Clarence City Council

Bushfire Management Plan

Glebe Hill Reserve
Howrah

Revised
January 2017
Clarence City Council

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PROJECT TEAM

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1. Introduction

This is the first revision of the initial bushfire management plan (BMP) for Glebe Hill Reserve. It covers Council owned land on Glebe Hill acquired by Council in 2011 as an offset for impacts associated with adjacent residential developments. In addition, in 2016 Council acquired 3.4ha of previously privately owned land located at 50 Minno Street, Howrah. Both parcels now form Glebe Hill Reserve.

The reserve has two conservation covenants (one for each parcel) stipulating activities on, or in relation to, the land which will cause damage to, or degradation of, the natural values (see figure 4).

This BMP will operate for a period of 5 years after which a second review is recommended.

It should be noted that this BMP is not an operations plan and does not deal directly with "response" to bushfires. Operational procedures are dealt with in various documents prepared by the Tasmania Fire Service (TFS) and other emergency services.

1.1 Aim

The aim of this BMP is to provide a framework for bushfire management that meets Clarence City Council's land management objectives for the site, as set out in Council's *Bushfire Management Strategy for Council Owned and Controlled Land*, *Bushfire Management Strategy - Best Management Practice Guidelines* and Strategic Plan.

It must be noted that it will not be possible to prevent bushfires occurring in the reserve. Unless these fires are suppressed quickly, there is a risk that large destructive fires may develop. Depending on weather conditions, such fires may burn a substantial portion of the bushland in and adjoining the reserve causing damage to assets and environmental values, and even loss of life. This BMP aims to lessen these risks by minimising the risk of fires starting in the reserve, and minimising the risk of injury or damage to assets in and surrounding the reserve.

This plan also provides for the use of fire as a management tool to:

- Target area for maximum risk reduction
- reduce bushfire hazard to protect assets from bushfires
- maintain the long-term viability of the native vegetation in the reserve
- Assist in the removal of weeds and the regeneration of degraded bushland.

1.2 Location and Description

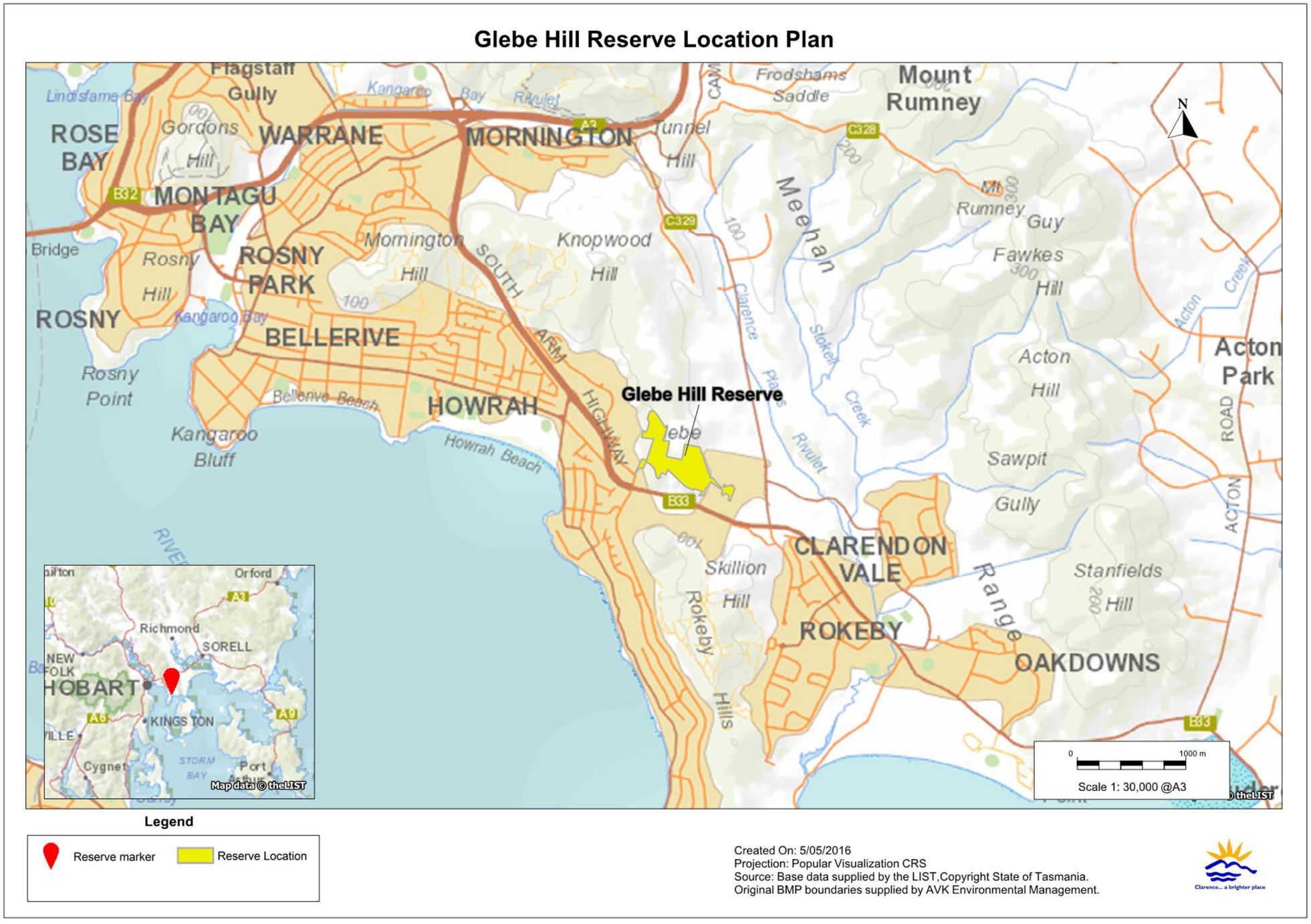
Glebe Hill Reserve has an area of approximately 19 hectares and is located on Glebe Hill in the suburb of Howrah (see figure 1). Glebe Hill is at the southern end of a range of hills running from Mornington to Rokeby and is part of the "scenic rim" of hills behind the suburbs of Bellerive and Howrah. The reserve borders new housing estates to the south and east, an existing developed area to the west and bushland on private property to the north.

Glebe Hill Reserve and some adjacent land (figure 3) have been mapped as a bushfire-prone area under the *Clarence Interim Planning Scheme 2015* (CIPS 15). Any future developments within or adjacent may require a Bushfire Risk Assessment and a Bushfire Hazard Management Plan.

1.2.1 Geology and Soils

The ridge top, western and southern slopes of the reserve are underlain by Permian siltstones and silty sandstones. The lower eastern slopes are underlain by Jurassic dolerite. Soils in the reserve are poor to imperfectly drained grey-brown podzolic soils.

Figure 1 – Location of the Reserve



1.2.2 Vegetation

The major vegetation communities in the reserve are shown in figure 2. Vegetation types have been classified using TASVEG 3.0 mapping, with some ground truthing of boundaries inside the BMP during the BMP revision.

Most of the reserve is covered in native forest and woodland. The dominant plant community is *Eucalyptus amygdalina* forest and woodland on mudstone (DAM). This component consists of three age classes; the mature component is experiencing moderate density reduction in areas.

There is also a large patch of *Eucalyptus risdonii* forest and woodland (DRI) on the west facing slope and a strip of *Eucalyptus viminalis* grassy forest and woodland (DVG) on the lower east facing slopes. The reserve also contains a small patch of native grassland that has been classified as rockplate grassland (GRP).

Eucalyptus risdonii forest and woodland (DRI) is listed as a threatened native vegetation community under the *Nature Conservation Act 2002.*

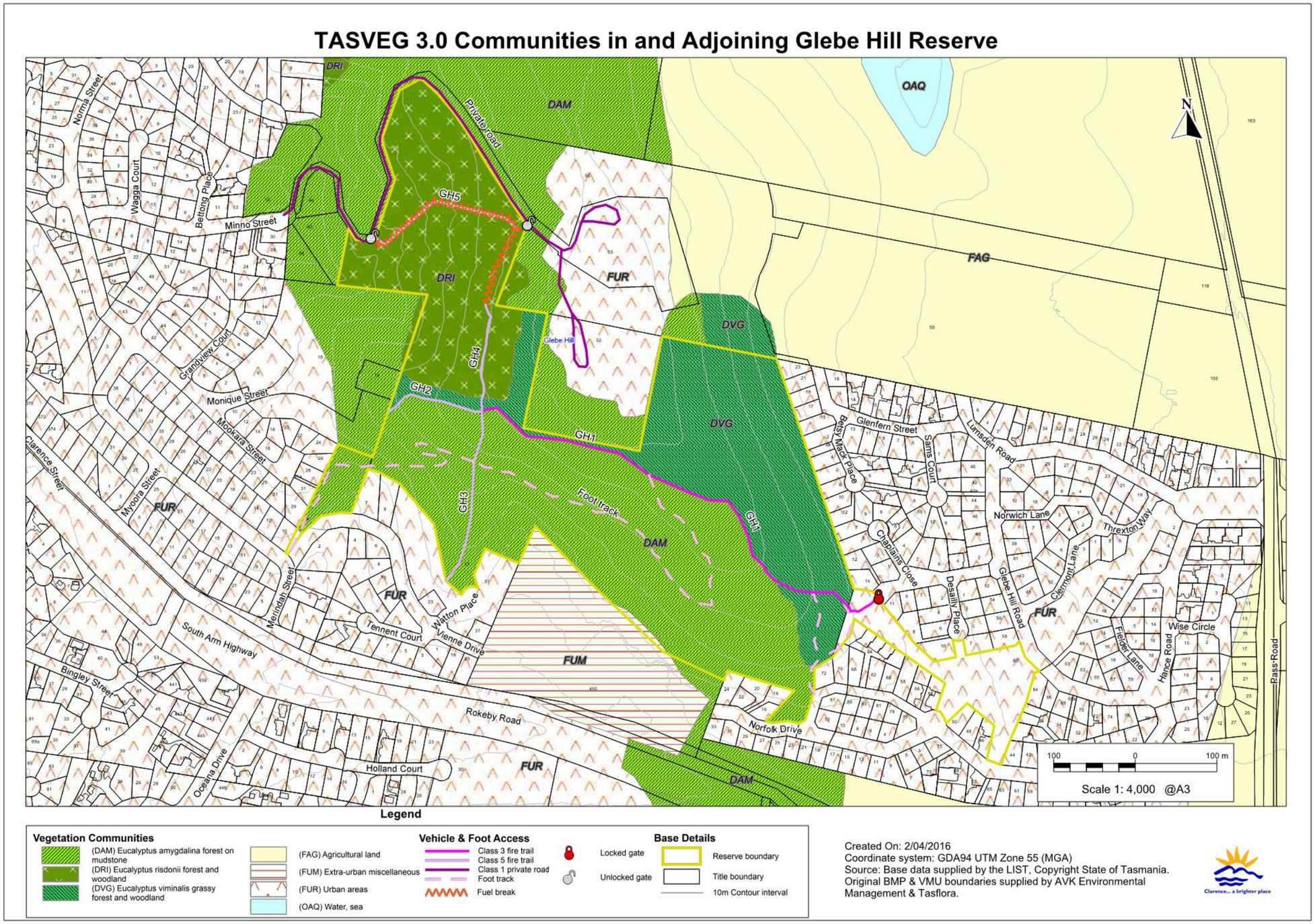
Gumleaf skeletoniser *(Uraba lugens)* was observed within the *Eucalypt* regeneration in some sections of VMU 7. Gumleaf skeletoniser can cause minor damage each winter and spring, but has been known to occur in outbreak proportions. Severe skeletonising may kill small trees, particularly if it occurs in more than one season; less severe damage or defoliation in only one season slows growth (Forestry Tasmania, 1999).

1.2.3 Reserve Usage

The reserve is a locally important recreational area for activities such as; walking, dog exercising and jogging.

The vegetation in the reserve shows evidence of partial clearing in the past, most likely for grazing.

Figure 2 – Native Vegetation Types in and adjoining the Reserve



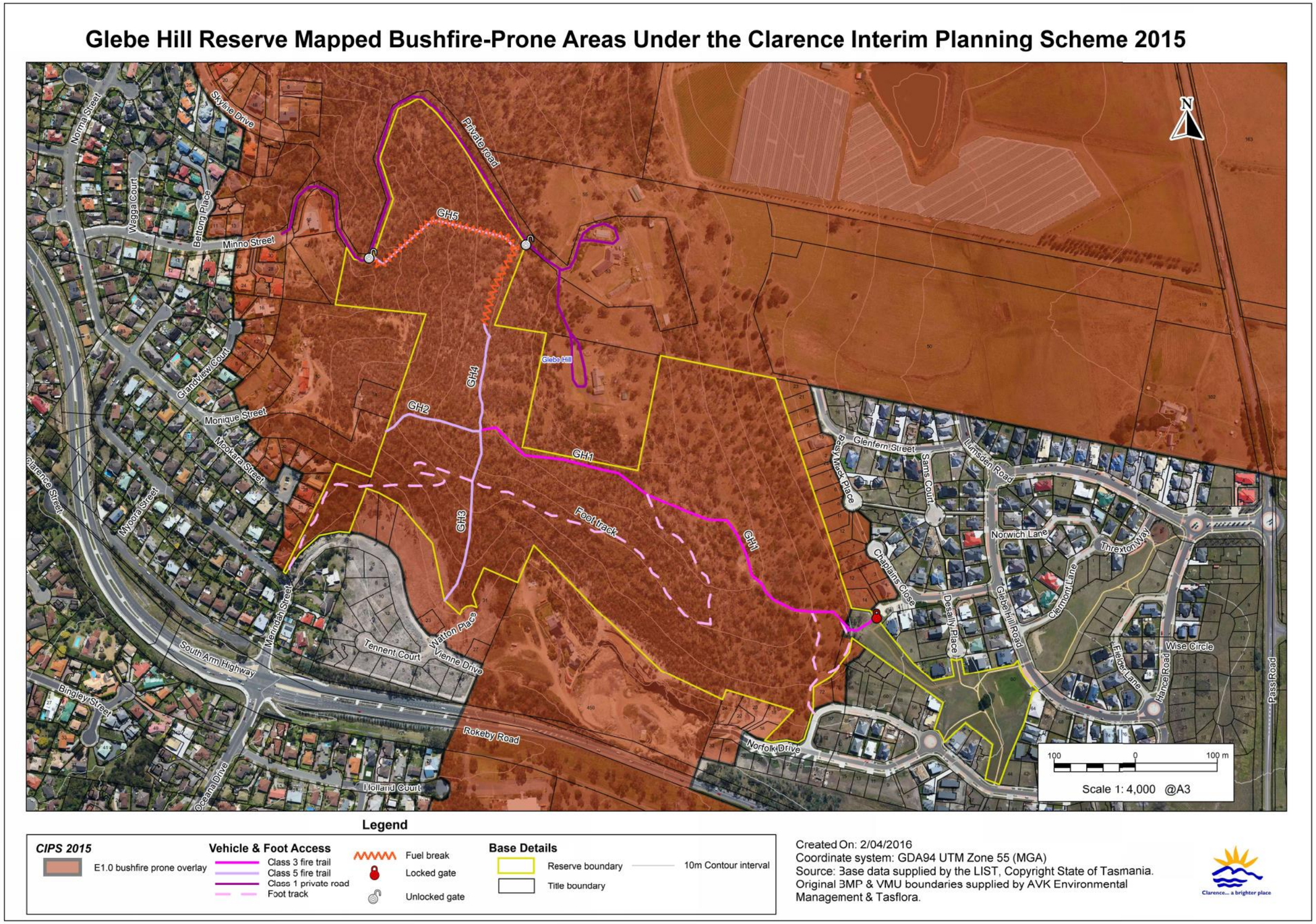
1.3 Bushfire Management Objectives

Bushfire management within the Glebe Hill Reserve will meet the following broad management objectives:

1. Protection of life, assets and adjoining property from bushfire.
2. Minimise the risk of fires starting and spreading in the reserve.
3. Protection and enhancement of the ecological and visual values provided by the reserve.
4. Protection of infrastructure and cultural heritage values within the reserve.
5. Recovery, maintenance and enhancement of vegetation communities and fauna habitat within the reserve.
6. Minimisation of soil loss resulting from bushfire, or bushfire management activities.

The actions recommended to attain each of these objectives are listed in section 5.1.

Figure 3 – Mapped Bushfire-Prone Areas under the *Clarence Interim Planning Scheme 2015* (CIPS 15)



1.4 Reserve Management Responsibilities

Management of the reserve is the responsibility of Clarence City Council. Clarence City Council has a responsibility under the *Fire Service Act* (1979) to take all reasonable precautions to prevent any fire lit on their property from spreading onto neighbouring property. This BMP will help to fulfil that "duty of care". The TFS is responsible for suppressing bushfires within the reserve.

1.5 Management Plans

There are a number of assessments and management plans that were prepared for the parts of the reserve or adjoining areas that contain information relevant to the management of the reserve prior to, and post Councils acquirements in 2011 and 50 Minno Street in 2016. These include:

- A **Reserve Activity Plan (RAP)** covering the land occupied by both covenants. The RAP is intended to document the natural, cultural, recreational and other values of the reserve, and include an implementation plan for proposed on-ground activities (North Barker Ecosystem Services, 2014). This RAP runs from 2014-2018.
- Two **Nature Conservation Plans**, one for the portion of the reserve formerly owned by Lynmore Holdings (North Barker Ecosystem Services, 2011) and the second for the private land formerly 50 Minno Street, Howrah. These plans are part of the Conservation Covenants under Part 5 of the Nature Conservation Act, 2002. The covenants have been enacted and provides management information stipulated by the Minister that has been incorporated into this BMP.

1.6 Conservation Covenants

The reserve has two Conservation Covenants in place on the land under Part 5 of the *Nature Conservation Act,* 2002. This was part of the off-set provisions in the Forest Practices Plan for the vegetation clearing required for the Glebe Hill Estate subdivision. The lands placed under these covenants by the previous owners are shown in figure 4.

The Conservation Covenants binds the current and all future owners of the land. The sections in the Terms of Covenant that have implications for bushfire management in the reserve are:

Clause 4.2 (c) "introduction of Foreign Material {must not be undertaken} except materials for the maintenance and construction of infrastructure, fences or carriageways as authorised in writing by the Minister"

Clause 4.2 (f) "lighting of fires {must not be undertaken} except for the purpose of fire hazard reduction or management of the Natural Values as authorised in writing by the Minister"

Clause 4.2 (h) "use of herbicides and other chemicals {must not be undertaken} except for registered herbicides or pesticides for the purpose of controlling exotic species that threaten natural values"

Clause 4.2 (i) "removal or disturbance of soil, rock or other mineral resources {must not be undertaken} except for the purposes of maintenance and construction of fences, carriageways, including walking tracks or infrastructure and for revegetation activities"

Clause 4.2 (k) "building or placement of infrastructure, fences or carriageways {must not be undertaken} except:

(i) for the purpose of constructing additional fences or constructing additional carriageways as authorised in writing by the Minister;

(ii) for the purposes of fencing to protect the Land from activities on adjoining land or to meet property boundary fencing commitments to adjoining landowners"

Clause 4.2 (m) "clearance of native vegetation {must not be undertaken} except:

(i) for the purposes of fire hazard reduction, firefighting purposes, or the creation and maintenance of firebreaks if authorised by the Tasmanian Fire Service or as authorised in writing by the Minister;

(ii) for the purposes of maintenance of carriageways, rights of ways and easements in accordance with all Legislative Requirements;

(iii) for the purposes of maintenance of infrastructure or fences as authorised in writing by the Minister;

(iv) for the purposes of constructing additional carriageways or fences as authorised in writing by the Minister;

(v) for the purpose of management of the Natural Values through the planned use of fire as authorised in writing by the Minister"

Clause 4.3 "The Owner agrees:

(a) to use best endeavours to ensure that Exotic Species that threaten the Natural Values of the Land do not become established;

(b) to use best endeavours to eliminate or control established Exotic Species that threaten the Natural Values of the Land by observing the weed management prescriptions and feral animal control prescriptions issued for the Land by the Minister;

(c) to observe any reasonable fire management practices prescribed for the Land by the Minister;

(d) to maintain fences if those fences are necessary to protect the Natural Values of the Land;

(e) to observe any threatened species management prescriptions issued for the Land by the Minister;

(f) to observe any prescriptions limiting off-road vehicle use issued for the Land by the Minister; and

(g) to use best endeavours to protect the Natural Values of the Land.

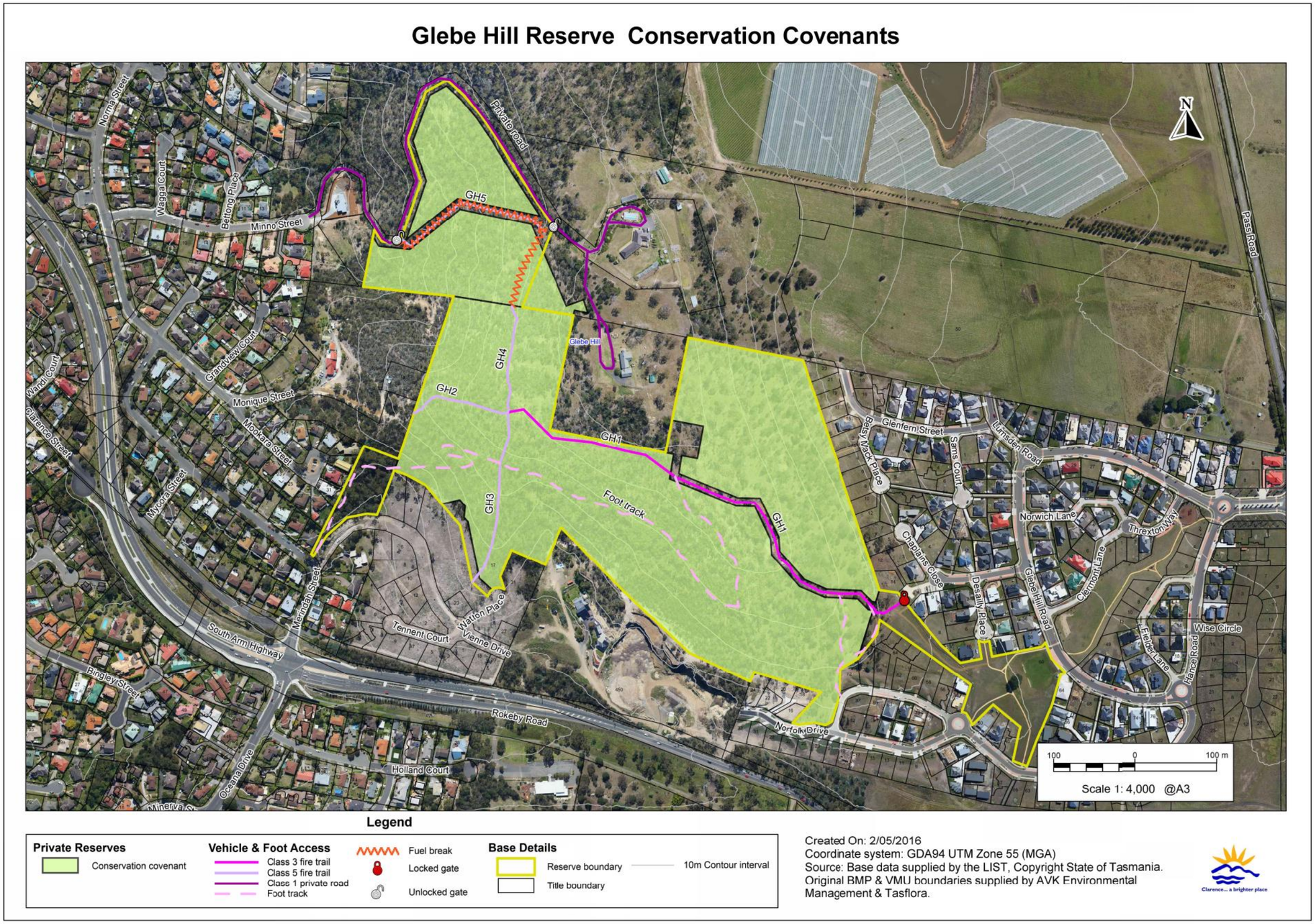
Clause 9 "The Owner will advise the Minister of any proposed actions or events which have had, or may have, adverse effects upon the Natural Values"

These restrictions only apply to the portions of the reserve covered by the Conservation Covenants.

There are other provisions in the Covenants that will affect other management activities.

As required under the terms of the Covenants, Council's Fire and Bushland Management will seek Ministerial authorisation from the Department of Primary Industries, Parks, Water and Environment (DPIPWE) to use fire prior to implementation of this Plan. If sufficient detail is provided to DPIPWE in the BMP then the authorisation may be provided for the full 5 year life of the Plan.

Figure 4 – Extent of Conservation Covenants



2. Bushfire Risks

Extreme bushfire conditions can occur in southern Tasmania when dry winters and springs are followed by summers where fuels are very dry. Under these conditions, fires can be expected to move quickly under the influence of strong, dry, north-westerly winds, and then move more or less at right angles on a broad front when the subsequent south-westerly wind change arrives. Fires that start under these conditions can reach a very high intensity, even in areas with relatively low fuel loads, and are very difficult to control until the weather conditions abate.

2.1 Bushfire History and Causes

The planned burn history (2011-2015) and attended TFS incidents (2011-2015) of Glebe Hill Reserve is shown on figure 5.

2.1.1 Bushfires

Data supplied by the TFS showed that within the duration of the previous BMP (2011-2015) the TFS attended two vegetation fires and one vehicle fires in or close to the reserve (see figure 5).

Both fires were less than 1^{ha} and on adjacent private property, one in 2011 with the ignition source being undetermined, the second occurring in 2015 and the result of burning of heaped vegetation. In 2011 the TFS attended a vehicle fire recorded within the reserve, this was most likely the result of the torching of a stolen vehicle, and accessed from adjacent bushland of private property to the west of the reserve.

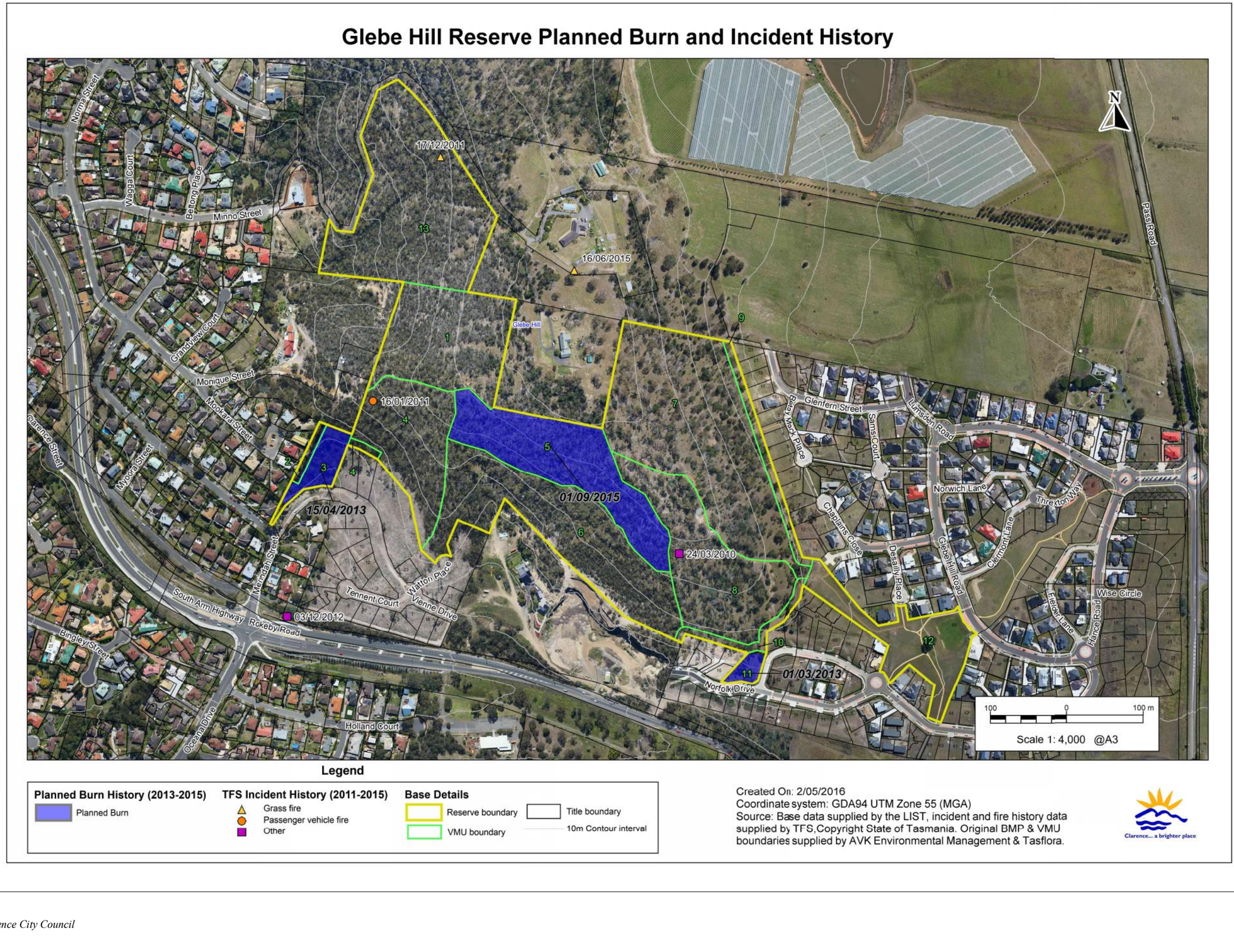
No bushfires have been documented impacting the reserve; there is however evidence within the DRI community on the western slopes of charcoaled bases of eucalypts in addition to many coppiced stumps aged at approximately 50 years. These observations compliment the original BMPs comments that the last major bush fire affecting the whole of the reserve was one of the "Black Tuesday" fires of 7 February 1967.

2.1.2 Planned Fires

During the 5 year period covered by the previous BMP, Clarence City Council conducted three planned burns within the park (figure 5). The planned burning in Vegetation Management Unit (VMU) 3 and 5 (see figure 9) were for fuel reduction purposes. The planned burn in VMU 11 was an ecological burn to assist in maintaining the rockplate grassland.

The revised planned burning schedule for 2016-2021 can be found in Table 9.

Figure 5 – Planned Burn History (2011-2015) and attended TFS Incidents (2011-2015) of Reserve



2.2 Fuel Types and Hazard Levels

The higher the intensity of a bushfire the greater its destructiveness and the more difficult it is to control. As the intensity of a bushfire increases it becomes progressively more difficult to contain and suppress the bushfire. Very high intensity (> 4000kW/m heat output at the fire front) fires with flame heights greater than 10m are generally uncontrollable (NSW Rural Fire Service, 1997). Although grass fires rarely attain a very high intensity, they can move much faster than forest fires, thereby making them difficult to contain.

Bushfire intensity is a function of the heat content of the fuel, the quantity (load) of fuel, and the rate of spread of the bushfire. The heat content of vegetation fuels is roughly constant, and rate of spread is largely a function of slope and weather conditions (wind speed and relative humidity). It has been found that the quantity and distribution of fine fuels are the main factor influencing bushfire behaviour. Larger fuels burn during a bushfire but do not contribute significantly to the spread of a bushfire (NSW Rural Fire Service, 1997).

Fine fuels consist of dead plant matter less than 6mm in diameter and live plant matter less than 2mm in diameter (including grasses, bracken, leaves, bark, and twigs and branches) (Marsden-Smedley, 2009). Fine fuel load (measured in tonnes per hectare) has therefore been used as a convenient measure of the underlying bushfire hazard in areas dominated by woody vegetation. The fine fuel load at any given time is a balance between the rate of fuel build-up, and factors that remove fuel, such as litter decomposition and bushfire. In the absence of fire, fuel loads in forests and woodlands with a shrubby or heathy understorey build up to a quasi-equilibrium state where the rate of fuel production equals the rate of decomposition. The maximum levels vary for different vegetation types and also for the same vegetation types in different locations (Conroy, 1988). The time taken to reach equilibrium fuel loads also varies, ranging from about 2 years in some native grasslands to about 20 to 40 years in dry eucalypt forests (Marsden-Smedley, 2009).

However, it has been found that the fuel structure is possibly more important than the total fine fuel load in determining bushfire behaviour (Marden-Smedley, 2009). Fuel in forests, woodlands and shrublands can be categorised into four layers with differing effects on bushfire behaviour (Hines et al., 2010). These layers are:

- **Surface fine fuel**; leaves, bark, small twigs and other fine fuel lying on the ground. These fuels provide the horizontal continuity that allows a bushfire to spread.
- **Near surface fine fuel**; grasses, low shrubs, bracken etc. up to about 0.5m above the ground surface. Fuels in this layer will burn when the surface fuel layer burns and will increase bushfire intensity.

- **Elevated fuels**; larger shrubs and small saplings with most of the fuel closer to the top of this layer and a clear gap between them and the surface fuels. These interact with the two lower fuel layers to further increase bushfire intensity. They also contribute to the vertical continuity of fuel that allows fire to 'climb' into the tree canopy.
- **Bark fuels**; flammable bark on trees, saplings and large bushes from ground level to the canopy. Loose fibrous bark on stringy-bark eucalypts, and candle bark on some gums can generate large amounts of burning embers which can start spot fires ahead of the main fire.

Canopy fuels are not usually included in fuel hazard assessments in forests and woodlands, but are included in shrubland and heath fuel types where they are equivalent to elevated fuels. If there is sufficient fuel in the lower fuel layers to start the canopy fuel burning (called a crown fire) bushfire intensity can increase considerably. Crown fires in forests are generally considered uncontrollable (Luke and McArthur, 1986).

The main fuel factor that influences the rate of spread of a bushfire is the quantity of near surface fuel whereas total fine fuel load is the main factor influencing bushfire intensity (Gould et al 2007).

In grasslands and grassy woodlands the degree of curing (dryness) of the fuel is considered at least as important as the actual fuel load (Cheney and Sullivan, 2008). Grass goes through an annual cycle with new growth in spring drying out over summer. The bushfire hazard in grassland areas is greatest when the grass is fully cured which usually occurs during the period from December to April depending on seasonal breaks and significant summer rainfall events. However, grasslands that are not grazed or slashed over winter can burn in spring if cured grass from the previous growing season is still present.

Unlike bushland dominated by woody plants, grasslands can accumulate fuel very rapidly, and therefore burning is not a very effective method of hazard reduction. As grass fuel decomposes faster than eucalypt leaves and twigs, and is more likely to be eaten by herbivores, fuel loads in grasslands and grassy woodlands can fluctuate from year to year (Cheney and Sullivan, 2008).

Fuel loads can be roughly categorised in terms of the potential threat they pose as follows:
Low - < 5 tonnes per hectare
Moderate - 5 to 15 tonnes per hectare
High - >15 tonnes per hectare.

The characteristics of each fuel type in the Glebe Hill Reserve are given in table 1. The TASVEG 3.0 codes of the vegetation types in figure 2 corresponding to each fuel type are listed under the fuel type.

Table 1 – Characteristics of the different fuel types in the reserve

FUEL TYPE	FUEL HAZARD CHARACTERISTICS	BUSHFIRE BEHAVIOUR AND CONTROL
Shrubby forest / woodland DAM DRI	Canopy, bark, elevated, near surface and surface fuels all present. Duff layer averaging 20-30mm, mainly she oak needles, leaves and small sticks. Shrub layer 3-5m in height. Near surface fuels a mixture of grasses, bark and heathy shrubs with some patches of bracken. Leaf and bark fall around trees contributes to a gradual build-up of fuel, particularly around the base of trees. Some dead standing trees. Generally moderate overall fuel loads, but high in some aggregates where there is dense shrub growth. Grass component of the fuel load can build up rapidly after fire.	Can burn with moderate to high intensity depending on the degree of fuel accumulation. Significant ember attack on structures downwind of the bushfire and spotting across containment lines can be expected. Capable of carrying a bushfire at any time of year if there is a sufficient amount of litter on the ground. Tree cover can sustain a crown fire and the eucalypts, particularly dead or trees with hollows, and those with rough bark, will be a source of burning embers which can carry a bushfire over nearby fire control lines (roads, fuel breaks) and threaten nearby buildings. Fuel reduction burning is effective in removing accumulated litter, elevated fuels and the bark fuels largely responsible for spotting, but grass and bracken fuels can be replenished within a year or two after fire.
Grassy forest / woodland DVG	Canopy, near surface and surface fuel all present, bark fuels only present at base and on rough barked trees and shrubs. Branches/bark fall present below live mature trees experiencing density reduction, which contributes to a gradual build-up of fuel. Dead standing trees with hollows present. Low to moderate fuel loads, dominant fuel type is bark, small dead branches with grass up to 0.4m. Grass component of the fuel load can build up fuel rapidly after fire.	Can burn with moderate to high intensity depending on the degree of fuel build-up. Significant ember attack on structures and spotting across containment lines can be expected. Capable of carrying a bushfire at any time of year if there is a sufficient amount of litter on the ground, and/or cured grass. Tree cover is generally too sparse to sustain a crown fire, however, the eucalypts, particularly dead or trees with hollows, will be a source of burning embers which can carry a bushfire over nearby fire control lines (roads, fuel breaks) and threaten nearby buildings. Fuel reduction burning is effective in removing accumulated litter and the bark fuels largely responsible for spotting, but grass fuels can be replenished within a year after fire.
Unmanaged grassland GRP	Native and introduced grasses, near surface and surface fuels present. Potential for dense elevated fuels to about 1m high following wet winters and springs. Flammability dependant on degree of curing of the grass. Grass fuels can be replenished within a year after a burn.	Can generate rapidly moving, moderate intensity fires in late summer and early autumn. Fires can occur at other times of the year if the cured standing crop from the previous year's growth persists. Likely to be relatively little spotting so fires can usually be stopped at roads and firebreaks, however, fires may be uncontrollable in extreme conditions.
Managed vegetation (mown grass)	Surface, and near surface fuels present. Generally low to moderate overall fuel loads. Grass and shrubs generally less than 200mm in height due to periodic slashing. Landscape plantings in these areas will gradually increase the fuel loads as they mature.	Will burn with low intensity unless there has been a lot of fuel accumulation or the near surface fuels have not been slashed for periods. Capable of carrying a bushfire at any time of year if there is a sufficient amount of litter on the ground, and/or cured grass. Fires in this fuel type are unlikely to spot over control lines and will be relatively easy to control.

Near surface and elevated fuels in the form of shrubs, bark, branches and grasses are by far the major fuel components in the reserve. Bushfires in these fuel types can be difficult to control, and most planned burns in this fuel type will be of moderate intensity.

2.3 Bushfire Threat and Risk to Persons

The main bushfire threat to the Glebe Hill Reserve is considered to come from fires that start on the western slopes of Glebe Hill or move into the reserve from the more extensive area of bushland to the north on days with strong northerly to north-westerly winds. Such fires could quickly run the length of the reserve and threaten adjoining property. During 2015 Councils Fire and Bushland Management undertook a planned fuel reduction burn in VMU 5, and VMU 3 during 2013. These planned burns reduced surface, near surface and some elevated fuel loads. The revised schedule of mosaic planned burns within the reserve (table 9) will continue to assist mitigating the impacts to the reserves natural values from future bushfires.

As the reserve is relatively narrow and it is easy to reach cleared areas on adjoining private property, the bushfire risk to persons in the reserve is considered to be low.

2.4 Assets at Risk from Bushfire

Assets potentially at risk from bushfire include; dwellings, infrastructure, and other items (such as ornamental and regeneration plantings) which would cost money to replace; as well as items of scenic, cultural and natural heritage value which could be damaged or destroyed by a bushfire, or bushfire suppression activities. Each landowner has an obligation to reduce a bushfire hazard where it is a threat to neighbouring properties. However, even with extensive hazard reduction burning, the risk of high intensity bushfires occurring in the reserve cannot be eliminated. Therefore consideration must be given to protection measures that will reduce the risk of bushfire damage to assets in and surrounding the reserve. Assets within and surrounding the reserve that are considered at risk from bushfires are shown in figure 6.

2.4.1 Bushfire Risk to Natural Heritage Assets

The conservation status of the plant communities in the Glebe Hill Reserve is given in table 2. A number of plant species of conservation value occur within the reserve. These are listed in table 3 along with their response to fire if known.

Observed fauna of conservation value reported prior to the development of the initial BMP within the reserve include the swift parrot (*Lathamus discolor*) and the eastern barred bandicoot (*Perameles gunnii*). The habitat requirements and preferred bushfire management of these species is given in table 4.

The *Natural Values Atlas* identifies no verified records of fauna species of conservation significance occurring within the reserve. It does identify potential habitat present within the reserve for the following species:

Spotted-tail quoll *(Dasyurus maculatus)*, green and gold frog *(Litoria raniformis)*, chaostola skipper *(Antipoda chaostola)*, tussock skink *(Pseudemoia pagenstecheri)*, Tunbridge looper moth *(Chrysolarentia decisaria)*, Tasmanian devil *(Sarcophilus harrisii)*, masked owl *(Tyto novaehollandiae)*, Australian grayling *(Prototroctes marena)*, forty-spotted paradalote *(Paradalotus quadragintus)* and grey goshawk *(Accipiter novaehollandiae)*.

Table 2 – Conservation value of native plant communities

TASVEG 3.0 CODE	EQUIVALENT FLORISTIC COMMUNITY[1]	Conservation Status[2]
DAM	DRY-gAMmud Grassy *E. amygdalina* forest	Not threatened
DRI	DRY-gRIS Grassy *E. risdonii* forest	THREATENED NATIVE COMMUNITY
DVG	DRY-gVIM Grassy *E viminalis* woodland	Not threatened
GRP	None described	Not threatened

1. Forest Practices Authority (2005)
2. *Nature Conservation Act 2002*

Figure 6 - Assets at risk from bushfire

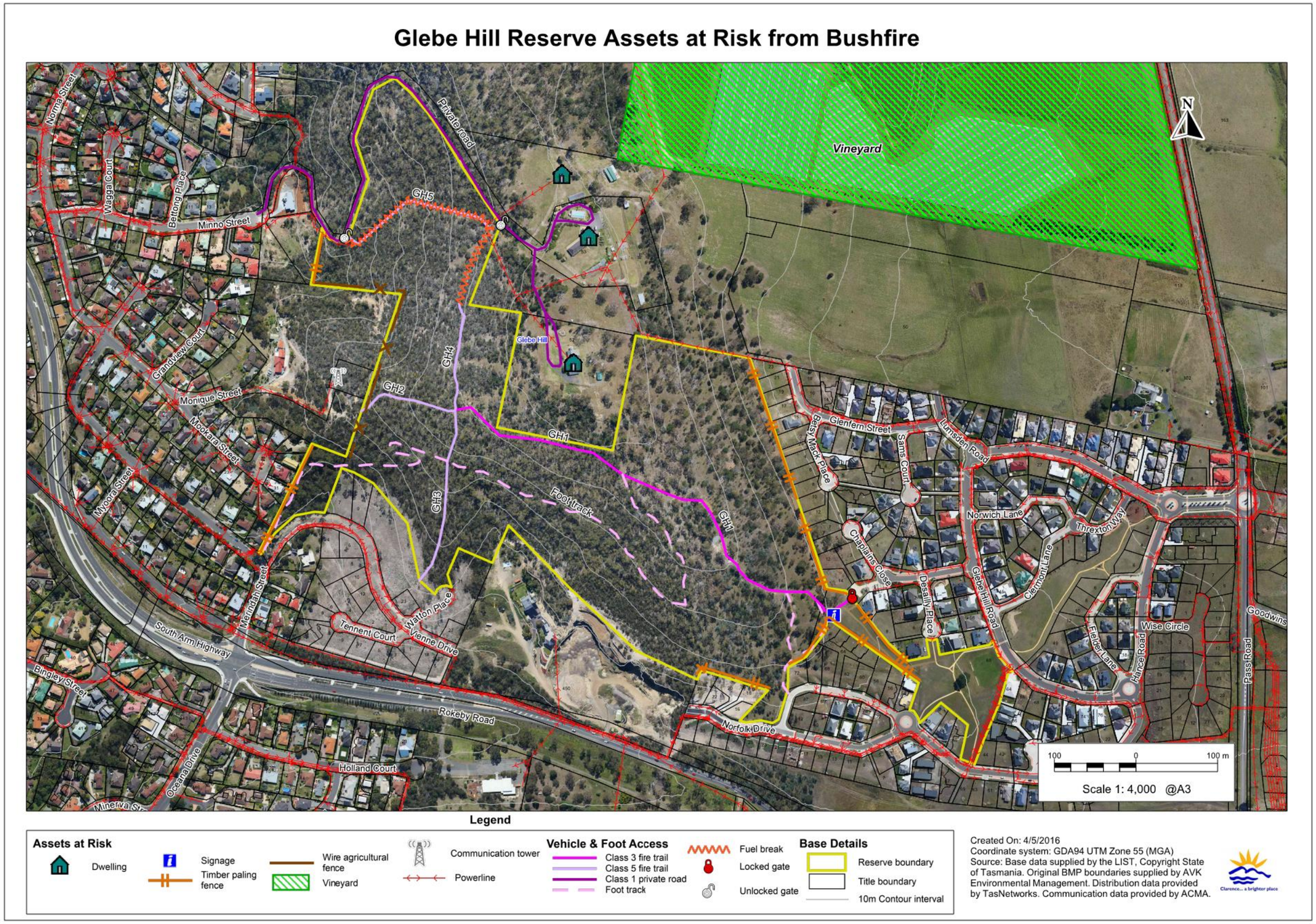


Table 3 - Plant species of conservation value and preferred bushfire management

SPECIES	CONSERVATION STATUS[1]	OCCURRENCE	RESPONSE TO BUSHFIRE AND MANAGEMENT	*ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999* (EPBC Act) STATUS
Arthropodium strictum chocolate lily	Delisted as RARE[1] in 2015. Holds conservation significance.	Widespread and locally abundant with numbers varying form 1 per 10 m^2 to 100 individuals per m^2. Numbers fluctuate significantly. Up to 1¾ million plants estimated in 2004.	Noticeable flush of regeneration from seed following fire. Plants also regenerate from tuberous rootstock.	Not threatened
Austrodanthonia induta tall wallaby grass	Delisted as RARE[1] in 2015. Holds conservation significance.	Widespread on upper slopes of Glebe Hill in low to moderate densities. Likely to be represented by 2000-20000 individuals.	Likely to regenerate from rootstock and establish from seed.	Not threatened
Eucalyptus risdonii Risdon peppermint	RARE	Occupies north west facing slopes in north of reserve. 2000-5000 trees.	Regenerates from lignotubers. Repeated fires may weaken trees. Fire promotes seed release and subsequent germination.	Not threatened

Hypoxis vaginata Sheathing yellowstar	Delisted as RARE[1] in 2015. Holds conservation significance.	Localised to rockplate site in south east corner. Numbers over 13000 over an area just under 900 m2 in 2004. Only measurable in dozens in 2011. Site requires biomass reduction to maintain open sward – ideally through localised burn.	Likely to regenerate form underground bulb but also likely to establish from seed after fire.	Not threatened
Ranunculus sessiliflorus var. sessiliflorus shade peppercress	Delisted as RARE[1] in 2015. Holds conservation significance.	Previously (1990s) recorded from the northern part of the reserve. This is a late winter/early spring flowering annual for which habitat is widespread.	Regenerates from seed.	Not threatened
Rytidosperma indutum tall wallaby grass	RARE	Widespread on upper slopes of Glebe Hill in low to moderate densities. Likely to be represented by 2000-20000 individuals.	Likely to regenerate from rootstock and establish from seed after bushfire.	Not threatened

1. Tasmanian *Threatened Species Protection Act* 1995

Table 4 - Fauna of conservation value and preferred bushfire management

SPECIES	CONSERVATION STATUS[1]	HABITAT AND PREFERRED BUSHFIRE MANAGEMENT	*ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999* (EPBC Act) STATUS
Perameles gunnii Eastern barred bandicoot	Tasmanian Status Not Threatened	Grasslands (both native and introduced) and grassy woodlands. Dense cover of regrowth is likely to be unsuitable habitat. **Mosaic burning will ensure open habitats are maintained and help mitigate devastating bushfires.**	VULNERABLE
Lathamus discolor Swift parrot	Endangered	Known to breed in the Meehan Range and likely to nest elsewhere. Nests in hollows in old growth eucalypts (Brereton 1997). Blue gums (*Eucalyptus globulus*) provide a preferred foraging habitat although swamp gums (*E. ovata)* are recognised as being particularly important as an alternative nectar source. The swift parrot feeds in the tree canopy and therefore an extensive, high-intensity bushfire that scorched the canopy could reduce the potential food resources for this species within a reserve. However, a temporary loss of food resources in a reserve due to a localised bushfire is unlikely to have a significant impact on regional food sources for this species. **Management should aim to avoid crown damage to larger trees by keeping planned burns at a low intensity and reducing the bushfire hazard to reduce the intensity of bushfires.**	ENDANGERED

1 - Tasmanian *Threatened Species Protection Act* 1995
2 - Vertebrate Advisory Committee, 1994.

The bushfire sensitivity and flammability ratings of the vegetation types in the reserve according to Pyrke and Marsden-Smedley (2005), is given in table 5.

Table 5 – Fire attributes of the native vegetation

TASVEG 3.0 CODE	FIRE SENSITIVITY	FLAMMABILITY
DAM	Low	High
DVG	Low	High
DRI	Low	High
GRP	Low	High

Flammability classification of Tasmanian vegetation (Pyrke & Marsden-Smedley, 2005)

FLAMMABILITY	CRITERIA FOR FLAMMABILITY
Very high	Will burn readily throughout the year even under mild weather conditions, except after recent rain (i.e. less than 2–7 days ago).
High	Will burn readily when fuels are dry enough but will be too moist to burn for lengthy periods, particularly in winter. Fuels will be dry enough to burn on most days from late spring to early autumn.
Moderate	Extended periods without rain (i.e. two weeks at least) and/or moderate or stronger winds are required for these communities to burn.
Low	These communities will burn only after extended drought (i.e. four weeks without rain) and/or under severe bushfire weather conditions (i.e. forest fire danger index > 40).

Note: recently burnt stands of low or moderate flammability classes may have a higher flammability rating.

Fire sensitivity classification of Tasmanian vegetation (Pyrke & Marsden-Smedley, 2005)

FIRE SENSITIVITY	ECOLOGICAL IMPACT OF BUSHFIRE	MANAGEMENT RECOMMENDATIONS
Extreme	Any bushfire will cause either irreversible or very long-term (> 500 years) damage.	Suppress all bushfire. Highest priority for bushfire suppression.
Very high	A single bushfire will cause significant change to the community for 50–100 years and will increase the probability of subsequent fires changing the community permanently.	Suppress all bushfire. High priority for bushfire suppression.
High	A bushfire-adapted community requiring at least 30 years between fires to maintain the defining species. Bushfire intervals greater than 80 years are required to reach mature stand structure.	Suppress all bushfire, but give higher priority to stands burnt less than 80 years ago.
Moderate	A bushfire-adapted community requiring at least 15 years between fires to maintain the defining species.	Suppress fires in stands burnt less than 20 years ago.
Low	Highly bushfire-adapted or non-native vegetation. A single bushfire will generally not affect biodiversity, although repeated short intervals (i.e. < 10 years) may cause long- term changes.	Suppression usually not an ecological priority except in specific situations (e.g. a recently burnt stand of a threatened species).

The low fire sensitivity of the native vegetation in the reserve indicates that it is highly fire adapted and a single bushfire will generally not adversely affect biodiversity, though repeated fires in forested areas at intervals of less than 10 years may cause long-term changes in floristics and vegetation structure (Pyrke & Marsden-Smedley 2005). The high flammability rating of the native bushland in the reserve in Pyrke & Marsden-Smedley (2005) indicates it will burn readily when fuels are dry but may be too moist to burn for long periods during winter. Fuels will generally be dry enough to burn on most days from late spring to early autumn.

2.4.2 Bushfire and Habitat Management

The main bushfire risk to natural heritage assets in the reserve is from fire regimes (planned or unplanned) that are outside the thresholds within which a particular plant community, or habitat for flora and fauna species, has viability in the long-term. Fire regimes within the thresholds of a particular plant community will help maintain its long-term viability, whereas fire regimes outside the thresholds are likely to lead to progressive changes in the structure and floristics of the plant community, and loss of habitat for the fauna favouring that plant community.

High intensity bushfires that burn the whole of the reserve can damage or destroy valuable fauna habitat including:

- Tree hollows used as nests and dens by many birds and arboreal mammals.
- Mature, senescing or dead trees that can be important invertebrate, bird and reptile habitat, and take a long time to replace.
- Understorey species that provide nest and shelter sites as well as a food source for many bird and mammal species.
- Fallen logs, bark and leaf litter that provide shelter and a food source for invertebrates, frogs, reptiles, birds and mammals.

Species may be lost from the reserve if they cannot recolonise from nearby areas, or survive in unburnt patches.

Bushfires often stimulate the spread of environmental and other weeds. However, some weed species provide significant protection and food sources for fauna (for example, gorse and blackberry) and removal of these species should be carefully managed to ensure they are progressively replaced by equivalent native species habitat.

Bushfire can favour the proliferation of bracken to the detriment of other native species and so where bracken is well established an extended absence from bushfire may be a useful tool to reduce its vigour.

Planned burning of the native vegetation in the reserve at the optimum frequency for its long-term viability is considered the best way to conserve important habitat for both flora and fauna in the reserve. Planned burning in a mosaic pattern along with maintenance of fire trails is the best way to minimise the risk of high intensity bushfires in the reserve.

The bushfire management requirements of the different plant communities/habitats in the reserve are given in table 6. These plant communities have been grouped together according to their bushfire management requirements.

Table 6 - Bushfire management requirements of the plant communities in the reserve

TASVEG 3.0 MAPPING UNITS	BUSHFIRE IMPACTS AND BUSHFIRE MANAGEMENT AIMS
Dry sclerophyll forests and woodlands	
DAM –*Eucalyptus amygdalina* forest on mudstone DVG – *Eucalyptus viminalis* grassy forest and woodland DRI – *Eucalyptus risdonii* forest and woodland	Infrequently burnt sites develop a dense shrubby understorey. Frequent fires (< 5 years) can inhibit tree regeneration and eliminate the shrubby component Overfrequent burning regimes In the past within much of forest overlying mudstones has contributed to loss of topsoil and erosion. Extended absence from fire can result in build-up of fuel causing hot and damaging burns. A temporal and spatial mosaic burning pattern would assist with tempering the effects of a devastating bushfire. **Optimal fire frequency is 15-30 years.** **Exclude fire from representative areas to provide controls for monitoring the effects of fire. Exclude fire from dry slopes on mudstone (supporting DRI) which due to low fertility have low biomass growth rates and are drought stressed.**
Grasslands	
GRP – Rockplate grassland	Bushfire intervals > 5 years may lead to a loss of biodiversity in grassy sites (Lunt & Morgan, 1988). Frequent fires (< 5 year intervals) may lead to a loss in diversity of invertebrates. **Grasslands are very localised. Some burning or other biomass reduction may be necessary to maintain them in the long term if bushfire is excluded.**

2.4.3 Bushfire Risk to Built and Cultural Assets

During the BMP review process Aboriginal Heritage Tasmania (AHT) completed a requested search of the Aboriginal Heritage Register (AHR) regarding the area inside the BMP boundary. There are no known Aboriginal heritage sites within the reserve.

The only infrastructure in the reserve likely to be at risk from bushfires is a power line servicing the three houses at the top of Glebe Hill (see figure 6), and perimeter and one internal fences. The fences include stock fencing and wooden paling fences on steel supports.

External to the reserve on the western boundary is a telecommunications tower, and to the north are two vineyards; Clarence House Vineyard and Meehan's Vineyard. Although not likely to be directly affected by bushfire or planned burning within the reserve, the grape vines in the vineyards could be affected by smoke from fires. Smoke during the period when the grapes are ripening can taint the wine produced from them and reduce its value. See table 7, table 9 and section 3.1.2 for proposed management strategies for adjacent vineyards.

The degree of bushfire danger at any particular time is a combination of fine fuel quantity, slope, and the prevailing weather conditions. The actual risk of a bushfire causing damage to an asset is a function the degree of danger, the probability of a bushfire igniting, and any measures taken to prevent the bushfire causing damage.

The four major modes of attack by bushfires that can cause damage to assets are:

1. wind-blown burning debris
2. radiant heat which can ignite flammable materials ahead of the fire front and shatter glass
3. flame contact
4. Strong winds generated or intensified by the bushfire.

The potential for damage to buildings in the path of large fires burning out of the reserve will depend largely on:

- whether the bushfire will approach upslope or downslope
- the quantity and distribution of fuel surrounding the building
- whether they are defended during the bushfire
- their design
- if the building was constructed to Australian Standard 3959-2009, *Construction of Buildings in Bushfire-prone Areas*
- How well they have been maintained.

The Australian Standard for Construction of buildings in bushfire-prone areas (AS:3959 – 2009) uses a Fire Danger Index (FDI) of 50 to determine the Bushfire Attack Level (BAL) for buildings that need to comply with the standard. An FDI of 50 is the boundary between Very High and Severe Fire Danger Rating.

There is insufficient data available to assess the likelihood of a high intensity bushfire starting in the reserve, however there is sufficient fine fuel within the reserve to sustain a high intensity bushfire on days of severe or higher fire danger. The bushfire risk to the built assets within and surrounding the reserve has been assessed using a procedure adapted from the National Emergency Risk Assessment Guidelines (NEMC, 2010). The assessment process is explained in section 5.4 of *Clarence City Council Bushfire Management Strategy for Council Owned and Controlled Land*, and the results and proposed management strategies are shown in table 7. This assessment process has been analysed and complies with AS/NZS IOS:31000-2009. Note that the assessment in table 7 only considers the risk from fires starting in, or passing through the reserve. Some assets may face a greater bushfire risk from nearby bushfire hazards that are not under the control of Clarence City Council.

The risk levels indicated in table 7 should be considered a relative ranking. Buildings with a low relative risk level are still within a bushfire prone area and require a defendable space to TFS specifications (see section 3.1.6).

NOTE: It was not possible to inspect assets on properties adjoining the reserve. The risk assessment therefore makes the following assumptions about these assets:

- Landowners/residents have established and are maintaining a defendable space to TFS specifications around vulnerable assets, either wholly within the lot, or up to the boundary with the reserve. Where this is not the case the asset may face a much higher bushfire risk than indicated in the risk assessment.
- All dwellings adjoining the reserve that have not been constructed to a specific Bushfire Attack Level in Australian Standard 3959 – 2009, *Construction of Buildings in Bushfire Prone Areas*, are well maintained to resist attack by wind-blown burning embers. Where this is not the case the asset may face a much higher bushfire risk than indicated in the risk assessment.

The original BMP discussed correspondence between Rob Lynch, the developer of Glebe Hill Estate and former owner of most of the reserve, and the TFS. Correspondence from TFS recommended that a 10m wide building protection zone (which should meet the current TFS specifications for defendable spaces of an inner zone) be maintained along sections of the reserve boundary.

The proposed lots in the new portion of the Glebe Hill Estate subdivision located at 31 Watton Place have a proposed 10m wide right of way (ROW) on the northern side within the reserve. To compliment this, it is recommended a 10m inner zone be established within the reserve on the northern side of the lots located at 7 and 9 Vienne Drive, Howrah.

Section E1.6.1.1 of the current *Interim Planning Directive No.1 Bushfire-Prone Areas Code* states as an acceptable solution, shows hazard management areas between bushfire-prone area, that have dimensions equal to or greater than, the separation distances required for BAL-19 or greater in Table 2.4.4 of *AS 3959-2009 Construction of Buildings in Bushfire-Prone Areas*. Given the depths of the proposed lots at 31 Watton Place, combined with the proposed 10m ROW, and the adjacent 10m proposed inner zone behind 7 and 9 Vienne Drive, the lots should be able to achieve the required BAL-19 rating.

See section 3.1.6 and table 9 for current defendable spaces recommended in this BMP for the reserve.

The management strategies recommended in table 7 will reduce the existing bushfire risk to built and cultural assets but in most cases will not eliminate it. Active protection of an asset during a bushfire can greatly reduce the bushfire risk. The TFS recommends that homes should not be defended when the Fire Danger Rating (FDR) exceeds 50 in your area unless you have created defendable space and ember-proofed your home. Assets at medium and high risk of damage from bushfire will need to be protected during planned burns in the reserve.

Table 7 - Bushfire risk assessment for built and cultural assets

RISK CATEGORIES

LOW – asset of low value or considered to have a relatively low risk of damage from bushfires in the reserve due to its construction, location, or protection measures already in place.

MODERATE – asset is vulnerable to damage by bushfires and could face attack by a moderate to high intensity bushfire, but has features that will reduce the intensity of the fire attack, or provide some protection from fires.

HIGH – asset is of high value, is vulnerable to damage by bushfires and could face attack by a high intensity bushfire with few, if any, features that would reduce the intensity of fire attack.

ASSET AT RISK	RISK ANALYSIS (See section 5.4 of the Bushfire Management Strategy)								OTHER BUSHFIRE RISKS	PROPOSED MANAGEMENT STRATEGIES
	A	B	C	D	E[1]	F	G	Level of Risk		
Power line to 50, 52 and 53 Minno Street	5	3	3	3	2	2	4	2160 High		TasNetworks to maintain vegetation beneath power lines. Clear at least 1 m around the base of each pole.
Telecommunications tower (adjoining reserve boundary)	5	3	3	2	3	2	2	1080 Moderate		No defendable space required within the reserve. Clear all trees, shrubs and bushes within 10m of tower.
Dwellings on 24, 26, 28, 29 and 31 Mookara Street	5	3	3	2	2	1	6	1080 Moderate		It is not known what BAL, if any, these buildings are constructed to. Advise residents of the need to maintain an adequate defendable space around their dwelling. Maintain the existing 6m outer zone along the reserve boundary to complement the defendable space on the lots. See MP 6 in the Best Management Practice Guidelines.
Dwellings bordering the reserve on 66 and 70 Hance Road	3	2	3	2	2	1	6	432 Moderate		Council records show 66 Hance Road was assessed with a BAL 12.5 rating as per AS 3959-1999. It is not known what BAL, if any, 70 Hance Road was constructed to. Advise residents of the need to maintain an adequate defendable space around their dwellings. Maintain a minimum 10m wide inner zone along the reserve boundary to complement the defendable space on the lots. See MP 6 in the Best Management Practice Guidelines.

ASSET AT RISK	RISK ANALYSIS (See section 5.4 of the Bushfire Management Strategy)								OTHER BUSHFIRE RISKS	PROPOSED MANAGEMENT STRATEGIES
	A	**B**	**C**	**D**	**E[1]**	**F**	**G**	**Level of Risk**		
Future dwelling on 72 Hance Road	3	2	3	2	2	1	6	432 Moderate		Dwellings to be constructed to AS 3959-2009 or most current. Advise residents of the need to maintain an adequate defendable space around their dwelling. Maintain a minimum 10m wide inner zone along the reserve boundary to complement the available defendable space on the lot. See MP 6 in the Best Management Practice Guidelines.
Future dwelling on 22 Norfolk Drive	5	1	3	2	2	1	6	360 Moderate		Council records show 22 Norfolk Drive was assessed with a BAL 19 rating as per AS 3959-1999. Advise residents of the need to maintain an adequate defendable space around their dwellings. Maintain a minimum 10m wide inner zone along the reserve boundary to complement the defendable space on the lot. See MP 6 in the Best Management Practice Guidelines.
Dwelling at 450 Rokeby Road	5	1	3	2	2	1	6	360 Moderate		Advise residents of the need to maintain an adequate defendable space around their dwelling. No defendable space required in the reserve.
Future dwelling on 20 Norfolk Drive	5	1	3	2	2	1	6	360 Moderate		Dwelling to be constructed to AS 3959-2009 or most current. Advise residents of the need to maintain an adequate defendable space around their dwelling once constructed. Maintain a minimum 10m wide inner zone along the reserve boundary to complement the defendable space on the lot. See MP 6 in the Best Management Practice Guidelines.
Future dwelling on 24 Norfolk Drive	5	1	3	2	2	1	6	360 Moderate		Dwelling to be constructed to AS 3959-2009 or most recent. Advise residents of the need to maintain an adequate defendable space around their dwelling once constructed. Maintain a minimum 10m wide inner zone along the reserve boundary to complement the defendable space on the lot. See MP 6 in the Best Management Practice Guidelines.

ASSET AT RISK	RISK ANALYSIS (See section 5.4 of the Bushfire Management Strategy)								OTHER BUSHFIRE RISKS	PROPOSED MANAGEMENT STRATEGIES
	A	**B**	**C**	**D**	**E[1]**	**F**	**G**	**Level of Risk**		
Future dwelling on 18 Norfolk Drive	5	1	3	2	2	1	6	360 Moderate		Council records show 18 Norfolk Drive has been assessed and received a BAL-29 rating as per AS 3959-2009. Advise residents of the need to maintain an adequate defendable space around their dwelling once constructed. Maintain a minimum 10m wide inner zone along the reserve boundary to complement the defendable space on the lot. See MP 6 in the Best Management Practice Guidelines.
Dwelling on 16 Norfolk Drive	5	1	3	2	2	1	6	360 Moderate		Council records show that this building is constructed to BAL-12.5 in AS 3959 – 2009. Advise residents of the need to maintain an adequate defendable space around their dwelling. Maintain a minimum 10m wide inner zone along the reserve boundary to complement the defendable space on the lot. See MP 6 in the Best Management Practice Guidelines.
Dwelling on 12 Highclere Court	3	1	3	2	2	1	6	216 Low		It is not known what BAL, if any, this building is constructed to. Advise residents of the need to maintain an adequate defendable space around their dwelling. Maintain a minimum 10m wide inner zone along the reserve boundary to complement the defendable space on the lot. See MP 6 in the Best Management Practice Guidelines.
Dwelling on 14 Highclere Court	3	1	3	2	2	1	6	216 Low		Council records show that this building is constructed to level 1 specifications in AS 3959 -1999. This roughly equates to BAL-12.5 in AS 3959 – 2009. Advise residents of the need to maintain an adequate defendable space around their dwelling. Maintain a minimum 10m wide inner zone along the reserve boundary to complement the defendable space on the lot. See MP 6 in the Best Management Practice Guidelines.

ASSET AT RISK	RISK ANALYSIS (See section 5.4 of the Bushfire Management Strategy)								OTHER BUSHFIRE RISKS	PROPOSED MANAGEMENT STRATEGIES
	A	**B**	**C**	**D**	**E[1]**	**F**	**G**	**Level of Risk**		
Dwelling on 12 Betsy Mack Place	3	1	3	2	2	1	6	216 Low		Council records show that this building is constructed to BAL-12.5 in AS 3959 – 2009. Advise residents of the need to maintain an adequate defendable space around their dwelling. Maintain a minimum 10m wide inner zone along the reserve boundary to complement the defendable space on the lot. See MP 6 in the Best Management Practice Guidelines.
Dwelling on 4 Betsy Mack Place	3	1	3	2	2	1	6	216 Low		Council records show that this building has no bushfire management plan and is therefore unlikely to comply with AS 3959-2009. Advise residents of the need to maintain an adequate defendable space around their dwelling. Maintain a minimum 10m wide inner zone along the reserve boundary to complement the defendable space on the lot. See MP 6 in the Best Management Practice Guidelines.
Future dwelling on 2 Betsy Mack Place	3	1	3	2	2	1	6	216 Low		Dwellings to be constructed to AS 3959-2009 or most current. Advise residents of the need to maintain an adequate defendable space around their dwelling. Maintain a minimum 10m wide inner zone along the reserve boundary to complement the defendable space on the lot. See MP 6 in the Best Management Practice Guidelines.
Future dwellings on 5 & 7 Chaplains Close.	3	1	3	2	2	1	6	216 Low		Dwellings to be constructed to AS 3959-2009 or most current. Advise residents of the need to maintain an adequate defendable space around their dwelling once constructed. Maintain a minimum 10m wide inner zone along the reserve boundary to complement the defendable space on the lot. See MP 6 in the Best Management Practice Guidelines.

ASSET AT RISK	RISK ANALYSIS (See section 5.4 of the Bushfire Management Strategy)								OTHER BUSHFIRE RISKS	PROPOSED MANAGEMENT STRATEGIES
	A	**B**	**C**	**D**	**E[1]**	**F**	**G**	**Level of Risk**		
Dwelling on 19 Glenfern Street	3	1	3	2	2	1	6	216 Low		Council records show that this building is constructed to level 1 specifications in AS 3959 -1999. This roughly equates to BAL-12.5 in AS 3959 – 2009. Advise residents of the need to maintain an adequate defendable space around their dwelling once constructed. Maintain a minimum 10m wide inner zone along the reserve boundary to complement the defendable space on the lot. See MP 6 in the Best Management Practice Guidelines.
Dwelling on 21 Glenfern Street	3	1	3	2	2	1	6	216 Low		Council records show that this structure was constructed incorporating a bushfire management plan, however it is uncertain what BAL rating if any, it was constructed to. Advise residents of the need to maintain an adequate defendable space around their dwelling. Maintain a minimum 10m wide inner zone along the reserve boundary to complement the defendable space on the lot. See MP 6 in the Best Management Practice Guidelines.
Dwelling on 15, 17 &21 Glenfern Street	3	1	3	2	2	1	6	216 Low		Council records show that these buildings were constructed incorporating individual bushfire management plans, however it is uncertain what BAL rating if any, they were constructed to. Advise residents of the need to maintain an adequate defendable space around their dwellings. Maintain a minimum 10m wide inner zone along the reserve boundary to complement the defendable space on the lot. See MP 6 in the Best Management Practice Guidelines.

ASSET AT RISK	RISK ANALYSIS (See section 5.4 of the Bushfire Management Strategy)								OTHER BUSHFIRE RISKS	PROPOSED MANAGEMENT STRATEGIES
	A	**B**	**C**	**D**	**E[1]**	**F**	**G**	**Level of Risk**		
Dwellings on 6 & 8 Betsy Mack Place	3	1	3	2	2	1	6	216 Low		Council records show that both buildings have been constructed to BAL-19 in AS 3959 – 2009. Advise residents of the need to maintain an adequate defendable space around their dwelling. Maintain a minimum 10m wide inner zone along the reserve boundary to complement the defendable space on the lot. See MP 6 in the Best Management Practice Guidelines.
Dwelling on 10 Betsy Mack Place	3	1	3	2	2	1	6	216 Low		Council records show that this building is constructed to BAL-12.5 in AS 3959 – 2009. Advise residents of the need to maintain an adequate defendable space around their dwelling. Maintain a minimum 10m wide inner zone along the reserve boundary to complement the defendable space on the lot. See MP 6 in the Best Management Practice Guidelines.
Dwellings on 52 and 53 Minno Street	3	3	3	2	0.2	2	6	129.6 Low		Advise residents of the need to maintain an adequate defendable space around their dwellings. No defendable space required in the reserve.
Dwelling on 10 Monique Street	5	1	3	2	0.2	1	6	36 Low		Advise residents of the need to maintain an adequate defendable space around their dwelling. No defendable space required in the reserve.
Dwelling on 42 Minno Street	5	1	3	2	0.2	1	6	36 Low		Council records show that this building is constructed to level 1 specifications in AS 3959 -1999. This roughly equates to BAL-12.5 in AS 3959 – 2009. Advise residents of the need to maintain an adequate defendable space around their dwelling once constructed. No defendable space required in the reserve.
Future dwelling on 1 Monique Street	5	1	3	2	0.2	1	6	36 Low		Dwellings to be constructed to AS 3959-2009 or most current. No defendable space required in the reserve at time of BMP review.

ASSET AT RISK	RISK ANALYSIS (See section 5.4 of the Bushfire Management Strategy)								OTHER BUSHFIRE RISKS	PROPOSED MANAGEMENT STRATEGIES
	A	**B**	**C**	**D**	**E[1]**	**F**	**G**	**Level of Risk**		
Dwelling bordering the reserve on 9 Vienne Drive	5	1	3	2	0.2	1	6	36 Low		Council records show that this building is constructed to BAL-19 in AS 3959 – 2009. Advise residents of the need to maintain an adequate defendable space around their dwelling. Maintain a minimum 10m wide inner zone along the reserve boundary to complement the defendable space on the lot. See MP 6 in the Best Management Practice Guidelines.
Future dwelling bordering the reserve on 7 Vienne Drive	5	1	3	2	0.2	1	6	36 Low		Dwelling to be constructed to AS 3959-2009 or most current. Maintain a minimum 10m wide inner zone along the reserve boundary to complement the defendable space on the lot. See MP 6 in the Best Management Practice Guidelines.
Future dwellings bordering the reserve Watton Place	5	1	3	2	0.2	1	6	36 Low		Dwellings to be constructed to AS 3959-2009 or most current. 10m wide ROW is proposed to be constructed within the reserve. No additional defendable space required in the reserve
Perimeter and internal fences	-	-	-	-	-	-	-	Variable		Replace if damaged by bushfire.
Grape vines in Clarence House Vineyard and Meehan's Vineyard	-	-	-	-	-	-	-	-	Grapes may be tainted by smoke from fires.	Consult with vineyard owners before burning in reserve.

1 – Note that the risk analysis score in column E only indicates that there is enough space to provide a defendable space between bushland in the reserve and an adjoining asset. It does not indicate that a defendable space has been established on the adjoining property, or if established is being adequately maintained.

3. Bushfire Management Issues

3.1 Existing Bushfire Management

3.1.1 Implementation of the Previous BMP

As part of this revision of the BMP for Glebe Hill Reserve, a review of the success of the implementation of the recommendations in the previous BMP was carried out. The review found that of eighteen recommendations ten had been fully implemented, seven had been partly implemented and 1 has not been implemented.

The full findings of the review are in Appendix A.

3.1.2 Planned Burning

The previous BMP recommended three planned burns across three VMUs within the reserve. All planned burns were successfully carried out. In addition VMU 10 above Norfolk Drive had extensive heap burning to re-establish a 10m inner zone within the reserve during 2015.

Burning has been withheld for the duration of this BMP on the exposed western DRI slopes (VMU 1&13). The low to moderate surface fuels here are assisting in retaining soil moisture and alleviating erosion in the moderate to high erodibility soil types.

An amended burning schedule for the next five years has been included in this plan (see table 9).

Table 9 also specifies planning restraints and required communication with the two vineyards adjacent to the reserve.

3.1.3 Vehicle Access Routes and Foot Tracks

As most of the reserve is covered by two enacted Conservation Covenants, the maintenance and establishment of vehicle access for fire management purposes throughout the reserve outlined in this BMP will require written approval from the Minister responsible for the *Nature Conservation Act 2002*. During each BMP review process the Minister or delegated DPIPWE representative must be notified with the revised works program, commencement of this program is not to occur until written approval is received.

The existing fire trails and foot tracks provide adequate access to most areas of the reserve for bushfire management, and are used as fire control lines for the planned burning recommended in this plan.

The management map in the *Nature Conservation Plan for 'Glebe Hill', Rokeby, and August 2012* shows several existing tracks to be decommissioned. With the 2016 Council acquirement of 50 Minno Street (now known as VMU 13 in this BMP), and the current operational bushfire management requirements, the Minister will be notified with Councils intention to re-establish the fire trail and fuel break network within the most current Glebe Hill Reserve polygon.

The location of the trails within the reserve considered necessary for bushfire management are shown in figure 7 and described in table 8. Each fire trail has been assigned a usage class and its current condition assessed against the standard for their assigned usage class in MP 1 in the *Clarence City Council Bushfire Management Strategy – Best Management Practice Guidelines.*

3.1.4 Water Supply

There are no water sources within the reserve. However, water for fire fighting and bushfire management can be easily obtained from fire hydrants in the streets surrounding the reserve (see figure 7).

Figure 7 –Vehicle and foot access

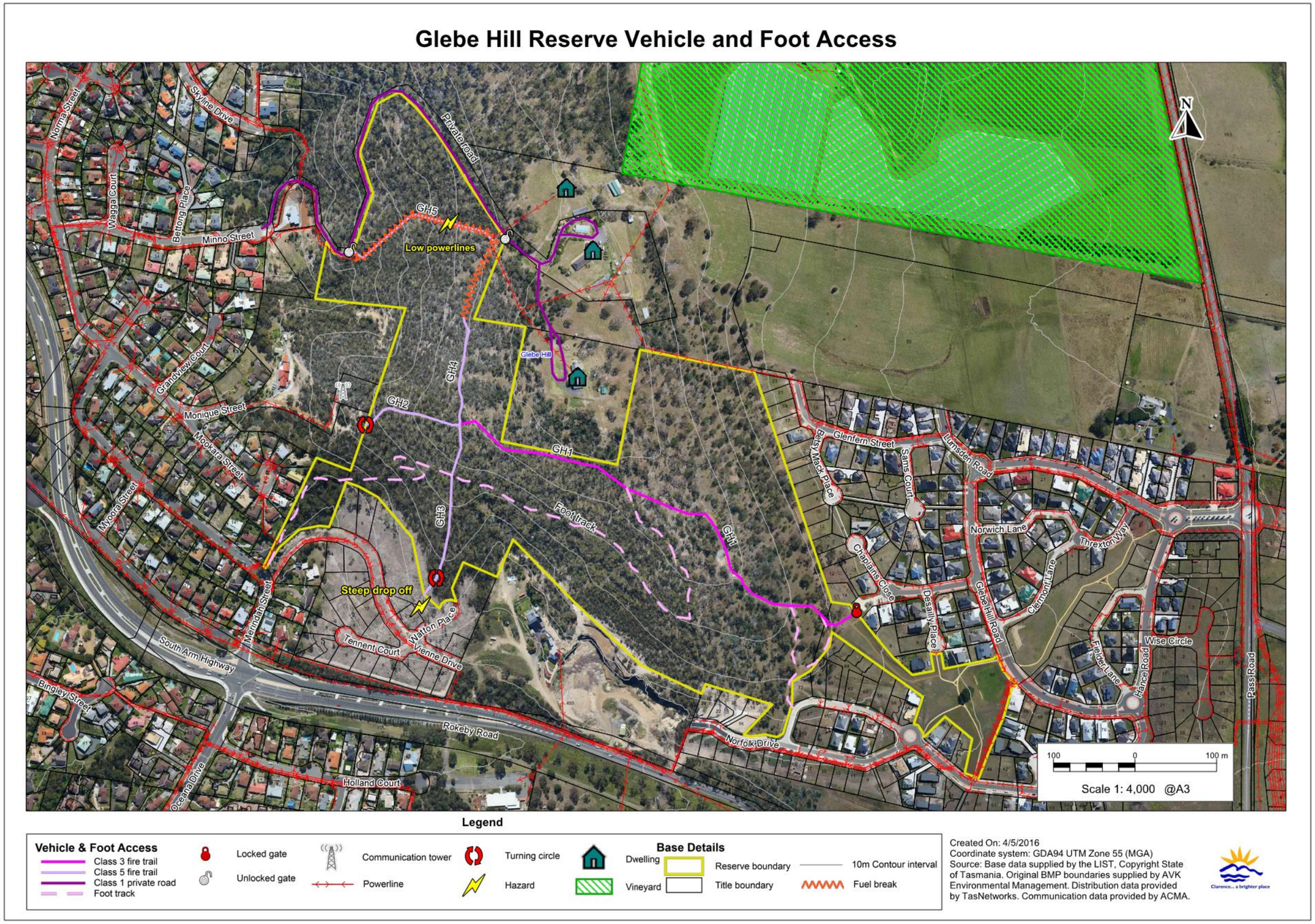


Table 8 - Condition and maintenance of fire trails in the reserve

Assigned vehicle usage class (MP 1):	Maintenance priority:
Class 1 – all 2WD and 4WD vehicles	**High** priority - major through routes and fire control lines
Class 3 – all weather 4WD, light and heavy 4WD vehicles (category 3, 4 & 5 tankers)	**Medium** priority - important access and escape routes and minor fire control lines
Class 5 – dry weather and/or high clearance 4WD, light 4WD (category 5 tankers), also includes trails with sharp bends and dead end trails with small turning areas.	**Low** priority - minor access routes and boundaries of vegetation management units.

The trail usage class describes the suitability of the fire trail if properly maintained, not necessarily its condition at the time of inspection.

MP refers to Management Procedures in *Clarence City Council Bushfire Management Strategy – Best Management Practice Guidelines

FIRE TRAIL ID	USAGE CLASS	STRATEGIC FIRE TRAIL UNDER HOBART FIRE PROTECTION PLAN[1]	MAINTENANCE PRIORITY	LOCATION AND CONDITION AT APRIL 2016	ACTION REQUIRED	MANAGEMENT CONSTRAINT
GH1	3	NO	High	Trail starts between 11 & 14 Highclere Court, Howrah through locked bollard. Trail runs east-west finishing at junction (JCN) GH2/GH3/GH4. Trail meets usage class 3 standards.	Inspection and maintenance as specified in MP2.	Consult Conservation Covenant prior to operations. Rare plant species *Eucalyptus risdonii*[2] *and Rytidosperma indutum*[2] within proximity. Consult DPIPWE Threatened Species Section as required.
GH 2	5	NO	Moderate	The trail is currently dead end with limited turning. Trail starts at JCN GH1/GH3/GH4, running west finishing at reserve boundary/private property at 1 Monique Street (wire fence). Trail meets usage class 5 standards.	Install turning circle at western end of fire trail. Inspection and maintenance as specified in MP2.	Consult Conservation Covenant prior to operations. Rare plant species, *Eucalyptus risdonii*[2] *and Rytidosperma indutum*[2] within proximity. Consult DPIPWE Threatened Species Section as required.

FIRE TRAIL ID	USAGE CLASS	STRATEGIC FIRE TRAIL UNDER HOBART FIRE PROTECTION PLAN[1]	MAINTENANCE PRIORITY	LOCATION AND CONDITION AT APRIL 2016	ACTION REQUIRED	MANAGEMENT CONSTRAINT
GH 3	5	NO	High	Trail starts at JCN GH1/GH2/GH4, running south and finishing at partially completed ROW (on Council land), above the partially constructed Watton Place. Trail currently meets usage class 5 standards. **Caution: 4-5m drop at end of fire trail where ROW has been installed.**	Barricade to be installed at end of current fire trail alignment. Sub-division developer to complete Watton Place and ROW (on Council land). Fire trail to link onto ROW. Boom gate to be installed.	ROW to be completed prior to linking fire trail onto Watton Place ROW. Consult Conservation Covenants prior to operations. Rare plant species, *Eucalyptus risdonii*[2] *and Rytidosperma indutum*[2] within proximity. Consult DPIPWE Threatened Species Section as required.
GH 4	5	NO	High	Trail starts at JCN GH1/GH2/GH3, running north along existing track, finishing at boundary VMU 1 & VMU 13. Trail does not meet usage class 5 standards.	**Area within VMU 1:** Fire trail is to be upgraded as per MP 1 - Fire Trail Construction. **Area covered by Conservation Covenant for land formerly 50 Minno Street (VMU 13):** Establish fuel break starting at boundary VMU 1 & VMU 13, linking onto fuel break beneath transmission lines. Establish agreement with owner 53 Minno Street to have access on private road for fire management purposes.	Consult Conservation Covenant prior to operations. Rare plant species *Eucalyptus risdonii*[2] *and Rytidosperma indutum*[2] within proximity. Consult DPIPWE Threatened Species Section as required.

FIRE TRAIL ID	USAGE CLASS	STRATEGIC FIRE TRAIL UNDER HOBART FIRE PROTECTION PLAN[1]	MAINTENANCE PRIORITY	LOCATION AND CONDITION AT APRIL 2016	ACTION REQUIRED	MANAGEMENT CONSTRAINT
GH 5	5	NO	High	Trail starts at eastern corner of VMU 13. Trail runs west beneath transmission lines finishing at proposed lower gate on private road located on 53 Minno Street, Howrah. Vegetation clearing has meet requirements for maintenance beneath transmission lines but not for class 5 usage standards. Trail currently does not meet class 5 usage standards. Trail also functions as fuel break (see figure 6 & 9). **Caution: Transmission lines low in section.**	Fire trail is to be established as per MP 1 - Fire Trail Construction. Establish agreement with owner 53 Minno Street to have access on private road for fire management purposes. Install gate at end of trail.	Consult Conservation Covenant prior to operations. Rare plant species *Eucalyptus risdonii*[2] *and Rytidosperma indutum*[2] within proximity. Consult DPIPWE Threatened Species Section as required. **Caution: Transmission lines low in section.**

[1] Strategic fire trails have been identified in the Hobart Fire Protection Plan. Strategic fire trails will be signposted.

[2] Tasmanian *Threatened Species Protection Act* 199

3.1.5 Fuel Breaks

A fuel break (sometimes called a "firebreak") is a strip of cleared, or partly cleared, bushland constructed and maintained to slow, or stop, the progress of a bushfire to assist in its control. They are not the same as defendable spaces which are maintained around vulnerable assets to protect them from bushfires. Fuel breaks in grassland can be effective in stopping fires if cleared down to mineral earth, but where trees and shrubs are present wind-blown burning embers will usually carry a bushfire across a fuel break. Therefore, in bushland with shrubs and trees the only benefit of a fuel break is to provide access for firefighters and a boundary for backburning operations. Currently there are no standards or guidelines for fuel breaks in Tasmania.

The reserve currently has no fuel breaks, however two are recommended. One will double as GH5 fire trail, traversing beneath the transmission lines in VMU 13 (see figure 6 &9). Caution must be given as the transmission lines are low in one section. The second linking the eastern end of the above fuel break to GH4.

3.1.6 Defendable Spaces

A defendable space is an area of managed vegetation around an asset likely to be at risk from bushfire that protects it from direct flame contact and intense radiant heat, as well providing an area where fire fighters can defend the asset.

The Tasmania Fire Service document *Bushfire Survival Plan 2015-2016* recommends that a defendable space includes two 'zones':

- An inner zone (formerly a Bushfire Protection Zone) where flammable materials are minimised.
- An outer zone (formerly a Fuel Modified Buffer Zone) where a low level of flammable material is permitted.

In the inner zone, flammable materials on, under and around your home should be moved away from the house.

In the inner zone:

- Include non-flammable areas such as paths, driveways, and mowed lawns.
- Use non-flammable mulch; do not use woodchips or bark.
- Locate any dams, orchards, vegetable gardens and any effluent disposal areas on the fire-prone side of the home.
- Use radiation shields and windbreaks such as stone or metal fences and hedges using low-flammability plants.
- Remove fire hazards such as wood piles, rubbish heaps and stored fuels.
- Replace all highly-flammable plants with low-flammability plants.
- Prune lower branches on trees and remove flammable shrubs from under and between trees.

- Rake up bark and leaves and keep roofs and gutters clear of flammable debris.

The TFS notes it is not necessary to remove all vegetation from the inner zone. Individual trees rarely cause houses to burn in bushfires.

Trees can screen a building from windblown embers while protecting it from radiant heat. Smooth barked trees are less likely to catch fire than those with rough bark. No tree should be able to fall on the building.

In the outer zone, small-sized natural fuels (such as leaf litter, bark, sticks, tussocks and some shrubs) should be removed and larger fuels (trees and shrubs) should be cut back to reduce the intensity of an approaching bushfire.

Natural fuels, both on the ground and between the ground and any larger trees, should be reduced by selective removal of vegetation, both horizontally and vertically, followed by ongoing maintenance.

In the outer zone:

- Retain established trees to trap embers and reduce wind speeds.
- Selectively remove small trees and shrubs to create clumps (rather than a continuous wall of trees) separated by open areas.
- Remove the vegetation between the ground and the bottom of the tree canopy, to a height of at least two metres.
- Minimise fine fuels at ground level, such as grasses and leaf litter.

The existence and adequacy of defendable spaces on individual lots adjoining the reserve was not surveyed as part of this BMP. Nevertheless, it must be stressed that establishment and maintenance of defendable spaces around residences bordering the reserve is essential for bushfire protection. Clarence City Council and individual landowners need to co-operate to provide and maintain adequate bushfire protection.

Some of the lots in the Glebe Hill Estate, as well as some lots bordering the reserve do not have enough room on the lot for an adequate inner zone. Part of the zone will need to be maintained in the reserve. Future subdivisions adjoining the reserve should allow for inner zones to be fully located within subdivisions so that their maintenance does not become an expense for the whole community.

Currently there are three defendable spaces within the reserve managed as inner zones. These range from 6m up to 10m, with a fourth recommended in VMU 4.

The areas being maintained as inner zones in the reserve are shown on figure 9.

The timber fence constructed along the eastern reserve boundary is a major fire hazard within the inner zone as some building envelopes are very close. The bushfire risk to adjoining dwellings could be substantially reduced by replacing the timber fence with a solid steel fence. This should be a relatively easy task as the existing timber fence is supported on steel posts.

3.1.7 Bushfire Detection and Suppression

Glebe Hill Reserve is visible from surrounding properties and roads, and it is likely that any fires would be promptly reported. Fires are most likely to start in the reserve itself or on neighbouring properties, though large fires in bushland on private property to the north could run or spot into the reserve.

Most of the reserve (except the recently acquired VMU 13) has effective internal access which should allow the TFS to rapidly reach and contain fires within the reserve, provided they are familiar with the location of access points and fire trails. The private road located on 53 Minno Street, Howrah provides access to VMU 13; however being narrow and long the TFS may not use this access in event of bushfire.

3.2 Weeds

Environmental weeds occur within the reserve, however the reserve is free of major weed infestations with only localised or scattered occurrences typical of urban fringe bushland (see figure 8). Ongoing monitoring and maintenance is required to keep the weed populations at current levels.

Several weed species found in the reserve are classified as declared weeds under the Tasmanian *Weed Management Act 1999* and/or Weeds of National Significance (WONS). Where possible these weeds will be targeted as a priority to prevent their further spread.

Blackberry *(Rubus fruticosus),* boneseed (*Chrysanthemoides monilifera)* and Montpellier broom *(Genista monspessulana)* are present declared weeds and WONS.

Declared weeds in the reserve that are not listed as WONS include slender thistle *(Carduus pycnocephalus),* fennel *(Foeniculum vulgare)* and Texas needle grass *(Nassella leucotricha).*

Other environmental weeds present within the reserve are:

Tree aeonium *(Aeonium arboreum),* bluebell creeper *(Billardiera heterophylla),* red valerian *(Centranthus ruber),* tree lucerne *(Chamaecytisus palmensis),* mirror bush *(Coprosma repens),* cotoneaster *(Cotoneaster sp.),* fuschia *(Fushcia magellanica),* garden geranium *(Geranium sp.),* holly *(Ilex aquifolium),* radiata pine *(Pinus radiata),* sweet pittosporum *(Pittosporum undulatum),* himalayan firethorn *(Pyracantha sp.)* and sweet briar *(Rosa rubiginosa).*

Boneseed *(Chrysanthemoides monilifera)* has the potential to spread following bushfires. Control measures will need to be implemented following any bushfires or planned burns in the reserve.

Bracken fern (*Pteridium esculentum*), although a native plant, is a concern in the reserve as it has the potential to dominate some sections of the reserve.

It is a greater bushfire hazard than most other understorey species and at high density can exclude other native species. As bracken recovers faster than other understorey species after bushfire, it can quickly dominate areas that are burnt frequently.

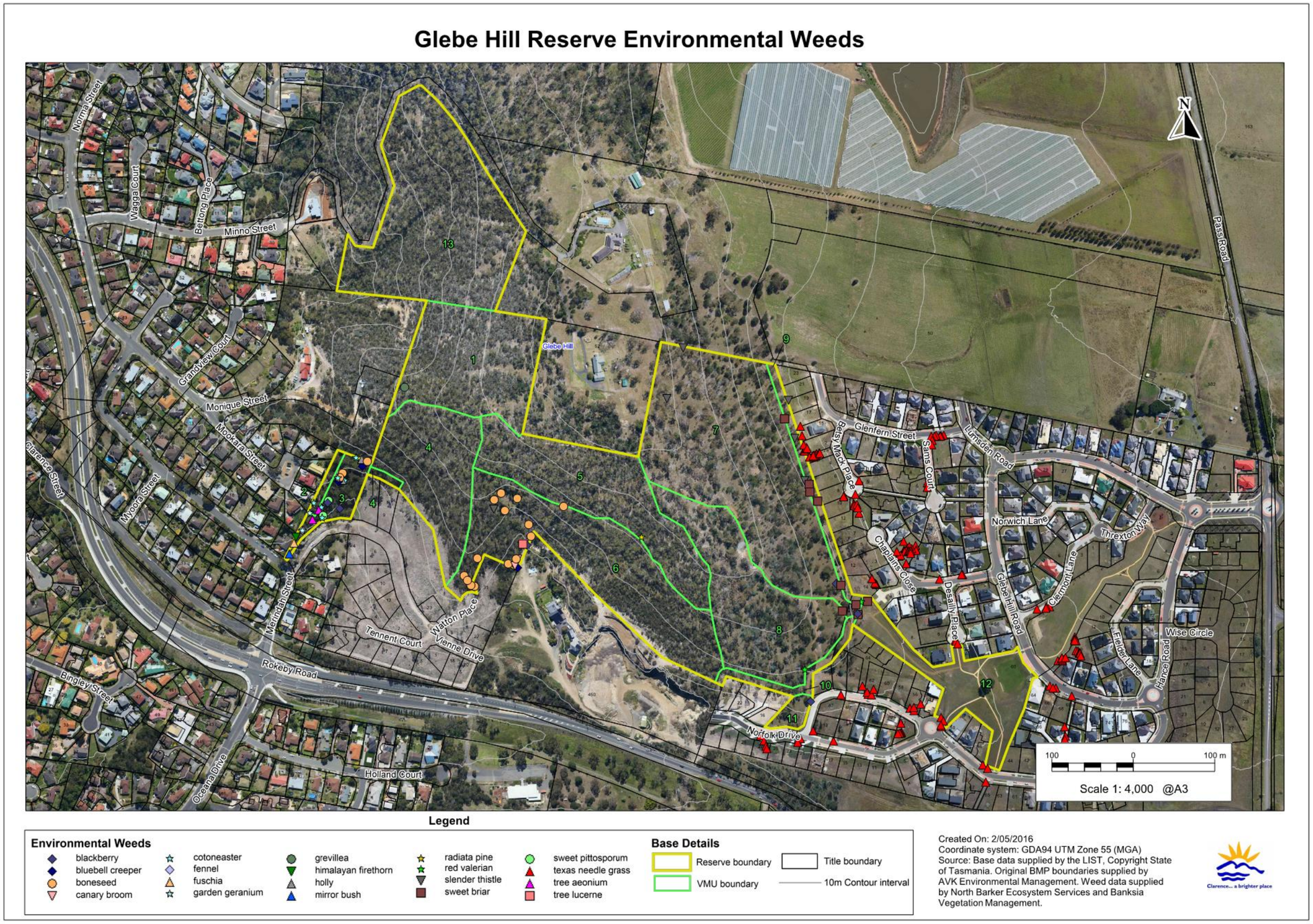
It also builds up an elevated fuel load in 2 to 3 years, thus making burning an ineffective method of hazard reduction. Bracken control is therefore an important component of bushfire management in the reserve.

Although she oak (*Allocasuarina verticillata*) is an indigenous species, it is capable of dominating suitable sites and forming monocultures that severely reduce understory species diversity as well as well as killing canopy species and preventing their regeneration. The resulting dense thickets are also a bushfire hazard. This currently appears to be happening in parts of the reserve and the density of she oak should be controlled to protect the biodiversity in the reserve.

As bracken and she oak are native species any removal will require the written approval of the Minister responsible for the Nature Conservation Act.

The most heavily weed-affected area is VMU 3. Here the bushland backs onto residential allotments in Mookara Street, Howrah where garden waste has been historically dumped within the reserve. Not only does this introduce weeds into the reserve but increases fuel loads close to dwellings.

Figure 8 – Environmental Weeds in the Reserve



3.3 Stakeholder and Community Concerns

At the commencement of the project Clarence City Council sent a letter to all landowners adjoining the reserve and to other stakeholder groups informing them that the BMP was being revised and inviting them to have input into the revised plan for the reserve by sending in a written submission, attending a community "walk and talk" in the reserve, or by contacting the reviewer directly. The community "walk and talk" was held in the reserve on 15 November 2015 and was attended by three community members and a Council representative. In addition, three written comment were received. The main community concerns about bushfire management in the reserve expressed during the walk and talk are summarised in Appendix B along with the Councils response.

4. Plan Implementation

To ensure that the recommendations in this plan are fully implemented, Clarence City Council will ensure that TFS brigades likely to attend bushfires within the reserve are familiar with the plan, and its contents are issued to the TFS.

4.1 Bushfire Risk Reduction Strategy

The overall bushfire risk reduction strategy recommended for the reserve can be summarised as follows:

- Reduce ignitions through prosecution of arsonists, and prompt reporting of fires.
- Upgrade existing access points and fire trails to the standard in the Clarence Bushfire Management Strategy and construct new fire trails to link existing trails and eliminate dead ends. Ensure the TFS are familiar with the location and condition of fire trails in the reserve.
- Ensure that new dwellings adjoining the reserve have BAL-19 separation distances as stated in AS3959 – 2009, and wherever possible the inner zones for these buildings are contained within the lots.
- Replace the existing timber fence on the eastern side of Glebe Hill Reserve between the reserve and Glebe Hill Estate with solid, non-combustible fencing.
- Encourage neighbouring residents to maintain defendable spaces around their homes.
- Carry out strategic planned burning and manual fuel removal to reduce bushfire hazards in the reserve.

4.2 Community Education, Awareness and Involvement

To ensure successful implementation of this BMP it will be necessary to inform key sectors of the community about bushfire management issues in the reserve. This should include surrounding residents and those with special interests in the reserve, or whose activities can affect assets within the reserve. The community education process is detailed in section 5.7 of *Clarence City Council Bushfire Management Strategy for Council Owned and Controlled Land*. This was not implemented during the previous BMP, and has a heavy influence in the effectiveness of this BMP.

In particular, adjoining residents should be advised that dumping garden waste and other rubbish in reserves increases the bushfire hazard and makes firefighting along the bushland/urban interface more difficult and dangerous for fire fighters. It also contributes to the spread of weeds. Residents should also be advised that they are not authorised to remove vegetation in a Council reserve, even if it is recommended in the BMP.

If residents have any concerns about the bushfire hazard in the reserve near their home, they are encouraged to contact Council's Fire and Bushland Vegetation Management Co-ordinator.

4.2.1 Planned Burning

The native plant communities in the reserve are considered dependent on bushfire to maintain their structure and floristics in the long term. Periodic burning will help to maintain diversity in the understorey, and allow bushfire dependent species to germinate and establish. However, there is a need to minimise damage to important habitat elements (such as dead trees, old logs and stumps) during these burns, and to ensure adequate retention of unburnt patches of each forest type to act as refugia for recolonisation of burnt areas.

The approach adopted in this plan is to use planned burning both for asset protection in areas targeted for maximum risk reduction and for habitat management. Areas burnt for habitat management will have the additional benefit of reduced bushfire hazard for a period following each bushfire.

4.2.2 Vegetation Management Units (VMU)

The bushfire management works program in this plan is based on the division of the reserve into vegetation management units (VMUs) (see figure 9). VMUs can be burnt at a frequency, season and intensity that are optimal for the plant communities within each unit or excluded from bushfire if the vegetation does not require burning, or the VMU is being managed by other means. The bushfire management requirements of the vegetation communities within the reserve are given in table 6.

The previous BMP divided the reserve into 12 VMUs based on the vegetation types in the reserve, and the presence of suitable control lines in the form of fire trails and foot tracks. The revised BMP now incorporates 13 VMUs post Councils 2016 acquirement of 50 Minno Street. The revised VMU regime will allow for the implementation of the most appropriate methods for managing bushfire hazard whilst promoting biodiversity.

4.2.3 Planned Fire Regimes

The approach adopted in this plan is to use planned burning for a combination of asset protection in areas targeted for maximum risk reduction and for habitat management.

When possible planned burning operations should be carried out following the seed-setting period of native species, and after the nesting period of the understorey bird species in the reserve. Where possible hollow logs and dead trees should be protected from bushfire due to their fauna habitat value. This can be achieved by using wet lines around the tree or log, or raking fine fuels away from logs or the base of hollow trees, and rapidly extinguishing fires at these points should they occur.

This BMP covers a 5-year period, after which another review is recommended. Burns within the reserve have been scheduled in table 9.

To allow for flexibility in budgeting and planning, and for unfavourable weather, the burns can take place in the year following that recommended in table 9, if required.

If a bushfire burns more than half of a VMU, the whole of the VMU should be considered to have been burnt and the schedule adjusted accordingly.

In order to create a mosaic of native bushland with different bushfire histories, VMUs should generally not be burnt within 2 years of adjoining VMUs.

Figure 9 – Vegetation Management Units in the Reserve

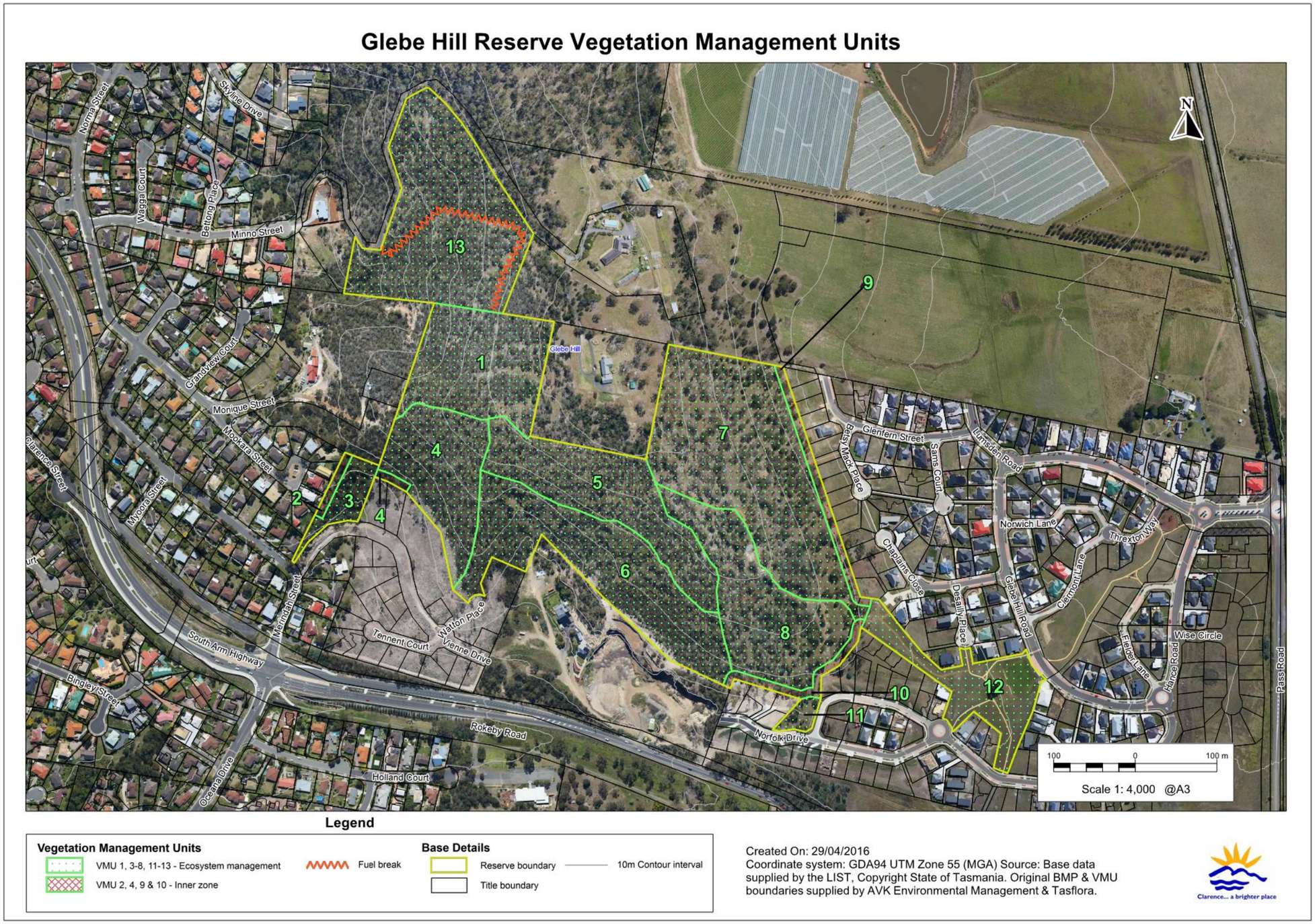


Table 9 – Bushfire management in the reserve

VMU[1]	AREA (ha)	BUSHFIRE MANAGEMENT OBJECTIVES and PRESCRIPTIONS	NOTES and PRECAUTIONS [2, 3]	LAST BURNT	NEXT BURN
1 DVG DRI	2.0	OBJECTIVES: Maintain the structure and floristics of vegetation communities. Maintain skyline visual amenity. PRESCRIPTION: Autumn or spring burn every 15 to 30 years.	Notify Clarence House Vineyard and Meehan's Vineyard in planning stage, and prior to burning. Contains the rare plant species *Eucalyptus risdonii*[3] and *Rytidosperma indutum*[3]. Obtain a permit from DPIPWE Threatened Species Section before burning. Consult DPIPWE Threatened Species Section before burning. Contains DRI[2]. Protect adjacent power lines during burns. Protect adjacent telecommunications tower during burn. Protect perimeter fence during burns.	Estimated 1967	Assess next plan
2 DAM	0.05	OBJECTIVE: Maintain as 6m wide inner zone to protect adjoining dwellings. PRESCRIPTION: See specifications for inner zones in MP 5 in the Best Management Practices Guidelines.		Not known	No burning
3 DAM	0.4	OBJECTIVES: Maintain the structure and floristics of the vegetation community. Reduce the extent and density of weeds. PRESCRIPTION: Autumn or spring burn every 15 to 30 years.	Notify Clarence House Vineyard and Meehan's Vineyard in planning stage, and prior to burning. Protect perimeter fence and nearby dwellings during burns. Large weed population. Pre and post burn weed control required.	2013	Assess next plan

VMU[1]	AREA (ha)	BUSHFIRE MANAGEMENT OBJECTIVES and PRESCRIPTIONS	NOTES and PRECAUTIONS [2, 3]	LAST BURNT	NEXT BURN
4 DAM	1.7	OBJECTIVES: Maintain the structure and floristics of the vegetation community. Promote regeneration of canopy species and limit density of she oaks to 60 % total canopy cover. Maintain visual amenity. Maintain minimal density of weeds. Maintain as 10m inner zone behind 7 & 9 Vienne Drive. PRESCRIPTION: Autumn or spring burn every 15 to 30 years. See specifications for inner zones in MP 5 in the Best Management Practices Guidelines.	Notify Clarence House Vineyard and Meehan's Vineyard in planning stage, and prior to burning. Contains the rare plant species *Eucalyptus risdonii*[3] and *Rytidosperma indutum*[3]. Obtain a permit from DPIPWE Threatened Species Section before burning. Protect adjoining property during burns. Protect perimeter fence during burns.	Not known	2022
5 DAM DVG	2.0	OBJECTIVES: Maintain the structure and floristics of the vegetation community. Maintain visual amenity. Reduce the extent and density of weeds. PRESCRIPTION: Autumn burn every 15 to 30 years.	Notify Clarence House Vineyard and Meehan's Vineyard in planning stage, and prior to burning. Contains the rare plant species *Eucalyptus risdonii*[3] and *Rytidosperma indutum*[3]. Obtain a permit from DPIPWE Threatened Species Section before burning. Protect adjoining property during burns.	2015	Assess next plan
6 DAM	2.9	OBJECTIVES: Maintain the structure and floristics of the vegetation community. Promote regeneration of canopy species and limit density of she oaks to 60 % total canopy cover. Maintain visual amenity. Reduce the extent and density of weeds, particularly boneseed. PRESCRIPTION: Autumn or spring burn every 15 to 30 years.	Notify Clarence House Vineyard and Meehan's Vineyard in planning stage, and prior to burning. Contains the rare plant species *Rytidosperma indutum*[3]. Obtain a permit from DPIPWE Threatened Species Section before burning. Protect adjoining property during burns. Protect perimeter fence during burns. Protect remnants of old hut site during burns.	Not known	Assess next plan

VMU[1]	AREA (ha)	BUSHFIRE MANAGEMENT OBJECTIVES and PRESCRIPTIONS	NOTES and PRECAUTIONS [2, 3]	LAST BURNT	NEXT BURN
7 DVG	4.2	OBJECTIVES: Maintain as open grassy woodland. Maintain visual amenity. Reduce the extent and density of weeds. PRESCRIPTION: Autumn or spring burn every 15 to 30 years.	Notify Clarence House Vineyard and Meehan's Vineyard in planning stage, and prior to burning. Burn following the end of the bird nesting/seed setting period. Protect adjoining property during burns. Protect perimeter fence during burns.	Not known	2022
8 DAM DVG	2.3	OBJECTIVES: Maintain the structure and floristics of the vegetation community. Promote regeneration of canopy species and limit density of she oaks to 60 % total canopy cover. Maintain visual amenity. Reduce the extent and density of weeds. PRESCRIPTION: Autumn or spring burn every 15 to 30 years.	Notify Clarence House Vineyard and Meehan's Vineyard in planning stage, and prior to burning. Burn following the end of the bird nesting/seed setting period. Protect adjoining property during burns. Protect perimeter fence during burns.	Not known	Assess next plan
9 DVG	0.4	OBJECTIVE: Maintain as 10m inner zone to protect adjoining dwellings. PRESCRIPTION: See specifications for inner zones in MP 5 in the Best Management Practices Guidelines.	Notify Clarence House Vineyard and Meehan's Vineyard prior to burning.	Not known	Heap burning only
10 DAM DVG	0.3	OBJECTIVE: Maintain as 10m inner zone to protect adjoining dwellings. PRESCRIPTION: See specifications for inner zones in MP 5 in the Best Management Practices Guidelines.	Notify Clarence House Vineyard and Meehan's Vineyard prior to burning.	Not known	Heap burning only
11 GRP	0.1	OBJECTIVEs: Maintain as rockplate grassland. Reduce the extent and density of weeds. PRESCRIPTION: Burn every 3 to 5 years in autumn.	Notify Clarence House Vineyard and Meehan's Vineyard in planning stage, and prior to burning.	2013	2017
12 FUM	1.3	OBJECTIVE: Maintain as managed grassland PRESCRIPTION: No burning for the duration of this plan.		Not known	No burning

VMU[1]	AREA (ha)	BUSHFIRE MANAGEMENT OBJECTIVES and PRESCRIPTIONS	NOTES and PRECAUTIONS [2, 3]	LAST BURNT	NEXT BURN
13 DRI DVG	3.6	OBJECTIVE: Maintain the structure and floristics of vegetation communities. PRESCRIPTION: Autumn or spring burn every 15 to 30 years.	Notify Clarence House Vineyard and Meehan's Vineyard in planning stage, and prior to burning. Contains the rare plant species, *Eucalyptus risdonii*[3] and *Rytidosperma indutum*[3]. Obtain a permit from DPIPWE Threatened Species Section before burning. Consult DPIPWE Threatened Species Section before burning. Contains DRI[2]. Protect adjoining property during burns. Protect power lines during burns. Protect perimeter fence during burns. **Caution: Low powerlines within VMU.**	Estimated 1967	Assess next plan

[1] TASVEG 3.0 codes of vegetation types in the unit.

[2] *Nature Conservation Act 2002*

[3] Tasmanian *Threatened Species Protection Act* 1995

4.2.4 Burn Preparation and Supervision

The VMUs scheduled for burning should be inspected some months before the proposed burn to check that the scheduling and burning prescriptions are still appropriate and to determine whether weeds are present that require treatment before burning. Where treatment of weeds is required, it should be carried out at least 3 months in advance of the burn to allow treated weeds to desiccate. Disturbance of the treated infestations (by mechanical means, slashing or burning) within this period may reduce the herbicide's effectiveness, and regeneration from rootstock is likely to occur. Terms within the enacted Conservation Covenants need to be consulted prior to herbicide application.

Successful implementation of the planned burns in this plan requires trained personnel and special equipment. Each planned burn recommended in this plan must have a burn plan prepared by someone who has completed the Forestry Tasmania "Develop Prescribed Burning Plans" course or equivalent. All persons engaged in planned burning or firefighting in the reserve must have completed the Forestry Tasmania "Forest Fire Fighting" course or equivalent.

If the planned burning is contracted out, the contractor must be able to meet the required training accreditation in the previous paragraph, as well as provide evidence of experience in carrying out broadscale low intensity fuel reduction burns.

4.3 Bushland Management

Bushfire can provide the disturbance that many introduced species need to spread to new areas, as well as to expand existing populations. Other bushfire management activities, such as construction and maintenance of fire trails, and establishment of fuel breaks during bushfire suppression, can also provide opportunities for weeds to colonise native bushland. Fire can also be used as a tool to manage weed infestations. Some species are best controlled by herbicide application to regrowth following a bushfire. Other species can sometimes be controlled by the application of a fire regime that stimulates germination of seed but kills the regrowth before it has been able to flower.

The planned burning recommended in this plan can assist a weed control program, and it is recommended that weed control activities be integrated with the management burning program in this plan. MP 8 in *Clarence City Council Bushfire Management Strategy - Best Management Practice Guidelines* includes guidelines for integrating weed management with management burning, and for minimising the risk of weed invasion following bushfires. These guidelines should ensure that fires in the reserve do not worsen existing weed problems, or cause weeds to spread.

It should be noted that bush regeneration and ornamental plantings in previously cleared areas might increase the bushfire hazard.

Any proposals for bush regeneration in the reserve should be considered in the context of this BMP, and Councils Fire and Bushland Management consulted to ensure that they do not compromise bushfire protection measures such as defendable spaces proposed in this plan.

In general, plantings are not allowed:

- on inner and outer zones around assets at risk
- on fuel breaks
- Within 2m of the edge of fire trails.

5. Bushfire Management Recommendations

The management actions recommended to meet the objectives of the plan in section 1.3 have been summarised and classified using the following criteria:

URGENT - Actions required to reduce a very high risk to life or property.

ESSENTIAL - Actions required to improve safety, or inadequate bushfire protection measures in high risk areas.

- Actions that are essential for control & suppression of wildfires, and/or conservation of threatened species.

RECOMMENDED - Actions required to improve inadequate bushfire protection measures in moderate risk areas.

- Actions required to ensure on-going effective bushfire management, or conservation of biodiversity.

ROUTINE - Maintenance of bushfire control resources and protection measures.

Urgent actions need to be undertaken as soon as possible.

Where applicable the desirable timing of other actions has been coded as follows:

A - Inspect and maintain annually, or as specified in the relevant MP

A/S - Timing as specified in the bushfire management plan

1, 2, etc. - Carry out action within the time period specified (years)

1A, 2A etc. - Construct within the next 1, 2 etc. years and then inspect and maintain annually, or as specified in the relevant MP.

Management actions have been linked to generic MP's in *Clarence City Council Bushfire Management Strategy – Best Management Practice Guidelines*. Performance indicators have also been provided for each management action. These should be used to determine if the specific objectives of this BMP have been achieved. They should be monitored when the plan is revised every 5 years. Where performance targets are not being achieved, a review of the relevant portion of the plan should be undertaken.

5.1 Management Action Summary

RECOMMENDED ACTION	OBJECTIVE (section 1.3)	PRIORITY	RESPONSIBILITY	PERFORMANCE INDICATORS
1) Develop/implement a community education program, including an information sheet, as outlined in section 5.7 of the Bushfire Management Strategy, to inform the community of bushfire management issues in the reserve and to ask them to report any smoke, or suspicious activity, on days of total fire bans to the police.	1, 2	REC - 1	Clarence City Council Fire and Bushland Management Tasmania Fire Service	Educational material distributed to adjoining residents, reserve users and other interest groups. Reduction in the incidence of illegal fires on and around the reserve.
2) Implement the bushfire protection measures in section 2.4 for protection of assets in and around the reserve.	1, 4	E	Clarence City Council Private landowners	Bushfire protection measures for adjoining dwellings implemented and maintained. No assets lost to fires originating in, or moving through, the reserve.
3) Erect appropriate signs on tracks and roads to warn reserve users of planned burns.	1	E	Clarence City Council Fire and Bushland Management	No users of the reserve injured by planned burns.
4) Implement the recovery procedures in MP 12 following planned burns and bushfires.	1, 5, 6	E	Clarence City Council Fire and Bushland Management Tasmania Fire Service	Post-fire recovery carried out after planned burns and bushfires. No users of the reserve injured by fires or the effects of fires.
5) Carry out fire trail repairs and maintenance listed in table 9.	2, 6	E – 2	Clarence City Council Fire and Bushland Management	Fire trail repair and upgrade works listed in table 9 completed.
6) Construct new fire trails as detailed in section table 8, section 3.1.3 and shown on figure 7.	2, 6	E - 3	Clarence City Council Fire and Bushland Management	New fire trails constructed to required standards.

RECOMMENDED ACTION	OBJECTIVE (section 1.3)	PRIORITY	RESPONSIBILITY	PERFORMANCE INDICATORS
7) Ensure all fire trails shown on figure 7 are inspected and maintained in a trafficable condition at all times according to table 8 and MP 2.	2, 4	ROU - A	Clarence City Council Fire and Bushland Management	Vehicle access routes inspected as required in MP 2, and maintained in a trafficable condition for fire service vehicles.
8) Inspect gates regularly to ensure that locks are in place and functioning. Ensure that the local Tasmania Fire Service Brigade and other emergency services have keys to the gates on trails giving access to the reserve.	2	ROU - A	Clarence City Council Fire and Bushland Management	No unauthorised use of fire trails in the reserve. Security lock system implemented, keys distributed to Tasmania Fire Service brigades and other emergency services.
9) Conduct a familiarisation tour of the reserve for local TFS brigades upon request.	1, 2, 4	ROU - A	Clarence City Council Fire and Bushland Management Tasmania Fire Service	Local TFS brigades familiar with bushfire management assets in the reserve.
10) Carry out planned burning according to the schedule in table 9 using the procedure in MP 7.	2, 3, 4, 5	E - A/S	Clarence City Council Fire and Bushland Management	Mosaic of burnt VMUs maintained. No decline in the structure and floristics of the native vegetation in the reserve.
11) Consult with the DPIPWE Threatened Species Section when carrying out bushfire management activities that may affect populations of threatened flora or fauna.	3	E	Clarence City Council Fire and Bushland Management DPIPWE Threatened Species Section	All planned burns carried out according to the requirements of threatened flora and fauna. No decline in the populations of threatened or rare flora and fauna due to fire.
12) Avoid burning the whole of any population of a threatened or rare plant species in a single fire.	3	E	Clarence City Council Fire and Bushland Management Tasmania Fire Service	All planned burns carried out according to the requirements of threatened flora and fauna. No decline in the populations of threatened or rare flora and fauna due to bushfire.

RECOMMENDED ACTION	OBJECTIVE (section 1.3)	PRIORITY	RESPONSIBILITY	PERFORMANCE INDICATORS
13) Carry out vegetation monitoring as detailed in section 5.10 of the Bushfire Management Strategy including the recovery of any populations of threatened or rare flora and fauna burnt by bushfires or planned burns.	3, 5	E	Clarence City Council Fire and Bushland Management DPIPWE Threatened Species Section	Vegetation monitoring plots set up and surveyed and data on the population size and extent of threatened species recorded before planned burns. Regular follow-up surveys undertaken.
14) Treat any weeds in areas to be burnt under this BMP according to MP 8. Ensure follow-up weeding is carried out after planned burns and bushfires.	3, 5	REC – A/S	Clarence City Council Landcare Groups	Pre- and post-fire weed control carried out in any weed infested VMUs burnt under this plan. Minimal coppicing or regrowth of weeds from treated rootstock. All declared noxious weeds removed, reduction in extent of other weeds.
15) Regularly revise burning schedules and prescriptions to ensure they incorporate the most recent information on the fire ecology of flora, fauna and plant communities of conservation value in the reserve.	3, 5	REC - A/S	Clarence City Council Fire and Bushland Management	BMP revised every 5 years.
16) Coordinate bushfire management, weed management and other management activities, such as bush regeneration, using the procedure in MP 9.	3, 5	REC - A	Clarence City Council Landcare Groups	Meetings held as recommended in MP9 and the outcomes recorded.
17) Ensure all personnel engaged in planned burning activities in the reserve have the appropriate level of training and equipment as outlined in MP 7.	1, 2	E	Clarence City Council Fire and Bushland Management	All personnel are able to demonstrate the required level of training.

RECOMMENDED ACTION	OBJECTIVE (section 1.3)	PRIORITY	RESPONSIBILITY	PERFORMANCE INDICATORS
18) Record bushfire management activities and bushfires using the procedures in MPs 10 and 11.	3, 4, 5	REC - A/S	Clarence City Council Fire and Bushland Management	Records maintained of all bushfire management activities.

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Appendix A

Implementation of the previous BMP

The following codes have been used in assessing implementation of the previous Bushfire Management Plan for Glebe Hill Reserve:

IS – Implemented successfully

PI – Partly implemented

NI – Not implemented

NA – Not applicable (to be implemented at a later time or dependent on another incident or action).

RECOMMENDED ACTION	CODE	COMMENT
1) Develop a community education program, including an information sheet, as outlined in section 5.7 of the Bushfire Management Strategy, to inform the community of bushfire management issues in the reserve and to ask them to report any smoke, or suspicious activity, on days of total fire bans to the police.	PI	A formalised community education program has not been designed. Public exhibition of Councils *Bushfire Management Strategy for Council Owned and Controlled Land*, *Bushfire Management Strategy Best Management Practice Guidelines* and the previous BMP for the reserve has taken place. Various TFS community bushfire preparation events have been attended and represented by Council Fire and Bushland Management throughout municipality.
2) Implement the bushfire protection measures in section 2.4 for protection of assets in and around the reserve.	PI	Most measures in section 2.4 have been undertaken. Some defendable spaces within the reserve need maintenance. See section 3.1.6 and table 7 in revised BMP for revises defendable space specifications.
3) Erect appropriate signs on tracks and roads to warn reserve users of planned burns.	IS	All signage erected prior to planned burns taking place. No users of reserve were injured during planned burns.
4) Implement the recovery procedures in MP 12 following planned burns and wildfires.	IS	Post fire recovery has been carried out after planned burns. No wild fires impacted reserve for duration of previous BMP.
5) Carry out fire trail repairs and maintenance listed in table 8.	PI	Some repairs and maintenance listed in the previous BMP has not been undertaken as they were not on Council managed land. The approach taken in the revised table 8 is based on present situational circumstances (at time of review). It is expected at the 2021 review these will alter again, as previously undeveloped private property becomes developed.

RECOMMENDED ACTION	CODE	COMMENT
6) Construct new fire trails as detailed in section 3.1.2 and shown on figure 6.	PI	Fire trail establishment has been assessed at an operational level throughout the previous BMP. The revised operational requirements can be found in table 8 and section 3.1.3
7) Ensure all fire trails shown on figure 6 are inspected and maintained in a trafficable condition at all times according to table 8 and MP 2, and fire trail signs are in place and legible.	PI	Fire trails in good condition and meet current PWS usage standards. On-going monitoring occurring. Fire trail signs not erected.
8) Inspect gates regularly to ensure that locks are in place and functioning. Ensure that the local Tasmania Fire Service Brigade and other emergency services have keys to the gates on trails giving access to the reserve.	IS	Gates/locks regularly audited. TFS have keys to Council locks within reserve.
9) Conduct a familiarisation tour of the reserve for local TFS brigades prior to the start of the fire permit period each year.	NI	Familiarisation tour not taken out. TFS attend periodic incidents within reserve. Familiarisation tour to be offered upon request from TFS.
10) Carry out planned burning according to the schedule in table 10 using the procedure in MP 7.	IS	All scheduled planned burns from previous plan carried out successfully.
11) Consult with the DPIPWE Threatened Species Section when carrying out bushfire management activities that may affect populations of threatened flora or fauna.	IS	DPIPWE specialists contacted and relevant permits acquired and stored at commencement of each planned burning season.
12) Avoid burning the whole of any population of a threatened or rare plant species in a single fire.	IS	Mosaic burning regime for VMUs utilised for annual burning programs. Spot lighting periodically used in VMUs with threatened species.
13) Carry out vegetation monitoring as detailed in section 5.10 of the Bushfire Management Strategy including the recovery of any populations of threatened or rare flora and fauna burnt by wildfires or planned burns.	PI	Whilst no formal vegetation monitoring has been established within the reserve, informal monitoring has been undertaken by Councils Fire and Bushland Management since 2013.
14) Treat any weeds in areas to be burnt under this bushfire management plan according to MP 8. Ensure follow-up weeding is carried out after planned burns and wildfires.	IS	Pre and post planned burn weed maintenance has occurred, and will be ongoing throughout duration of future BMPs.

RECOMMENDED ACTION	CODE	COMMENT
15) Regularly revise burning schedules and prescriptions to ensure they incorporate the most recent information on the fire ecology of flora, fauna and plant communities of conservation value in the reserve.	IS	Regimes and prescriptions have been analysed throughout life of previous BMP. During 2016 review process all VMUs regimes and prescriptions have been evaluated to suit best outcomes for asset protection and ecological burning.
16) Coordinate bushfire management, weed management and other management activities, such as bush regeneration, using the procedure in MP 9.	PI	Coordination of activities has been undertaken. Meetings as recommended in MP9 not carried out.
17) Ensure all personnel engaged in planned burning activities in the reserve have the appropriate level of training and equipment as outlined in the bushfire management policy, and the minimum equipment listed in MP 7.	IS	Extensive training has been delivered to Council Fire and Bushland Crew during term of previous BMP. Ongoing training will be recommended on a needs basis.
18) Record bushfire management activities and wildfires using the procedures in MPs 10 and 11.	IS	Since 2013 Council has developed extensive GIS Fire Management context. All available historic fire management information has been input and updated annually.

Appendix B

Summary of community concerns and comments

in the initial round of community consultation

COMMUNITY CONCERNS and COMMENTS	COUNCILS COMMENT
Comment on spring burning and the impacts to rare flora.	During planning stages of burns Council obtains relevant permits from DPIPWE for threatened flora. If spring burning is prescribed, when possible Council will conduct burns post flowering and seed setting periods.
Comment on continued relationships between Landcare group and Councils Fire and Bushland Management	Councils Fire and Bushland Management support ongoing relationships with local Landcare group, and identify Landcare group as a key stakeholder in the reserves natural values and ongoing management. Ongoing communications will assure Landcare group get accurate unbiased information on bushfire management within the reserve, which will assist in delivering a holistic management approach.
Question on safety to residents in Glebe Hill Estate from bushfires impacting the reserve.	Council encourages residents to access the TFS document *TFS Bushfire Survival Plan 2015-2016.* This document discusses knowing your bushfire risk and when to leave. Councils Fire and Bushland Management annually maintain defendable spaces within the reserve to TFS standards.
Question if the Conservation Covenant for 50 Minno Street will be transferred to Council?	Yes, the Conservation has been transferred to Council. Councils Fire and Bushland Management has been in discussions with DPIPWE during 2016 on impacts to fire management operations and relevant approvals outlined in Covenant.
Question if recently acquired Council land (formerly 50 Minno Street) will be included in revised BMP. In particular fire break establishment.	Yes, this section of land is referenced as VMU 13 within the revised BMP. Fire break and fire trail established has been recommending pending approval from DPIPWE as stated in relevant Conservation Covenants.
Comment that Conservation Covenant should be taken into consideration with Council Management plans to assure no conflicts.	During 2016 Councils Fire and Bushland Management have been in discussions with DPIPWE regarding recommended works within reviewed BMP, and relations to Conservation Covenants. DPIPWE to provide relevant documentation/permits when appropriate.
Comment on dry 2015 winter, creating a higher fire threat for upcoming bushfire season.	Acknowledge and agree.
Comment on positive work/contributions Councils Fire and Bushland Management have had within reserve during previous BMP.	Acknowledge and thank for productive feedback.

COMMUNITY CONCERNS and COMMENTS	COUNCILS COMMENT
Comment on need to remove residue left from TasNetworks contractors clearing vegetation beneath transmission lines in previously private land now Councils (53 Minno Street).	Council Fire and Bushland Management are investigating best means of removal as at April 2016.
Comment requesting defendable spaces within reserve to be greater extents.	Councils agrees with comment, during 2015 Council re-established some defendable spaces within reserve. Further recommendations have been included within the reviewed BMP.
Comment on long grass in defendable spaces within reserve and trees coming up to back fences.	During 2015 Council re-established some defendable spaces within reserve. Further recommendations have been included within the reviewed BMP. Defendable spaces are slashed annually in Councils vegetation slashing program. Council encourages residents to notify Council with concerns during spring growth periods, so Council can action.
Comment on materials used for fencing in residential areas that back on to reserve. Particularly compliance from Council signing off on timber paling fences when other materials have been mentioned in the Glebe Hill Development Plan.	Having checked Council's records all of the dwellings except 8 Betsy Mack Place were substantial designed and or approved prior to the commencement of Bushfire Standards dated 28 Nov 2012. A colorbond fence has been erected at 8 Betsy Mack Place which complies with Glebe Hill Development Plan.