

Clarence City Council

Bushfire Management Plan

Natone Hill Bush Park

Lindisfarne

Revised
January 2017
Clarence City Council

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1. Introduction

This Bushfire Management Plan (BMP) is a revision and expansion of the previous BMP for Natone Hill Bush Park prepared by AVK Environmental Management and North Barker Ecosystem Services, and will operate for a period of 5 years after which another 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 park. 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 the park 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 park, and minimising the risk of injury or damage to assets in and surrounding the park.

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 park
- Assist in the removal of weeds and the regeneration of degraded bushland.

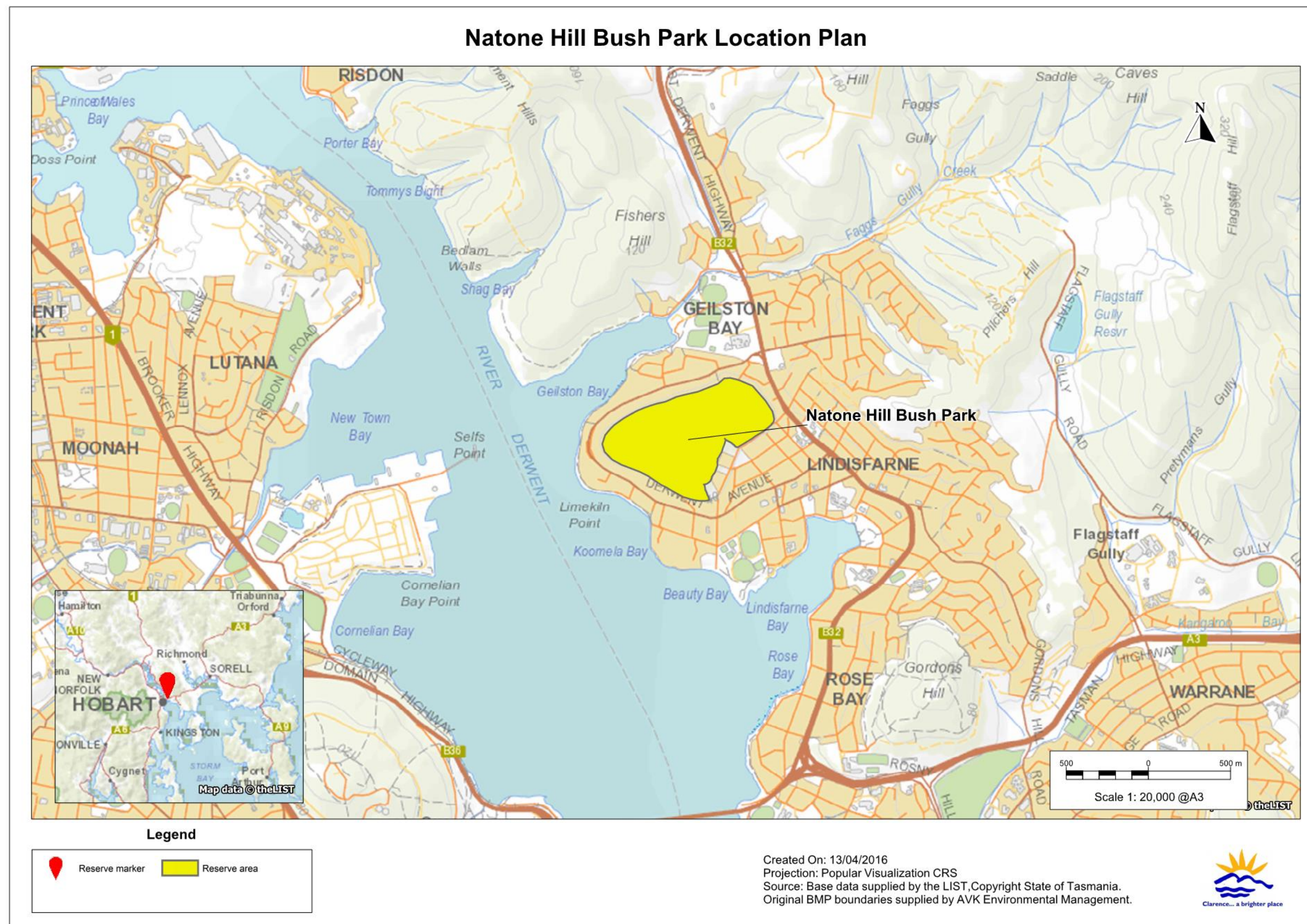
1.2 Location and Description

The Natone Hill Bush Park is located on a peninsula between Geilston Bay (north) and Lindisfarne Bay (south) in the suburb of Lindisfarne (see figure 1). The park is approximately 42^{ha} in size, roughly circular in shape, and located on a prominent round hill rising to 129m above sea level. The park is part of a "scenic rim" of low tree covered hills on the foreshores of the Derwent River that provides a high level of visual amenity along the main "tourist" route of the Tasman Highway, and contributes significantly to the scenic appeal of the Hobart/Clarence region.

The park is encircled by residential development and experiences a high level of recreational use, particularly on the fire trail/walking track around the perimeter of the park.

Natone Hill Bush Park has been mapped as a bushfire-prone area under the *Clarence Interim Planning Scheme 2015*. Any future developments within or adjacent may require a Bushfire Risk Assessment and a Bushfire Hazard Management Plan.

Figure 1 - Location of the Park



1.2.1 Geology and Soils

The geology of the park consists of mudstones and/or siltstones of Permian origin with fossiliferous quartz siltstones and “Risdon” sandstones under the upper 90% of the park, and older “Malbina” formation quartz sandstone and siltstones on the lower 10% (de Gryse, 1990).

Soils in the park consist of shallow podzolic “mudstone” soils with a texture varying from sandy loam to silty clay loam (Kearon, 1993). This soil type is susceptible to sheet, rill, gully and tunnel erosion. Siltation of adjoining waterways following erosion of frequently burned areas was noted by Wood (1988).

1.2.2 Vegetation

The vegetation communities in the park are shown in figure 2. Vegetation types and community boundaries within the park are based on TASVEG 3.0 mapping, modified where required following a survey of the park. Vegetation community boundaries outside the park have not been checked for accuracy but are shown to give an indication of the surrounding vegetation.

The dominant TASVEG 3.0 community is *Eucalyptus amygdalina* forest on mudstone (DAM). Aggregates of *Eucalyptus globulus* dry forest and woodland (DGL), *Eucalyptus risdonii* forest and woodland (DRI) and *Eucalyptus viminalis* grassy forest and woodland (DVG) are present within the park.

Eucalyptus globulus dry forest and woodland (DGL) and *Eucalyptus risdonii* forest and woodland (DRI) are listed as threatened native vegetation communities under the *Nature Conservation Act 2002*.

The *Eucalypt* component of the park consists of four main age classes, all displaying signs of frequent fire disturbance. Burnt out butts are common within mature components, the regen component showing multiple coppicing events. Epicormic growth is evident in VMU 1 resulting from the planned burn during 2013. In general, the *Eucalypt* component is typical of dry sclerophyll forest with frequent fire intervals.

Gumleaf skeletoniser (*Uraba lugens*) is mildly present within the *Eucalypt* regeneration on the upper section of the northern facing slope. 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).

Historical grazing and frequent burning of the park is likely to have resulted in the loss of some species.

Bull oak (*Allocasuarina littoralis*) and silver wattle (*Acacia dealbata*) occur in extensive patches, sagg/mat rush (*Lomandra longifolia*) and extensive areas of flag iris (*Diplarrena moraea*) are common, along with a range of exotic grasses.

Recent plantings of Risdon peppermint (*Eucalyptus risdonii*) extend beyond the natural range of the species at this site. The previous BMP noted no evidence of natural recruitment of *Eucalyptus risdonii*, during field work for the review process natural recruitment although sparse is occurring.

1.2.3 Park Usage

Natone Hill Bush Park is an important recreational area for activities such as; walking, bike riding, dog exercising, jogging. The most frequented section of the reserve is the perimeter trail.

The Natone Hill Landcare Group has been actively working within the reserve since 1992.

TasWater and Telstra both have infrastructure within the park.

Figure 2 – Vegetation Types in the Park



1.3 Bushfire Management Objectives

Bushfire management within the Natone Hill Bush Park 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 park
3. Protection and enhancement of the ecological and visual values provided by the park
4. Protection of infrastructure and cultural heritage values within the park
5. Recovery, maintenance and enhancement of vegetation communities and fauna habitat within the park
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.

1.4 Park Management Responsibilities

Management of the park 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 park.

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 bushfire history of the Natone Hill Bush Park is shown on figure 3.

2.1.1 Bushfires

Data supplied by the TFS and Clarence City Council showed that within the duration of the previous BMP the TFS attended six incidents within in the park (see figure 3). All incidents were vegetation fires <1^{ha}, ignition was determined to be malicious for all.

Previous BMPs noted a high incidence of arson and/or “accidental” fires in the park historically. Since the establishment of a full time Council Fire Crew in 2012 there has been a drastic decrease in fire related incidents within the park.

During the BMP review process the former Municipal Fire Control Officer (serving early 1970’s to late 1980’s) was consulted. He confirmed that in approximately 1986, most of Natone Hill was burnt from a relatedly high intensity bushfire. A similar intensity fire burnt most of Natone Hill again in January 2005.

2.1.2 Planned Fires

The planned burn history is shown in figure 4.

During the 5 year period covered by the previous BMP three planned burns were conducted by Council’s Fire and Bushland Management within the park. VMU 1 in 2013, VMU 10 in 2011 and VMU 8 in 2015. The 2016-2021 planned burning schedule for the park is in table 9.

The former Municipal Fire Control Officer (serving early 1970’s to late 1980’s) confirmed that planned burning occurred within the park during 1970 through to 1986. No planned burning was required following the 1986 bushfire. No planned burning was conducted following the January 2005 bushfire until 2013. Planned burning on the northern facing side of the park (VMU 1 and VMU 9) is to be excluded until the *Eucalyptus amygdalina* regen can withstand fire.

In addition VMU 6 and VMU 7 are to have planned burning excluded until planted *Eucalyptus risdonii* can withstand fire. Alternatively patch burning can be utilised.

Figure 3 – Bushfire History / TFS Incidents

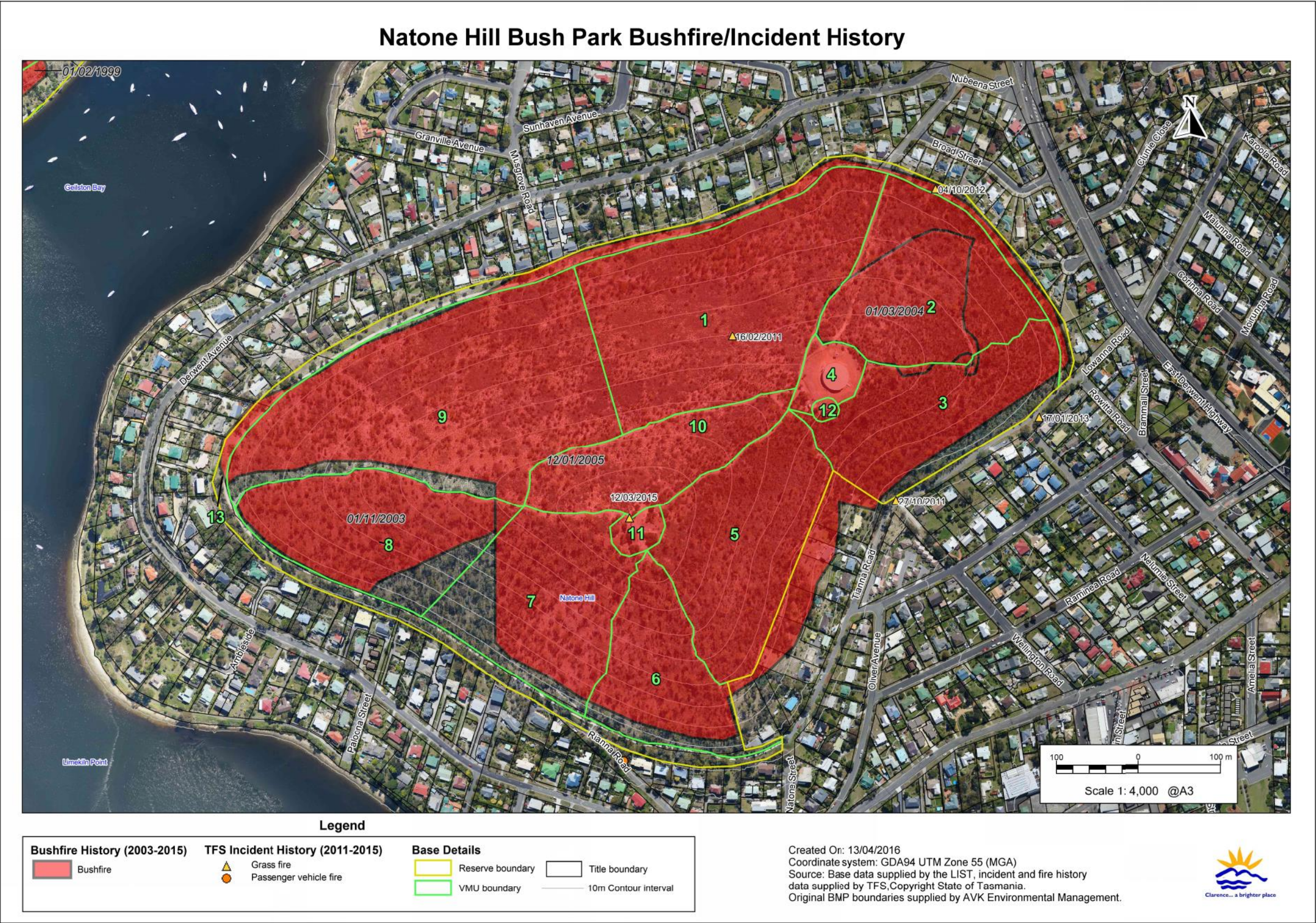
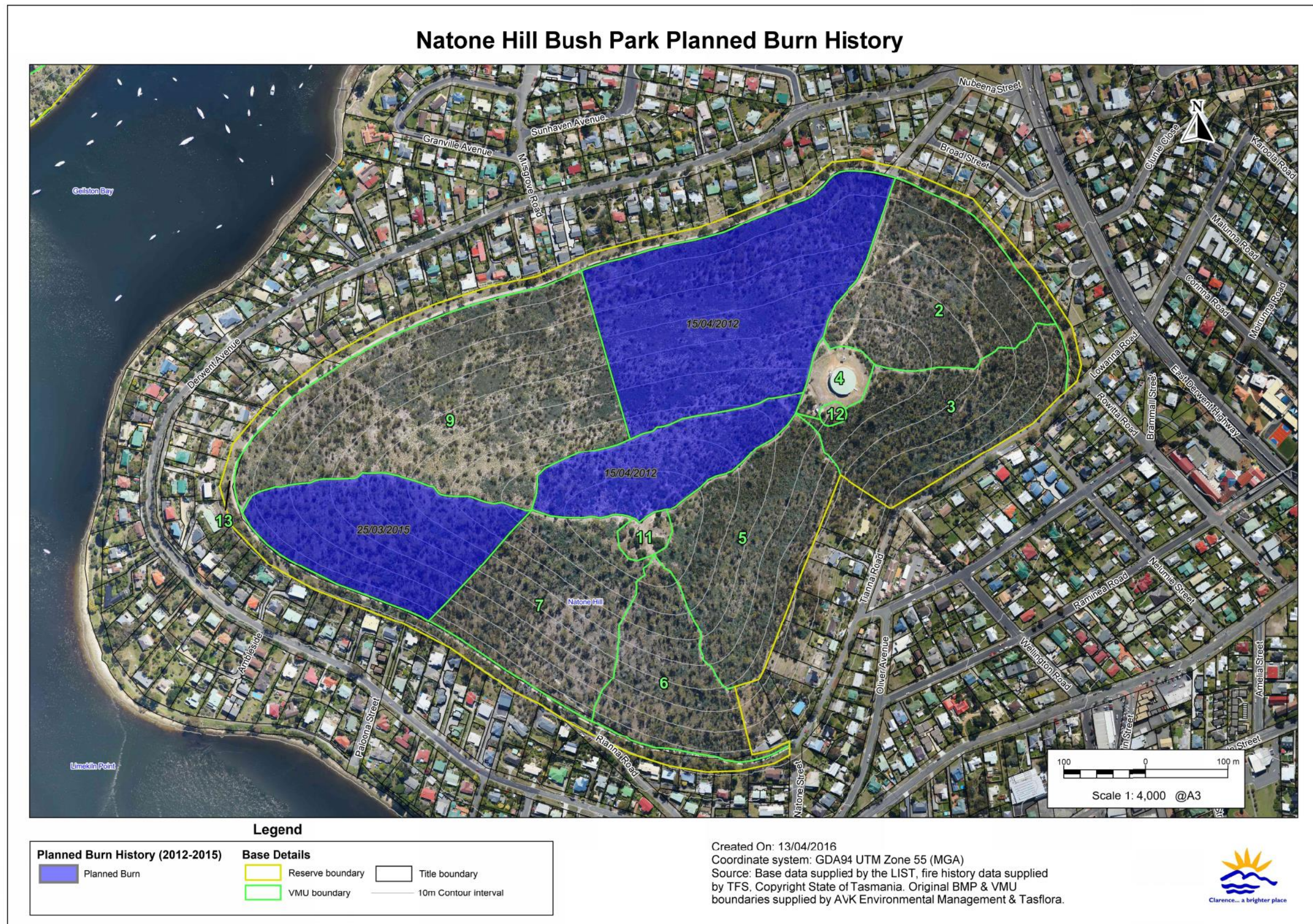


Figure 4 – Planned burn history (2011-2015)



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 ($> 4000 \text{ kW/m}$ 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.

Fire 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 (Marsden-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 0.5 m 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 front.

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) fire 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 fire 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 Natone Hill Bush Park 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 park

FUEL TYPE	FUEL HAZARD CHARACTERISTICS	BUSHFIRE BEHAVIOUR AND CONTROL
Shrubby forest / woodland DGL	<p>Dense surface fuels present in form of leaves, bark, small sticks, moss and decomposing grass. Duff layer average 20mm-40mm depth.</p> <p>Near surface fuels present in form of dead limbs/branches, grasses up to 0.5m with large accumulation of bark at bases of mature <i>Eucalypts</i>.</p> <p>Grass component of the fuel load can build up fuel rapidly after a bushfire.</p> <p>Elevated fuels are the dominant fuel layer, predominantly dead limbs/branches and shrub layer up to 6m.</p> <p>Canopy fuels are present and dense in patches.</p> <p>Dead standing mature <i>Eucalypt</i> present but sparse.</p> <p>General mod-high fuel loadings averaging 8t/ha.</p>	<p>Can burn with moderate to high intensity depending on the degree of fuel accumulation. 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 <i>Eucalypts</i>, particularly old hollow trees 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. Hazard 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 a burn.</p>
Grassy forest / woodland DRI	<p>Near surface and surface fuels present in the form of grasses, leaves and sticks. Branches present, however sparse. Duff layer averaging 30mm depth.</p> <p>Grasses in dense aggregates, but lower in height (0.5m) than in open grassland. Grass component of the fuel load can build up fuel rapidly after fire.</p> <p>Bark fuels only present at bases of mature <i>Eucalypts</i>. Some with burnt butts.</p> <p>Some dead standing <i>Eucalypts</i> present.</p> <p>Average fuel loadings 5-7t/ha.</p>	<p>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 old hollow trees 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. Hazard 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 or two after a burn.</p>

FUEL TYPE	FUEL HAZARD CHARACTERISTICS	BUSHFIRE BEHAVIOUR AND CONTROL
Grassy forest / woodland DAM DVG	<p>Surface fuel loading present in the form of leaves, sticks decomposing cured grasses. Bark and leaf build up at base of <i>Eucalypts</i> will continue to gradually build-up this layer.</p> <p>Near surface fuels present, predominantly grasses up to 1m in dense aggregates.</p> <p>Elevated fuels present in form of dead branches with dense aggregates of standing wattles up to 2.5m.</p> <p>Dead standing <i>Eucalypt</i> sp. stumps present.</p> <p>Coppicing plus natural recruitment of <i>Eucalypt</i> sp. up to 5m, dense in patches.</p> <p>Moderate fuel loadings 5-10t/ha averaging 6t/ha.</p>	<p>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.</p> <p><i>Eucalypt</i> sp. regen cover is dense enough in aggregates combined with elevated fuel layer to sustain crown fire in patches.</p> <p>Mature <i>Eucalypts</i> with burnt butts, 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. Hazard 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 or two after a burn.</p>
Grassy forest / woodland DAM (Southern aspect planned burn 2015)	<p>Surface fuels present in the form of small branches, leaves and cured grass – all sparse with minimal loadings.</p> <p>Near surface fuels very sparse, but present in small aggregates post burn. Dominant fuel loading is <i>Lomandra</i> sp. aggregates up to 0.4m high.</p> <p>Elevated fuels present in form of dead standing burnt understorey sp. in addition to some living understorey sp.</p> <p>Canopy fuels present in for of <i>Eucalyptus amygdalina</i> regen average 10-15m.</p> <p>Standing dead trees present but sparse.</p> <p>Mature component of <i>Eucalypt</i> have historically burnt butts.</p> <p>Grass component of the fuel load will build up rapidly.</p> <p>Average fuel loading at February 2016 <5t/ha.</p>	<p>2015 planned burn has removed majority of fuel loadings. At present surface fuels very limited, currently not capable of sustaining ground fire.</p> <p>Grass fuels can be replenished within a year or two after a burn.</p> <p>Fuel loads too low to sustain a crown fire, however, the <i>Eucalypts</i>, particularly old hollow trees and those with rough bark, could be a source of burning embers which could threaten nearby buildings and help bushfire cross the previously burnt area.</p>

With the exception of VMU 2, VMU 3 and VMU 5 the frequent fire history within the park has made the grassy structure the dominant fuel component within the park. This means that in relatively wet years fuel loads can build up rapidly. It also means that fuel loads will build up quickly following a bushfire, limiting the effectiveness of fuel reduction burning.

Fuel loadings within the park is between <5-10^t/ha. Average fuel loadings within the park are 5-7^t/ha.

2.3 Bushfire Threat and Risk to Persons

The main bushfire threat to the park is considered to come from fires that start on the north to north-western slopes of the hill on days with northerly to north-westerly winds and very high or greater fire danger ratings. As occurred in 1986 and January 2005, control of these fires may require back burning around the perimeter of the park. As most usage of the park is confined to the walking track around the base of the hill the bushfire risk to persons is considered to be low, however persons near the top of the hill during a bushfire could be at risk as the bushfire is likely to burn rapidly upslope. This risk is mitigated by good access in the reserve for fire fighters and the planned burning program that creates areas with reduced fuels.

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 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 park 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 park. Assets within and surrounding the park that are considered at risk from bushfires are shown in figure 5.

2.4.1 Bushfire Risk to Natural Heritage Assets

The conservation value of the plant communities in the Natone Hill Bush Park is given in table 2. A number of plant species of conservation value occur within the park (see figure 5). These are listed in table 3 along with their response to fire if known.

The *Natural Values Atlas* identifies no verified records of fauna species of conservation significance occurring in the reserve. It does identify potential habitat present within the reserve for the following species: eastern barred bandicoot (*Parameles gunnii*), spotted-tail quoll (*Dasyurus maculatus*), green and gold frog (*Litoria raniformis*), chaostola skipper (*Antipoda chaostola*), tussock skink (*Pseudemoia pagenstecheri*), swift parrot (*Lathamus discolor*), Tasmanian devil (*Sarcophilus*

harrisii), masked owl (*Tyto novaehollandiae*), forty-spotted pardalote (*Paradalotus quadragintus*) and grey goshawk (*Accipiter novaehollandiae*).

Table 2 – Conservation values of native plant communities

TASVEG 3.0 CODE	EQUIVALENT FLORISTIC COMMUNITY ¹	Conservation Status ²
DAM	DRY-gAMmud Grassy <i>E. amygdalina</i> forest	Not threatened
DGL	DRY-gGLOB Grassy <i>E. globulus</i> forest	THREATENED NATIVE COMMUNITY
DRI	DRY-gRIS Grassy <i>E. risdonii</i> forest	THREATENED NATIVE COMMUNITY
DVG	DRY-gVIM Grassy <i>E. viminalis</i> woodland	Not threatened

1. Forest Practices Authority (2005)

2. Nature Conservation Act 2002

Figure 5 - Assets at risk from bushfire

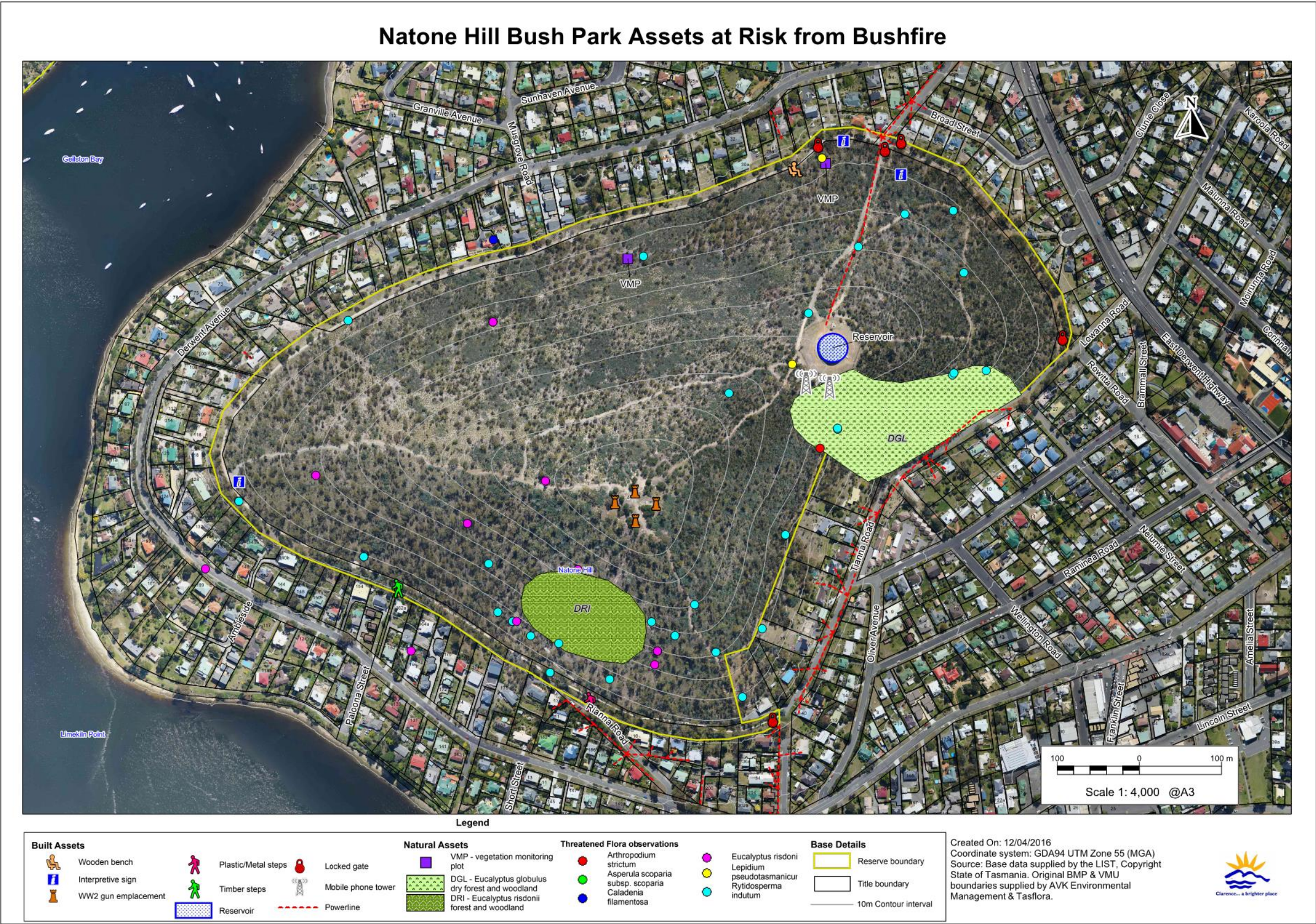


Table 3 - Plant species of conservation value and preferred bushfire management

SPECIES	CONSERVATION STATUS ¹	OCCURRENCE	RESPONSE TO BUSHFIRE AND MANAGEMENT	ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999 (EPBC Act) STATUS
<i>Acacia gunnii</i> Ploughshare wattle	Locally significant	<i>E. amygdalina</i> sedgy woodland north side.	Requires infrequent high intensity burns to crack seed.	Not threatened
<i>Arthropodium strictum</i> Chocolate lily	RARE	Found to be widespread on grassy west facing slopes in previous BMPs.	Noticeable flush of regeneration from seed following bushfire. Plants also regenerate from tuberous rootstock.	Not threatened
<i>Asperula scoparia</i> subsp. <i>Scoparia</i> Prickly woodruff	RARE	One observation in 1993 in VMU 9.	There is currently no information available regarding the ecology and management of this species.	Not threatened
<i>Caladenia filamentosa</i> Daddy longlegs	RARE	Historical observation from 1937 on lower sections of VMU 9.	A listing statement is currently being compiled for this species (2016).	Not threatened
<i>Eucalyptus risdonii</i> Risdon peppermint	RARE	Forms a localised stand on the west facing upper slope.	Regenerates from lignotubers. Repeated fires may weaken trees. Fire promotes seed release and subsequent germination.	Not threatened
<i>Lepidium pseudotasmanicum</i> Shade peppergrass	RARE	Recorded in 1996 near eastern entrance.	Regenerates, sometimes prolifically, from seed after bushfire.	Not threatened

SPECIES	CONSERVATION STATUS ¹	OCCURRENCE	RESPONSE TO BUSHFIRE AND MANAGEMENT	ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999 (EPBC Act) STATUS
<i>Lomandra nana</i> Pale mat-rush	Locally significant	<i>E. viminalis</i> / <i>E. amygdalina</i> grassy woodland east side.	Likely to regenerate from rootstock and establish from seed.	Not threatened
<i>Rytidosperma indutum</i> Tall wallaby grass	RARE	Widespread throughout the open woodland vegetation on all aspects.	Likely to regenerate from rootstock and establish from seed after bushfire.	Not threatened

1. Tasmanian Threatened Species Protection Act 1995

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

Table 4 – Fire attributes of the native vegetation

TASVEG 3.0 CODE	FIRE SENSITIVITY	FLAMMABILITY
DAM	Low	High
DGL	Low	High
DVG	Low	High
DRI	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 fire 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 fire-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 fire-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 fire-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 park indicates that it is highly fire adapted and a single fire will generally not adversely affect biodiversity, though repeated fires 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 park in Pyrke & Marsden-Smedley (2005) indicates that 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 park is from bushfires that burn the whole of the park as well as 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 park 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 park 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.

Planned burning of the native vegetation in the park 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 park. Planned burning in a mosaic pattern along with maintenance of fire trails is the best way to minimise the risk of a bushfire burning the whole of the park again. The bushfire management requirements of the different plant communities/habitats in the park are given in table 5.

These plant communities have been grouped together according to their bushfire management requirements.

Table 5 - Bushfire management requirements of the plant communities in the park

TASVEG 3.0 MAPPING UNITS	BUSHFIRE IMPACTS AND BUSHFIRE MANAGEMENT AIMS
Grassy dry sclerophyll forests and woodlands	
<p>DGL – <i>Eucalyptus globulus</i> dry forest and woodland</p> <p>DAM – <i>Eucalyptus amygdalina</i> forest on mudstone</p> <p>DVG – <i>Eucalyptus viminalis</i> grassy forest and woodland</p> <p>DRI – <i>Eucalyptus risdonii</i> forest and woodland</p>	<p>Infrequently burnt sites develop a dense shrubby understorey. Kangaroo grass (<i>Themeda triandra</i>) can die out after an extended absence of bushfire, or other method of biomass reduction (Lunt & Morgan, 1998).</p> <p>Frequent bushfires (< 5 years) can inhibit tree regeneration and eliminate the shrubby component</p> <p>Sites overlying dolerite and other more fertile soils have markedly more rapid rates of regeneration than low fertility soils derived from mudstone and sandstone.</p> <p>Overfrequent burning regimes in the past within much of forest overlying mudstones has contributed to loss of topsoil and erosion.</p> <p>Extended absence from bushfire can result in build-up of fuel causing hot and damaging burns.</p> <p>A temporal and spatial mosaic-burning pattern would assist with tempering the effects of a devastating bushfire.</p> <p>Optimal bushfire frequency is 5-20 years on fertile sites.</p> <p>Exclude bushfire from representative areas to provide controls for monitoring the effects of bushfire. Exclude bushfire from most areas on mudstone, which due to low fertility have low biomass growth rates and are drought stressed.</p>

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 park.

The only site of European cultural heritage value known in the park is the World War II era gun emplacements at the summit of Natone Hill, of which only the excavations remain.

Infrastructure in the park includes a large covered water reservoir managed by TasWater, two mobile phone towers, a power line, metal gates and signage. Of these only the mobile phone towers, the power line poles and the signage are likely to be damaged by bushfire. The main built assets at risk from bushfire are the buildings and infrastructure in the residential areas that surround the park.

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 park 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 park; however there is sufficient fine fuel within the park to sustain a high intensity bushfire on days of extreme fire danger. The bushfire risk to the built and cultural heritage assets within and surrounding the park 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 6. This assessment process has been analysed and meets compliance with AS/NZS IOS:31000-2009. Note that the assessment in table 6 only considers the risk from fires starting in, or passing through the park. Some assets may face a greater bushfire risk from nearby bushfire hazards that are not under the control of Clarence City Council. Some assets, such as the World War II era gun emplacements, may not be directly damaged by bushfire but may be damaged by bushfire management and bushfire suppression activities, such as constructing fire control lines. These risks are noted under “other risks” in table 6.

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

- Landowners/residents have established and are maintaining a defensible space to Tasmania Fire Service specifications around vulnerable assets, either wholly within the lot, or up to the boundary with the park where there is insufficient space within the lot. 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 park 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 management strategies recommended in table 6 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. Assets at medium and high risk of damage from bushfire will need to be protected during planned burns in the park.

Table 6 - Bushfire risk assessment for built and cultural assets

RISK CATEGORIES										
<p>LOW – asset of low value or considered to have a low risk of damage from bushfires in the reserve due to its construction, location, or protection measures already in place.</p> <p>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. Further bushfire protection measures are required.</p> <p>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. Further bushfire protection measures are required.</p>										
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 the water reservoir	5	3	3	3	2	2	4	2160 High		Maintain existing easement. Clear at least 1m around the base of each pole.
Mobile phone towers	5	3	3	2	3	2	2	1080 Moderate		Clear all trees, shrubs and bushes within 10m of the towers.
Dwellings bordering the park on the upslope side of Tianna Road	5	1	3	2	2	1	6	672 Moderate		No protection measures required within the park. Advise residents of the need to maintain an adequate defendable space around their dwellings.
Dwellings bordering the eastern side of the park between Nubeena Street and Lowanna Road	5	1	3	2	2	1	6	672 Moderate		Advise residents of the need to maintain an adequate defendable space around their dwellings. Maintain as outer zone between the ring trail and the rear of the properties with fine fuel loads less than 5 tonnes per hectare. See MP 6 in the Best Management Practice Guidelines.
Dwellings bordering the park on the downslope side of Tianna Road	5	1	3	2	2	1	6	672 Moderate		No protection measures required within the park. Advise residents of the need to maintain an adequate defendable space around their dwellings.
Metal Interpretation signage	5	3	3	1	3	2	1	270 Moderate		Replace signs that cannot be cleaned after a bushfire.

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 bordering the park along Derwent Avenue	5	1	1	2	2	1	6	60 Low		Advise residents of the need to maintain an adequate defensible space around their dwellings. Maintain as outer zone between the ring trail and the rear of the properties with fine fuel loads less than 5 tonnes per hectare. See MP 6 in the Best Management Practice Guidelines.
Covered water reservoir	5	3	3	0	2	2	1	0 Minimal		No protection measures required.
WWII gun emplacement at the top of Natone Hill	3	3	3	0	2	2	0	0 Minimal	Asset may be damaged by machinery movement during bushfire management or bushfire suppression.	Inform the TFS and crews carrying out management activities of the location and importance of the asset.

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

3. Bushfire Management Issues

3.1 Existing Bushfire Management

3.1.1 Implementation of the Previous Bushfire Management Plan

As part of this revision of the BMP for Natone Hill Bush Park, a review of the success of the implementation of the recommendations of the previous BMP was carried out. The review found that of eighteen recommendations eleven have been fully implemented, six have been partly implemented and one has not yet been implemented. The recommendation that was not implemented was conducting a familiarisation tour of the park for local TFS brigades. The full findings of the review are in Appendix A.

3.1.2 Planned Burning

The previous BMP recommended four broadscale planned burns throughout the park, and heap burning in VMU 13 which is managed as an outer zone. Of the four broadscale burns three were successfully carried out in VMU1, VMU 8 and VMU 10. The one remaining in VMU 2 has been carried over to be undertaken in autumn 2016. VMU 13 has been successfully heap burnt as required.

3.1.3 Vehicle Access Routes and Foot Tracks

The park has three main fire trails; an unsealed perimeter fire trail (NH3), a sealed road to the water reservoir (NH1), and a trail from the water reservoir to the summit of the hill that continues down the western side of the hill to connect with the perimeter fire trail (NH4). There are other existing fire trails and foot tracks within the park that provide adequate access to all areas for bushfire management. These are used as fire control lines for the planned burning recommended in this plan. Locations of fire trails and walking tracks within the park are shown in figure 6 and described in table 7. 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*.

Locked gates prevent unauthorised vehicle access to fire trails and service roads in the park. Unauthorised use by trails bikes and 4WD vehicles is rare.

In November 2015 NH1, NH3 and NH4 were identified under the Hobart Fire Protection Plan as strategic fire trails.

Strategic fire trails are those that provide important access routes for firefighting, through or along the perimeter of bushland areas, and are potential control lines for major fires. These trails need to be maintained to a standard that allows for all weather vehicle access by fire fighting vehicles. This will generally be Class 3 in the PWS fire trail classification system (Hobart Fire Management Area, 2016).

3.1.4 Water Supply

There are no water sources within the park. However, water for firefighting and bushfire management can be easily obtained from fire hydrants in the streets surrounding the park (see figure 6).

Figure 6 – Vehicle and Foot Access

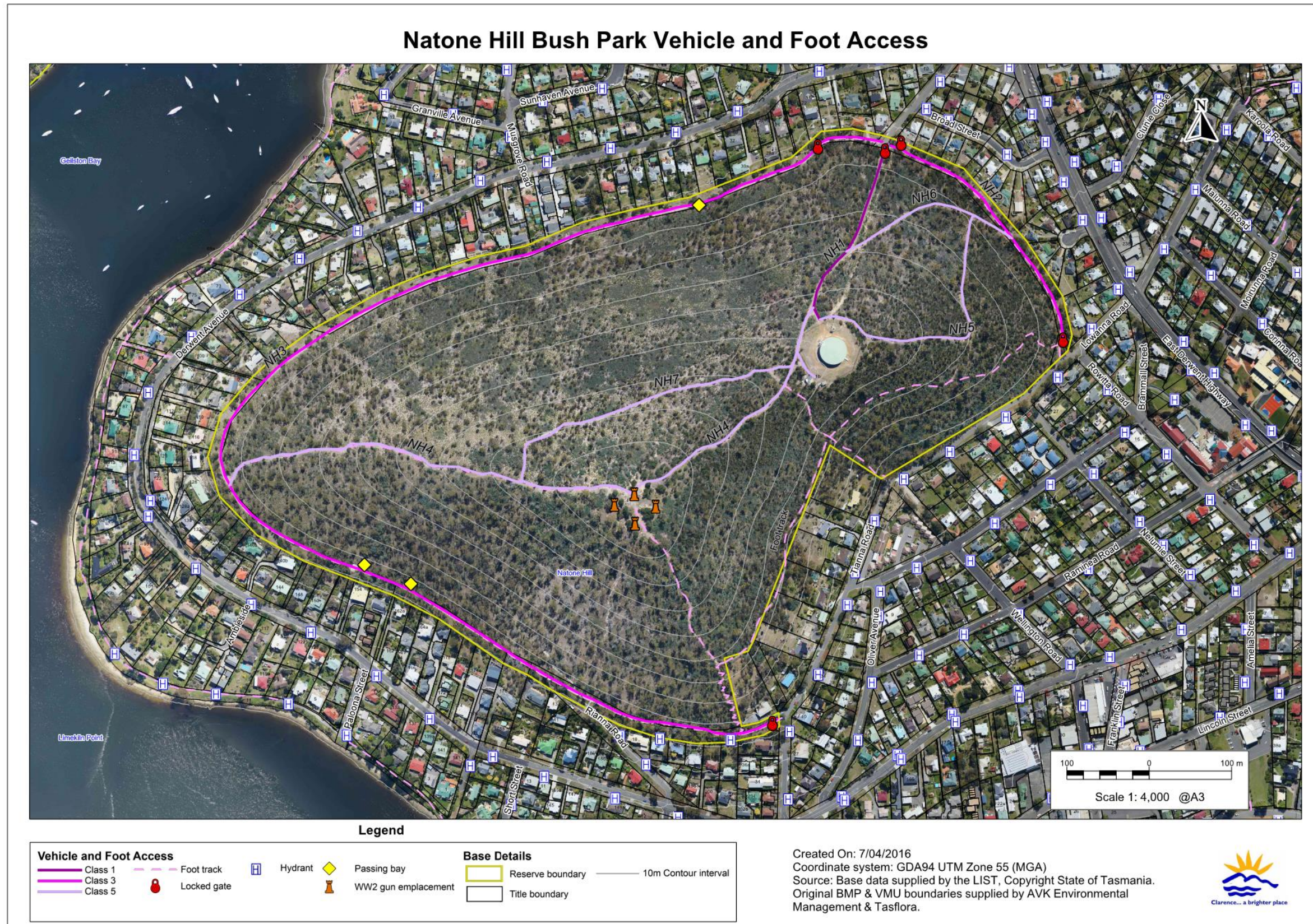


Table 7 - Condition and maintenance of fire trails

Assigned usage class (see Management Procedure 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 FEBRUARY 2016	ACTION REQUIRED	MANAGEMENT CONSTRAINT
NH1	1	YES	High	Runs from the end of Nubeena Street to the water reservoir. Road is sealed but worn with some pot holes, meets usage class 1 specifications. Fire trail is signed at Nubeena Street entrance.	Inspection and maintenance as specified in MP2.	NO
NH2	3	NO	High	Section of the perimeter track between Nubeena Street and Lowanna Road. Trail is in good condition but meets usage class 3 specifications. Nubeena Street entrance has a lockable bollard and can be obstructed by parked vehicles at times, Lowanna Road has locked boom gate.	Inspection and maintenance as specified in MP2.	NO

FIRE TRAIL ID	USAGE CLASS	STRATEGIC FIRE TRAIL UNDER HOBART FIRE PROTECTION PLAN ¹	MAINTENANCE PRIORITY	LOCATION AND CONDITION AT FEBRUARY 2016	ACTION REQUIRED	MANAGEMENT CONSTRAINT
NH3	3	YES	High	<p>Section of the ring track between Nubeena Street and Tianna Road.</p> <p>Trail is in good condition but needs further improvement to meet usage class 3 specifications; in particular sections of the trail need to be widened to allow access by heavy tankers.</p> <p>Some turning and passing areas have been provided along the trail but more are required to meet usage class 3 specifications, alternatively the trail would need to be made one way during firefighting operations.</p> <p>Bottom side of trail is steep in sections, caution must be considered when driving.</p>	<p>Inspection and maintenance as specified in MP2.</p> <p>Widen narrow sections of the trail to allow through access by heavy tankers.</p> <p>Remove dead branches overhanging the trail. Clear shrubs and branches that are encroaching onto the trail.</p>	<p>Threatened flora within proximity. Preferably undertake maintenance in Autumn when not in seed setting period.</p> <p>May require permit from DPIPWE Threatened Species Section.</p>
NH4	5	YES	High	<p>Runs from the water reservoir to NH3 via the summit of Natone Hill.</p> <p>Trail meets class 5 specifications except for encroaching vegetation.</p> <p>Fire trail is signed.</p>	<p>Inspection and maintenance as specified in MP2.</p> <p>Clear encroaching vegetation.</p>	<p>Threatened flora within proximity. Preferably undertake maintenance in Autumn when not in seed setting period.</p> <p>May require permit from DPIPWE Threatened Species Section.</p>

FIRE TRAIL ID	USAGE CLASS	STRATEGIC FIRE TRAIL UNDER HOBART FIRE PROTECTION PLAN ¹	MAINTENANCE PRIORITY	LOCATION AND CONDITION AT FEBRUARY 2016	ACTION REQUIRED	MANAGEMENT CONSTRAINT
NH5	5	NO	Low	Runs from the water reservoir to NH6. Trail meets usage class 5 specifications except for encroaching vegetation. Bike jumps have been made on side of fire trail.	Inspection and maintenance as specified in MP2. Remove dead branches overhanging the trail. Clear encroaching vegetation. Remove bike jumps.	Threatened flora within proximity. Preferably undertake maintenance in Autumn when not in seed setting period. May require permit from DPIPWE Threatened Species Section.
NH6	5	NO	Medium	Links NH2 to NH1. Trail is in good condition and meets usage class 5 specifications except for encroaching vegetation. Fire trail is signed.	Inspection and maintenance as specified in MP2. Clear encroaching vegetation.	Threatened flora within proximity. Preferably undertake maintenance in Autumn when not in seed setting period. May require permit from DPIPWE Threatened Species Section.
NH7	5	NO	High	Runs parallel to NH4 on northern side. Trail is in good condition and meets usage class 5 specifications except for encroaching vegetation.	Inspection and maintenance as specified in MP2. Clear encroaching vegetation.	NO

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

3.1.5 Fuel Breaks and Defendable Spaces

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 back burning operations. Currently there are no standards or guidelines for fuel breaks in Tasmania. There is no fuel breaks maintained in the park, nor are any considered necessary.

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 Bushfire Protection Zone) where flammable materials are minimised.
- An outer zone (formerly 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 building.

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

An area between 8 and 12 metres wide separates the perimeter fire trail (NH3) from properties adjoining the park. This area is being maintained by Council as an outer zone and is wide enough to meet TFS requirements for an outer zone. Most of the residents surrounding the park appear to have well maintained yards. This, together with the fire trail and an inner zone on each lot, would provide an adequate defensible space for most dwellings bordering the park. However, to improve safety on the perimeter fire trail and strengthen the outer zone it is recommended that it be extended for 2 metres on the upslope side of fire trails NH2 and NH3 where required.

There are a number of dwellings on the western side of Tianna Road that back directly onto the park. These are on large lots and most have well managed gardens that act as inner zones. Dwellings on these lots do not require defensible spaces within the park as an adequate defensible space can be provided within the lot.

3.1.6 Bushfire Detection and Suppression

Natone Hill Bush Park is highly visible from surrounding suburbs and it is likely that any fires would be promptly reported. The perimeter fire trail and internal access should be sufficient to allow the TFS to rapidly reach and contain fires within the park. The location of the park on a circular hill means that fires in the park will tend to burn upslope to the top of the hill, unless there are very strong winds. Fires approaching residential areas will generally be moving downslope which will reduce their intensity. In this situation the perimeter fire trail (NH3) and outer zone could be an effective control line.

3.2 Weeds

Over the last 20 years, the Natone Hill Landcare Group has played an active role in removing significant infestations of declared and environmental weeds across Natone Hill. The park is now largely free from large infestations of weeds (Tasflora, 2015).

Environmental weeds occur throughout the park (see figure 7). Two weed species found in the park are classified as a declared weed 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.

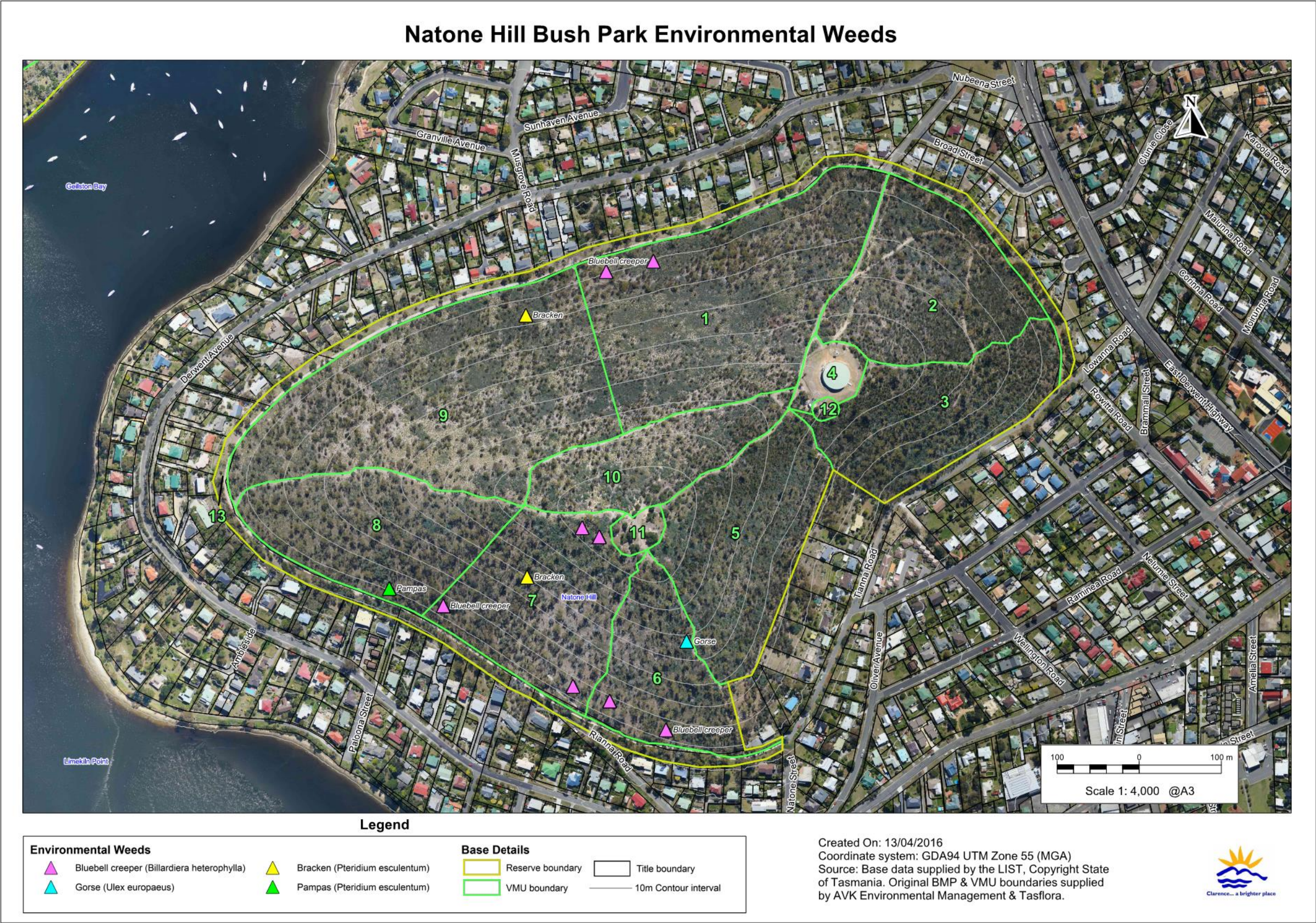
Gorse (*Ulex europaeus*) is a present declared weed and WONS.

Pampas (*Cortaderia selloana*) is a present declared weed that is not listed as a WONS.

The other environmental weeds observed within the park were bluebell creeper (*Billardiera heterophylla*) and bracken (*Pteridium esculentum*). A detailed weed survey was not undertaken as part of this BMP, merely field observations.

Weed control activities have been integrated with the planned burning program in VMU 1, VMU 8 and VMU 10 during the previous BMP as outlined in MP 8 in *Clarence City Council Bushfire Management Strategy - Best Management Practice Guidelines*. It is recommended this regime continue.

Figure 7 – Environmental weeds in reserve



3.3 Stakeholder and Community Concerns

At the commencement of the project Clarence City Council sent a letter to all landowners adjoining the park 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 park by sending in a written submission, attending a community “walk and talk” in the park, or by contacting the reviewer directly. The community “walk and talk” was held in the park on 8th November 2015 and was attended by three community members (one from the local historical society) and a Council representative. Two written comments were received. The community concerns expressed about bushfire management in the park are summarised in Appendix B along with the Council’s 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 park 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 Natone Hill Bush Park can be summarised as follows:

- Reduce ignitions through prosecution of arsonists, and prompt reporting of fires.
- Maintain access points and fire trails to enable the TFS to rapidly contain fires that start in the park, and ensure the TFS are familiar with the location and condition of fire trails in the park.
- Maintain defensible spaces in the park to protect assets within and adjoining the park.
- Carry out strategic planned burning to reduce bushfire hazards in the park.
- Encourage neighbouring residents to maintain defensible spaces around their homes.

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 park. This should include surrounding residents and those with special interests in the park, or whose activities can affect assets within the park. 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 towards the effectiveness of this BMP.

In particular, adjoining residents should be advised on the management of VMU 13 as an outer zone, and that dumping garden waste and other rubbish in the park 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.

4.3 Planned Burning

The native plant communities in the park are considered dependent on fire to maintain their structure and floristics in the long term. Periodic burning will help to maintain diversity in the understorey, and allow fire 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.

4.3.1 Vegetation Management Units (VMU)

The planned burning program in this plan is based on the division of the dry forest and woodland habitats into a mosaic of vegetation management units (VMUs) (see figure 8). VMUs can be burnt at a frequency, season and intensity that are optimal for the plant communities within each unit or excluded from fire 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 park are given in table 5.

The previous BMP divided the park into 13 VMUs based on the vegetation types in the park, and the presence of suitable control lines in the form of fire trails and foot tracks. This management regime will continue as at present allows for the most appropriate methods for managing fire hazards whilst promoting biodiversity within the park.

4.3.2 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.

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 park. Where possible hollow logs and dead trees should be protected from planned burning 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 park have been scheduled in table 8. 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 8, 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 fire frequencies, VMUs should generally not be burnt within 2 years of adjoining VMUs.

On the northern facing side of Natone Hill the dominant fuel type is *Lomandra* sp. with coppiced *Eucalyptus* sp. regen 1-5m. Given the grassy component will typically replenish 1-2 years post burn and the *Eucalypt* component is not yet tall enough to sustain fire some VMU's have had planned burning withheld until the *Eucalypt* component can tolerate fire (table 8). This will also assist slowing down the spread of Bracken (*Pteridium esculentum*) within the park.

Figure 8 – Vegetation Management Units in the Park

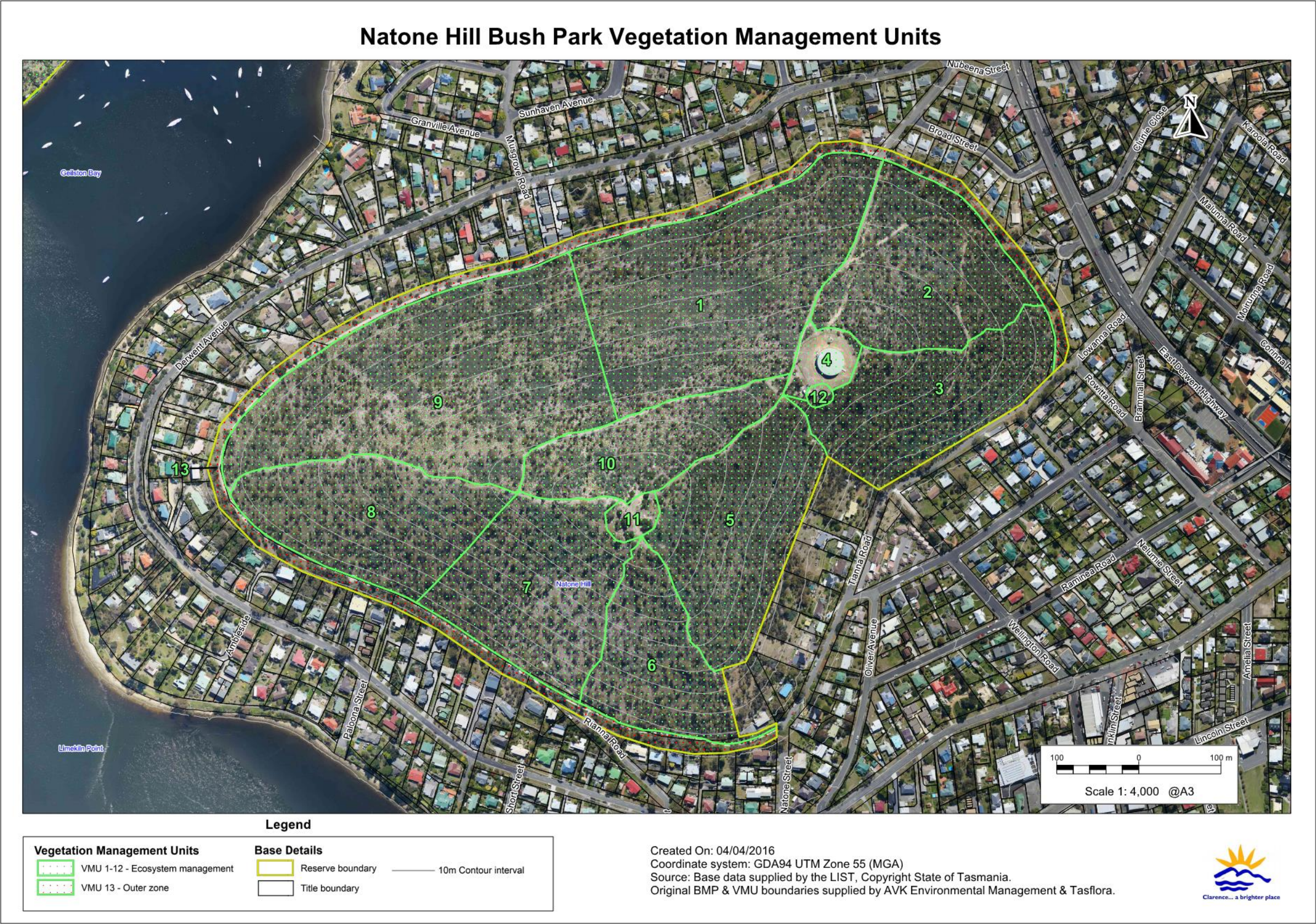


Table 8 – Bushfire management in the park

VMU ¹	AREA (ha)	BUSHFIRE MANAGEMENT OBJECTIVES and PRESCRIPTIONS	NOTES and PRECAUTIONS ^{2, 3, 4}	LAST BURNT	NEXT BURN
1 DAM	6.8	<p>OBJECTIVES:</p> <p>Maintain the structure and floristics of the vegetation community.</p> <p>Maintain groundcover to minimise erosion.</p> <p>Allow recruitment of canopy species.</p> <p>Reduce the extent and density of weeds.</p> <p>PRESCRIPTION:</p> <p>Autumn burn every 5 to 15 years.</p>	<p>Contains the rare plant species <i>Rytidosperma indutum</i> ³ and <i>Lepidium pseudotasmanicum</i> ³.</p> <p>Obtain a permit from DPIPWE Threatened Species Section before burning.</p> <p>Do not burn during the bird nesting/seed setting period.</p> <p>Protect adjoining property during burns.</p> <p>Contains Vegetation Monitoring Plots (VMP) 004 and VMP005. To be measured pre and post burn.</p>	2013	Assess next plan
2 DAM	3.9	<p>OBJECTIVES:</p> <p>Maintain the structure and floristics of the vegetation community.</p> <p>Maintain groundcover to minimise erosion.</p> <p>Allow recruitment of canopy species.</p> <p>PRESCRIPTION:</p> <p>Autumn burn every 5 to 15 years.</p>	<p>Contains the rare plant species <i>Rytidosperma indutum</i> ³.</p> <p>Obtain a permit from DPIPWE Threatened Species Section before burning.</p> <p>Avoid burning within the power line easement. Contact TasNetworks before burning.</p> <p>Protect water reservoir infrastructure from damage. Contact TasWater before burning.</p> <p>Do not burn during the bird nesting/seed setting period.</p> <p>Protect adjoining property during burns.</p>	Jan 2005	2016
3 DAM DGL	3.4	<p>OBJECTIVES:</p> <p>Maintain the structure and floristics of the vegetation communities.</p> <p>Maintain groundcover to minimise erosion.</p> <p>Allow recruitment of canopy species.</p> <p>PRESCRIPTION:</p> <p>Autumn burn every 10 to 20 years.</p>	<p>Contains the rare plant species <i>Rytidosperma indutum</i> ³.</p> <p>Obtain a permit from DPIPWE Threatened Species Section before burning.</p> <p>Consult DPIPWE Threatened Species Section before burning. Contains DGL ².</p> <p>Protect water reservoir infrastructure from damage. Contact TasWater before burning.</p> <p>Do not burn during the bird nesting/seed setting period.</p> <p>Keep burns at low intensity to minimise canopy scorch.</p> <p>Protect adjoining property during burns.</p>	Jan 2005	2021

VMU ¹	AREA (ha)	BUSHFIRE MANAGEMENT OBJECTIVES and PRESCRIPTIONS	NOTES and PRECAUTIONS ^{2, 3, 4}	LAST BURNT	NEXT BURN
4	0.5	OBJECTIVE: Protect TasWater infrastructure. PRESCRIPTION: Exclude fire.	Land managed by TasWater	Jan 2005	No burning
5 DAM DGL	3.9	OBJECTIVES: Maintain the structure and floristics of the vegetation communities. Maintain groundcover to minimise erosion. Allow recruitment of canopy species. Keep burns at low intensity to minimise canopy scorch. PRESCRIPTION: Autumn burn every 10 to 20 years.	Contains the rare plant species <i>Arthropodium strictum</i> ³ and <i>Rytidosperma indutum</i> ³ . Obtain a permit from DPIPWE Threatened Species Section before burning. Consult DPIPWE Threatened Species Section before burning. Contains DGL ² . Protect remains of World War II gun emplacements in VMU 11 during bushfire management activities. Do not burn during the bird nesting/seed setting period. Protect adjoining property during burns.	Jan 2005	2018
6 DAM DRI DVG	2.5	OBJECTIVES: Maintain the structure and floristics of the vegetation communities. Maintain groundcover to minimise erosion. Allow recruitment of canopy species. Reduce the extent and density of weeds. PRESCRIPTION: Exclude fire until recently planted <i>Eucalyptus risdonii</i> are at least 3m high.	Contains the rare plant species <i>Arthropodium strictum</i> ³ , <i>Eucalyptus risdonii</i> ³ and <i>Rytidosperma indutum</i> ³ . Obtain a permit from DPIPWE Threatened Species Section before burning. Consult DPIPWE Threatened Species Section before burning. Contains DRI ² . Protect remains of World War II gun emplacements in VMU 11 during bushfire management activities. Do not burn during the bird nesting/seed setting period. Protect adjoining property during burns.	Jan 2005	Assess next plan

VMU ¹	AREA (ha)	BUSHFIRE MANAGEMENT OBJECTIVES and PRESCRIPTIONS	NOTES and PRECAUTIONS ^{2, 3, 4}	LAST BURNT	NEXT BURN
7 DAM DRI DVG	3.8	<p>OBJECTIVES:</p> <p>Maintain the structure and floristics of the vegetation communities.</p> <p>Maintain groundcover to minimise erosion.</p> <p>Allow recruitment of canopy species.</p> <p>Reduce the extent and density of weeds.</p> <p>PRESCRIPTION:</p> <p>Exclude fire until recently planted <i>Eucalyptus risdonii</i> are at least 3m high.</p>	<p>Contains the rare plant species <i>Rytidosperma indutum</i> ³ and <i>Eucalyptus risdonii</i> ³.</p> <p>Obtain a permit from DPIPWE Threatened Species Section before burning.</p> <p>Consult DPIPWE Threatened Species Section before burning. Contains DRI ².</p> <p>Protect remains of World War II gun emplacements in VMU 11 during bushfire management activities.</p> <p>Do not burn during the bird nesting/seed setting period.</p> <p>Protect adjoining property during burns.</p>	Jan 2005	Assess next plan
8 DAM	3.8	<p>OBJECTIVES:</p> <p>Maintain the structure and floristics of the vegetation communities.</p> <p>Maintain groundcover to minimise erosion.</p> <p>Allow recruitment of canopy species.</p> <p>Reduce the extent and density of weeds.</p> <p>PRESCRIPTION:</p> <p>Autumn burn every 5 to 15 years.</p>	<p>Contains the rare plant species <i>Arthropodium strictum</i> ³, <i>Eucalyptus risdonii</i> ³ and <i>Rytidosperma indutum</i> ³.</p> <p>Obtain a permit from DPIPWE Threatened Species Section before burning.</p> <p>Do not burn during the bird nesting/seed setting period.</p> <p>Protect adjoining property during burns.</p>	2015	Assess next plan
9 DAM	8.0	<p>OBJECTIVES:</p> <p>Maintain the structure and floristics of the vegetation communities.</p> <p>Maintain groundcover to minimise erosion.</p> <p>Allow recruitment of canopy species.</p> <p>Reduce the extent and density of weeds.</p> <p>PRESCRIPTION:</p> <p>Autumn burn every 5 to 15 years.</p>	<p>Contains the rare plant species <i>Asperula scoparia subsp. Scoparia</i> ³, <i>Eucalyptus risdonii</i> ³ and <i>Rytidosperma indutum</i> ³.</p> <p>Obtain a permit from DPIPWE Threatened Species Section before burning.</p> <p>Do not burn during the bird nesting/seed setting period.</p> <p>Protect adjoining property during burns.</p>	Jan 2005	Assess next plan

VMU ¹	AREA (ha)	BUSHFIRE MANAGEMENT OBJECTIVES and PRESCRIPTIONS	NOTES and PRECAUTIONS ^{2, 3, 4}	LAST BURNT	NEXT BURN
10 DAM	2.4	<p>OBJECTIVES:</p> <p>Maintain the structure and floristics of the vegetation communities.</p> <p>Maintain groundcover to minimise erosion.</p> <p>Allow recruitment of canopy species.</p> <p>PRESCRIPTION:</p> <p>Autumn burn every 5 to 15 years.</p>	<p>Contains the rare plant species <i>Eucalyptus risdonii</i> ³, <i>Lepidium pseudotasmanicum</i> ³ and <i>Rytidosperma indutum</i> ³.</p> <p>Obtain a permit from DPIPWE Threatened Species Section before burning.</p> <p>Protect remains of World War II gun emplacements in VMU 11 during bushfire management activities.</p> <p>Do not burn during the bird nesting/seed setting period.</p>	2011	Assess next plan
11 DAM DVG	0.3	<p>OBJECTIVE:</p> <p>Protect heritage site.</p> <p>PRESCRIPTION:</p> <p>Exclude fire.</p>	Protect remains of World War II gun emplacements during bushfire management activities.	Jan 2005	No burning
12	0.07	<p>OBJECTIVE:</p> <p>Protect mobile phone towers from bushfire.</p> <p>PRESCRIPTION:</p> <p>Clear all trees, shrubs and bushes within 10m of the tower.</p>		Jan 2005	No burning
13 DAM	3.0	<p>OBJECTIVE:</p> <p>Maintain as an outer zone to protect adjoining dwellings.</p> <p>PRESCRIPTION:</p> <p>See specifications for outer zones in MP 5 in the Best Management Practices Guidelines.</p>	<p>Contains the rare plant species <i>Arthropodium strictum</i> ³ and <i>Rytidosperma indutum</i> ³.</p> <p>Obtain a permit from DPIPWE Threatened Species Section before clearing areas where species occurs.</p>	Partially burnt Jan 2005	Pile burns only

¹ TASVEG 3.0 codes of vegetation types in the unit.

² Nature Conservation Act 2002

³ Tasmanian Threatened Species Protection Act 1995

4.3.3 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. 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.

4.4 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 bulldozing 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 park do not worsen existing weed problems, or cause weeds to spread.

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

Any proposals for bush regeneration in the park should be considered in the context of this BMP to ensure that they do not compromise bushfire protection measures proposed in this plan. In general, plantings are not allowed:

- Inner zones and outer zones established around assets at risk.
- Within 2m of 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 bushfires, 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

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

RECOMMENDED ACTION	OBJECTIVE (section 1.3)	PRIORITY	RESPONSIBILITY	PERFORMANCE INDICATORS
1) Develop/commence 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 such as management regimes of VMU 13, 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, park users and other interest groups. Reduction in residents planting in Council managed outer zones. Reduction in the incidence of illegal fires on and around the park.
2) Implement the bushfire protection measures in section 2.4 for protection of built assets in and around the park.	1, 4	E	Clarence City Council Fire and Bushland Management Private landowners TasWater	Bushfire protection measures in the park implemented and maintained. No assets lost to fires originating in, or moving through, the park.
3) Erect appropriate signs on tracks and roads to warn park users of planned burns.	1	E	Clarence City Council Fire and Bushland Management	No users of the park injured by planned burns.
4) Ensure that authorities planning bushfire control operations in the park are aware of the location of cultural heritage assets, and ensure they are not damaged by machinery movement or other activities.	4	REC	Clarence City Council Tasmania Fire Service	No cultural heritage assets damaged during bushfire management or control operations in the park.

RECOMMENDED ACTION	OBJECTIVE (section 1.3)	PRIORITY	RESPONSIBILITY	PERFORMANCE INDICATORS
5) 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 park injured by fires or the effects of fires.
6) Carry out fire trail repairs and maintenance listed in table 7.	2, 6	E - 2	Clarence City Council Fire and Bushland Management	Fire trail repair works listed in table 7 completed.
7) Ensure all fire trails shown on figure 6 are inspected and maintained in a trafficable condition at all times according to MP 2 and Strategic Fire Trail signs are installed and legible.	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 TFS Brigade and other emergency services have keys to the gates on trails giving access to the park.	2	ROU - A	Clarence City Council Fire and Bushland Management	No unauthorised use of fire trails in the park. Security lock system implemented, keys distributed to TFS brigades and other emergency services.
9) Upon request by TFS, conduct a familiarisation tour of the park for local TFS brigades prior to the start of the fire permit period each year.	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 park.
10) Carry out planned burning according to the schedule in table 8.	2, 3, 4, 5	E - A/S	Clarence City Council Fire and Bushland Management	Mosaic of burnt VMUs maintained. No decline in the populations or distribution of threatened species. Structure and floristics of native plant communities maintained.

RECOMMENDED ACTION	OBJECTIVE (section 1.3)	PRIORITY	RESPONSIBILITY	PERFORMANCE INDICATORS
11) 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 Fire and Bushland Management 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 weeds and WONS removed, reduction in extent of other weeds.
12) Consult with 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. All required permits obtained before burns or other management activities likely to affect threatened species.
13) 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 fire.
14) 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.
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 park.	3, 5	REC - A/S	Clarence City Council Fire and Bushland Management	Bushfire management plan revised every 5 years.

RECOMMENDED ACTION	OBJECTIVE (section 1.3)	PRIORITY	RESPONSIBILITY	PERFORMANCE INDICATORS
16) Coordinate bushfire management, weed management and other management activities 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 park have the appropriate level of training and equipment as outlined in the bushfire management strategy, and the minimum equipment listed in MP 7.	1, 2	E	Clarence City Council Fire and Bushland Management	All personnel are able to demonstrate the required level of training and minimum levels of equipment.
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.
19) Move rocks and install lockable bollard at Nubeena Street entrance for vehicle access.	1,2,4	E - 1A	Clarence City Council Fire and Bushland Management	Lockable bollard installed. Vehicles can access NH2 from Nubeena Street end.
20) Assess and identify hazardous trees in outer zone between Lowanna Road and Nubeena Street (VMU 13) and remove as required.	1,2,5,	E - 1A	Clarence City Council Fire and Bushland Management	Dangerous trees removed. Level of safety increased for park users and adjacent properties.

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Appendix A

Implementation of the previous bushfire management plan

The following codes have been used in assessing implementation of the previous Bushfire Management Plan for Natone Hill Bush Park:

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) Implement a community education program to request residents near the park to report any smoke, or suspicious activity, on days of total fire bans.	PI	<p>A formalised community education program has not been designed.</p> <p>Public exhibition of Councils <i>Bushfire Management Strategy for Council Owned and Controlled Land</i>, <i>Bushfire Management Strategy Best Management Practice Guidelines</i> and the previous BMP for the park has taken place.</p> <p>Various TFS community bushfire preparation events have been attended and represented by Council Fire and Bushland Management throughout municipality</p>
2) Implement the bushfire protection measures in section 2.4 for protection of built assets in and around the park.	IS	<p>No bushfires impacted park during previous BMP.</p> <p>Bushfire protection measures in the park implemented and maintained.</p> <p>Ongoing outer zone maintenance is required.</p>
3) Erect appropriate signs on tracks and roads to warn park users of management burns.	IS	<p>All appropriate signage erected prior to ignition of planned burns. No users of the park were injured during planned burns.</p>
4) Ensure that authorities planning wildfire control operations in the park are aware of the location of cultural heritage assets and ensure they are not damaged by machinery movement or other activities.	PI	<p>No damage to cultural heritage assets reported during TFS response to incidents within park during previous BMP. However it is unlikely that the TFS knew the location of the assets.</p> <p>TFS familiarization with heritage sites still to be carried out.</p>
5) Implement the recovery procedures in MP 12 following planned burns and wildfires.	IS	<p>No bushfires impacted park during previous BMP.</p> <p>All hazardous trees inspected and actioned as required prior to leaving planned burn locations. Post burn weed work and monitoring has taken place.</p> <p>No users of the park injured by fires or the effects of fires.</p>

RECOMMENDED ACTION	CODE	COMMENT
6) Carry out fire trail repairs and maintenance listed in Table 8.	PI	Fire trail repair works listed in table 8 completed. Passing bays have been installed on sections of NH3. Boom gate not installed at Nubeena Street entrance. Recommend lockable bollard more suitable.
7) Ensure all fire trails shown on figure 5 are inspected and maintained in a trafficable condition at all times according to MP 2 and fire trail signs are in place and legible.	IS	Vehicle access routes inspected as required in MP 2, and maintained in a trafficable condition for fire service vehicles. Fire trail signs installed.
8) Inspect gates regularly to ensure that locks are in place and functioning. Ensure that the local TFS brigades and other emergency services have keys to the gates on trails giving access to the park.	IS	Gates inspected regularly, new bollards /locks installed as required.
9) Conduct a familiarisation tour of the park 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 park. Familiarisation tour to be offered once review completed.
10) Carry out planned burning according to the schedule in table 9 using the procedure in MP 7.	IS	Three scheduled planned burns completed, one carried over to 2016 planned burn program. Mosaic of burnt VMUs maintained. Structure and floristics of native plant communities maintained.
11) 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/post burn weed management implemented. Follow up weed monitoring/maintenance is occurring.
12) Consult with the DPIPWE Threatened Species Section when carrying out bushfire management activities that may affect populations of threatened flora or fauna.	PI	Permits acquired from DPIPWE as required in planning stage of planned burns. DPIPWE not consulted during passing bay installation on NH3 due to small size of operation.
13) Avoid burning the whole of any population of a threatened or rare plant species in a single fire.	IS	All planned burns carried out according to the requirements of threatened flora and fauna. No decline in populations of threatened or rare flora, or fauna due to fire has been identified during previous BMP.
14) 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	In 2013 VMU 1 had two Vegetation Monitoring Plots established. These are assessed annually by Councils Fire and Bushland Management. This includes photo point monitoring.
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 park.	IS	Regimes and prescriptions have been analysed throughout life of previous BMP. During 2015 review process all VMUs regimes and prescriptions have been evaluated to suit best outcomes for asset protection and ecological protection.

RECOMMENDED ACTION	CODE	COMMENT
16) Coordinate bushfire management, weed management and other management activities 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 park have the appropriate level of training and equipment as outlined in the bushfire management strategy, 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 on a regular basis.

Appendix B

**Summary of community concerns and comments
in the initial round of community consultation**

COMMUNITY CONCERNS and COMMENTS	COUNCIL'S COMMENT
Comment on rubbish becoming visible adjacent to NH3 post planned burn in VMU 8. Resident collected and removed several rubbish bags.	Advise residents to notify Council of rubbish within reserve and Council will remove.
Concern over sections of outer zone on western side being very dry/bony, prone to erosion.	From a fire management perspective this assists in keeping outer zone in a minimal fuel state, however from an environmental aspect this is not desirable. Some sections have since been planted to mitigate erosion, however browsing by rabbits have made this not successful.
Concern over rabbit population within park and the impacts towards browsing of vegetation.	Not a fire management issue however noted.
Concern about excessive grass growth on the lower side of Tianna Road.	Although this is not in the park, fires in the park could easily spot into this area and threaten adjoining houses.
Concern regarding planned burn in VMU 10 in 2011 and time frame for natural revegetation to occur post burn.	5 years post planned burn there is a healthy stocking of <i>Eucalyptus</i> sp. both coppiced and natural recruitment. The vegetation type in VMU 10 (at 2016) represents similar to other VMUs on northern facing slope of hill. Vegetation monitoring of VMU 10 post planned burn has been taking place since 2012 and will continue for the duration of the next BMP. The aim is to assist gathering long term data for the impacts from planned burning/bushfire towards this forest type. Planned burning will not occur in this VMU until <i>Eucalypt</i> regen is mature enough to withstand fire and fuel loadings require reducing.
Concern on lack of hazard reduction by Council on south-eastern side of reserve above Tianna Road and Natone Street.	Planned burning is scheduled for VMU 2 in 2016, VMU 3 in 2021 and VMU 5 in 2018.