



**GLENORCHY**  
CITY COUNCIL

# **Bushfire Mitigation Strategy**

Glenorchy City Council

2020-2030



## Disclaimer and Information Statement

This strategy was developed by Glenorchy City Council (GCC) and the information in this strategy is current as at the date of publication. The information and/or the recommendations contained in this strategy have been compiled and based on the information, records, data and any other sources of information available at time of publication. Accordingly, the accuracy of the information and/or recommendations in this report relies entirely upon the information and material available at time of publication. Whilst GCC have exercised all due care and skill in compiling the strategy, readers should confirm the accuracy and reliability of the information and material GCC has relied upon in producing the strategy. This strategy may also contain information, systems or data which is the property of GCC. In these circumstances, the property referred to will remain the property of GCC and GCC has in no way waived or altered in any way its ownership right, or provided consent for use, unless expressly provided in the strategy.

## Version Control

Version	Release Date	Prepared By	Changes
1.0	16 <sup>th</sup> June 2020	Rob Whittle	First complete working draft for review by Hobart Fire Management Area Committee and Subject Matter Experts.
1.1	22 <sup>nd</sup> December 2020	Rob Whittle	Amendments included from review.

## Acknowledgment and Endorsement

<b>Strategy noted by Hobart Fire Management Area Committee (HFMAC):</b> 19 <sup>th</sup> October 2020
<b>Strategy adopted by GCC:</b> 21 <sup>st</sup> December 2020

## Context statement

This is the first Bushfire Mitigation Strategy (BMS) for bushfire-prone vegetation managed by GCC outside of Wellington Park. The Wellington Park Fire Management Strategy remains to provide a coordinated approach to bushfire mitigation within Wellington Park. This strategy will function for a ten-year period, with the first review to be undertaken at three years post adoption. Outputs from this strategy derive from a science-based approach.

Reducing the risk to life and property is the overriding priority in this strategy as it is in all bushfire plans. This strategy applies a risk-based planning approach based on principles from ISO 31000:2018 Risk Management – Guidelines, and the Tasmanian Emergency Risk Assessment Guidelines (TERAG). This approach allows council to manage bushfire risks efficiently, effectively and consistently by considering what council is currently doing to manage bushfire risks, if that is adequate, and if and where council needs to improve. This approach is based on the principal that bushfire does not stop at cadastral boundaries. The three key factors that contribute to bushfire risk are weather, vegetation, and terrain.

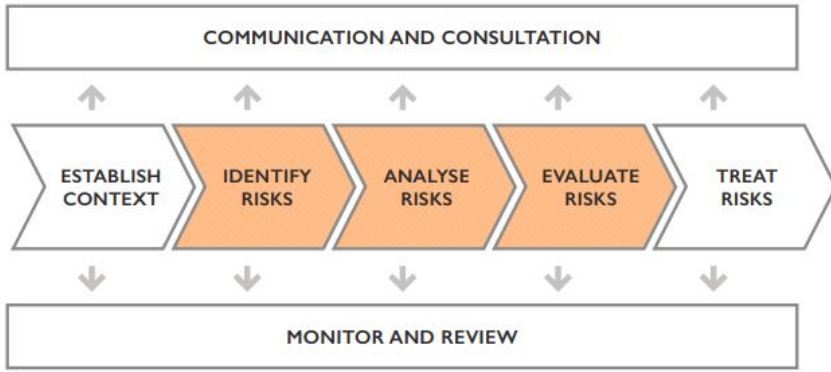


Figure 1: Risk management process (Department of Police, Fire and Emergency Management, 2017).

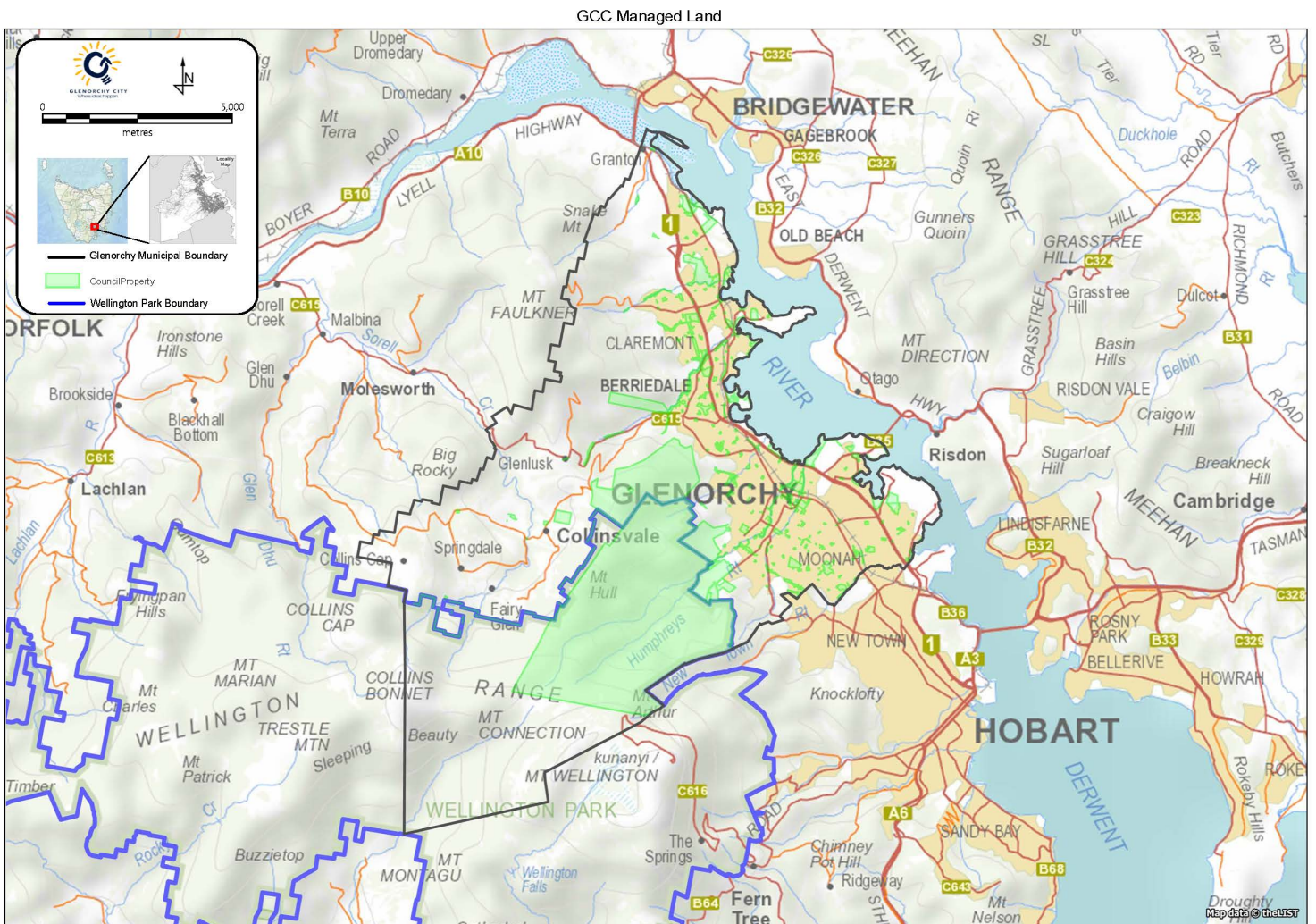


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## Glossary of terms

The Australasian Fire and Emergency Services Authority Council (AFAC) Bushfire Glossary will be used as reference in this strategy.

Term	Definition
<b>AS 3959 – 2018 Construction of building in bushfire-prone areas</b>	This Standard is primarily concerned with improving the ability of buildings in designated bushfire-prone areas to better withstand attack from bushfire thus giving a measure of protection to the building occupants (until the fire front passes) as well as to the building itself (Standards Australia Limited, 2018).
<b>Assets</b>	Anything valued by people which includes houses, crops, forests and, in many cases, the environment.
<b>Australasian Fire and Emergency Services Authorities Council (AFAC)</b>	The peak representative body for fire, emergency services and land management agencies in the Australasian region. It develops and promotes national standards for the fire industry.
<b>Bushfire Attack level (BAL)</b>	The BAL scale is that used within Australian Standard 3959-2018. The BAL determines the level of risk to life and potential for building loss or damage resulting from bushfire.
<b>Bushfire</b>	Unplanned vegetation fire. A generic term which includes, grass fires, forest fires and scrub fires both with and without a suppression objective.

<b>Bushfire management</b>	All those activities directed to prevention, detection, damage mitigation and suppression of bushfires. Includes relevant legislation, policy, administration, law enforcement, community education, training of firefighters, planning, communications systems, equipment, research, and the multitude of field operations undertaken by land managers and emergency services personnel relating to bushfire control.
<b>Bushfire risk</b>	Processes, occurrences or actions that increase the likelihood of fires occurring.
<b>Climate</b>	The atmospheric conditions of a place over an extended period of time.
<b>Cultural heritage</b>	Encompassing both Aboriginal and historic heritage values both statutory and non-statutory.
<b>Ecological burning</b>	A form of prescribed burning. Treatment with fire of vegetation in nominated areas to achieve specified ecological objectives.
<b>Fine fuel</b>	Fuels that burn in the continuous flaming zone at the fire's edge. They contribute the most to fire's rate of spread and flame height. Typically, dead plant material, such as leaves, grass, bark and twigs thinner than 6mm thick, and live plant material thinner than 3mm thick.
<b>Fire management</b>	All activities associated with the management of fire prone land, including the use of fire or other means to meet land management goals and objectives.
<b>Fire suppression</b>	The activities connected with restricting the spread of a fire following its detection and before making it safe.
<b>Fuel</b>	Any material such as grass, leaf litter and live vegetation which can be ignited and sustains a fire. Fuel is usually measured using the Overall Fuel Hazard Assessment Guide 4 <sup>th</sup> ed. 2010 DSE.
<b>Fuel management</b>	Modification of fuels by prescribed burning, or other means.
<b>Fuel modification</b>	Manipulation or removal of fuels to reduce the likelihood of ignition and/or to lessen potential damage and resistance to control (e.g., lopping, chipping, crushing, piling and burning).
<b>Fuel reduction</b>	Manipulation, including combustion, or removal of fuels to reduce the likelihood of ignition and/or lessen potential damage and resistance to control.
<b>Fuel reduction burning</b>	The planned application of fire to reduce hazardous fuel quantities; undertaken in prescribed environmental conditions within prescribed boundaries.
<b>Hazard</b>	A source of potential harm or a situation with potential to cause loss.
<b>Legislation</b>	A set of laws made by a State, Territory or Federal Government; includes acts and regulations.
<b>National Emergency Risk Assessment Guidelines (NERAG)</b>	A contextualised, emergency-related risk assessment method to enable consistent and rigorous emergency-related risk assessments, increase the quality and comparability of risk assessments and improve the national evidence base on emergency-related risks. The outputs from NERAG risk assessments are intended to improve decision making when allocating scarce resources for risk treatment and emergency prevention and preparedness measures.
<b>Planning</b>	The collective and collaborative efforts by which agreements



	are reached and documented between people and organisations to meet their communities' vegetation fire management needs. It is a sequence of steps which details how the process will take place.
<b>Prescribed burn</b>	A fire utilised for Prescribed burning.
<b>Prescribed burning</b>	The controlled application of fire under specified environmental conditions to a predetermined area and at the time, intensity, and rate of spread required to attain planned resource management objectives. Also known as planned burning.
<b>Prevention</b>	All activities concerned with minimising the occurrence of incidents, particularly those of human origin.
<b>Recovery</b>	The coordinated process of supporting emergency affected communities in reconstruction of the physical infrastructure and restoration of emotional, social, economic and physical wellbeing.
<b>Response</b>	Actions taken in anticipation of, during, and immediately after an incident to ensure that its effects are minimised, and that people affected are given immediate relief and support.
<b>Risk</b>	The exposure to the possibility of such things as economic or financial loss or gain, physical damage, injury or delay, as a consequence of pursuing a particular course of action. The concept of risk has two elements, i.e. the likelihood of something happening and the consequences if it happens. (AS4360).
<b>State Fire Management Council (SFMC)</b>	Appointed under Section 14 of the <i>Fire Service Act 1979</i> with the responsibility of developing a State vegetation fire management policy to be used as the basis for all fire management planning. And, to provide advice to both the Minister and the State Fire Commission on matters relating to the prevention or mitigation of vegetation fires.
<b>Tasmania Fire Service (TFS)</b>	The operational arm of the State Fire Commission, established by the <i>Fire Service Act 1979</i> .
<b>Tasmanian Emergency Risk Assessment Guidelines (TERAG)</b>	Guidelines produced by the State Emergency Management Committee to support Tasmanian emergency management committees and hazard management authorities to prepare emergency risk assessments in line with the National Emergency Risk Assessment Guidelines (NERAG).
<b>Values at risk</b>	The natural resources or improvements that may be jeopardised if a fire occurs.
<b>Vegetation fire</b>	Covers all fire in vegetation, both planned and unplanned. Unplanned vegetation fire is more specifically known as bushfire.





## 1 Introduction

Bushfire has been a constant and natural phenomenon in Australia for many thousands of years. South-eastern Australia, including Tasmania, is particularly prone to fire and is regarded as one of the most bushfire-affected regions in the world. Fire is an important and natural component in the management and renewal of biodiversity and habitat. If uncontrolled, however, its effects can be catastrophic (Tasmanian State Bushfire Safety Policy, 2014).

In June 2017 council adopted its first Bushfire Mitigation Policy. The policy provides direction on how council will prescribe mitigation treatments for low probability but high impact bushfire events which may impact the Greater Hobart area. This strategy is an output from the policy which will provide council with a framework to adaptively reduce bushfire risks when implemented and maintained.

## 2 Strategy purpose and aim

This strategy is designed to achieve an overall aim of mitigating the impact of bushfire to the municipality of Glenorchy, whilst contributing to a tenure blind bushfire mitigation approach to Greater Hobart. The principal used in guiding this strategy is that bushfire safety is a shared responsibility between government, agencies and other stakeholders. It explains GCC's responsibilities as a land owner to reduce bushfire risks from council managed bushfire-prone vegetation, the process used to determine the levels of risk, and when appropriate the fuel reduction actions to reduce the risk of bushfire occurring and/or to reduce the intensity and impact of bushfires when they do occur.

## 3 Objectives of this strategy

The two primary objectives of the strategy are:

1. To minimise the impact of major bushfires on human life, communities, essential and community infrastructure, industries, the economy and the environment. Human life will be afforded priority over all other considerations, and
2. To maintain or improve the resilience of natural ecosystems and their ability to deliver services such as biodiversity, water, carbon storage.

The following means objectives will be used to achieve the two primary objectives:

- Continuously improving bushfire risk mitigation treatments
- deliver a tenure-blind, integrated approach to mitigate bushfire risk, and
- comply with legislation.

## 4 Strategic directions

- 1. Enhance the provisions of hazard management areas, defensible spaces, and fuel breaks**  
This direction aims to reduce risk at a Glenorchy Local Government Area (LGA) and property/household scale. For maximum effectiveness perpetual maintenance and reviews are required. This direction also includes the design of service levels for some Council managed treatments. Council will target that the prescribed maximum width of a hazard management area on Council managed land is no less than that required for BAL-29 rated development to be achieved on the lot once the owner of the lot has undertaken their best efforts.
- 2. Develop Fire Trail Construction and Maintenance Specifications**  
This includes specifications for the construction, reinstatement or reconstruction of existing fire trail surfaces and associated drainage infrastructure. Additionally, vegetation maintenance directly adjacent to existing fire trails.
- 3. Enhance the provisions of fire trail network to all weather access where required to meet future risk requirements**  
Stakeholders utilise Council managed fire trail networks for a broad range of recreational, asset management, and emergency response actions. This direction includes identifying each fire trails current access class and prioritising enhancements.
- 4. Work with utility providers and lead the development of individual memorandum of understandings (MoU) for perpetual fire trail maintenance to targeted fire trails**  
This will include examining current fire trail access/maintenance arrangements with utility providers then working in collaboration to realise opportunities to improve and formalise current arrangements.
- 5. Ensure access is maintained for sections of fire trails on private property that have strategic importance to Greater Hobart bushfire risk reduction within Glenorchy LGA**  
Several fire trails pass through multiple land tenures with different levels of maintenance and management standards. An opportunity exists to examine fire trails within Glenorchy LGA and establish terms of access.
- 6. Design treatments to reduce bushfire risks deriving from vehicle fires in bushfire-prone areas including adjacent to Collinsvale Road and Glenlusk Road**  
This treatment will reduce the likelihood of vehicle fires developing into large broadscale bushfires where the risk consequences can be severe.
- 7. Develop a centralised Operations & Maintenance Vegetation Control Program and undertake gap analysis**  
This will identify opportunities for increased efficiency across Council's Operations & Maintenance Work Group, and Environment Section and will increase operational capacity to treat bushfire risks during each bushfire season.
- 8. Undertake gap analysis on existing road side vegetation clearing specifications undertaken by Council in bushfire-prone areas**  
A key aspect of this direction is to improve current Council specifications with an outcome of reducing bushfire risk to communities during bushfires events. This direction should align where appropriate with the *Local Government (Highways) Act 1982*. Outputs will be incorporated into the centralised Operations & Maintenance Vegetation Control Program once developed.
- 9. Further develop practices and lead the harmonisation of pre and post fire vegetation and fuel hazard reaccumulation rate assessments within Hobart Fire Management Area (HFMA)**

Sharing information and training at the HFMA level will create the ability to more accurately model bushfire risk at the landscape level and understand accurate fuel hazard levels and potential fire behaviour during bushfire events.

**10. Undertake gap analysis and develop business case for specific skills acquisition for existing staff within Council to assist operational aspects of bushfire risk reduction treatments and emergency management**

There are several benefits for Council in conducting this review and embarking on a skills enhancement program for staff. The ramping up of agencies and Council's response capability during times of critical need is now part of the landscape for emergencies in Australia. Being able to call on existing staff with an in-depth knowledge of Council policies and procedures, its communities and economic base is a proactive approach in dealing with emergencies.

**11. Contribute to enhance resource sharing across Local Government for planned burning operations within the HFMA**

This will allow for opportunities to increase available resources and expertise within the HFMA during planned burning operations whilst imparting knowledge and training opportunities.

**12. Continue to identify, develop and apply best practice approaches and contribute to reducing bushfire risk within the HFMA**

This includes strengthening partnerships with stakeholders at a statewide level. A key element is contributing to the development of a Tasmanian statewide bushfire risk assessment process and apply/implement outputs to the Glenorchy LGA.

**13. Develop bushland closure and communication procedures for days of severe forest fire danger ratings (FFDI), days of total fire bans and fire incidents within Council managed land.**

Fires in bushland areas on days with a severe or above FFDI will generally be uncontrollable and will move very quickly posing a great risk to anyone within the vicinity.

The objectives of the closures are to mitigate the risk of:

- loss of life or injury
- fires starting within bushland areas either accidentally or deliberately.

These procedures will primarily relate to responsibilities and functions of the Council's Operations and Maintenance Workgroup, and Environment Workgroup for the management and use of Council managed bushland areas and will apply to GCC staff, authorised contractors and community volunteers operating within Council managed bushland areas, and the general public.

## 5 Strategic planning framework for Council's bushfire risk mitigation

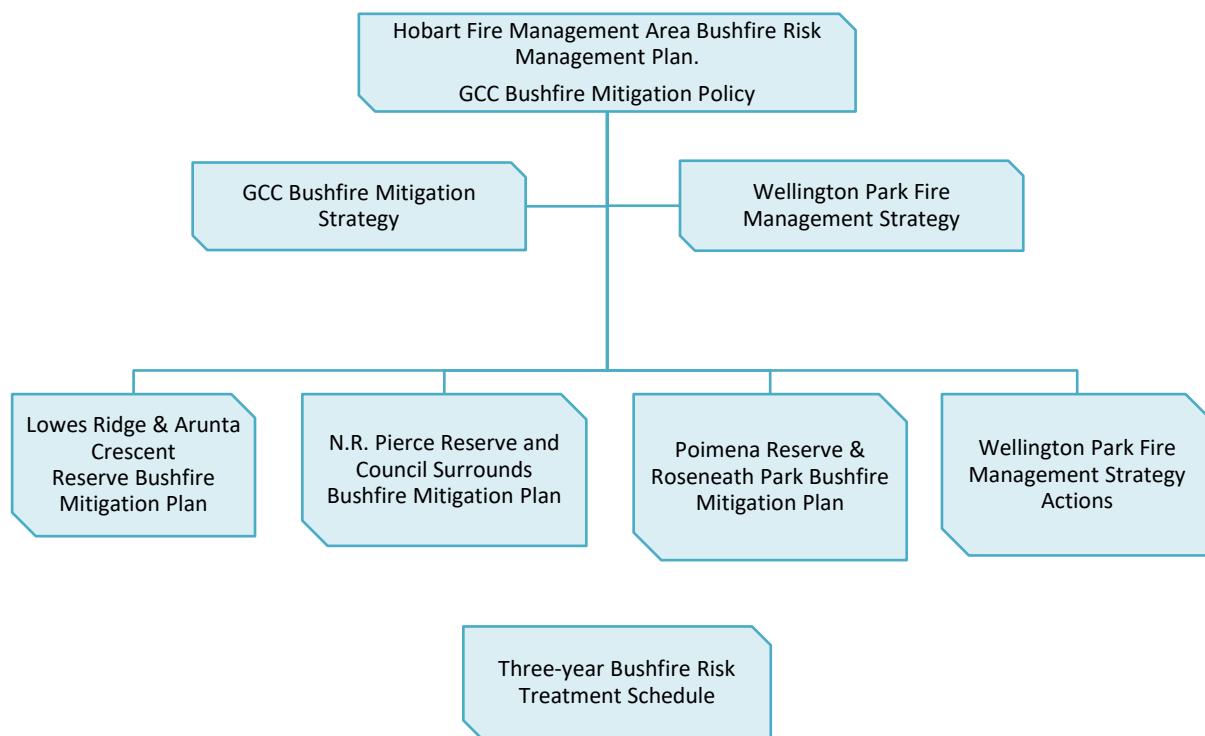


Figure 3: Strategic planning framework for council's bushfire risk mitigation

### 5.1 Bushfire Mitigation Plans (BMPs)

BMPs are tactical level planning documents that focuses on addressing bushfire hazards and improving the survivability of communities and assets. BMPs identify key areas for fuel management, and provides tactical guidance regarding prescribed burning, fuel treatment, fire management infrastructure, and asset protection work.

BMPs will be prepared for the following bushfire-prone areas managed by council:

- Lowes Ridge & Arunta Crescent Reserve
- N.R. Pierce Reserve and Council surrounds
- Poimena Reserve & Roseneath Park.

The TFS also have community protection planning documents for Glenorchy such as Bushfire Response Plans, Bushfire Protection Plans, and Bushfire Mitigation Plans that have been considered in this strategy.

### 5.2 GCC Three-year Bushfire Risk Treatment Schedule

This lists annual actions to be undertaken over a three-year period to reduce bushfire risk. Actions derive from risk registers developed by the Hobart Fire Management Area Committee, individual BMPs (section 5.1), the Wellington Park Fire Management Strategy, and associated Council asset maintenance schedules. This schedule will assist with annual planning and budgeting.

## 6 Relationships with other planning

This strategy is designed to factor in the broader aims and objectives of the following documents:

- Glenorchy City Council Strategic Plan 2016 – 2025
  - Section 3.2 Manage our natural environments now and for the future
  - Section 4.3 Build strong relationships to deliver our communities' goals
- Glenorchy City Council Annual Plan 2019/20 - 2022/23
  - Section 3.2 Manage our natural environments now and for the future
  - Section 4.1.2 Manage the City's assets soundly for the long-term benefit of the community
- Glenorchy City Council Bushfire Mitigation Policy
- Glenorchy Municipal Emergency Management Plan
- Hobart Fire Management Area Bushfire Risk Management Plan
- Fire Management Strategy for Wellington Park 2006
- Greater Wellington Range Zone 1 Bushfire Mitigation Strategy (22 December 2017)
- City of Hobart Bushfire Management Strategy 2014
- Tasmanian Vegetation Fire Management Policy 2017.

### 6.1 Relationship with statutory planning – Bushfire-prone area overlay

The Glenorchy Interim Planning Scheme 2015 does not include a bushfire-prone area overlay. It is anticipated a bushfire-prone area overlay for the Glenorchy LGA will be included when a statewide planning scheme is implemented.

Bushfire protection requirements apply to new building work through the building approvals process. The Bushfire-Prone Areas Code Applies to new subdivisions, hazardous uses and vulnerable uses through the planning approvals process.

### 6.2 Statutory responsibilities

As a land owner council has an obligation under section 64 of the *Fire Service Act 1979* to take diligent steps to prevent any fire lit on its property during a fire permit period from spreading onto a neighbouring property causing personal injury, damage to adjoining property, or damage to items of natural or heritage value. Additionally, council is required to take diligent steps to extinguish or control any unauthorised fire on their property during a fire permit period, and to report that fire to the TFS or Police.

As well as the obligations that apply to all landowners/occupiers, Council has several specific powers and obligations under this Act. These are:

- to nominate a representative to sit on the local Special Fire Area Committee (Section 55)
- to “cause the formation in its municipal area of such fire breaks as it considers necessary or desirable to arrest the spread, or to facilitate the suppression of, fires” (Section 56)
- to contribute towards the operating costs of fire brigades (Sections 79 to 95).

Council also has specific responsibilities under various Acts of Parliament for bushfire mitigation, bushfire hazard abatement, and the conservation and management of native flora and fauna.

These Acts include but not limited to:

- *Aboriginal Relics Act 1975*
- *Environmental Management and Pollution Control Act 1994*

- *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*
- *Environment Protection Policy (Air Quality) 2004*
- *Forest Practices Act 1985*
- *Forest Practices Regulations 2007*
- *Local Government Act 1993*
- *Local Government (Building and Miscellaneous Provisions) Act 1993*
- *Nature Conservation Act 2002*
- *State Policy on Water Quality Management 1997*
- *Tasmanian Air Quality Strategy 2006*
- *Threatened Species Protection Act 1995*
- *Weed Management Act 1999*
- *Wellington Park Act 1993.*

## 7 Location and Description

### 7.1 Overview

Glenorchy City is in southern Tasmania and approximately seven kilometres north of the Hobart CBD. The city covers an area of approximately 12,110<sup>ha</sup>, 2016 Census data reports a population of 46,253 with an average 2.3 people per household. The Department of Treasury and Finance have population projections for 2037 for Glenorchy City to reach 51,568 (Treasury.tas.gov.au, 2018).

The city is bounded by Mt Faulkner to the north, the Derwent River to the east, City of Hobart to the south, and the Wellington Ranges to the west.

### 7.2 Cultural heritage

Mt Wellington has significance for the Aboriginal community although little is yet known of the extent of Aboriginal occupation of the area. Since European settlement, Mt Wellington has been utilised for its resources, including the supply of drinking water to Greater Hobart and other regional communities, and has provided substantial tourism and recreation opportunities, resulting in a range of historical sites and artefacts scattered throughout the area. The very presence of Mt Wellington near Tasmania's largest population centre creates a strong element of 'place' (Wellington Park Management Plan, 2013).

This strategy acknowledges the importance of both the Aboriginal and historic cultural heritage of Wellington Park and, land and reserves within Glenorchy. The consideration and management of cultural heritage values will be at the earliest possible stage during tactical and operational planning phases.

Aboriginal Heritage Tasmania has been consulted during the design of this strategy, and where applicable, consideration has been given to known Aboriginal and cultural heritage sites in respective BMPs which are an output of this strategy.

### 7.3 Environment

Bushfire behaviour is influenced primarily by the environmental factors present at any given time. These include; vegetation type and amount of fine fuels available to burn, topography including

elevation, aspect, slope; and climate including temperature, average rainfall, soil dryness index, relative humidity and windspeed.

## 7.4 Vegetation

The three predominant vegetation communities within council managed bushfire-prone vegetation are dry eucalypt forest and woodland, wet eucalypt forest, and montane eucalypt forest and woodland. Dry eucalypt forest and woodland communities are generally highly fire adapted and fire is an essential part of regenerative cycles, wet eucalypt forests can be highly fire sensitive, however extended bushfire intervals are required to reach mature stand structure. Montane forest and woodland communities are highly fire sensitive and a single bushfire will cause significant change to the community (Pyrke & Marsden & Smedley, 2005). It is probable that some vegetation communities within the HFMA are incorrectly mapped.

## 7.5 Topography

Urban settlements within Glenorchy range from sea level up to 450m above sea level (ASL) where the peri-urban interface is most prominent. The most significant topographical feature influencing bushfire behaviour to Glenorchy is the Wellington Ranges at 1271m ASL; the distribution of steep and much inaccessible terrain with tall forest canopies will allow fire to move freely whilst making aerial suppression of bushfires challenging.

## 7.6 Climate and rainfall

The Australian climate is generally hot, dry and prone to drought. In the southeast, occasional strong winds often associated with summertime cold fronts can lead to extreme fire danger. The amount of rain in preceding months affects the amount of dry grasses. If good spring rains have resulted in abundant plant growth, late summer grass fires can be intense. Many of Australia's native plants burn easily. The eucalypts high oil content makes them particularly fire prone. The vast areas of dry grass common in mid-to-late summer also burn readily. Most loss of life and property damage occurs around the fringes of the cities where homes are sometimes surrounded by flammable vegetation (Bom.gov.au, 2018).

Rainfall varies considerably throughout Greater Hobart (1600mm per year on the summit of Mt Wellington to less than 500mm per year at the Hobart Airport) resulting in a highly variable fire season with some areas being able to sustain fire for many months of the year. Due to this the length of the fire season can range from October through to April in areas of lower rainfall and from December to March in areas of higher rainfall and wetter vegetation types (State Fire Management Council, 2020).

## 7.7 Smoke taint in wine and grapes

Grapevines that are exposed to smoke may be at risk of producing a wine that is affected by smoke taint, therefore unpalatable and unsaleable. When vineyards are exposed to smoke, this can result in wines with undesirable sensory characters, such as smoky, burnt, ashy or medicinal, described as 'smoke tainted'. This can occur without visible smoke and a considerable distance from the source. The density of smoke, exposure time and smoke age are critical factors involved. The risk of smoke taint begins rising from fruitset (December), and increases to high risk after the grapes ripening (February) through to the end of harvest (usually May but varies by each season and location) (Wine Tasmania, 2018).

Council will use a proactive approach to planned burning activities around vineyards including:

- Early and often consultation directly with vineyards
- provide facilitation for contact details with vineyard managers
- Advocate for planned burns to proceed in spring if possible and investigate alternative risk management options.

## 8 Identifying bushfire risk potential for Glenorchy LGA

### 8.1 Risk statement

A bushfire impacting Glenorchy under a severe or above fire danger rating (figure 4) will impact the health of people and can cause death(s) and will impact fauna, flora, cultural values, built assets, infrastructure and the local economy. By recognising and mitigating this risk Council can contribute to making a more resilient community.



## 8.2 Fire Danger Rating (FDR) used in Tasmania

Fire Danger Ratings (figure 4) are based on forecast weather conditions. By analysing these conditions, the likelihood of a fire starting, and its potential impact can be predicted.

### 8.3 Bushfire weather

The Derwent Valley and south east of Tasmania regularly experience Extreme and Catastrophic fire danger ratings. The Hobart Fire Management Area is one of the driest parts of Tasmania.

Glenorchy regularly experiences significant fire weather; including on average two days with a Forest Fire Danger Index (FFDI) of greater than 40 on average per fire season. These may occur any time between October to March. Bushfires that occur on such days are typically difficult to control, unless contained quickly by initial attack, and often cause property and environmental damage. When fires occur on days with a fire danger rating of Catastrophic it is likely to result in significant property losses; although these weather conditions are rare, several have occurred over the past 15 years (Greater Wellington Range Zone 1 Bushfire Mitigation Strategy. Prepared for Tasmania Fire Service, 2018).

#### 8.3.1 Climate Change

Fire danger has increased in recent decades and is projected to increase further with global warming (figure 5). There is an increase in both average and extreme (99th percentile) FFDI projected through the century. The rates of change vary across Tasmania and are different in each season. Most notably there is an increase in high fire danger days projected to occur in spring. There is also a projected increase in the frequency of the weather systems associated with many of the most severe fire weather events and increases to other large-scale drivers of fire risk, as well as projected increases in soil dryness. (Fox-Hughes et al., 2015).

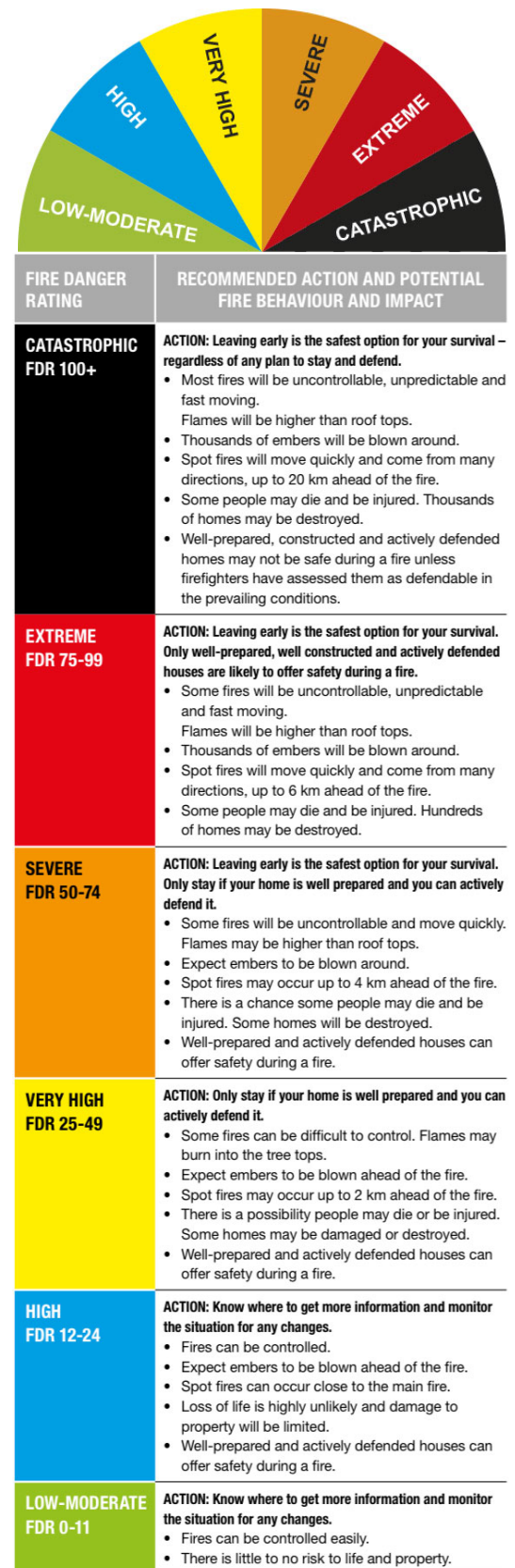
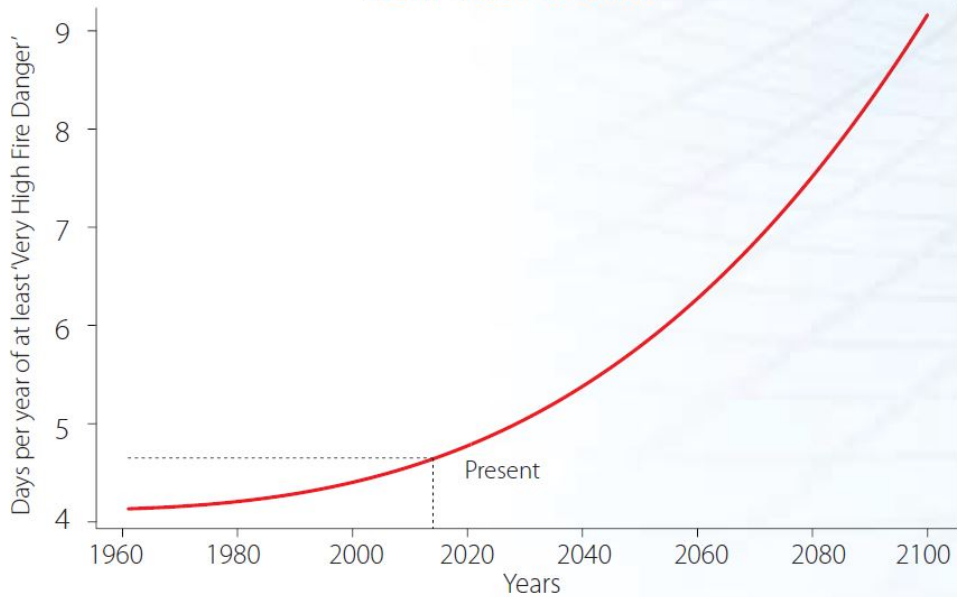


Figure 4: Tasmanian Fire Danger Rating system (TFS, 2018)

## Projected Frequency of the 'Very High Fire Danger Days' from 1961 to 2100



Smoothed projection of the number of days per year categorised as at least 'Very High Fire Danger' from 1961 to 2100. Forest Fire Danger Index values will increase into the future, with the majority of the increase after 2050.

Figure 5: Projected frequency of the 'Very High Fire Danger Days' for Tasmania from 1961 to 2100 (Fox-Hughes et al., 2015).

### 8.4 Bushfire attack mechanisms

Bushfire attack mechanisms that have the potential to impact a building where it can no longer provide a safe haven for occupants can be categorised into five key mechanisms:

- Smoke
- wind
- embers
- radiant heat
- direct flame contact.

The Australian Standard 3959 – 2018 Construction of buildings in bushfire-prone areas is primarily concerned with improving the ability of buildings in designated bushfire-prone areas to better withstand attack from bushfire thus giving a measure of protection to the building occupants (until the fire front passes) as well as to the building itself (Standards Australia Limited, 2011). An FFDI of 50 is used in Tasmania to determine the Bushfire Attack Level (BAL) for buildings that need to comply with this standard.

### 8.5 Ignition history

The TFS database identified 3634 fire incidents within the Glenorchy LGA during the period August 1999 to February 2018. These have been summarised in table 1 and figure 6. Most incidents occurred within the urban landscape with few occurring within the Wellington Ranges or Mt Faulkner area. The data gives the impression bushfire ignitions deriving from passenger vehicle fires within the northern facing foot hills of Goat Hills (within the suburbs of Berridale and Collinsvale) pose a significant risk for potential bushfire ignitions (figure 7).

Incident Type	Number of Incidents	% Total Incidents
<b>Vegetation fire</b>	1694	46%
<b>Passenger vehicle fire</b>	1158	32%
<b>Other fire incident (i.e. burning of green waste heaps, malicious activity)</b>	782	22%

Table 1: Ignition history GCC LGA August 1999 – February 2018.

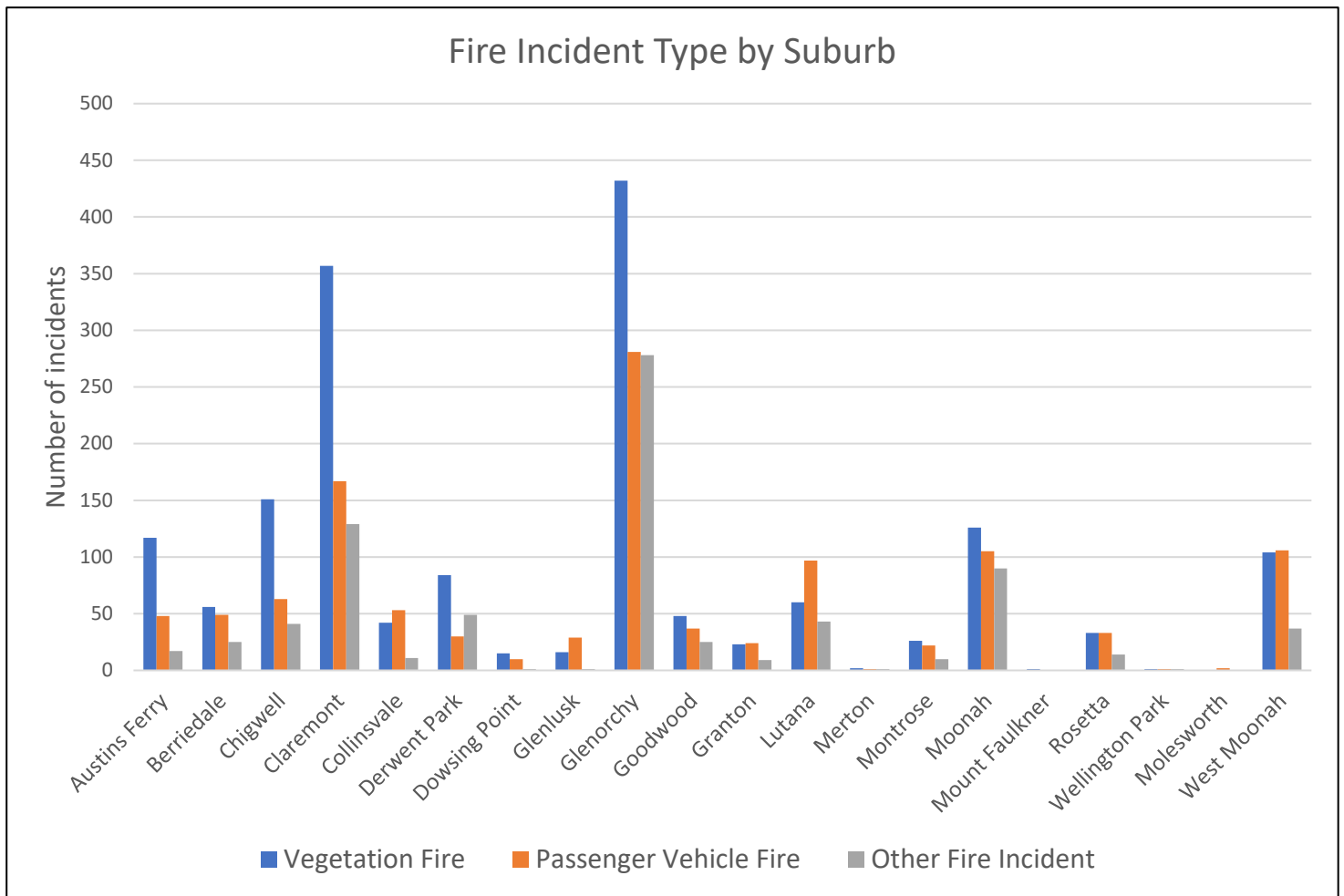


Figure 6: Fire incident history by incident type and suburb August 1999 - February 2018.



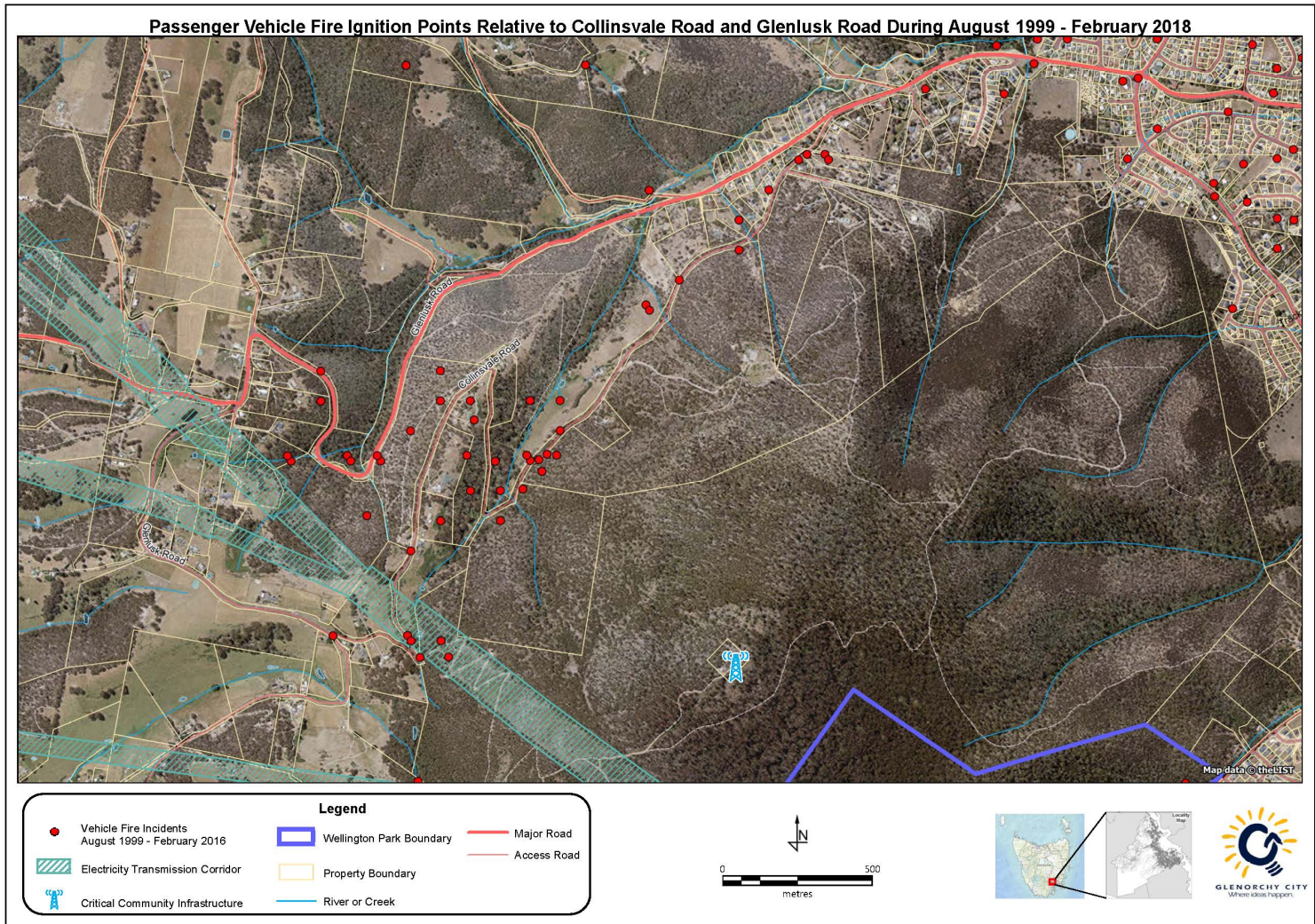


Figure 8: Passenger vehicle fire ignition points relative to Collinsvale Road and Glenlusk Road August 1999 - February 2018.

## 8.6 Glenorchy LGA Bushfire history

In Tasmania geographic information system (GIS) mapping of bushfire and planned burn boundaries only became regular practice during the 1990s. Before this bushfire history was word of mouth, or sometimes in the form of a loosely hand drawn boundary on a paper map (L. Suhr, personal communication, August 27, 2018).

Figure 9 shows the fire history within Greater Hobart during the period 1967 to 2016. The most destructive bushfire to impact the city of Glenorchy was the 1967 Black Tuesday Bushfires impacting approximately 182,109<sup>ha</sup> (approximately 5900<sup>ha</sup> within the GCC LGA) and costing the lives of 55 people (4 within GCC LGA) with another 9-people dying during the fires by natural causes, most likely due to fire trauma (McNiece, 2016). The 1967 fires impacted Upper Merton, reaching the Derwent River in some parts of Glenorchy. 11 houses were destroyed at the upper end of Tolosa Street (Haygarth and Hendrick, n.d.). This fire event led to significant changes to the regulation, arrangements and management of fire in Tasmania.

Year	Location	Documented Notes
<b>1887</b>	Lower slopes Mt Wellington	Played havoc with the 'native shrubs'
<b>January 1898</b>	Between Lower Glenorchy Reservoir and Collinsvale	
<b>1906</b>	Slopes of Mt Wellington reaching as low as Barossa Road	
<b>March 1910</b>	Reached as far as Mt Hull, Glenlusk and the top of the Goat Hills	
<b>February 1914</b>	Slopes of Mt Wellington	Reported to rage the slopes of Mt Wellington and said to be the biggest since the summer of 1897–98
<b>1927</b>	Started near Merton and burned into Lenah Valley	Destroying hundreds of acres of bushland and orchard
<b>February 1934</b>	'Behind the Glenorchy Reservoir'	Several fires reported to burn
<b>April 1937</b>	Started at the top of the Glenorchy Reservoir and burned down towards Lenah Valley	
<b>February 1967</b>	Greater Hobart	

Table 2: Documented historical bushfires impacting Glenorchy LGA (Haygarth and Hendrick, n.d.)



Greater Hobart Fire History 1967 to 2016

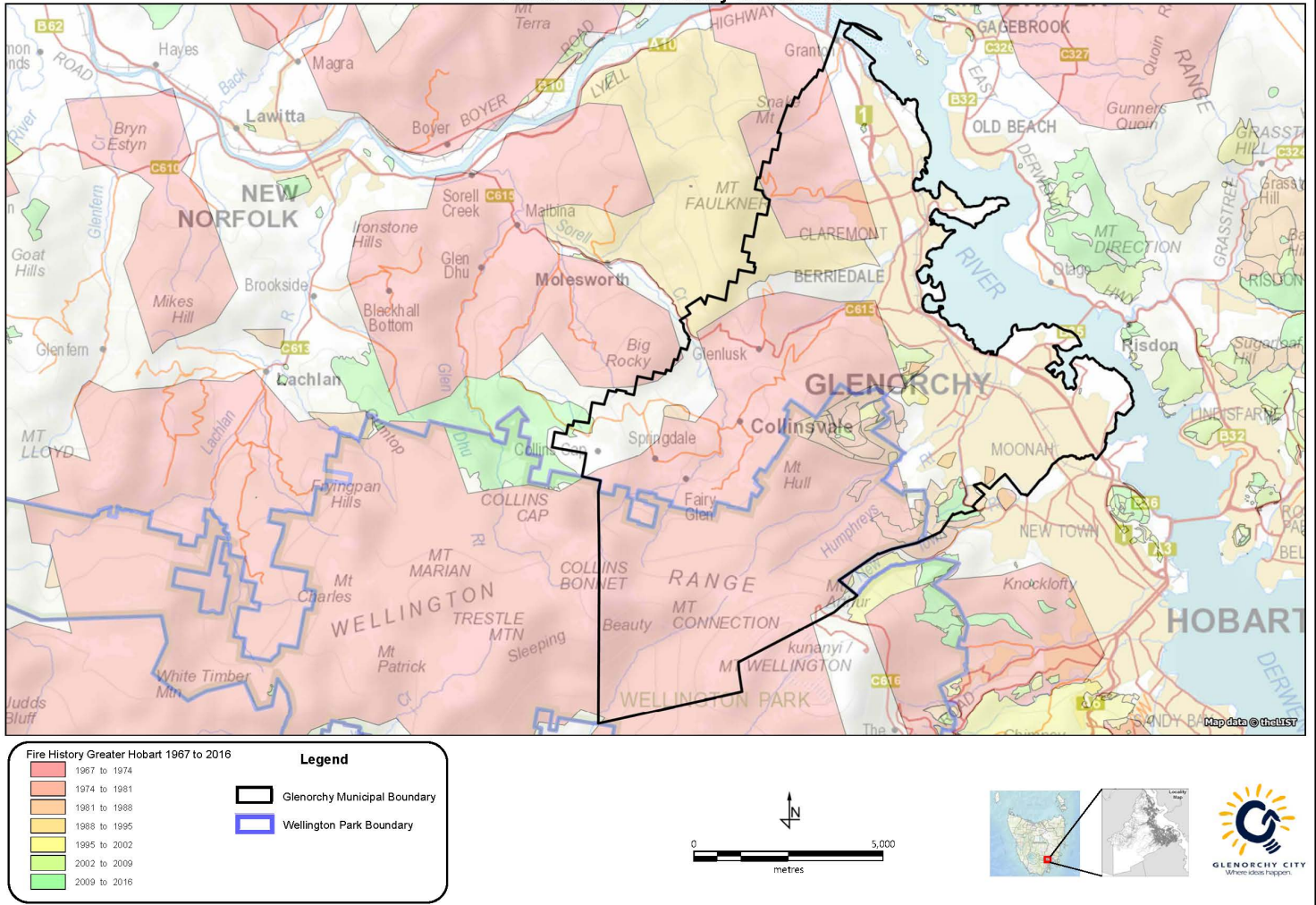


Figure 9: Fire history Greater Hobart 1967 to 2016.

## 9 Analysing bushfire risk potential for Glenorchy LGA

The Tasmanian State Natural Disaster Risk Assessment identifies the likelihood of bushfire being unlikely, however the consequence being high, and the risks associated with bushfire being high.

### 9.1 Bushfire risk assessment analysis for areas covered by Bushfire Mitigation Plans

The bushfire risk to assets within and surrounding bushfire-prone areas covered by BMPs (section 5.1) was assessed with the objective to rank the appropriate level of risk so that mitigation treatments can be prioritised and are appropriate to the level of risk. The risk assessment process derives from a process previously undertaken within the HFMA by AVK Environmental Management.

All Council managed bushfire-prone areas with specific BMPs have been impacted by bushfire within the last twenty years. There have been no reports of any significant damage to adjoining properties during this period. However, there is sufficient fuel in these areas to sustain high intensity fires on days of very high or above FFDI.

The bushfire risk assessment used in BMPs is only for bushfires burning within Council managed bushfire-prone vegetation or approaching an adjoining asset being impacted by fire leaving council managed bushfire-prone vegetation. Some assets may face a greater bushfire risk from bushfire-prone vegetation that is not under Council control. The assessment is based on three main factors:

1. Bushfire threat in terms of fuel loads/hazard levels and fire approach
2. vulnerability to damage of the asset
3. potential consequences of a fire damaging or destroying the asset.

The limitation of the assessment approach used is that it fails to identify bushfire risk and treatments at the larger landscape level. Bushfire risk treatments within this strategy at a landscape level have been identified utilising Phoenix Rapidfire and Bushfire Risk Assessment Model (BRAM) and includes priority area risk profiling with identification of priority assets. These are addressed regionally through the HFMA and documented in the Hobart Fire Management Area Bushfire Risk Management Plan. Risk treatments from the Hobart Fire Management Area Bushfire Risk Management Plan will be included in the GCC Three-year Bushfire Risk Treatment Schedule.

### 9.2 Phoenix RapidFire analysis

Phoenix RapidFire is a research tool developed by the University of Melbourne (Kevin Tolhurst and Derek Chong). It is used for both incident prediction through capturing the nature of a fire as it spreads across the landscape, and as a key tool for bushfire risk assessment and strategic bushfire management planning at a landscape level.

During April 2019 the Bushfire Risk Unit (BRU) of the TFS ran a series of bushfire simulator modelling within Greater Hobart to assist in the strategic outputs for this strategy. Phoenix RapidFire simulations used six scenarios (table 3) and were based on an incremental fire risk analysis which allowed to identify the potential outcomes of one alternative compared to another. A complete listing of assumptions and limitations is contained in a separate report (Tasmania Fire Service, 2019).



Scenario ID	Description
1) <b>Pre-program</b>	Where all fire history up until 1st July 2013 was included
2) <b>Current</b>	All fire history up until 31st December 2018 was included. The additional fire history beyond 31st June 2018 was included from the BRU's Fire Management Unit database
3) <b>Max</b>	Where no fire history was used (fuel loads at maximum)
4) <b>Min</b>	Where all treatable fuels set to burnt (treatable fuel loads at minimum)
5) <b>No Fuel Treatment</b>	Where 2013 fuel loads are accumulated to 2019 without any bushfires or planned burning in the landscape
6) <b>Planned Burning Only</b>	Where 'Current' fuel conditions are used with the absence of bushfire in the 2013-2019 period

Table 3: Phoenix RapidFire modelling scenarios

### 9.3 Bushfire Risk Assessment Model (BRAM) analysis

BRAM is a model developed by the Fire Management Section of the Tasmanian Parks and Wildlife Service. BRAM identifies bushfire risk at a strategic level as well as to identify the elements driving actual bushfire risk. A BRAM analysis of the Glenorchy LGA was completed during April 2019 by the Tasmanian Parks and Wildlife Service on behalf of Council which included overall bushfire risk, values at risk, predicted fire behaviour, and ignition potential. Section 10.3 discusses the modelling outputs.

## 10 Evaluating bushfire risk potential for Glenorchy LGA

Evaluating bushfire risk potential helps determine which risks require further detailed assessment within the LGA, and what treatments and treatment frequency is required. Council's Three-year Bushfire Risk Treatment Schedule will list treatments that are an output of this strategy.

### 10.1 Bushfire risk assessment for areas covered by Bushfire Mitigation Plans evaluation

This assessment identified four key findings:

1. The requirement for Council to reinstate/install hazard management areas on Council managed land to reduce bushfire risk to human settlements and the vulnerability to damage of critical community infrastructure
2. Develop a maintenance program for fire trails under Council control to ensure fire trails are trafficable during bushfire seasons
3. Develop a planned burning program based on the two primary objectives of this strategy (section 3)
4. Continually develop the Bushfire Mitigation Vegetation Monitoring Program (section 12.1.1) to assist in the adaptive management approach to this strategy.

### 10.2 Phoenix RapidFire evaluation

The simulations identified clear risk reductions on the urban fringe, with a general trend for minor risk accumulation the further you move away from the urban interface. Modelling provided evidence to suggest the main driver for this reduction is planned burning that has occurred

between 2013 and 2018 within Greater Hobart and not bushfire. Modelling also indicated areas where planned burning has helped hold the risk levels steady or slowed the rate of its incline.

Modelling additionally highlighted just how much of the area is sitting on or near the maximum risk, and the areas that are likely to accumulate further over time without additional fuel reduction by planned burning or bushfire, and that a sizeable amount of area will still carry fire at greater than 3000 kW/m even if all treatable fuels have been burnt (Tasmania Fire Service, 2019).

Results of this evaluation have emphasised that Council's current planned burning and mechanical treatment practices will contribute to mitigating bushfire risk at a landscape level whilst contributing to a tenure blind approach to the HFMA.

Evaluation results have influenced Council's bushfire risk mitigation treatments that will be included in Council's Three-year Bushfire Risk Treatment Schedule including but not limited to; planned burning, mechanical treatments, hazard management areas, fuel breaks and fire trails.

### 10.3 BRAM evaluation

The outputs of the modelling showed the bushfire risk profile of the LGA varying, the overall ignition potential is in the high to very high category. Likelihood of bushfire occurring may be reduced if an aggressive prevention program was undertaken. Fire behaviour potential could also be reduced by fuel reduction burning occurring in the areas of treatable vegetation types identified as high flammability with high head fire intensity (HFI) (older Dry Forest stands with high fuel loads). Note the areas identified as extreme HFI with moderate flammability is in Wet Forest stand types. Wet forest vegetation is generally untreatable by fuel reduction burning due to when conditions are safe to burn the vegetation is too wet, when the vegetation can carry fire it is generally unsafe during summer months with high or above FFDI.

## 11 Treating bushfire risk potential

### 11.1 Treatment statement

The size and intensity of each bushfire relates directly to the presence or effectiveness of bushfire risk reduction treatments, and the treatments perpetual maintenance. These treatments may affect the likelihood of fire occurring or the likelihood of the risk statement being fully materialised. Treatments include:

- Community education and engagement coordinated through the TFS
- planned burning
- hazard management areas/defendable spaces consistent with AS 3959 – 2018 Construction of building in bushfire-prone areas. Council will ensure that the prescribed minimum width of a hazard management area on Council land is no less than that required for BAL-29 rated development to be achieved on the lot once the owner of the lot has undertaken their best efforts
- fuel breaks consistent with the TFS Fuel Break Guidelines
- fire trails
- mechanical vegetation thinning.

## 11.2 Greater Hobart bushfire risk reduction

Bushfire risk reduction at a Greater Hobart landscape scale is based on the guiding principal that bushfire does not stop at cadastral boundaries. Within Greater Hobart the predominant fuel age is 1967 regeneration with very high or extreme overall fuel hazard scores (Hines *et al.* 2010) however other significant bushfires have occurred within the Hobart Fire Management Area in 1983, 1998, 2001, 2006 and 2013.

At a landscape scale, the guiding principal to risk reduction is having a mosaic of uneven aged fuels, thus altering fire behaviour through reducing bushfire rate of spread, flame height, spotting and headfire intensity, giving agencies an upper hand in bushfire management.

### 11.2.1 Hobart Fire Management Area Committee (HFMAC)

The HFMA includes local government areas of Hobart, Glenorchy, Clarence, Brighton and parts of Kingborough and Derwent Valley. The principal aim of the HFMAC is to bring together the various stakeholders that manage land use across the HFMA, to work together to effectively manage vegetation fuels for the mitigation of bushfires. GCC is required under Section 55 of the *Fire Service Act* 1979 to have a representative sit on the HFMAC.

### 11.2.2 Hobart Fire Management Area Bushfire Risk Management Plan

The Hobart Fire Management Area Bushfire Risk Management Plan is an output of the HFMAC taking a risk management approach including a range of measures that will reduce the bushfire risk within the HFMA. The plan includes information on strategic emergency vehicle access routes (fire trails) and fuel breaks. The aim is to identify existing strategic access routes, note their current condition and identify where new vehicle access is required for fire management. Similarly, information on existing fuel breaks on public land has been gathered and the need for additional breaks identified, particularly to protect high value assets (State Fire Management Council, 2018).

Council's treatments at a Greater Hobart level that are outputs from this strategy include:

- GCC Coordinator Bushfire Management sitting on HFMAC
- Council's perpetual commitment to continuously improve its bushfire risk mitigation treatments/capabilities.

## 11.3 Glenorchy LGA scale bushfire risk reduction

The context of this strategy is bushfire-prone vegetation managed by council. The TFS facilitate numerous programs throughout the LGA including Bushfire Ready Neighbourhoods, Bushfire Ready Schools, and Fuel Reduction Program to contribute to Glenorchy LGA scale bushfire risk reduction.

Council's treatments at an LGA level that are outputs from this strategy include:

- Community education and engagement coordinated through the TFS
- implementation of BMPs for areas identified in section 5.1
- planned burning
- hazard management areas/defendable spaces consistent with AS 3959 – 2018 Construction of building in bushfire-prone areas. Council will ensure that the prescribed minimum width of a hazard management area on Council land is no less than that required for BAL-29 rated development to be achieved on the lot once the owner of the lot has undertaken their best efforts

- fuel breaks consistent with the TFS Fuel Break Guidelines
- fire trails
- mechanical vegetation thinning.

#### 11.4 Property/household scale bushfire risk reduction

The proactive management of individual properties by their owners is fundamental in reducing bushfire risk. Risk reduction treatments undertaken by Council on Council managed bushfire-prone vegetation will only be effective when fuel modification also occurs at the property/household level on adjoining private land.

Council's treatments at a property scale that are outputs from this strategy include:

- Community education and engagement coordinated through the TFS
- annual Fire Hazard Abatement Program
- annual Vegetation Control Program
- application of planning and building regulations to proposed use and development in bushfire-prone areas
- fuel breaks consistent with the TFS Fuel Break Guidelines
- hazard management areas/defendable spaces consistent with AS 3959 – 2018 Construction of building in bushfire-prone areas
- annual Bushland Weed and Vegetation Management Program.

## 12 Monitoring, evaluation and review

### 12.1 Strategy monitoring

For ongoing effectiveness this strategy will require regular checks to ensure that information is relevant, up to date and that the most suitable bushfire risk mitigation treatments are in place. These checks must be ongoing to account for any changes either in the risk assessment process used, legislative changes, and the adequacy of controls or elements of the risk.

#### 12.1.1 GCC Bushfire Mitigation Vegetation Monitoring Program

During 2017 Council established a Bushfire Mitigation Vegetation Monitoring Program (VMP). This program captures forest health data and fuel hazard accumulation rates annually at permanent bushland locations targeted to be treated with planned burning, or untreatable fuels that have potential to be impacted by high intensity bushfire resulting in long term/permanent changes in forest structure. The VMP will assist determining measurable outcomes to fuel management treatments prescribed within the Three-year Bushfire Risk Treatment Schedule.

### 12.2 Strategy evaluation

During each strategy review an evaluation process will occur which will assist determining the effectiveness of the strategy in achieving the objectives and assist prescribing corrective actions if required.

The evaluation process will include but not limited to:

- Effectiveness of bushfire risk reduction treatments prescribed
- changes to Council's operational ability to implement required treatments



- changes to legislation
- changes to statutory planning
- changes to TFS guidelines.

### 12.3 Strategy review

This strategy will function for a ten-year period, with the first review to be undertaken at three years post adoption with following reviews at three-year intervals. An objective of each review will be to work towards achieving common priorities within Council by further imbedding bushfire mitigation treatments and principals into Council’s governance and operational framework.

This strategy will enter a review phase if any of the following occurs:

- Significant bushfire event impacts the HFMA
- significant changes to relevant state or federal legislation/policy
- significant change to Tasmanian bushfire risk assessment.

### References

Bom.gov.au. (2018). *Bushfire Weather*. [online] Available at: <http://www.bom.gov.au/weather-services/bushfire/about-bushfire-weather.shtml> [Accessed 12 Sep. 2018].

Bom.gov.au. (2018). *Climate statistics for Australian locations*. [online] Available at: [http://www.bom.gov.au/climate/averages/tables/cw\\_094030.shtml](http://www.bom.gov.au/climate/averages/tables/cw_094030.shtml) [Accessed 21 Aug. 2018].

Department of Police, Fire and Emergency Management (2017). *Tasmanian Emergency Risk Assessment Guidelines, TERAG 2017, Version 1.0*. p.17 & p. 82.

Fox–Hughes P, Harris RMB, Lee G, Jabour J, Grose MR, Remenyi TA & Bindoff NL (2015) *Climate Futures for Tasmania future fire danger: the summary and the technical report*, Antarctic Climate & Ecosystems Cooperative Research Centre, Hobart, Tasmania p.4.

Greater Wellington Range Zone 1 Bushfire Mitigation Strategy. Prepared for Tasmania Fire Service. (2018). Eco Logical Australia, p.11.

Haygarth, N. and Hendrick, D. (n.d.). *Glenorchy Bushland Reserves Study, An historical overview of the Wellington Park, Goat Hills and Poimena Reserves within the Glenorchy Municipal Area*. p.41.

Hines F, Tolhurst KG, Wilson AA, McCarthy GJ (2010) Overall Fuel Hazard Assessment Guide. In. (Ed. DoSa Environment). (Victorian Government Dept of Sustainability and Environment: Melbourne, VIC, Australia)

McNiece, R. (2016). *Flames of Fear: History of Tasmanian Bushfires from 1820*. North Hobart, TAS, Australia: Wellington Bridge Press, p.49.

Pyrke A. F. and Marsden & Smedley J. B. (2005). Fire-attributes categories, fire sensitivity, and flammability of Tasmanian vegetation communities. *Tasforests* p.16, 35-46

Standards Australia Limited. (2018). *AS 3959-2018 Construction of buildings in bushfire-prone areas*. Sydney: SAI Global Limited.

State Bushfire Safety Policy. (2014). Tasmania: Tasmania Fire Service.

State Fire Management Council (2018). *Hobart Fire Management Area Fire Protection Plan 2018*. State Fire Management Council, p.7.

State Fire Management Council (2020). *Hobart Fire Management Area Bushfire Risk Management Plan 2020*. State Fire Management Council, p.8.

Tasmania Fire Service (2019). *Glenorchy Fireshed Modelling Report*. Hobart: Tasmania Fire Service.

Tasmanian Fire Service (2018), Information on the Fire Danger Rating and Alerts, viewed 6 November 2018, < <http://www.fire.tas.gov.au/Show?pagelD=colFireDanger#FDI-guide>>.

Tasmanian Vegetation Fire Management Policy 2017. (2017). Tasmania: State Fire Management Council.

Treasury.tas.gov.au. (2018). *2014 Population projections for Tasmania and its Local Government Areas*. [online] Available at: <https://www.treasury.tas.gov.au/economy/economic-data/2014-population-projections-for-tasmania-and-its-local-government-areas> [Accessed 20 Aug. 2018].

Wellington Park Management Plan. (2013). Amended October 2015. Hobart: Wellington Park Management Trust.

Wine Tasmania. (2018). *Smoke Taint in Wine Grapes*. [ebook] Tasmania: Wine Tasmania. Available at: <http://winetasmania.com.au> [Accessed 28 Nov. 2018].

