Bushfire Management across Rockhampton Region by reducing risk, increasing community understanding of risk, and building resilience. It provides nine potential pathway actions and 20 recommendations to assist in the latter.

The Bushfire Management Mitigation Plan (2021-2025) is one of the tools the LDMG will use to guide risk reduction across the Region. By doing so the LDMG is well-placed to modernise the local disaster management arrangements into the future.

The level of cooperation and initiative by many stakeholders across the Region was evident during the Study. Many stakeholders are passionate about their community and wanting to drive bushfire management to a new level. Embracing these champions of change to lead the enhanced bushfire management strategies will be a cornerstone strategy for the LDMG to move forward.



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# 21 Annex A – Stakeholder Consultation List

| Date | Topic | Stakeholders Met |
|---|---|---|
| 20/7/2020 | Project Inception Meeting | RRC DMU |
| 21/7/2020 | Workshop to inform the Study | Rockhampton AFMG |
| 22/7/2020 | Workshop to inform the Study | Rockhampton LDMG |
| 23/7/2020 | Clarification on Roles and Responsibilities for RCC | A/General Manager, Community Services, RRC |
| 23/7/2020 | Workshop to inform the Study | Rockhampton DIDRR |
| 29/7/2020 | Workshop to inform the Study | RRC Bushfire Management Sections |
| 31/7/2020 | Workshop to inform the Study | Rockhampton DDMG |
| 7/7/2020 | Attend LDMG Meeting | Rockhampton LDMG |
| 13/8/2020 | Attend AFMG Meeting | Rockhampton AFMG |
| 11/9/2020 | Workshop Mount Morgan Hazard Reduction Activities | DoR Staff |
| 29/9/2020 | Validation Workshop | A/Station Officer, QFES Mount Morgan, DoR Staff |
| 8/10/2020 | Validation Workshop | Rockhampton QPWS&P Operations Staff |
| 9/10/2020 | Validation Meeting | QPWS&P Staff |
| 13/10/2020 | Validation Meeting | Rockhampton QPS and DDMG |
| 13/10/2020 | Validation Meeting | Executive Director, Central Region, DoR |
| 13/10/2020 | Validation Meeting | Manager, Parks, RCC |
| 15/10/2020 | LSFMG Meeting | QFES, RRC, QPWS&P |
| 15/10/2020 | Workshop to inform the Study/ Validation Workshop | Fitzroy Rural Fire Group |
| 21/10/2020 | Validation Meeting | Planning and Regulatory Staff |
| 22/10/2020 | Workshop to inform the Study/ Validation Workshop | Rockhampton, Mount Morgan and Gracemere SES Groups. |
| 29/10/2020 | Validation Workshop | Area Fire Management Group |
| 10/2/2021 | Validation Workshop | Local Disaster Management Group |

# 22 Annex B – Recent Fire History in the Region

A number of fires have been referenced throughout the Study across the Rockhampton Area. This Annex provides further case studies.

### 2009 Mount Archer and Berserker Ranges Fire

89% of survey respondents from the community said they were in the area during the major fire in October 2009. Given the considerations provided by the community from the 2018 and 2019 event, it is also important to see how experiences have changed over the years. The following is what the community said about the 2009 event:

- *"We closed up our home, to avoid the smoke."*
- *"We had zero preparedness or survival plan – we didn't see the risk, nor know what to do."*
- *"Much of the land in 2009 which was cleared of hazards, are no longer cleared."*
- *"Rural Fire Service Queensland (RFSQ) officers were happy with our preparation and used our driveways to defend our property."*
- *"When the fire was apparent, I started cleaning up my yard, cleared gutters etc."*
- *"We know the list of things we need to pack and get out."*

The Australian Broadcasting Corporation (ABC) reported the fires as follows (Australian Broadcasting Corporation, 2009):

- *Approximately 100 homes were under threat in Mount Archer due to a large bushfire which burnt out of control.*
- *The fast-moving blaze travelled in poor fire conditions toward buildings on the fringe of Frenchville, near Mount Archer National Park.*
- *Queensland Fire and Rescue Service (QFRS) [now QFES] officials advised the fire was moving erratically, with structures likely to be burnt in addition to one home lost overnight.*
- *Strong winds were hampering efforts by more than 100 firefighters to contain the blaze and helicopter water bombing continued.*
- *Residents in and around Saunders, Holt and Bloxsom Streets and Shields Avenue in Frenchville were told to leave their homes if the path as clear.*
- *There were warnings that electricity, water and mobile phone signals could be lost in the area over the following hours. Several roads in the area were closed and traffic from the Capricorn Coast to Rockhampton was being diverted.*
- *Authorities said well-prepared homes can offer safety during the fire and may be defendable.*
- *An evacuation centre was established at the PCYC on the corner of Bridge Street and Queen Elizabeth Drive in Rockhampton.*
- *Recommendations to the community advised residents should evacuate before the fire arrives and that officers may order evacuations if required.*
- *QFRS [now QFES] was quoted "If they're comfortable with their preparations, if they've got their bushfire plan in place and the forest is not directly impinging on their property, then they may elect to stay. However, if we look at the property and decide it is going to be very difficult to defend, then we'll be requiring them to leave."*
- *Motorists were advised to avoid the Mount Archer area as emergency vehicles needed to have clear access.*



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### 2011 Stanwell and Mount Archer and Berserker Ranges Bushfires

Once again, the ABC provided good coverage of the fires reporting on both the Stanwell and Mount Archer and Berserker Ranges fires (Australian Broadcasting Corporation, 2011):

#### Stanwell

- *Strong winds were fanning a bushfire burning west of Rockhampton in central Queensland.*
- *Fire crews were putting in containment lines to try to stop the bushfire from reaching the Alton Downs area.*
- *The fire started the previous day near Stanwell and moved north, burning 2,500 hectares.*
- *QFRS [now QFES] said the fire is moving quickly driven by the winds. "We're trying to conduct back-burns to surround the fire, especially on the north-west edge of this fire because prevailing winds are making it hard to do this."*
- *A resident said he was worried about his property last night until a fire break was put in. "We had a D9 dozer here last night and pushed a firebreak seven kilometres underneath the powerlines so we could burn back towards the mountain and our place was safe then."*
- *Spotter planes and water bombers were called in. The fire got close to homes but did not destroy any.*
- *With the wind change that occurred around 8:30 at night from the south-west, it pushed the fire to the northeast very quickly.*
- *The fire was able to be contained from getting into houses, but it came right up to the backyards and borders of private property in that area.*
- *Work continued back-burning along Tucker Road, to contain the fire to the north with earthmoving equipment.*

#### Mount Archer

- *QFRS [now QFES] spoke of a fire at Mount Archer at the same time advising that urban crews continue to patrol the Pilbeam Drive area of Frenchville in North Rockhampton with a fire burning at Mount Archer.*
- *The fire started and had a small flare-up in an inaccessible area.*
- *Pilbeam Drive remained open.*
- *The fires on Mount Archer are close to where hundreds of homes in Rockhampton's hillside suburbs were threatened two years ago in one of the largest fires in the city's history.*
- *The area in and around Frenchville was contained and crews continued to work on the edge.*
- *The fire was not anticipated to be a further problem.*
- *Work was commencing on the southern edge of the fire in the Nerimbera area.*
- *Fire fighters didn't expect it to threaten houses in Rockhampton, as the fire moved back into the park.*

Mount Archer Bushfire 2011. Source: Queensland Times



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### 2018 Mount Archer and Berserker Ranges Bushfires

Fires impacted the Mount Archer and Berserker Ranges area again in August 2018.

Firefighting operations occurred over a number of days when overnight on 22nd August the fire jumped containment lines as a wind change caused spot fires to occur on both sides of Pilbeam Drive. With the wind change, the back-burn also had potential impact upon the gully. Weather conditions were described as what would 'normally be expected in October, not August'.

On 23rd August, residents and visitors were prevented from driving up to the summit, but no evacuation was enacted. The fire burned on each side of Pilbeam Drive. The closure of Pilbeam Drive continued, as required, based on firefighting operations.

Water bombers and a water attack helicopter were brought in to help strengthen the containment lines and to assist with 'spot overs' from flaming embers jumping the containment lines. The Airport Fire and Rescue Service provided a high-capacity water tanker that was connected to the sprinkler line from Pilbeam Drive Saddle to roughly the bottom of Arnold Drive (Nerimbera).

Fixed-wing aircraft worked on the hot spots on the west side of Pilbeam Drive before continuing with plans to back-burn along the eastern side of the range down to Arnold Drive (Nerimbera). Several other crews worked along Pilbeam Drive, supporting the aerial bombing on the western side of Mount Archer and the eastern back-burning.

The community were quoted in the media saying:

- *"Because the fire might come this way, I've decided to work on the front now, but we had the back cleared and ready to go, it's not too bad, I think that's the thing, I think you've got to be a bit proactive and make sure that us as property owners up here are prepared for it. We choose to live here; we've got to make the most of it."*
- *"The houses on the top of the mountain (are) safe" saying he'd never felt the urge to leave. "The fires approach at ground level and were easily controlled thanks to back burning. It's really just a matter of living with the smoke."* (The Morning Bulletin, 2018)

QFES released an 'Advice' message (QFES Newsroom, 2018), saying:

- Currently as at 4pm Thursday, 23rd August, a large, slow moving bushfire is travelling in a north-westerly direction below Elida Street and Sleipner Street, Mount Archer.
- Firefighters, with the support of water bombing aircraft, have contained the fire on the eastern side of the summit.

Late on 23rd August, residents were escorted back to their homes. On 24th August, QFES crews stayed at the summit to protect homes and monitor containment lines. Once the eastern fire was controlled, attention was diverted to homes along Frenchville Road and back-burning near properties as required.

### 2019 Mount Archer and Berserker Ranges Fire

Fires impacted the Mount Archer and Berserker Ranges area again in September 2019. From Sunday 8th September to Wednesday 11th September 2019 the Mount Archer and Berserker Ranges fire was considered at the lowest level of warning, 'advice'.

Residents were urged to stay informed about the fire burning in the national park on the mountain range in the vicinity of Pilbeam Drive. Fire fighters from QFES, RFSQ and QPWS&P continued to work on the fires to build containment lines and were supported by two water-bombing helicopters.

On 11th September, QFES issued a number of warnings:

- At 13:15hrs, a 'Prepare to Leave' message was issued as the fire travelled from the Mount Archer National Park towards Murlay Avenue, Bloxsom Street, Saunders Street, Thirkettle Avenue and adjoining areas. *"The fire is likely to impact houses in Murlay Avenue, Bloxsom Street, Saunders Street, Thirkettle Avenue and adjoining areas."*

The warning was then downgraded an hour later to 'Stay Informed' asking residents to keep up to date and decide what actions they would take if the situation changed.

During the night of 11th September, the fire travelled slowly through the Pilbeam Drive area with fire crews keeping watch on the fire. Consideration was given to back-burn in and around Koongal, particularly in the area of Rockonia Road, however it was decided not to proceed.



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On 12th September:

- Inspections occurred on burnt trees on Frenchville Road and Pilbeam Drive, where burning occurred overnight, to ensure they weren't a threat to motorists. It was deemed safe to proceed as firefighters were continuing to work alongside the road.
- Up to 40 firefighters at a time were involved in the firefighting effort, supported by water-bombing aircraft.
- No evacuations were undertaken.
- Mount Archer State School continued to operate during the fire and QPS blocked off areas such as Bloxsom and Goldston Streets.

At 09:35hrs on Sunday 16th September, QFES provided their final update: *"QFES crews are aware of a bushfire in Mount Archer National Park, Mount Archer. This fire has been contained and is posing no threat to property at this time. QPWS&P crews are monitoring. Smoke may affect surrounding areas. Residents are advised to close windows and doors and keep respiratory medications close by. Motorists should drive with caution and to conditions. If you feel your property is under threat, call Triple Zero (000) immediately."* (QFES Newsroom, 2019)



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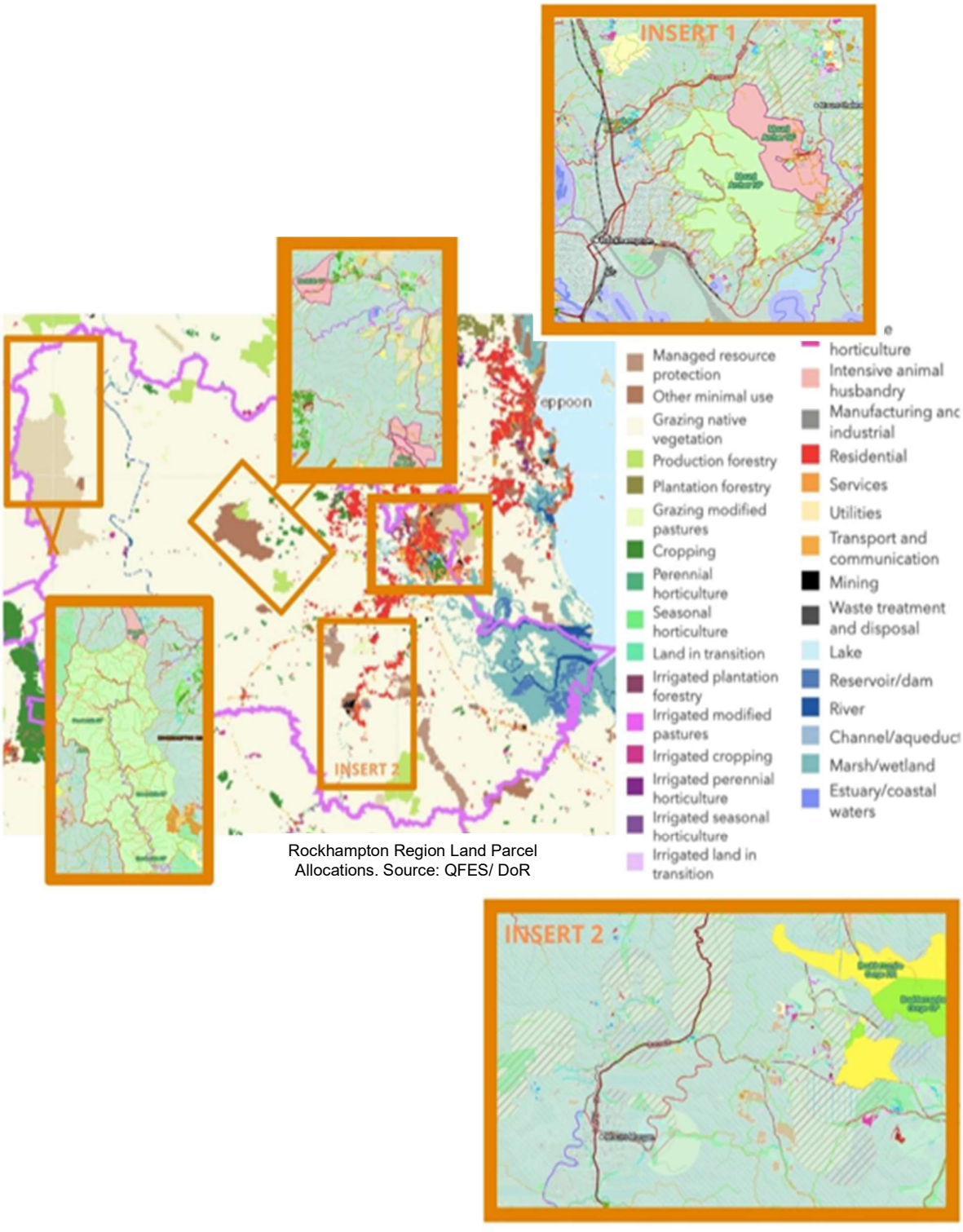
# 23 Annex C – Land use planning mapping contained in planning scheme




Rockhampton Region Land Parcel Allocations. Source: QFES/ DoR



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# 24 Annex D - Community Risk Profiles

## Mount Archer Summit

Mount Archer lies 9km north-east of Rockhampton's city centre. It has one point of entry, from Frenchville Road, which is sealed and suitable for conventional vehicles. The summit is surrounded by the Mount Archer National Park which boasts picturesque lookouts and views of Rockhampton city. The population at the summit is 85, however, during peak tourism periods, this can increase with day trippers visiting Fraser Park and the Mount Archer National Park.

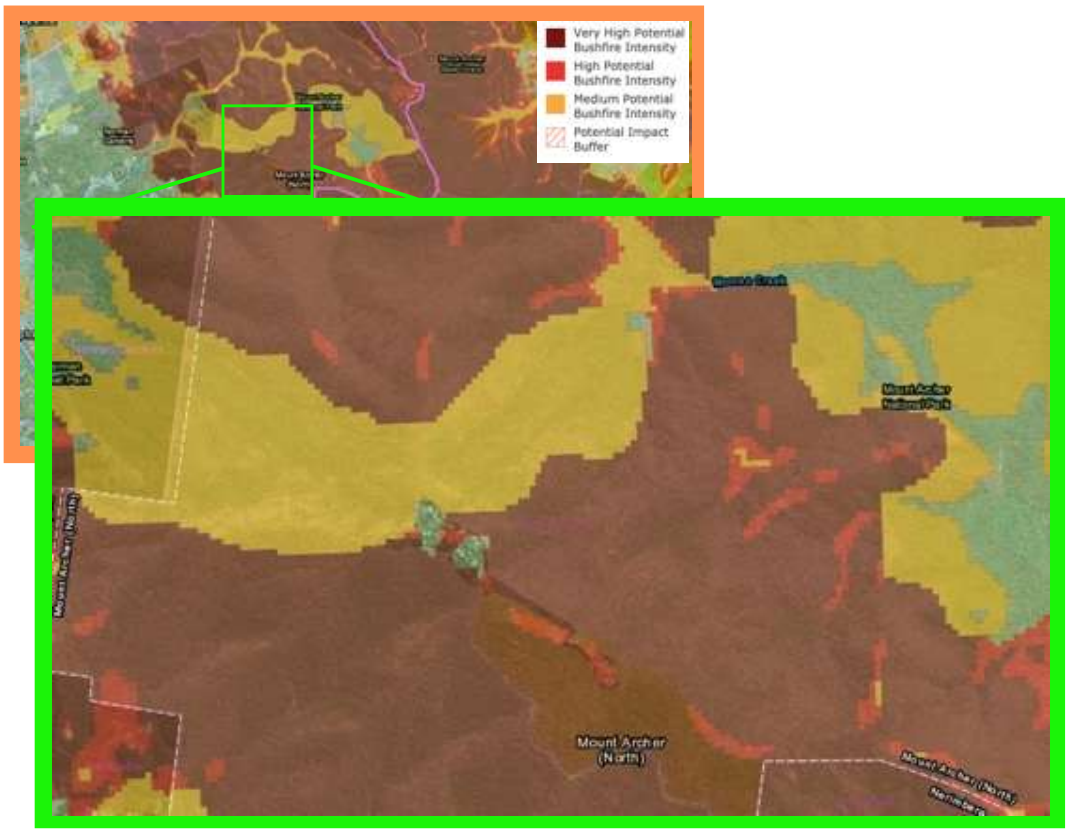
| Locality | Size ($km^2$) | Total Population | Total Population (Male) | Total Population (female) | Total Population (A&TSI) | Median Age |
|---|---|---|---|---|---|---|
| Mount Archer (Summit) | 4 | 85 | 43 | 42 | 0 | 52 |

Source: 2016 Census Data

Mount Archer is identified in the Bushfire Management Mitigation Plan (2021-2025) as one of three priority areas in the Region. It is defined under The Study as the highest risk.

The mitigation work conducted by QPWS&P and RRC, supported by QFES, and with the community education work which QFES leads, should be commended. When applied, this reduces risk, however due to the terrain composition and location of structure, from a bushfire perspective, this community is rated as:

| Low | Medium | High | Very High | Extreme |
|---|---|---|---|---|




Source: SDCC Mapping Tool (QFES and DoR Layers)



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## Mount Archer – Frenchville and Norman Gardens

Norman Gardens and Frenchville are suburbs at the base of Mount Archer, and include properties built into the mountain edge, and suburbs such as Norman Gardens which have a small buffer of grasslands in areas.

This area has a high population of people working in the Rockhampton central busines district, on the other side of the river, and therefore a high level of vacancy throughout the day (peak fire periods). There are vulnerable assets such as aged care facilities, childcare centres and schools within the area.

| Locality | Size (km²) | Total Population | Total Population (Male) | Total Population (female) | Total Population (A&TSI) | Median Age |
|---|---|---|---|---|---|---|
| Frenchville | 18 | 9,944 | 4,832 | 5,112 | 588 | 35 |
| Norman Gardens | 24 | 9,028 | 4,387 | 4,641 | 495 | 36 |
| **Combined** | **42** | **18,972** | **9,219** | **9,753** | **1,083** | **35** |

Source: 2016 Census Data

Mount Archer area is identified in the Bushfire Management Mitigation Plan 2021-2025 as one of three priority areas in the Region. It is defined under The Study as the highest risk.

The mitigation work conducted by QPWS&P and RRC, supported by QFES, and with the community education work which QFES leads, should be commended. When applied, this reduces risk, however due to the terrain composition and location of structure, from a bushfire perspective, this community is rated as:

Low | Medium | High | **Very High** | Extreme


Source: SDCC Mapping Tool (QFES and DoR Layers)



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## Mount Archer – Lakes Creek and Koongal

Lakes Creek and Koongal are the southern suburbs at the base of Mount Archer. Unlike Frenchville and Norman Gardens, there is more of a trend of grassland areas adjoining the development near the mountain. This in itself can cause a hazard when trying to manage the hazard.

The areas have a high population of vulnerable people in the community, and also houses key community assets such as Lakes Creek State School, Mount Archer State School and a number of childcare centres. It meets the local government boundary between RRC and Livingstone Shire Council.

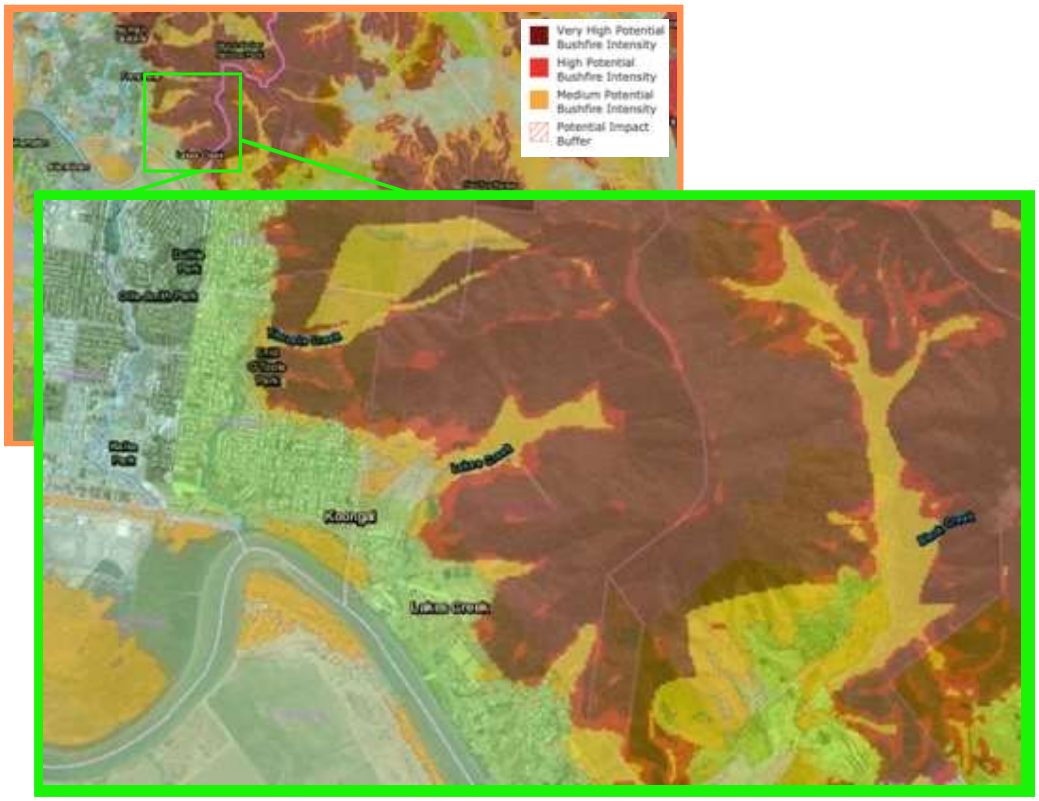
| Locality | Size ($km^2$) | Total Population | Total Population (Male) | Total Population (female) | Total Population (A&TSI) | Median Age |
|---|---|---|---|---|---|---|
| Lakes Creek | 8 | 552 | 290 | 262 | 54 | 35 |
| Koongal | 13 | 4,026 | 2,049 | 1,977 | 499 | 34 |
| **Combined** | **21** | **4578** | **2339** | **2239** | **553** | **35** |

Source: 2016 Census Data

The Mount Archer area is identified in the Bushfire Management Mitigation Plan 2021-2025 as one of three priority areas in the Region. It is defined under The Study as the highest risk.

The mitigation work conducted by QPWS&P and RRC, supported by QFES, and with the community education work which QFES leads, should be commended. When applied, this reduces risk, however due to the terrain composition and location of structure, from a bushfire perspective, this community is rated as:

| Low | Medium | High | **Very High** | Extreme |
|---|---|---|---|---|




Source: SDCC Mapping Tool (QFES and DoR Layers)



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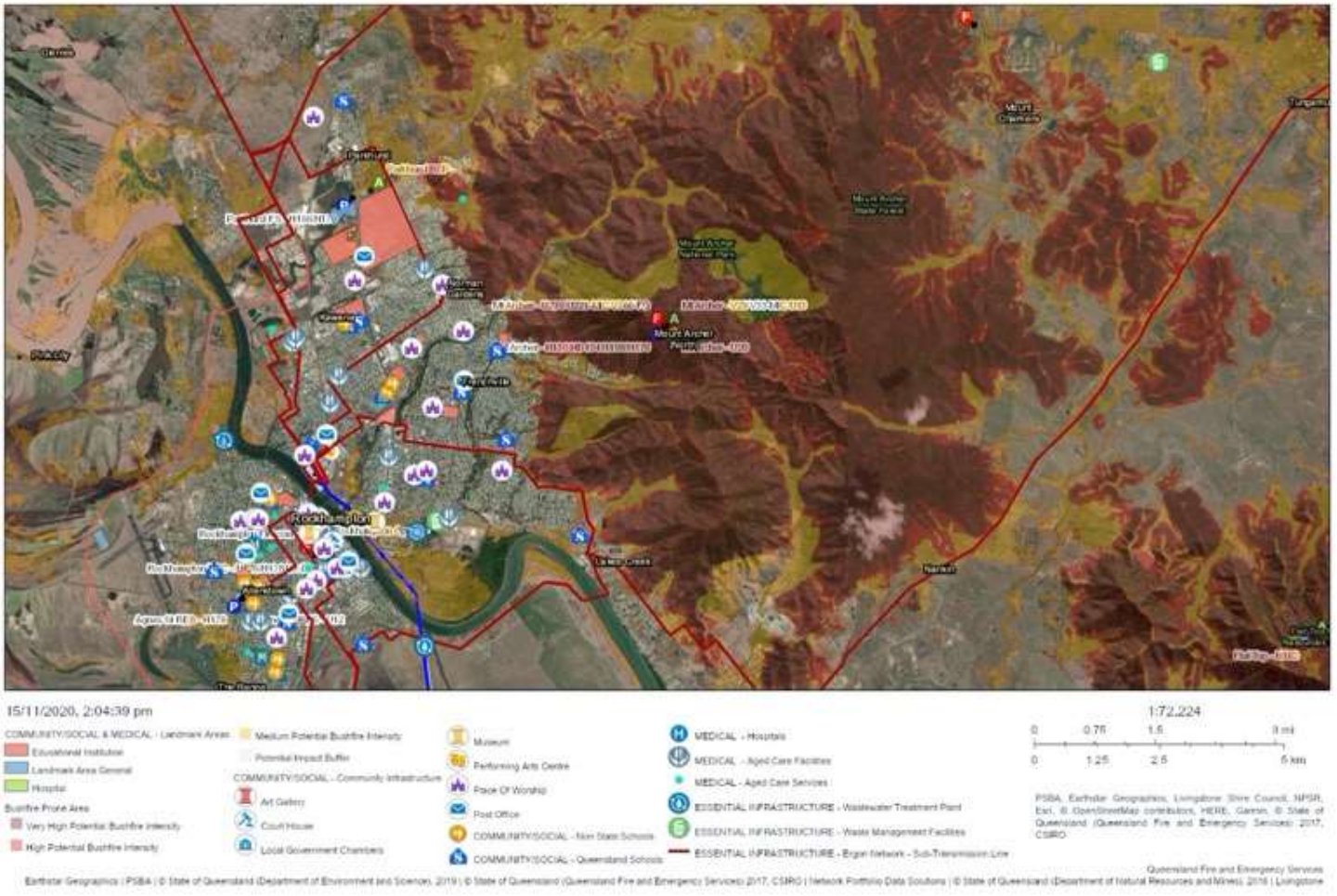
Source: SDCC Mapping Tool (QFES and DoR Layers)

## Mount Archer – Critical Infrastructure Map

QERMF Web map



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## Mount Morgan

Mount Morgan is a locality in the Rockhampton Region that is largely comprised of the township of Mount Morgan and has a population of approximately 2,900 residents. As the name suggests, Mount Morgan is situated at an elevation of 341 meters and characterised by hilly, and in some cases very steep, terrain. Founded in 1882 after the discovery of gold in the area, the Mount Morgan mine was, at one stage, the richest in the world. This is reflected in the character of the township, with a number of buildings on the Queensland Heritage Register and many others that retain the charm of yesteryears.

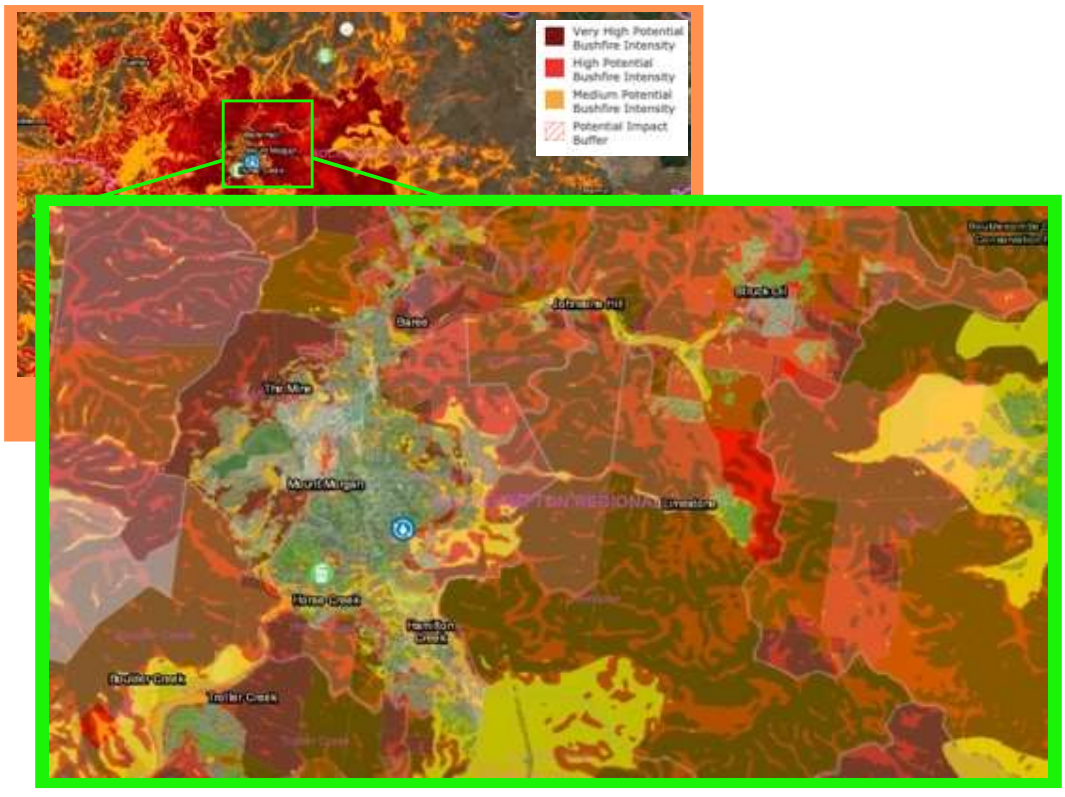
Mount Morgan is located approximately 38km south-west of Rockhampton. The historic mine site is now a significant tourist attraction, as is the Railway Museum. Many of the working population travel via Razorback Road or the Burnett Highway, which traverses the Mount Morgan Range, to Rockhampton for employment. Although small in size Mount Morgan is home to many services including schools, supermarket, library, post office and local hospital. The town is serviced by an auxiliary firefighting station with a number of rural fire brigades surrounding it.

| Locality | Size ($km^2$) | Total Population | Total Population (Male) | Total Population (female) | Total Population (A&TSI) | Median Age |
|---|---|---|---|---|---|---|
| Mount Morgan | 12 | 2,928 | 1,527 | 1,401 | 383 | 50 |

Source: 2016 Census Data

Mount Morgan is identified in the Bushfire Management Mitigation Plan 2021-2025 as one of three priority areas in the Region. Based on the evidence of a high incidence of arson, potential for property to property spread, and considering the pro-active approach which RRC and DoR takes in this area on mitigation, from a bushfire perspective, this community is rated as:

| Low | Medium | High | **Very High** | Extreme |
|---|---|---|---|---|




Source: SDCC Mapping Tool (QFES and DoR Layers)



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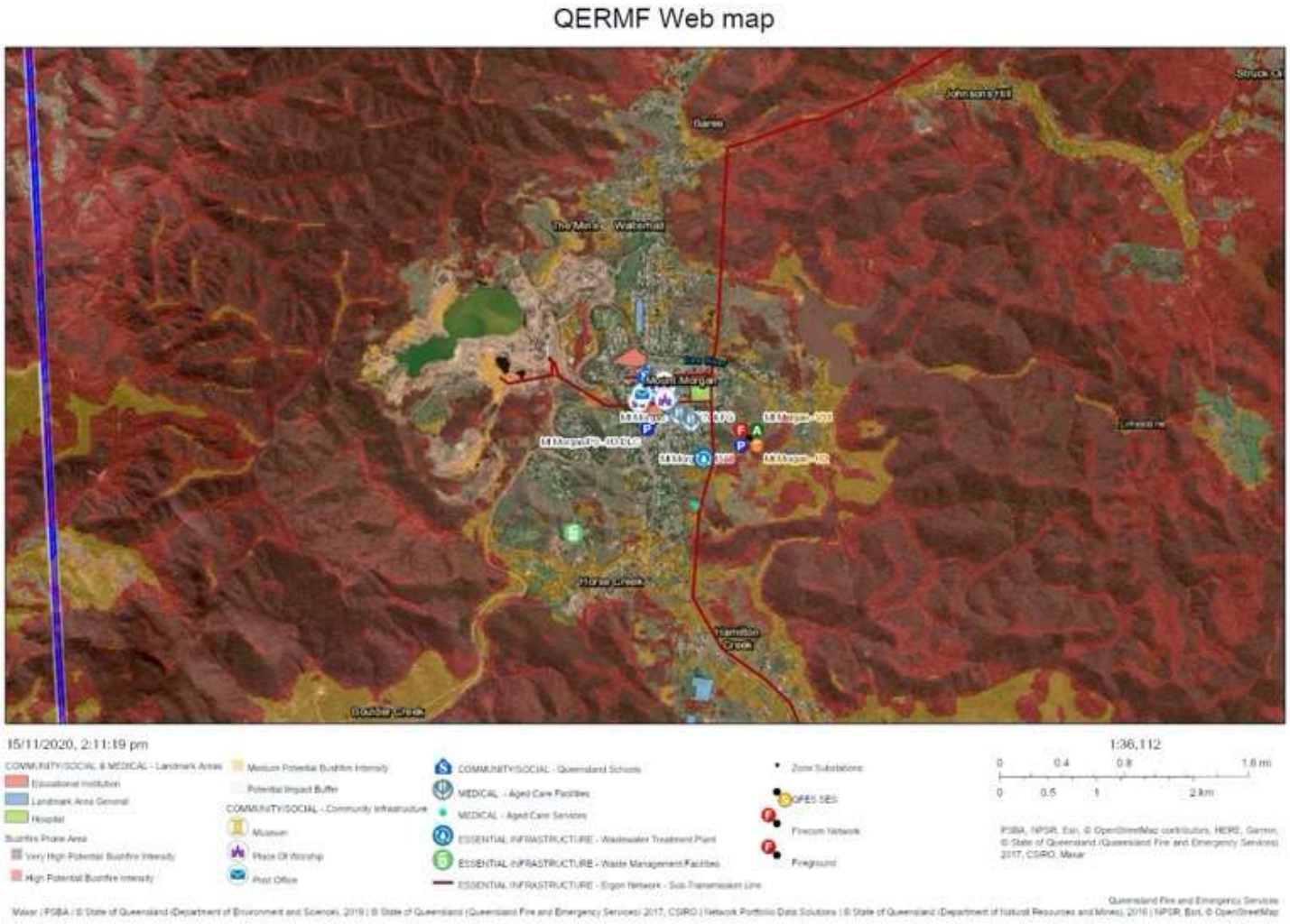
## Mount Morgan – Critical Infrastructure Map




Source: QFES QERMF Mapping Application



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## Fitzroy Northern Area

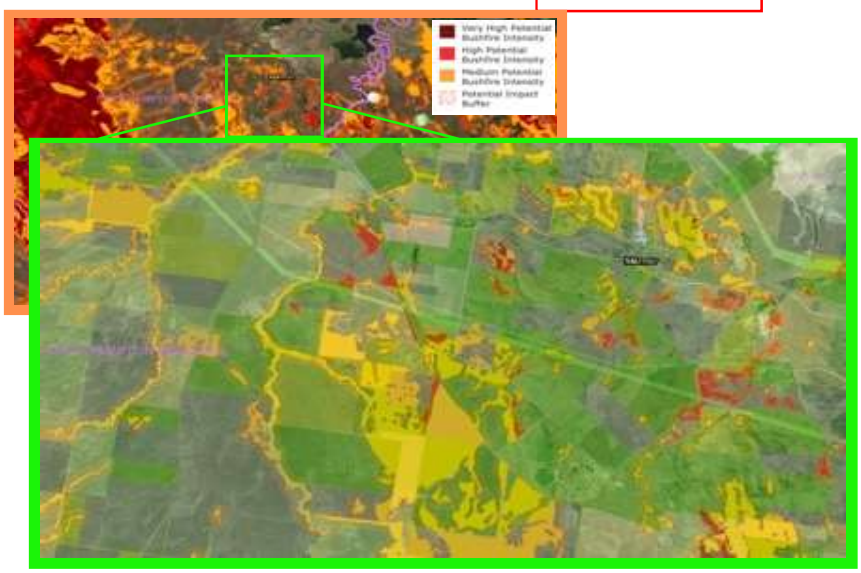
The Fitzroy Northern Area comprises the localities of Alton Downs, Dalma, Garnant, Glenroy, Morinish, Morinish South, Nine Mile, Pink Lily, Ridgelands and South Yaamba, and is based on the extent and coverage of the Fitzroy Northern Area Ratepayers Association. This area encompasses over one third of the Rockhampton Region in size and primarily consists of rural land, producing cattle, cotton and other crops. This area has a combined population of over 2,000 people, equating to less than one person per square kilometre. The community is socially active with a playgroup and many sporting and community groups in place. Residents need to travel to Rockhampton for shopping, services and higher education.

| Locality | Size ($km^2$) | Total Population | Total Population (Male) | Total Population (female) | Total Population (A&TSI) | Median Age |
|---|---|---|---|---|---|---|
| Alton Downs | 177 | 1,279 | 645 | 634 | 41 | 40 |
| Dalma | 93 | 78 | 39 | 39 | - | 40 |
| Garnant | 97 | 99 | 58 | 41 | - | 43 |
| Glenroy | 877 | 28 | 17 | 11 | - | 34 |
| Moronish | 755 | 89 | 47 | 42 | - | 50 |
| Moronish Sth | 368 | - | - | - | - | - |
| Nine Mile | 131 | 77 | 42 | 35 | - | 38 |
| Pink Lady | 32 | 231 | 127 | 104 | 7 | 44 |
| Ridgelands | 113 | 166 | 92 | 74 | - | 43 |
| South Yaamba | 101 | 99 | 52 | 47 | - | 33 |
| **Combined** | **2,744** | **2,146** | **1,119** | **1,027** | **48** | **40** |

Source: 2016 Census Data

There are mountainous and hilly terrain in the localities of Ridgelands, Morinish (including Morinish State Forest) and Glenroy (Goodedulla National Park and Develin State Forest). There are rural fire stations situated throughout the area. This is an at-risk area addressed in the Bushfire Management Mitigation Plan (2021-2025). From a bushfire risk perspective, this community is rated as:

Low | Medium | High | **Very High** | Extreme



Source: SDCC Mapping Tool (QFES and DoR Layers)



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## Kabra

Kabra is a locality in the Rockhampton Region, primarily comprised of rural land and supported by the small township of Kabra. The township of Kabra is located 20km south-west of Rockhampton and 6km to the south-west of Gracemere.

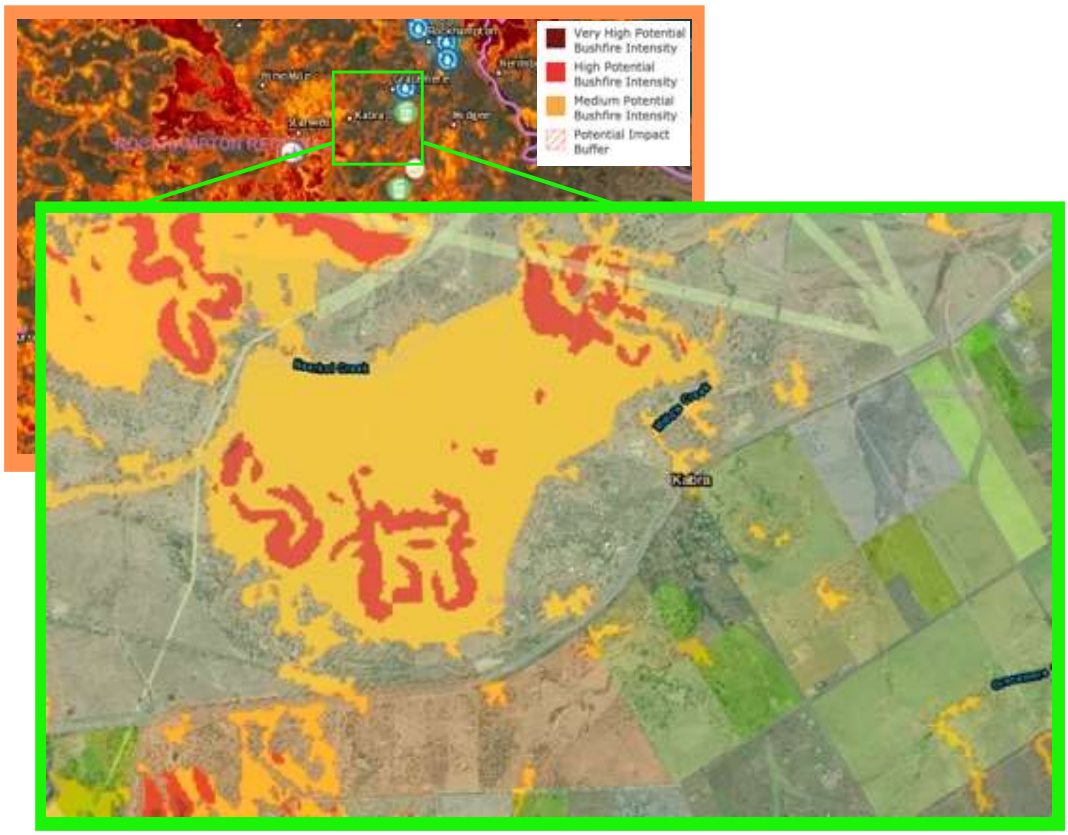
The township is bordered on three sides by large tracts of land, that have been allocated to allow for future industrial development, and the Capricorn Highway and Central Western railway line to the north. At the time of the 2016 Census, the locality of Stanwell had a population of 421 people, a decrease of 50 people from the previous Census in 2011. There is limited employment in the locality and therefore the majority of Kabra's working population travel to Rockhampton, Gracemere, or beyond, for employment. The Kabra Hotel provides an important service to the local community however travel to Rockhampton or Gracemere is necessary for shopping, additional services and higher education. There is no rural fire brigade in Kabra. Gracemere fire station services this area.

| Locality | Size (km²) | Total Population | Total Population (Male) | Total Population (female) | Total Population (A&TSI) | Median Age |
|---|---|---|---|---|---|---|
| Kabra | 95 | 421 | 193 | 228 | 193 | 42 |

Source: 2016 Census Data

In 2018 extreme weather conditions saw a catastrophic fire danger declared and thousands of residents evacuated in the localities of Stanwell, Kabra and Gracemere. Considering the ridge line and sloping land to the north and west of the locality, and the fire history for the location, from a bushfire perspective, this community is rated as:

| Low | Medium | High | **Very High** | Extreme |
|---|---|---|---|---|




Source: SDCC Mapping Tool (QFES and DNRME Layers)



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## Stanwell

Stanwell is a locality in the Rockhampton Region, primarily comprised of rural land and supported by the small township of Stanwell. To the south of the township large tracts of land have been allocated to allow for future industrial development. The Stanwell Power Station provides electricity to many residents in Queensland.

Stanwell is located 28km to the south-west of Rockhampton and 15km south-west of Gracemere. At the time of the 2016 Census, the locality had a population of 337 people, an increase of 30 people from the previous Census in 2011. There is limited employment in the locality and therefore the majority of Stanwell's working population travel to Rockhampton, Gracemere or beyond.

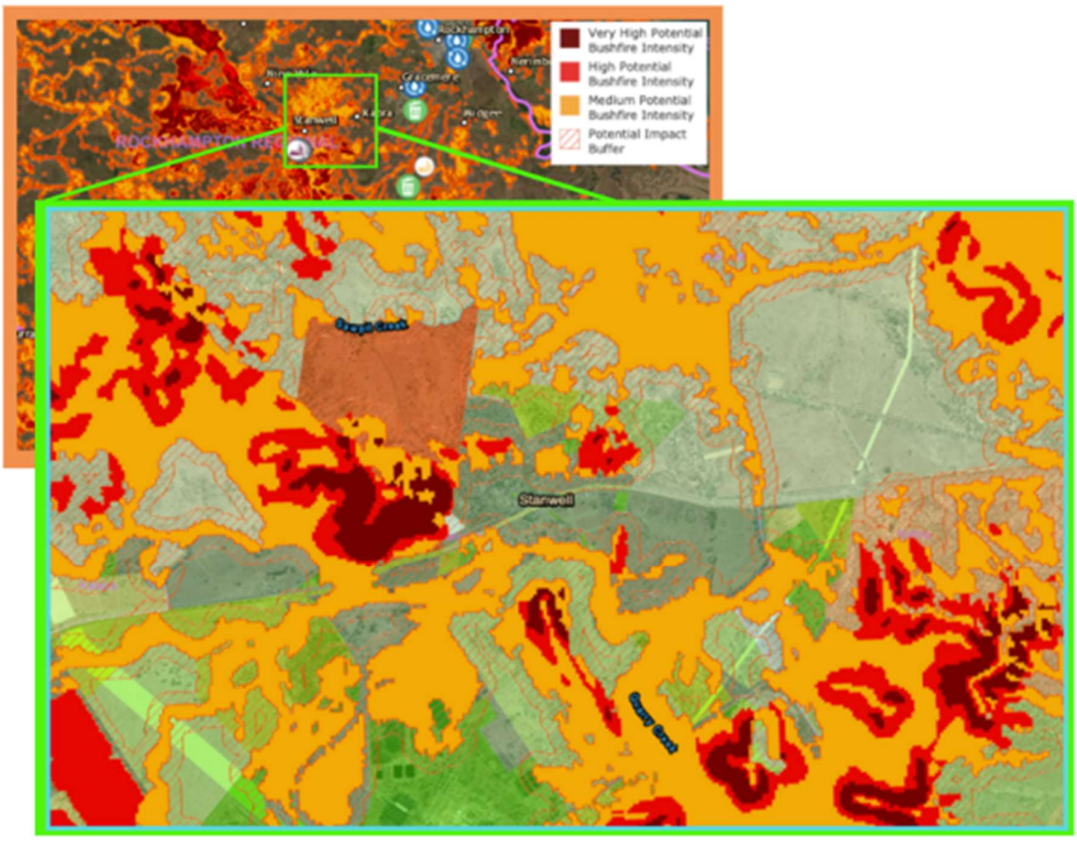
The Stanwell State Primary School and service station provide important services to the local community however travel to Rockhampton or Gracemere is necessary for most shopping, additional services and higher education

| Locality | Size (km$^2$) | Total Population | Total Population (Male) | Total Population (female) | Total Population (A&TSI) | Median Age |
|---|---|---|---|---|---|---|
| Stanwell | 137 | 337 | 185 | 152 | 32 | 40 |

Source: 2016 Census Data

The ridge line, sloping from the southern end of Morinish, through Kalapa and across Stanwell to the Mount Morgan area, has a high frequency of fire, as recorded by fire scar data. Significant fire scars were recorded in these hills in 2003, 2008, 2010, 2013, and 2018. From a bushfire perspective, this community is rated as:

Low | Medium | High | **Very High** | Extreme




Source: SDCC Mapping Tool (QFES and DNRME Layers)



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## Wycarbah

Wycarbah is a locality in the Rockhampton Region, primarily comprised of rural land and supported by the small township of Wycarbah. It is located adjacent to the Capricorn Highway and Central Western railway line and is 40km south-west of Rockhampton and 30km south-west of Gracemere.

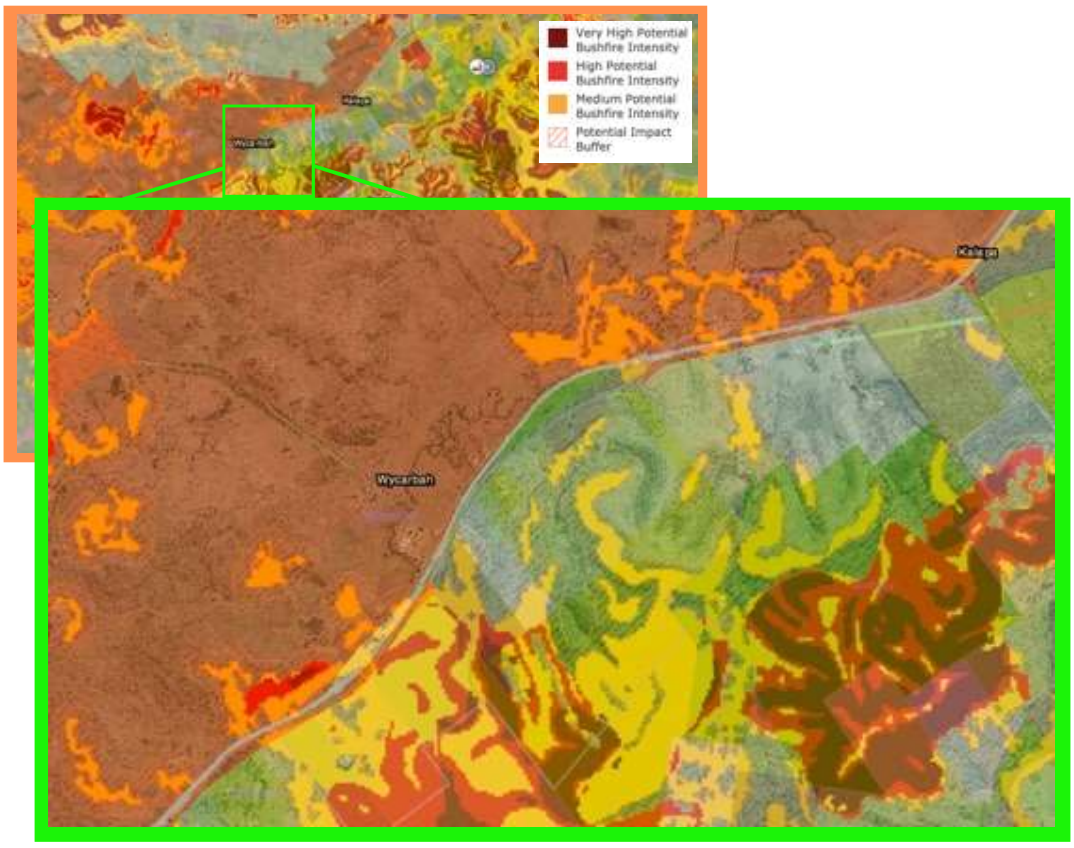
The township is comprised of a number of houses and the Wycarbah Hall. At the time of the 2016 Census the locality of Wycarbah had a population of 49 people including 16 families. Those families with children need to travel outside of the locality for schooling. All residents in the locality need to travel to Rockhampton or Gracemere for shopping, additional services and higher education.

| Locality | Size (km$^2$) | Total Population | Total Population (Male) | Total Population (female) | Total Population (A&TSI) | Median Age |
|---|---|---|---|---|---|---|
| Wycarbah | 214 | 49 | 25 | 24 | - | 52 |

Source: 2016 Census Data

There is potential for a fire to come out of areas described as very high danger. It is isolated and there is limited access and egress. From a bushfire perspective, this community is rated as:

| Low | Medium | High | **Very High** | Extreme |
|---|---|---|---|---|




Source: SDCC Mapping Tool (QFES and DNRME Layers)



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## Westwood

Westwood is a locality in the Rockhampton Region, primarily comprised of rural land and supported by the small township of Westwood. It is located adjacent to the Capricorn Highway and Central Western railway line. It is 50km to the south-west of Rockhampton and 40km to the south-west of Gracemere.

At the time of the 2016 Census the locality of Westwood had a population of 174 people, a decrease of 50 people from the previous Census in 2011, a common trend for most rural communities in Australia. Rural industries provide the majority of employment for the working population in the locality with the remainder travelling to Rockhampton, Gracemere or beyond.

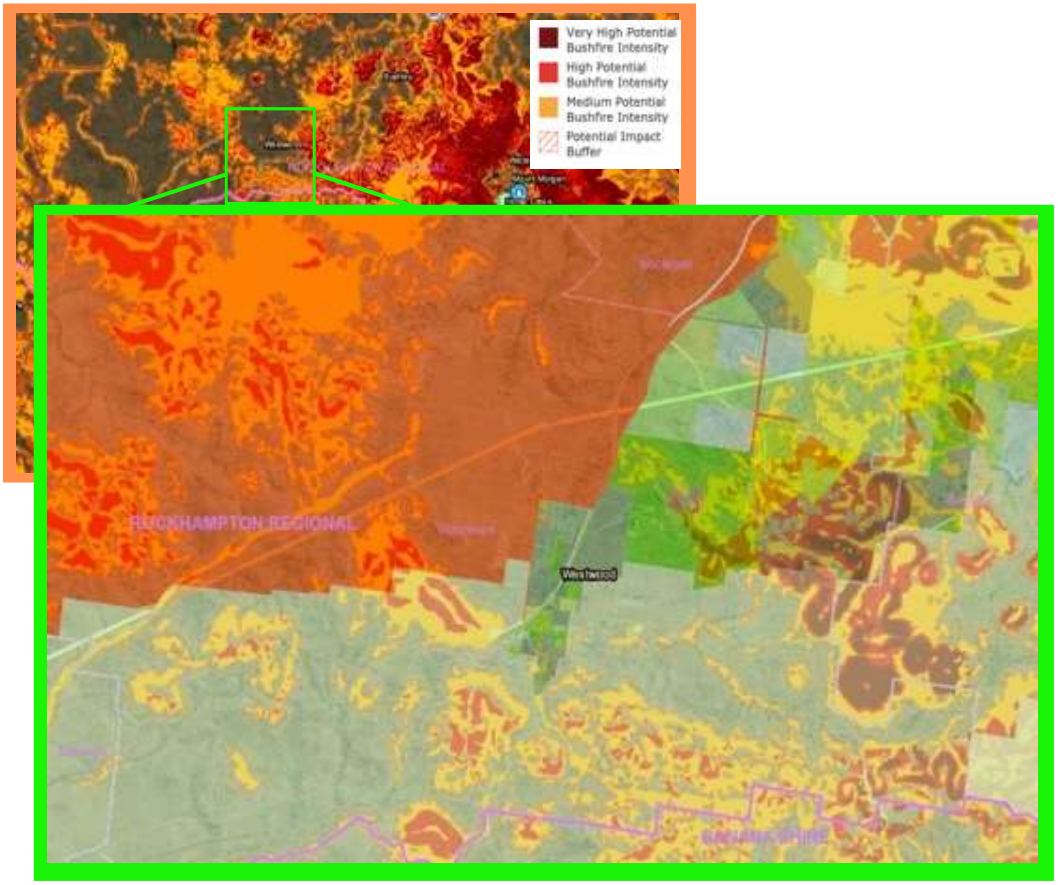
The Westwood State primary school, police station and hotel provide important services to the local community however travel to Rockhampton or Gracemere is necessary for most shopping, additional services and higher education.

| Locality | Size (km$^2$) | Total Population | Total Population (Male) | Total Population (female) | Total Population (A&TSI) | Median Age |
|---|---|---|---|---|---|---|
| Westwood | 175 | 174 | 87 | 87 | 3 | 46 |

Source: 2016 Census Data

The ranges to the west and along the eastern boundary of the locality provide significant fire risk. With its isolation, lack of services, and entry and egress issues, from a bushfire perspective, this community is rated as:

| Low | Medium | High | **Very High** | Extreme |
|---|---|---|---|---|




Source: SDCC Mapping Tool (QFES and DNRME Layers)



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## Gracemere

Gracemere is a locality in the Rockhampton Region that is largely comprised of the town of Gracemere which has a population of over 11,000 residents. It is the largest centre, after Rockhampton, in the Region.

Gracemere provides many services including schools, supermarket, library, post office and local hospital. It is located 10km south-west of the city of Rockhampton. Many of the working population travel to Rockhampton for employment via the Capricorn Highway, which traverses the Fitzroy River floodplain.

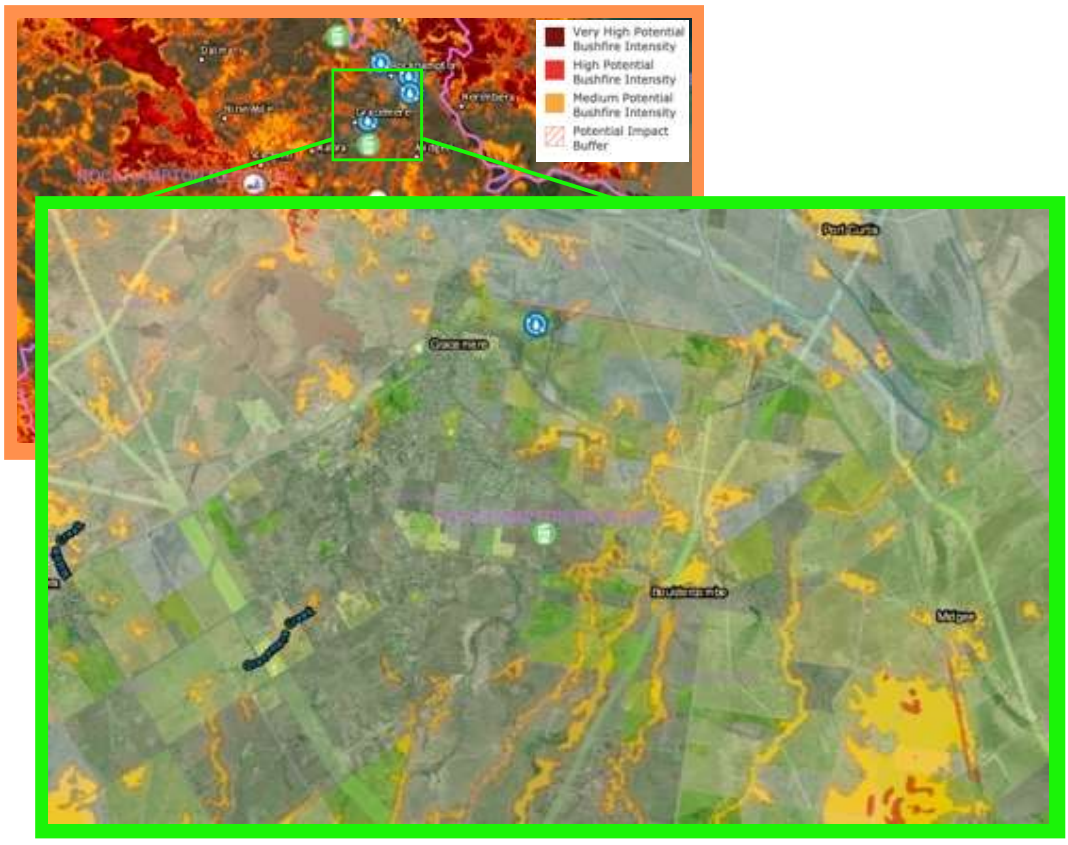
There has been a recent growth in Gracemere as a result of mining in the industrial area to the north of the town. The town is serviced by an auxiliary firefighting station with a number of rural fire brigades surrounding it.

| Locality | Size (km$^2$) | Total Population | Total Population (Male) | Total Population (female) | Total Population (A&TSI) | Median Age |
|---|---|---|---|---|---|---|
| Gracemere | 70 | 11,315 | 5,654 | 5,851 | 952 | 30 |

Source: 2016 Census Data

In 2018, extreme weather conditions saw a catastrophic fire danger declared and thousands of residents evacuated in the localities of Stanwell, Kabra and Gracemere. The ridge line and sloping land to the north and west of the locality have a very high potential for bushfire, however there are pasture lines which buffer the town from these higher levels of risk. Therefore, from a bushfire risk perspective, this community is rated as:

| Low | Medium | **High** | Very High | Extreme |
|---|---|---|---|---|




Source: SDCC Mapping Tool (QFES and DNRME Layers)



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Version: 1, Version Date: 03/08/2021

## Bouldercombe

Bouldercombe is a locality in the Rockhampton Region, primarily comprised of rural land and acreage lifestyle blocks surrounding the small township of Bouldercombe. At the time of the 2016 Census the locality of Bouldercombe had a population of 1,085 people, a decrease of 50 people from the previous Census in 2011. Located 20km south of Rockhampton, the majority of the working population travel via the Burnett Highway to Rockhampton, or beyond, for employment. Beef cattle farming is the third top employer in the area.

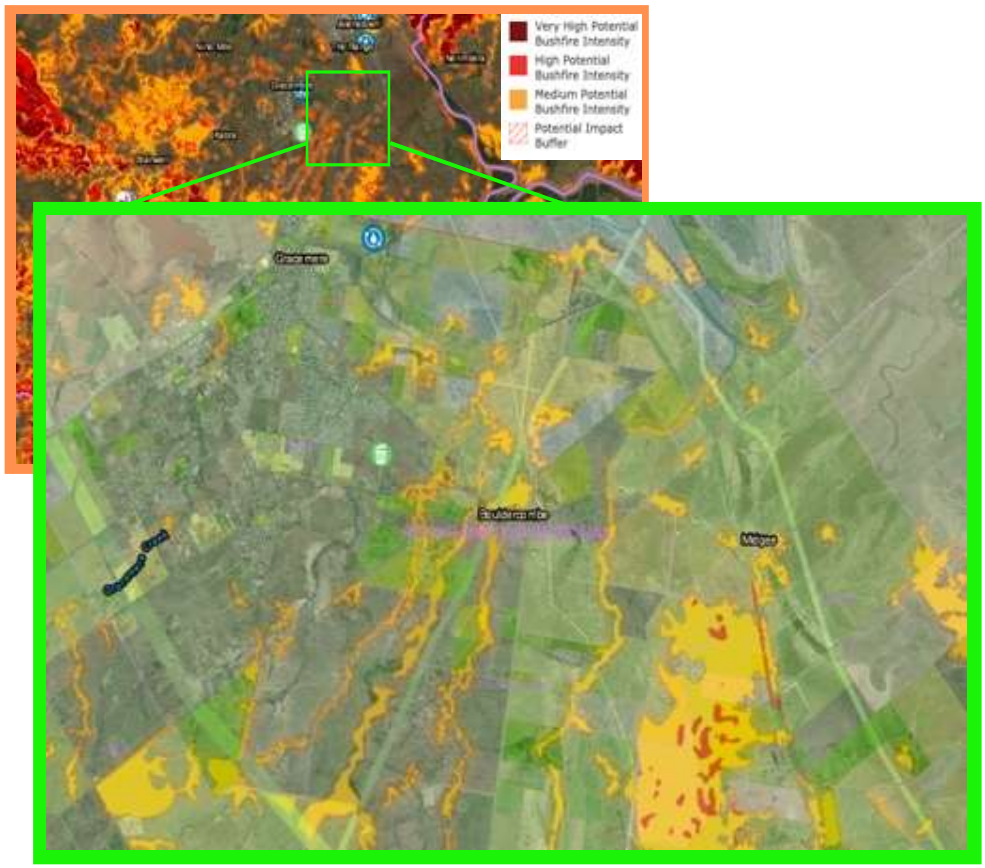
Bouldercombe is supported by a state primary school and service station however, residents need to travel to Rockhampton for most shopping, services and higher education. The Bouldercombe Gorge Resources Reserve is located close to the township and is a popular attraction for locals and visitors.

| Locality | Size ($km^2$) | Total Population | Total Population (Male) | Total Population (female) | Total Population (A&TSI) | Median Age |
|---|---|---|---|---|---|---|
| Bouldercombe | 161 | 1,085 | 552 | 533 | 77 | 44 |

Source: 2016 Census Data

The mountainous and hilly terrain to the south (Bouldercombe Gorge Resources Reserve and Mount Morgan Range) have a very high potential for bushfire. There is a rural fire station in Bouldercombe. From a bushfire risk perspective, this community is rated as:

| Low | **Medium** | High | Very High | Extreme |
|---|---|---|---|---|




Source: SDCC Mapping Tool (QFES and DNRME Layers)



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## Bajool/Marmor

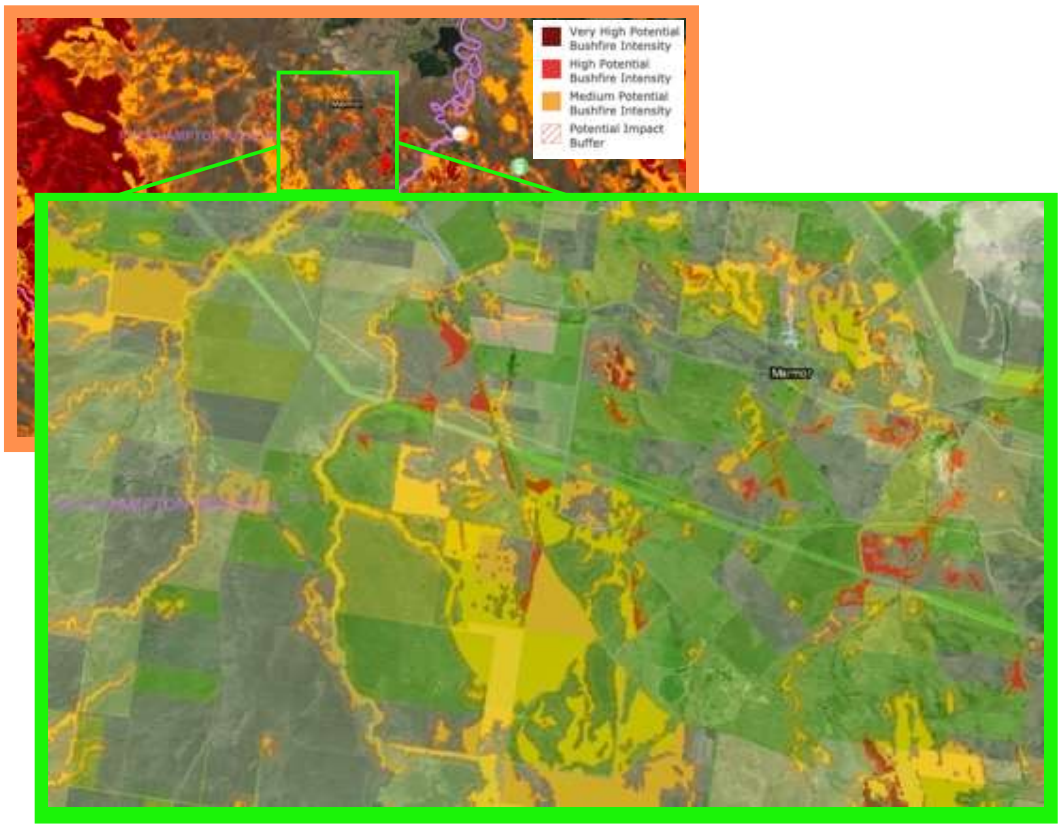
The Bajool and Marmor localities primarily consist of rural lands, supported by the townships of Bajool and Marmor, and the community of Upper Ulam. The Bajool and Marmor townships are located 35km and 44km respectively south-east of Rockhampton. This profile covers Marmor and Upper Ulam communities (Bajool and Marmor localities). With a combined population of 667 people, at the time of the 2016 Census, this area is experiencing a declining population, as is the case in most rural communities. Key infrastructure in this area is the Bajool Explosives Reserve, Marmor Quarry and Marmor Lime Manufacturing Plant, all of which have proximate access to the Bruce Highway. To the west is a portion of the Bouldercombe Gorge Resources Reserve and Gelobera State Forest.

| Locality | Size (km²) | Total Population | Total Population (Male) | Total Population (female) | Total Population (A&TSI) | Median Age |
|---|---|---|---|---|---|---|
| Bajool | 589 | 455 | 242 | 213 | 31 | 42 |
| Marmor | 138 | 212 | 107 | 105 | 25 | 45 |
| **Combined** | **727** | **667** | **349** | **318** | **56** | **44** |

Source: 2016 Census Data

In close proximity to the Bajool township, there is a medium likelihood of bushfires because of the nature of the vegetation. In surrounding areas, the risk is somewhat higher with the highest risk in the timbered range area. The presence of the explosive reserve does pose a serious threat. Hazard reduction burns are conducted annually, whilst the RFS also conducts campaigns detailing where to obtain permits, when burn-offs are permitted, and general community education related to bushfire. From a bushfire risk perspective, this community is rated as:

Low | **Medium** | High | Very High | Extreme




Source: SDCC Mapping Tool (QFES and DNRME Layers)



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## Gogango

Gogango is a locality in the Rockhampton Region, primarily comprised of rural land, supported by the small township of Gogango, and located adjacent to the Capricorn Highway and Central Western railway line.

The township is comprised of a number of houses, park, hall and primary school. At the time of the 2016 Census the locality of Gogango had a population of 111 people.

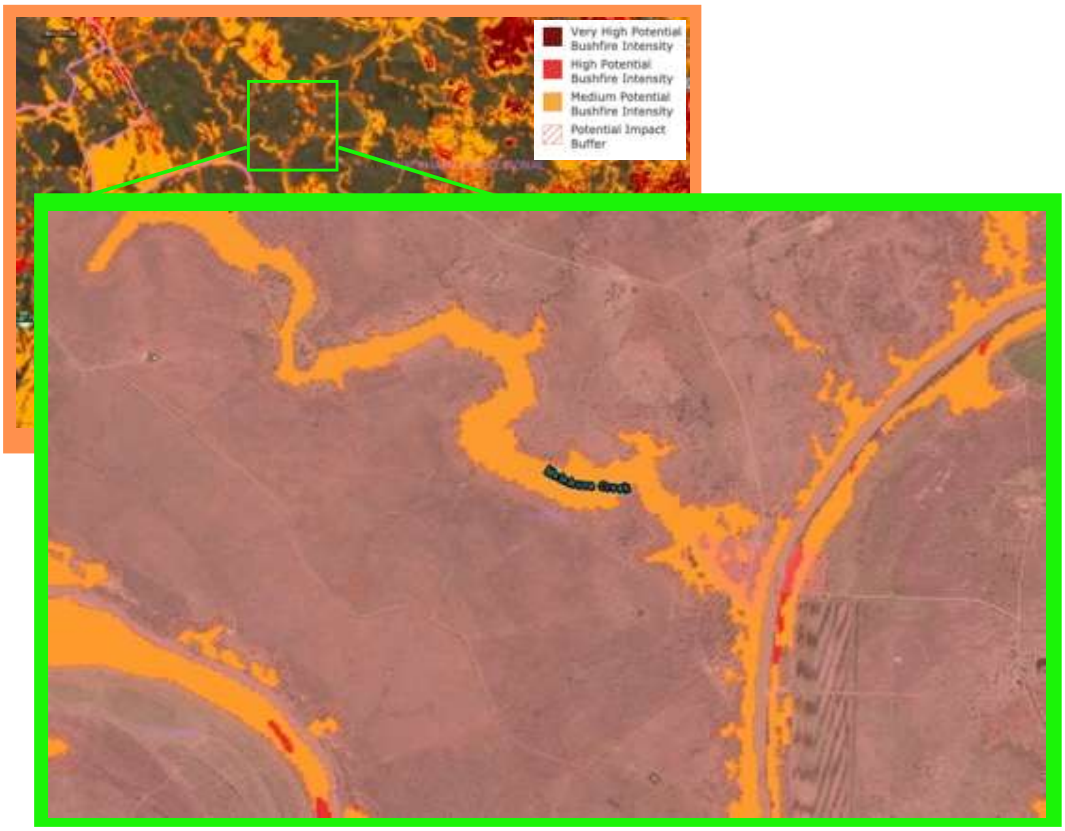
Rural industries provide the majority of employment for the working population in the locality, with the remainder travelling to Rockhampton, Gracemere or beyond, for employment. Residents need to travel to Rockhampton or Gracemere for most shopping, services and higher education

| Locality | Size (km$^2$) | Total Population | Total Population (Male) | Total Population (female) | Total Population (A&TSI) | Median Age |
|---|---|---|---|---|---|---|
| Gogango | 793 | 111 | 59 | 52 | - | 51 |

Source: 2016 Census Data

The mountainous and hilly terrain to the south (Bouldercombe Gorge Resources Reserve and Mount Morgan Range) have a very high potential for bushfire. The nearest rural fire station is in Bouldercombe. From a bushfire risk perspective, this community is rated as:

**Low** | Medium | High | Very High | Extreme




Source: SDCC Mapping Tool (QFES and DNRME Layers)



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