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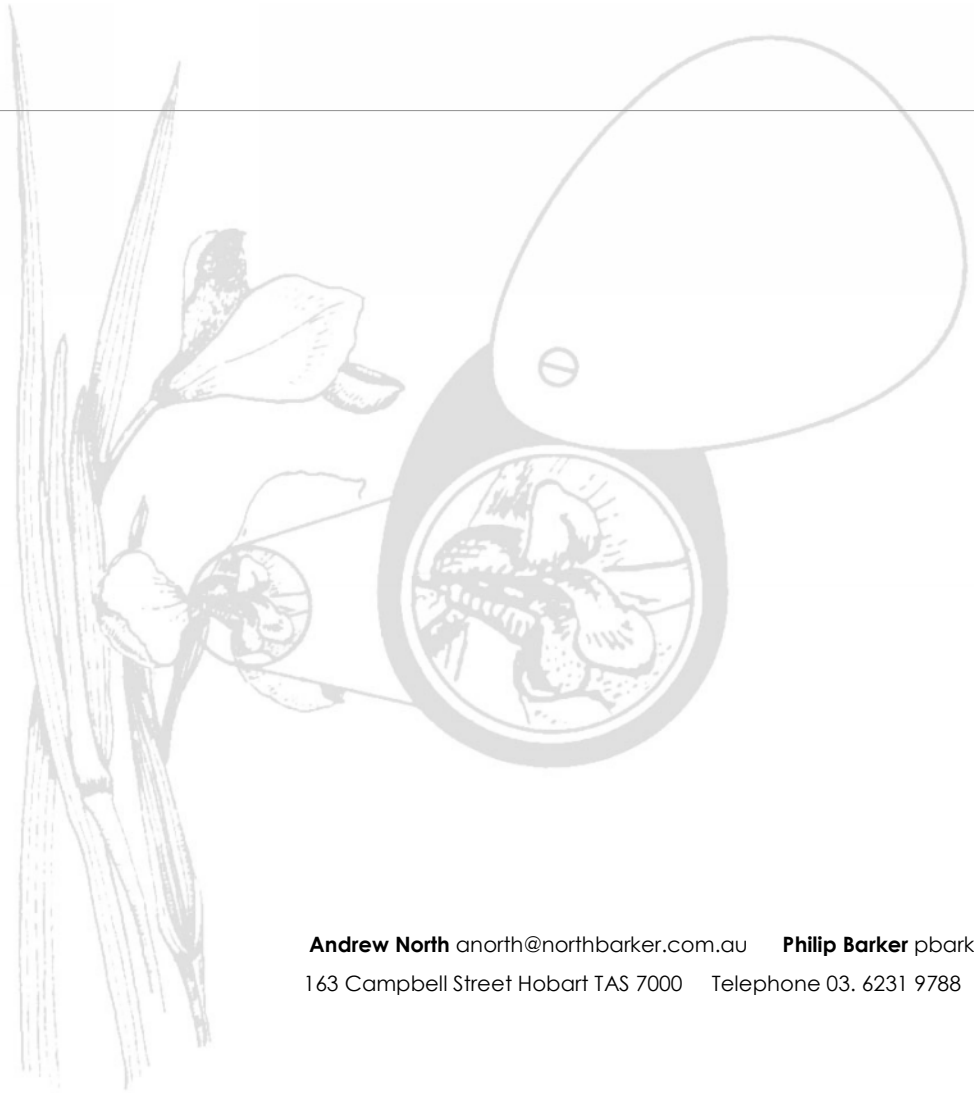
ECOSYSTEM SERVICES

Glebe Hill Bushland Reserve Activity Plan 2014 - 2018

2nd April 2014

For Clarence City Council (CCC011)



Andrew North anorth@northbarker.com.au **Philip Barker** pbarker@northbarker.com.au
163 Campbell Street Hobart TAS 7000 Telephone 03. 6231 9788 Facsimile 03. 6231 9877

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1 INTRODUCTION

Glebe Hill Bushland Reserve is located on the eastern shore of Hobart in the suburb of Howrah in south-east Tasmania. It occurs in the Clarence City Council.

Glebe Hill Bushland Reserve (henceforth known as the Reserve) is made up of two land parcels, both of which are currently protected by conservation covenants under the Tasmanian *Nature Conservation Act 2002*. The southern larger conservation covenant is owned by the Clarence City Council (henceforth known as the Council), the ownership being transferred to the Council as part of a previous adjacent subdivision. The northern smaller and adjoining conservation covenant, currently privately owned was also established as part of a subdivision. Ownership of this covenant is also likely to be transferred to the Council. This Reserve Activity Plan covers the land occupied by these two covenants in anticipation that they will in future form part of the greater Glebe Hill Bushland Reserve.

This is the first Activity Plan to be prepared for Glebe Hill. Each conservation covenant area has a corresponding Nature Conservation Plan that details management prescriptions and describes activities and restrictions that will ensure that the Reserve's natural values are maintained and enhanced.

This Reserve Activity Plan for Glebe Hill Bushland Reserve is intended to document the natural, cultural, recreational and other values of the reserve, and include an implementation plan for proposed on-ground activities from 2014 to 2018.

2 OBJECTIVES

The objectives of the Glebe Hill Bushland Reserve Activity Plan are to:

- ensure the Reserve is sustainably managed to protect and enhance its natural, cultural and social values;
- identify priority on-ground management activities to be undertaken within the Reserve by Council, community groups and/or volunteers;
- encourage community involvement through raising awareness of the Reserve's values and encourage participation in activities to minimise threats to these values.

3 SITE DESCRIPTION

Glebe Hill Bushland Reserve, occupying around 22 hectares, is part of the low hills locally known as the Rokeby Hills (Figure 1). It is situated within the South East bioregion of Tasmania[1].It is dominated by native vegetation, with a smaller section of open grassed reserve on its eastern side. The terrain is centred on Glebe Hill, and consists of the main hill and its lower slopes which are mainly of a gentle nature. The underlying geology is predominantly composed of Permian mudstone, with a very small section of dolerite occurring on the far eastern boundary.

[1] IBRA5 - Peters & Thackway 1998

The altitudinal range is from approximately 60 to 130 metres above sea level. The Reserve is in the dry sub-humid warm zone and within the 500 to 600 mm annual rainfall zone.

In terms of the immediate surrounding environment, the Reserve is adjacent to residential suburbs to the west, south and east. To the north of the reserve large areas of intact native bushland are contiguous with the Reserve, these bushland areas being interspersed with some isolated houses. Tenuous links occur to the south of the reserve with the continuation of the Rokeby Hills, although Rokeby Road and further suburban development have weakened these links.

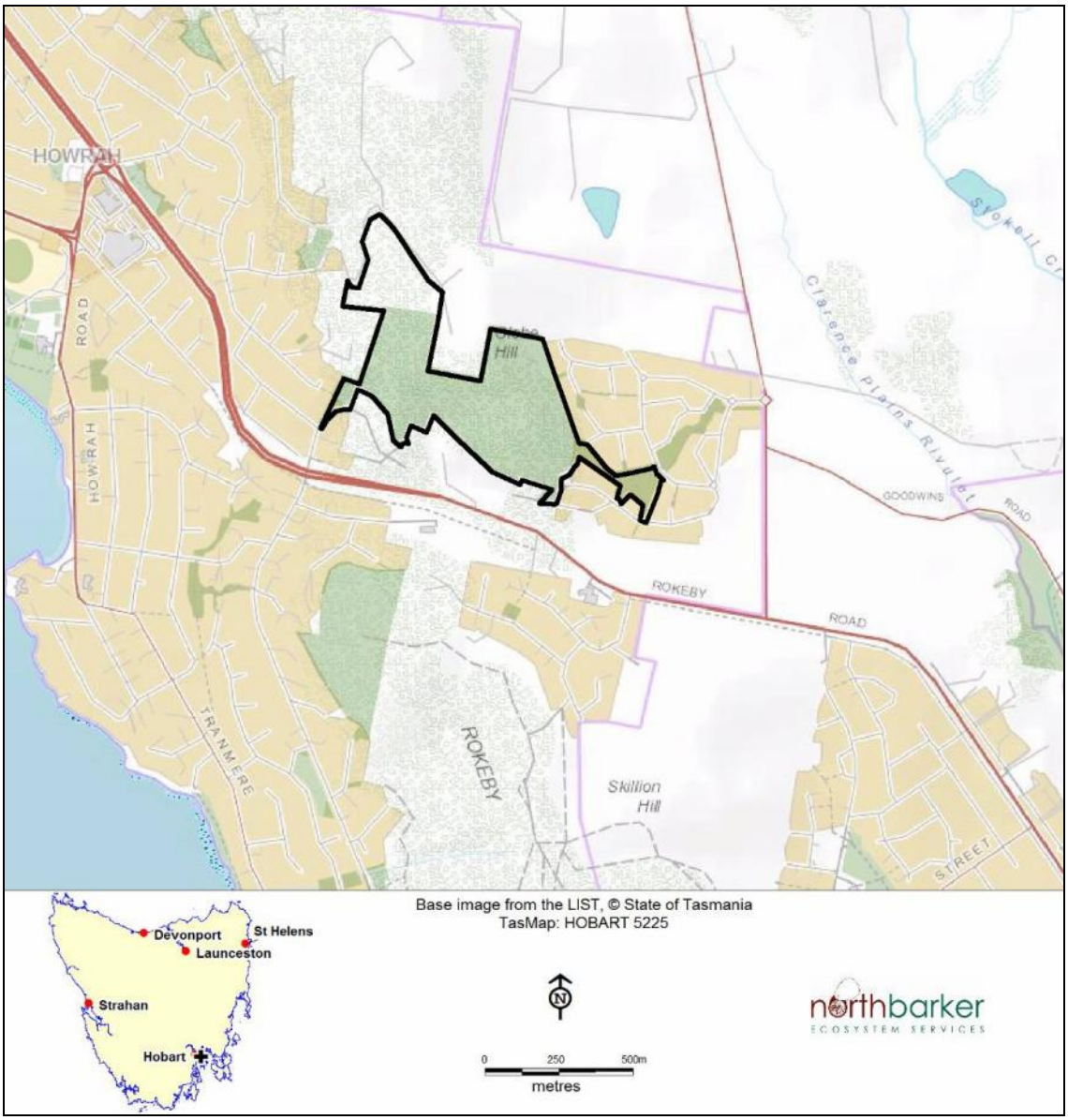


Figure 1: Location of Glebe Hill Bushland Reserve

4 RESERVE NATURAL VALUES

4.1 Vegetation Communities

The Reserve is comprised of four native vegetation communities (TASVEG version 2.0):

- *Eucalyptus amygdalina* forest on mudstone (DAM)
- *Eucalyptus risdonii* forest and woodland (DRI)
- *Eucalyptus viminalis* grassy forest and woodland (DVG)
- Rockplate grassland (GRP)

The distribution of vegetation communities is shown in Figure 2.

Table 1: Extent and reservation status of the native vegetation communities recorded in the study area.[2]

TASVEG community and extent in study area	**Pre 1750/ current ha**	**Reservation ha / %**	**Pre 1750 / current ha**	**Reservation ha / %**	**Status** (JANIS)
Region	**TAS**	**TAS**	**South East**	**South East**	
Eucalyptus amygdalina forest on mudstone (DAM) 15.5 ha	69,100 41,500	11,500 *28% (current)*	12,000 6,000	1,600 *27% (current)*	Not threatened
Eucalyptus risdonii forest and woodland (DRI) 1.9 ha	860 780	350 46% *(current)*	860 780	350 46% *(current)*	Rare (threatened)
Eucalyptus viminalis grassy forest and woodland (DVG) 2.6 ha	249,600 109,600	14,600 13%	127,300 68,100	8,300 12% *(current)*	Not threatened
Rockplate grassland (GRP) 0.3 ha	NA 140	40 29%	NA 100	40 40% *(current)*	Not threatened

[2] Knight 2012

***Eucalyptus amygdalina* forest on mudstone (DAM)**

Eucalyptus amygdalina forest on mudstone (DAM) is the dominant vegetation community within the Reserve covering approximately 15.5 hectares. It is found throughout the reserve on mudstone soils. DAM is not threatened under the Tasmanian *Nature Conservation Act 2002*.

This community is comprised of two eucalypt species – the dominant eucalypt being white gum (*E. viminalis*) with black peppermint (*E. amygdalina*) co/sub-dominant. The shrub layer is dominated by bull oak *(Allocasuarina littoralis*), with silver wattle (*Acacia dealbata*), prickly box *(Bursaria spinosa*) and native hop bush (*Dodonaea viscosa*) all frequent. The lower shrub layer is diverse and includes a number of low growing and prostrate species including peachberry (*Lissanthe strigosa*), broad leaf bitter pea (*Daviesia latifolia)*, yellow everlasting bush (*Ozothamnus obcordatus*) and native cranberry (*Astroloma humifusum*). Prominent graminoids include sagg (*Lomandra longifolia*) and black anther flax lily (*Dianella revoluta*). Native grasses include spear grass (*Austrostipa* spp.) and wallaby grass (*Austrodanthonia* spp.). There is moderate diversity of native herbs.

The condition is predominantly good with some degradation through tracks, and some weed infestations on the interface with suburban areas and previously the agricultural land.

***Eucalyptus amygdalina* forest on mudstone (DAM)**

***Eucalyptus risdonii* forest and woodland (DRI)**

Eucalyptus risdonii forest and woodland (DRI) is less abundant within the Reserve covering approximately 1.9 hectares. It is found only on the upper west facing slopes of Glebe Hill, on rockier, shallower mudstone soils. DRI is listed as **threatened** under the Tasmanian *Nature Conservation Act 2002*[3] (NCA).

Risdon peppermint (*Eucalyptus risdonii*) is the dominant canopy species. There is a prominent tall shrub layer that includes bull oak (*Allocasuarina littoralis*), native hop bush (*Dodonaea viscosa*) and hairy dogwood (*Pomaderris pilifera*) over a diverse assemblage of low shrub that include spreading wattle (*Acacia genistifolia*), yellow everlasting bush (*Ozothamnus obcordatus*), matted bushpea *(Pultenaea pedunculata),* glandular pinkbells (*Tetratheca labillardierei*), hop bitterpea (*Daviesia latifolia*), and common heath (*Epacris impressa*). Relative abundances of these species vary across the slope, as does the understorey dominance which is a mixture of native herbs, grasses and orchids.

The condition is predominantly good with little to no weed infestations.

***Eucalyptus risdonii* forest and woodland (DRI)**

[3] Schedule 3a NCA, 2002

***Eucalyptus viminalis* grassy forest and woodland (DVG)**

Eucalyptus viminalis grassy forest and woodland (DVG) is less abundant within the Reserve covering approximately 2.6 hectares. It is found only on the mid to lower east facing slopes of Glebe Hill, where dolerite soils are dominant. *Eucalyptus viminalis* grassy forest and woodland is not threatened under the *Nature Conservation Act 2002*. It is however considered to be locally significant within the Clarence Municipality, with Table 1 highlighting the low reservation status within the SE bioregion and Tasmania. As this community is not listed under any state legislation, there may be a clearing bias towards it when developments are planned. This may lead to excessive clearance of this community which may be detrimental in the long term, and highlights the importance of conserving areas of DVG within council and other reserves.

This community consists of short mature regrowth trees of *E. viminalis.* There is a relatively sparse tall shrub layer dominated by prickly box (*Bursaria spinosa)* and with occasional silver wattle (*Acacia dealbata),* black wattle *(A. mearnsii),* drooping sheoak (*Allocasuarina verticillata*) and native hop bush (*Dodonaea viscosa*). Low shrubs are scarce, with occasional occurrences of *Astroloma humifusum* (native cranberry)*, Bossiaea prostrata* (creeping bossiaea)*, Lissanthe strigosa* (peachberry heath) and *Pimelea humilis* (dwarf riceflower). Grasses dominate the ground cover with *Austrostipa* sp. being most prominent with kangaroo grass (*Themeda triandra*) and velvet tussockgrass (*Poa rodwayi*) also frequent. Graminoids and herbs are insignificant, with fan sedge (*Lepidosperma inops*) and grassland woodsorrel (*Oxalis perennans*) possibly being the most frequent species of the first and latter categories.

The condition is predominantly good with some typical agricultural weeds invading adjacent to the interface with the previous agricultural land (now housing).

***Eucalyptus viminalis* grassy forest and woodland (DVG)**

***Rockplate grassland* (GRP)**

Immediately to the west of Glebe Hill small patches of rockplate grassland (GRP) occur, covering approximately 0.3 hectares. Another small patch occurs on the south-eastern edge of the Reserve. This grassland is likely to be disturbance induced as a result of vegetation clearance for rough grazing or may be a consequence of shallow soils inhibiting tree establishment. Rockplate grassland is not threatened under the *Nature Conservation Act 2002*.

This community is dominated by native species in particular *Austrostipa* spp. with kangaroo grass (*Themeda triandra)* subdominant, and supports good populations of the chocolate lily (*Arthropodium strictum*). Other frequent herbs are native flax (*Linum marginale*), scaly buttons (*Leptorhynchos squamatus*) and trailing native-primrose (*Goodenia lanata*).

The condition is predominantly good with little to no weed infestations.

Rockplate grassland (GRP)

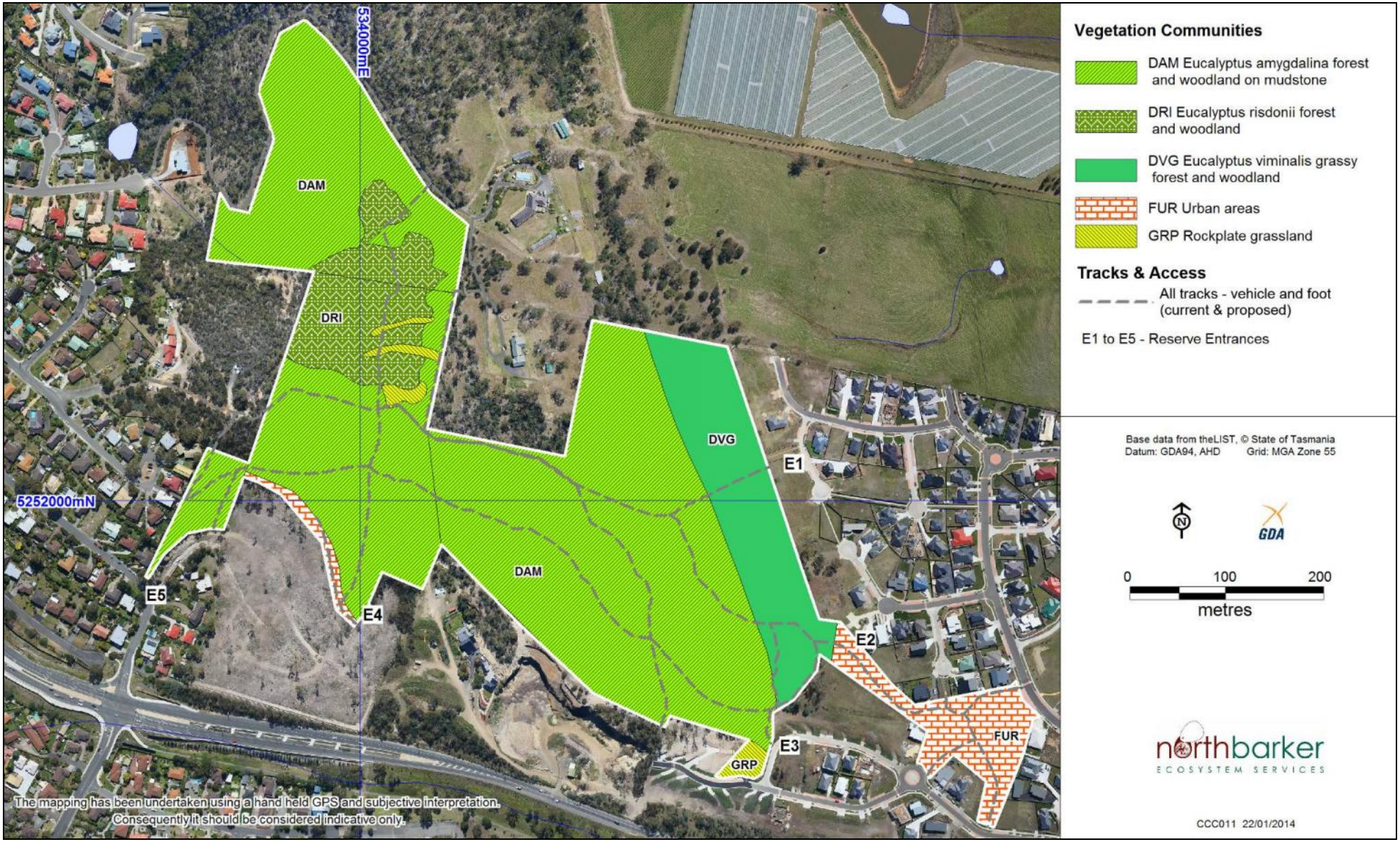


Figure 2: Vegetation Communities

4.2 Native Flora

A total of 112 species of vascular plant have been recorded within the Reserve, including 16 introduced species. A full species list is given in Appendix 1.

4.3 Threatened Flora

Four native species recorded on site are listed as 'rare' under the Tasmanian *Threatened Species Protection Act 1995* (TSPA) (see Table 2). No nationally threatened species listed under the Commonwealth *Environment Protection & Biodiversity Conservation Act 1999* (EPBCA) were recorded.

The distribution of threatened flora populations is shown in Figure 3.

Table 2: Threatened plant species recorded within the Reserve

Species	Status[4] TSPA / EPBCA	Population Estimate (2004-05) - number of plants or area (ha)
Arthropodium strictum Chocolate lily	Rare / -	1.75 million plants
Eucalyptus risdonii Risdon peppermint	Rare / -	1.9 hectares
Hypoxis vaginata Sheathing yellowstar	Rare / -	13,000 plants
Rytidosperma indutum Tall wallabygrass	Rare / -	200 - 300 plants

Arthropodium strictum (chocolate lily) – Rare (TSPA)

Arthropodium strictum is an attractive lily with chocolate scented purple flowers, flowering in spring, usually between October and December. It grows in open forest, dry hillsides, grassy woodlands and grasslands, and occurs predominantly in the eastern half of Tasmania - in the Hobart area, and the central and northern Midlands. There are however far fewer records in southern Tasmania, although it is represented in Waverly Flora Park and other parts of the Rokeby Hills.

A. strictum is represented by a very significant population within the Reserve. Plants are distributed primarily in the eastern and central part of the reserve, but they also occur in patches and as scattered individuals on the western side. Previous site surveys (A. North, 2004-

[4] Tasmanian *Threatened Species Protection Act 1995*, Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

05) have estimated the population as numbering approximately 1.75 million plants. These numbers appear to be persisting, with an abundance of plants present in 2013.

Flowers of *Arthropodium strictum*

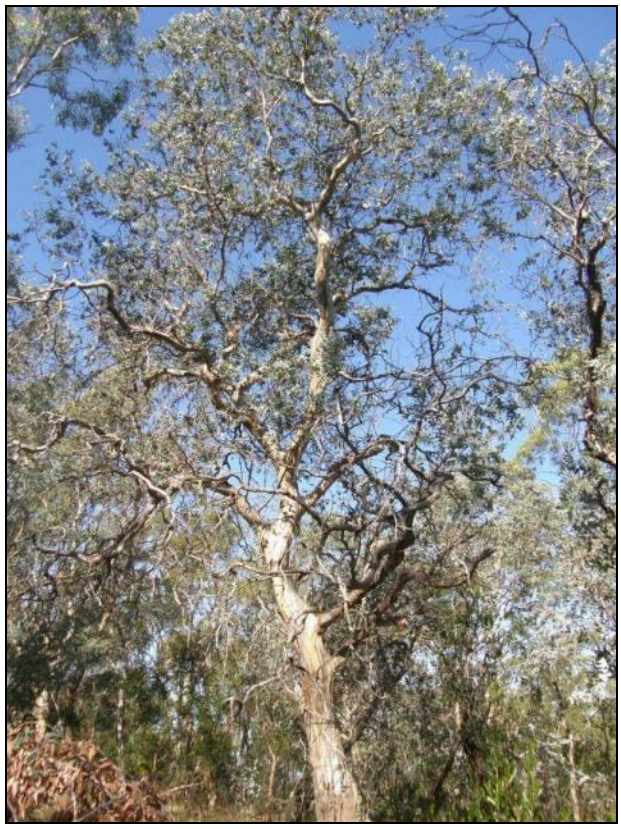
***Mass of Arthropodium strictum* flowers**

Eucalyptus risdonii (Risdon peppermint) – Rare (TSPA)

Eucalyptus risdonii is a small tree that grows to between 3 and 8m, and has distinctly blue/grey leaves, covered in a waxy white (glaucous) coating. *Eucalyptus risdonii* is a Tasmanian endemic that is confined to the greater Hobart region and is found on the dry hills between Mangalore and Rokeby where it occurs on the dry sunny crests and northwest facing upper slopes on Permian mudstone soils.

Within the Reserve this species primarily occurs in the western part of the Reserve where it occupies the upper west facing slope of Glebe Hill. It occurs as a significant stand occupying approximately 1.9 hectares.

Fruit and leaves of *Eucalyptus risdonii*



Habit of *Eucalyptus risdonii*

Hypoxis vaginata subsp. vaginata (yellow sheathing star) – Rare (TSPA)

Hypoxis vaginata is a small perennial herb that has grass-like leaves and small bright yellow flowers that open in early spring, usually in September and October. It grows in unimproved wet native pastures and seepage areas in grassy woodland. It is found primarily in the Midlands and the north of the state, but also occurs in the Hobart region.

Within the Reserve this species only occurs in the south eastern part of the Reserve where it occupies an area of rockplate grassland. Previous site surveys (A. North, 2004-05) have estimated the population as numbering approximately 13,000 plants.

Flowers and leaves of *Hypoxis vaginata* subsp. *vaginata*

Habitat of *Hypoxis vaginata* subsp. *vaginata*

Rytidosperma induta (tall wallabygrass) – Rare (TSPA)

Rytidosperma induta is an erect, tufted perennial grass that grows to approximately 120 cm tall. It occurs on mudstone and dolerite in open, dry sclerophyll woodlands. It is found in the Midlands, south-east and east coasts of the state and in many reserves in the greater Hobart area. It is widespread on the Rokeby Hills and is known to occur in at least one formal reserve nearby (Meehan Range), but is represented in many reserves in Hobart and Clarence including Waverly Flora Park, Ridgeway Reserve, Knocklofty Reserve and the Domain.

Within the Reserve it occurs as scattered and occasional plants on the upper slopes particularly in the western half. It occurs in association with both the *Eucalyptus risdonii* forest and woodland and the *Eucalyptus amygdalina* forest. Population estimates for this species have not been formalised, however it is likely to be in the order of several hundred plants.

Flowering head of *Rytidosperma induta*

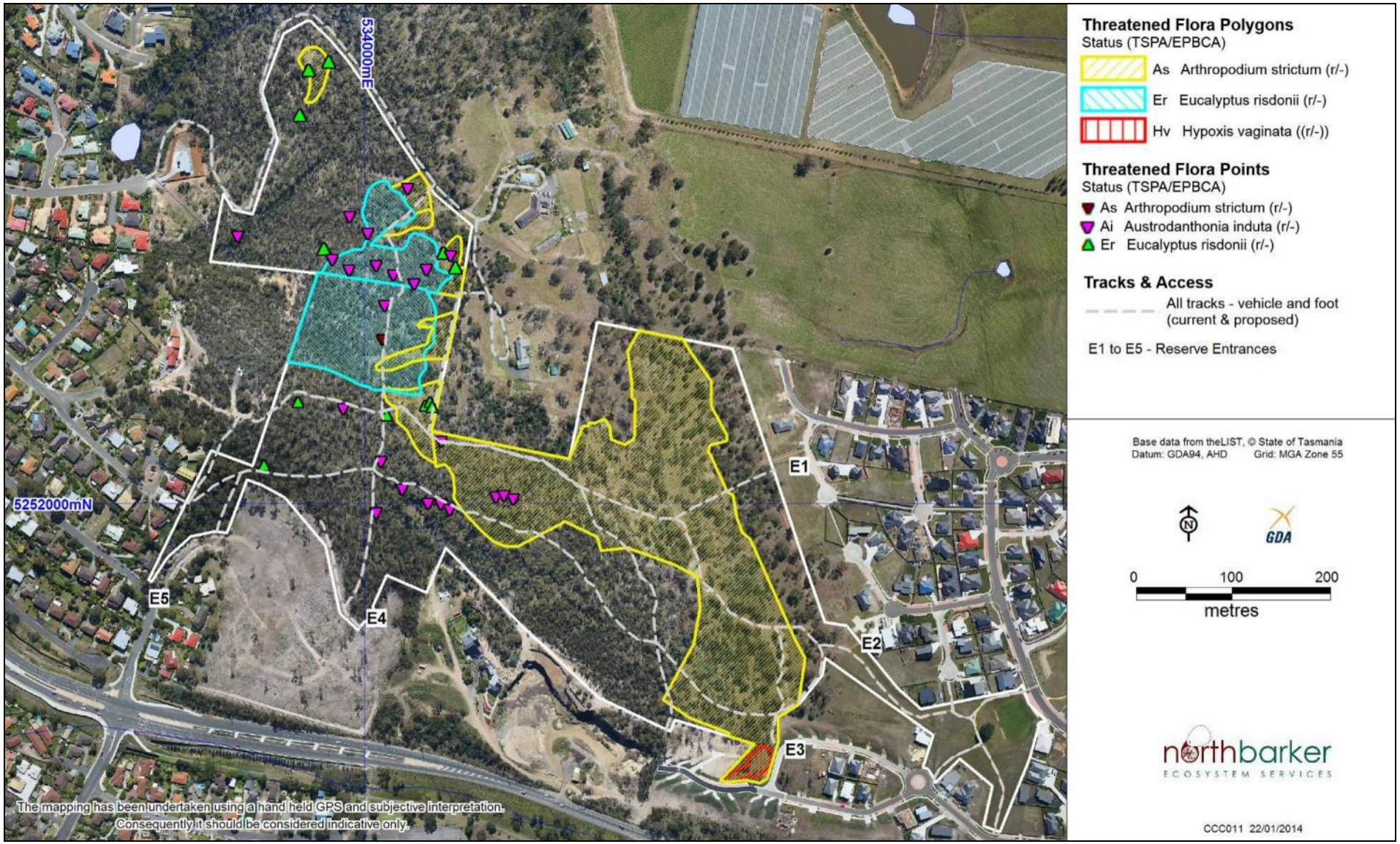


Figure 3: Threatened Flora

4.4 Fauna and Fauna Habitat

The bushland in the Reserve forms part of an extensive area of dry forest that would provide a range of habitat opportunities for smaller mammals, birds, reptiles and invertebrates. There is plenty of dead wood and fallen timber and some trees contain small hollows providing suitable habitat for hollow nesting birds and mammals. Patches of dense cover occur throughout the site, particularly in the gullies and areas of thicker grass which would provide shelter to mammals. There is little access to water in the form of creeks or standing water and no dens or rocky outcrops have been observed during surveys. The relatively open nature of much of the forest and woodland on site, particularly the grassy woodland areas provides opportunities for grazing, hunting and foraging for many fauna species.

Wallabies, brushtail possums, bettongs, pademelons and eastern barred bandicoots have been observed by local residents and in past surveys foraging both within the Reserve and the adjacent agricultural land, along with common woodland bird species. Bird surveys undertaken by Birds Tasmania in October 2013 recorded 17 species. Typical dry woodland bird species were recorded, with no unusual or threatened species being observed. A complete bird species list can be seen in Appendix 2.

4.5 Threatened Fauna

No threatened fauna records exist on the Natural Values Atlas (DPIPWE)[5] for the Reserve; however certain species have been recorded in the vicinity and could possibly occur within the Reserve. The most likely species to occur within the Reserve are the eastern barred bandicoot (*Perameles gunnii*) and the swift parrot (*Lathamus discolor*).

Eastern barred bandicoot (*Perameles gunnii*) - Vulnerable (EPBCA)

The eastern barred bandicoot is a small marsupial that inhabits grassland and grassy woodland. It forages preferably in open grassy areas, but for shelter and nesting it requires a dense ground cover of native tussock grasses, sedges and shrubs. They forage after dusk and sleep during the day in grass-lined nests where the cover is thick.

The dry grassy woodland and forest present on the property is therefore potentially suitable for this species, and it has been recorded in the vicinity although not in the Reserve itself. Eastern barred bandicoots have been observed foraging in and adjacent to the Reserve by local residents.

Swift parrot (*Lathamus discolor*) - Endangered (TSPA), Endangered (EPBCA)

The swift parrot is a small bright green parrot that migrates annually from Tasmania to mainland Australia. The breeding range of the swift parrot is largely restricted to the east coast of Tasmania within the range of the Tasmanian blue gum (*Eucalyptus globulus*). Swift parrots also nest in hollows in old growth trees across a range of eucalypt species.

The study area is located within the core range of the species, and it has been recorded in the vicinity although not in the Reserve itself. The Reserve is unlikely to provide any breeding habitat for this species due to insufficient hollows of a suitable size. Whilst there are very few blue gums, the Reserve could still be used for foraging particularly when the eucalypts on site are flowering.

[5] Natural Values Report #59274 30th October 2013 (DPIPWE)

4.6 Landscape Setting and Connectivity

The Reserve is a central component and link in an almost constant chain of native vegetation forming the Rokeby Hills. The upper slopes and ridgeline of the Rokeby Hills remain as intact bushland whilst the lower slopes and valleys have since European settlement succumbed to agriculture or residential development. The Rokeby Hills historically would have been connected to the north to the larger Meehan Range, however this link has been broken by vegetation clearance largely for agriculture and more recently housing development.

In terms of the immediate surrounding environment, the Reserve is adjacent to residential suburbs to the west, south and east. To the north of the reserve large areas of intact native bushland (the continuation of the Rokeby Hills) are contiguous with the Reserve, these bushland areas being interspersed with some isolated houses. Tenuous links occur to the south of the reserve with the southern extension of the Rokeby Hills, although Rokeby Road and further suburban development have weakened these links.

As a condition of the Glebe Hill suburban development to the east of the Reserve, a native revegetation buffer has been created between the new suburb and intensive viticulture to the north. This buffer is approximately 30m wide and forms a potential corridor between the Reserve and native vegetation remnants along the Clarence Plains Rivulet. This corridor is more likely to be of benefit to birds and invertebrates that can fly over Pass Road and associated vehicles. Mammals and reptiles are much more susceptible to vehicle roadkill; hence the corridor is likely to be more problematic. The benefits of having this corridor are likely to outweigh the potential impacts from roadkill.

The location of landscape linkages can be seen in Figure 4.

4.7 Aboriginal Heritage

Aboriginal Heritage Tasmania (AHT) has completed a search of the Tasmanian Aboriginal Site Index for the Reserve and has advised that there are no Aboriginal heritage sites recorded within the reserve boundary. Previous reports indicate that the area has a low probability of Aboriginal heritage being present (AHT, 2013).

All Aboriginal heritage is protected under the *Aboriginal Relics Act 1975*. If at any time during works you suspect Aboriginal heritage, such as stone artefacts, cave/shelter sites, burial sites, middens or other cultural material, cease works immediately and contact AHT for advice. Appendix 3 details an Unanticipated Discovery Plan, which explains what steps should be followed if any of the above items are discovered whilst working on a site. This plan should be on hand during ground disturbing works, to aid in meeting requirements under the Act should Aboriginal Heritage be uncovered.

4.8 European Heritage

Whilst the Glebe Hill area has an interesting and varied history since European settlement there are no obvious heritage items that occur within the Reserve. No items from the Reserve are listed on the Tasmanian Heritage Register. For those interested in the European history of the area a book by Wendy Andrew "Footprints - The People and Places of Early Clarence Plains and Rokeby" is an excellent resource.

4.9 Recreation Values

The Reserve is used for a range of recreational values by local residents, the primary one being walking. Other activities include jogging, dog walking, bird watching and nature observation and interaction. The Reserve is not currently classified by the Council with respect to its dog exercising status. The Council dog management policy is currently under review and the status of the Reserve with respect to dogs will be clarified after the review is complete. See Fauna and Habitat Protection (section 6.3) for further information and management recommendations.

4.10 Education Values

Educational activities that have occurred or do occur in the Reserve are unknown. There are currently no Landcare/ Bushcare type groups operating within the Reserve. There are however opportunities for the Reserve to be utilised in natural history or environmental teaching by local schools With the newly arrived residents building homes on the slopes of Glebe Hill to the south and east it is very timely to establish a local Landcare or 'Friends of' group.

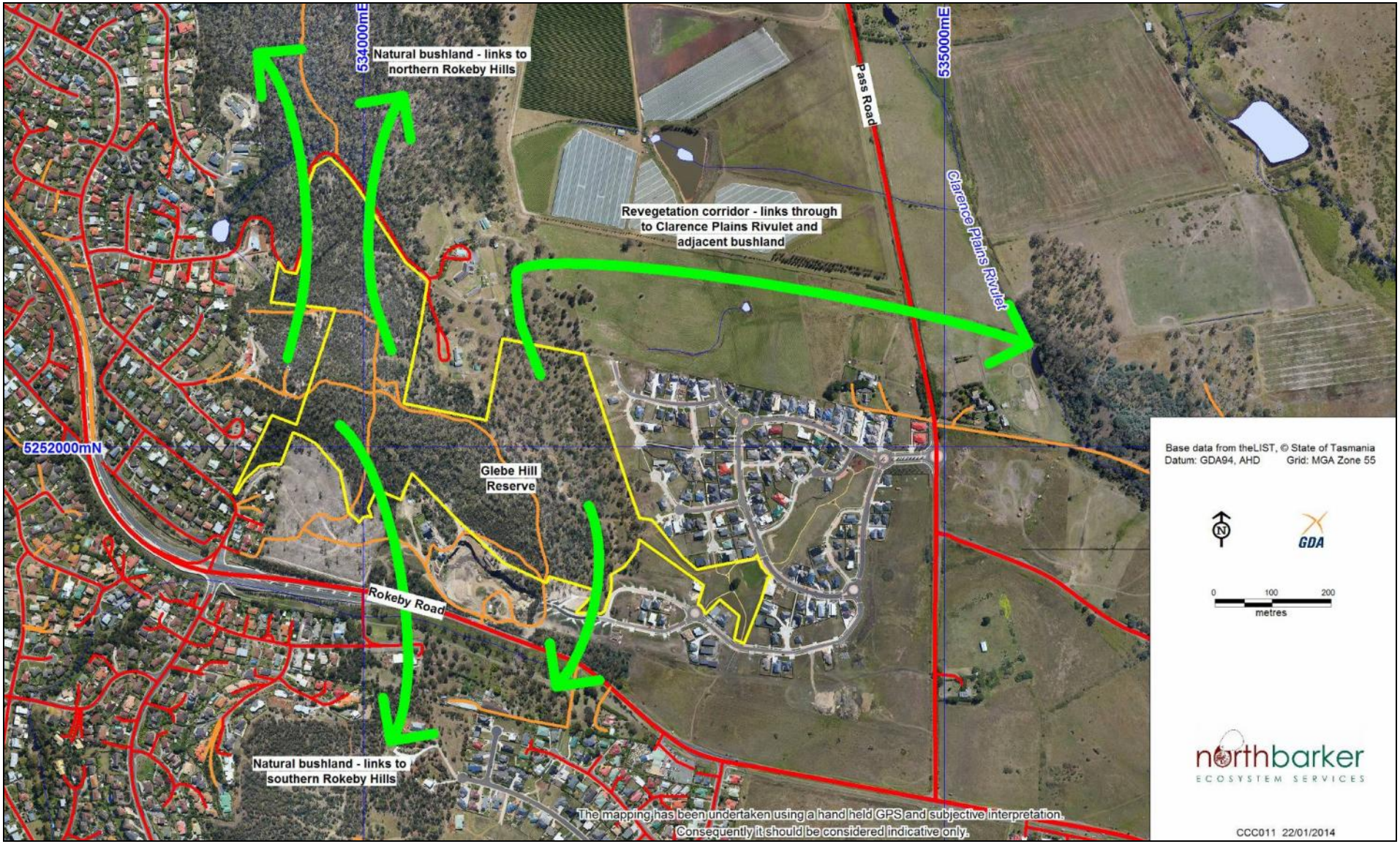


Figure 4: Landscape Setting and Connectivity

5 STAKEHOLDER CONSULTATION

A "Walk and Talk" meeting was held with interested local residents on Sunday 10th November 2013 between 3 and 5pm. Facilitated by the Council, the purpose of the meeting was to discuss the Reserve and the purpose of the Reserve Activity Plan, whilst allowing residents to provide input, discuss concerns or raise issues important to them. A total of twelve residents attended this meeting, during which issues and Reserve values were discussed whilst walking through the Reserve.

Following the "Walk and Talk", attendees were invited to submit formal written responses. Several major adjacent landholders who were unable to attend the "Walk and Talk" were approached via phone or email. In all, fourteen residents provided written comments or comments over phone or email. A summary of issues raised during this consultation is provided in Appendix 4.

The Draft Glebe Hill Bushland Reserve Activity Plan 2014 - 2018 was released for community consultation in early February 2014. Several submissions were received during this consultation period. A Glebe Hill Bushland Reserve Report Card was developed as a key tool, aimed to encourage feedback on the draft plan and was mailed out to interested residents and stakeholders.

The feedback received during the consultation period has been considered and incorporated in to the plan where appropriate. Issues raised that are not specifically related to the Reserve and its management have been forwarded to the relevant Council staff where they will be considered and addressed where possible.

6 PREVIOUS PLANS AND COMMITMENTS

6.1 Nature Conservation Plans

Glebe Hill Bushland Reserve is made up of two land parcels, both of which are currently protected by conservation covenants under the Tasmanian Nature Conservation Act 2002. Each conservation covenant area has a corresponding Nature Conservation Plan[6][7] that details management prescriptions and describes activities and restrictions that will ensure that the Reserve's natural values are maintained and enhanced. Under the covenant system, the specific management objectives are:

- to maintain the structure of vegetation community and allow for regeneration of native species under the proposed management regime;
- to implement appropriate fire regimes;
- to protect the habitat of threatened and/or priority species; and
- to eradicate or control weeds and feral animals and prevent any further introductions of exotic species.

[6] Nature Conservation Plan for Glebe Hill, Rokeby (August 2012)

[7] Nature Conservation Plan for 50 Minno St, Howrah

There is an obligation under this system that the landowner will protect and enhance the natural values of the Reserve, and implement management actions that aim to achieve this. The success, or otherwise, of the management regimes will be monitored by DPIPWE[8] Stewardship Officers, who can also offer advice on appropriate management and monitoring techniques.

Management prescriptions and recommendations from the two Nature Conservation Plans are relatively generic in nature and are in broad agreement and of a similar intent and nature to the management recommendations that follow within this plan.

6.2 Bushfire Management Plan

The Glebe Hill Reserve Bushfire Management Plan (2012 - 2016)[9] (BMP) is the first bushfire management plan for the Reserve. It aims to lessen the risks posed by wildfires by minimising the risk of fires starting in the Reserve, and minimising the risk of injury or damage to assets in and surrounding the Reserve. The BMP also provides for the use of fire as a management tool to:

- reduce bushfire hazard to protect assets from wildfires,
- maintain the long-term viability of the native vegetation in the reserve, and
- assist in the removal of weeds and the regeneration of degraded bushland.

With respect to this plan, one of the major implications of the BMP is the planned burning program. The Council is responsible for the implementation of the BMP within the Reserve, and hence the implementation of the planned burning program. Recommendations made within the BMP in relation to planned burning, weed control, track maintenance and vegetation clearance will overlap with many of the recommendations made within this plan. Even so, it is recommended that the implementation of management actions recommended in this plan is made in consultation with the BMP and vice versa.

In 2013 vegetation management units (VMU) 3 and 11 in the south-west and south-east of the Reserve were burnt as part of the planned burning program. VMU 5 is programmed to be burnt in 2014 when conditions are suitable[10]. VMU 11 is planned to be burned again in 2017, otherwise no other VMU's are scheduled to be burnt within the current BMP timeframe up to 2016. Following this the plan will be reviewed and more VMU's may be scheduled for burning post 2016.

In the event of a wildfire impacting on native vegetation within the Reserve, the implementation plan (see Section 8) will need to be reviewed.

[8] Department of Primary Industries, Water and Environment, Tasmania

[9] AVK Environmental Management (2012) Bushfire Management Plan. Glebe Hill Reserve, Howrah. Clarence City Council.

[10] pers. comm., Pat Marshall, CCC Fire Management Officer

7 MANAGEMENT ISSUES AND RECOMMENDATIONS

7.1 Weeds

Management of weeds is seen as one of the major issues needing to be addressed to maintain the integrity of the natural values present within the Reserve. Weeds invade native vegetation and out-compete or smother native species, resulting in the death or decline of native plants and the fauna that depend on them. If weeds are not actively managed there will be a gradual decline in the condition and diversity of species and a potential decline in threatened flora populations and fauna habitat values.

Weeds in Tasmania can be listed nationally as Weeds of National Significance (WONS) or in Tasmania as declared weeds under the Tasmanian *Weed Management Act 1999* (WMA). There is no legislative requirement for weeds listed as WONS to be controlled; however weeds listed under the Tasmanian WMA as declared are legally required to be controlled by landowners. It is therefore the responsibility of the Council to undertake the control of declared weeds within the Reserve.

Weed Species Present

Most of the Reserve is in surprisingly good condition when it comes to weed invasion, however, significant weed species do occur and some of the moister, south-east facing slopes and the eastern boundary do have more serious weed infestations.

Five weed species listed as 'declared weeds' (D) under the *Weed Management Act 1999* have been recorded in the Reserve. Three of these species are also listed as "Weeds of National Significance" (WONS). 15 environmental weeds (E) were also recorded. Of the 20 weeds species recorded in the Reserve, 14 were found only on the two moist slope areas which account for approximately 5% of the Reserve area. This highlights the localised nature of most of the weed species within the Reserve.

Texas needle grass (*Nassella leucotricha*) is of particular concern. The lands to the immediate east of Glebe Hill sloping down to Pass Road and the junction with Rokeby Road support the first and currently only known infestation of this highly invasive weed in Tasmania. Although it has been subject to targeted treatment since its discovery and a high level of concern from the Weed Management Section at DPIPWE, plants continue to pop up at new sites. The risk of an overlooked patch of plants seeding and spreading is high. It is known from the part of the Reserve that extends into the residential subdivision to the east in ex-pasture. The occasional plant has been recorded in and around the entrance to Glebe hill where it enters bushland. This open grassy vegetation provides prime habitat for Texas needle grass where its occurrence amongst native grasses would provide a considerable challenge to control.

Table 3 below details the weed species recorded. The distribution of weed species recorded is shown in Figure 5. Further details on weed species recorded, photos of each species and recommended control methods are given in Appendix 5, 6 and 7.

Weed Control

Apart from a few isolated occurrences, weeds in the Reserve are concentrated in three general areas - the two south-east facing gullies and the eastern boundary. Historically, the

gully areas have contained larger infestations of weeds, but weed control has occurred here as a condition of a previous adjacent subdivision. No further weed control work has taken place in the reserve.

The current weed infestation level is considered to be quite manageable. It is recommended to focus on all declared and environmental weeds together. Follow up control work will be required on an annual basis, particularly in the gully areas that have contained a historically high weed level, and also along the eastern boundary. Given an ongoing commitment it is entirely feasible that the listed declared and environmental weeds can be "eradicated" from the Reserve. Reinfestation from outside sources and the soil seed bank will always be an issue, but future resources required to control weeds will be low and drop to a minimal annual amount. Eventually an annual walk through of the Reserve and around its boundaries to monitor for new weeds whilst doing some minor control work at previously controlled areas is all that will be required.

Management of minor herbaceous and grassy weed species should only be considered once all other declared and environmental weeds have been controlled and upon review of this plan after five years.

Weed Control and Fire Management

It is recommended that weed control activities be integrated with the management burning program recommended within the Glebe Hill Reserve BMP. Carried out incorrectly or without proper planning, planned burning can exacerbate weed problems. As a part of Clarence City Council's Bushfire Management Strategy[11], a set of guidelines has been developed to integrate management burning with weed management to ensure that this does not happen. These guidelines - Best Practice Management Guidelines[12] - recommend the following in relation to weed control:

- before planned burning;
    - woody and herbaceous weeds in the areas to be burnt should be treated to ensure infestations are root dead at the time of burning
    - herbicide treatment should be carried out at least 3 months prior to the burn to ensure that the chemical has penetrated into the root system, achieved a total kill of all tissue, and the plant has had time to desiccate prior to burning
- after planned burning (which is likely to stimulate weed germination);
    - as soon as possible control weed seedlings before native seedlings germinate
    - control regrowth from the stumps of regenerating woody weeds

Weed Education

One of the major sources of weeds in reserves that occur in a suburban setting comes from suburban gardens. The establishment of new residences on the boundaries is likely to present an increased level of threat from inappropriately disposed garden waste and by garden plants naturalising into the reserve. Bird spread weeds are also likely to increase as gardens establish

[11] AVK Environmental Management (2011) Bushfire Management Strategy for Council Owned and Controlled Land. Clarence City Council.

[12] AVK Environmental Management (2011) Bushfire Management Strategy. Best Practice Management Guidelines. Clarence City Council.

and mature. The majority of weeds listed in Table 3 are considered to be garden escapes. Garden plants can "escape" into the bush either from seeds or fruits that are transported into the bush (e.g. blackberries by birds) or by garden cuttings and waste that are disposed of illegally over the back or side fence. Highly invasive species are well documented and resources are readily available that can help to inform people about this issue, and about alternative plants that are available. It is recommended that the Council undertake an awareness raising campaign with local residents about bushland weeds, garden escapes and illegal dumping of garden waste.

Recommendations:

1. **Control all declared and environmental weeds in an initial control effort.**
2. **Integrate weed control activities with the management burning program.**
3. **Undertake follow up control of weeds in areas previously treated.**
4. **In conjunction with weed control efforts, monitor the Reserve for new weed infestations.**
5. **Review weed management after five years of weed management activities.**
6. **Undertake an awareness raising campaign with local residents about bushland weeds.**

Table 3: Environmental and declared weed species recorded within the Reserve

Common Name	Scientific Name	Status
blackberry	*Rubus fruticosus*	D, WONS
boneseed	*Chrysanthemoides monilifera* subsp. *monilifera*	D, WONS
Montpellier broom	*Genista monspessulana*	D, WONS
fennel	*Foeniculum vulgare*	D
slender thistle	*Carduus pycnocephalus* and *Carduus tenuiflorus*	D
aeonium	*Aeonium* sp.	E
bluebell creeper	*Billardiera heterophylla*	E
cotoneaster	*Cotoneaster* sp.	E
fuchsia	*Fuchsia magellanica*	E
garden geranium	*Geranium* sp.	E
grevillea	*Grevillea rosmarinifolia*	E
Himalayan firethorn	*Pyracantha* sp.	E
holly	*Ilex aquifolium*	E
mirror bush	*Coprosma repens*	E
radiata pine	*Pinus radiata*	E
red valerian	*Centranthus ruber*	E
sweet briar	*Rosa rubiginosa*	E
sweet pittosporum	*Pittosporum undulatum*	E
tagasaste	*Chamaecytisus palmensis*	E
Texas needle grass	*Nassella leucotricha*	E

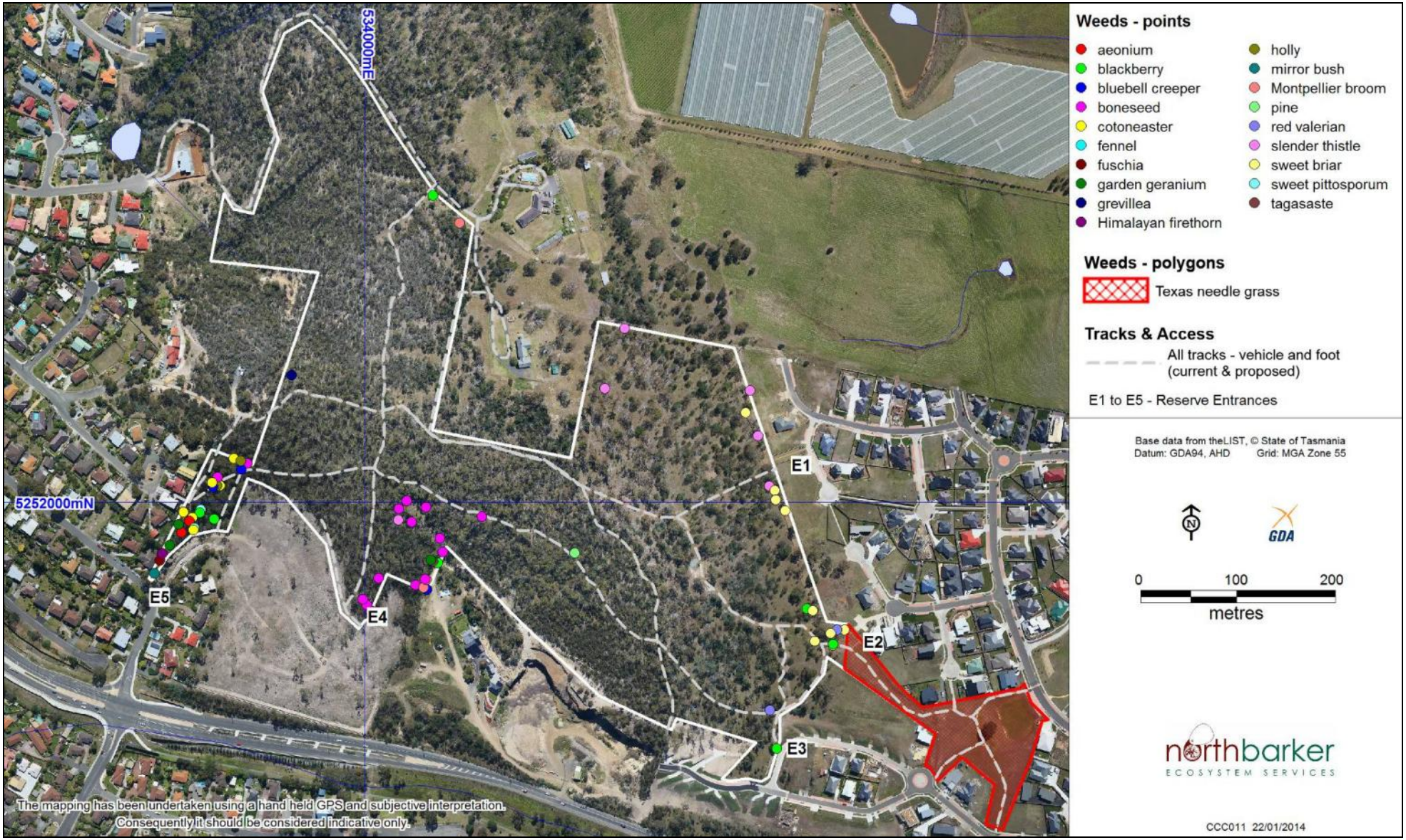


Figure 5: Weeds

7.2 Natural Regeneration and Revegetation

The native vegetation structure within the Reserve is largely intact and in what is considered to be a natural state. Consequently revegetation activities are not considered necessary in any part of the Reserve. The most disturbed areas occur where weed control activities have occurred and will continue to occur. In these areas natural regeneration should be facilitated by weed control activities and if managed correctly is the most efficient and cost effective way of maintaining the structure of vegetation communities. Careful follow up weed control in these areas must ensure regenerating native species are protected.

Bushfires can eliminate new recruits of trees and shrubs. It is preferable therefore to have an uneven age range reflecting a mosaic of habitats. Patch burning can ensure fuel loads are varied and losses of recruits are localised. Implementation of the Glebe Hill Reserve Bushfire Management Plan will help to ensure this is maintained.

Recommendations:

7. **Encourage natural regeneration of native species by undertaking initial weed control and ensuring follow up control protects this regeneration.**

8. **Ensure the management burning program allows for ongoing recruitment of woody vegetation.**

7.3 Fauna and Habitat Protection

Section 4.4 describes the fauna and fauna habitat values of the Reserve, with the vegetation considered to provide a range of habitat opportunities for smaller mammals, birds, reptiles and invertebrates. A diversity of vegetation types, plant structures (e.g. logs, hollows) and terrain (e.g. creeks, rocky outcrops) is considered ideal in providing a variety of habitat opportunities for native fauna. Maintaining this diversity will provide the best opportunity for fauna to persist and thrive.

The most likely impact to fauna habitat will come from uncontrolled bushfires in the Reserve, particularly if the whole Reserve is burnt out in one fire event. Implementation of the Glebe Hill Reserve BMP will help to ensure this does not happen by managing fuel loads and burning different management units in different years. The plan takes in to account the need to have a variety of different age structures of vegetation within the Reserve, and if implemented correctly will ensure a mosaic of habitat types and regrowth levels over the Reserve.

Weed control activities will have a positive effect on fauna habitat values by maintaining the vegetation composition and structure that native animals are adapted to and by not allowing this to be altered by weed invasion.

Introduced predators, in particular suburban cats and dogs can have a large impact on the native fauna populations in any reserve. Fauna can be killed or harassed to the point where they abandon the habitat for more isolated remnants. Being adjacent to suburbs which are increasing in the area increases the pressure on native fauna. Cats allowed to roam, particularly at night can have a large impact on vulnerable species, while dogs walking off-leash through the Reserve can chase small mammals, and their presence and smell can deter or drive out some fauna species.

The Council has an ongoing commitment to responsible cat ownership, with the most important part of this being keeping cats indoors overnight. Whilst this is not legally enforceable, an awareness raising campaign could influence some local residents to better manage their cats. Dogs are more of an issue when being walked off-leash through the Reserve, if they are not under effective control. Classification of the Reserve by Council as to its dog walking status is needed. The Council dog management policy is currently under review and the status of the Reserve with respect to dogs will be clarified after the review is complete. It is recommended that the Reserve be classified as a "dog under effective control" site. In such an area effective dog control provisions apply - dogs may be exercised off a lead provided they are, at all times, within sight and immediately responsive to an owners commands.

Recommendations:

9. **Ensure the management burning program takes into account fauna habitat requirements.**

10. **Maintain fauna habitat values by implementing weed control.**

11. **Council to undertake an awareness raising campaign with local residents about responsible cat and dog ownership within the Reserve.**

12. **Council to designate the Reserve as a "dog under effective control" site.**

7.4 Vegetation and Fauna Monitoring

Monitoring of flora and fauna composition within the Reserve over time is an effective way of assessing the health of an ecosystem, the effectiveness of current management activities and to justify the allocation of resources. The most effective monitoring methods for the Reserve are:

- vegetation monitoring plots
- photopoints
- resurvey weeds
- resurvey birds

The Glebe Hill Reserve Bushfire Management Plan recommends setting up vegetation monitoring plots to assess the impacts of planned burning within the Reserve. In 2013 vegetation management units (VMU) 3 and 11 were burnt as part of the planned burning program (see Appendix 11). VMU 5 is programmed to be burnt in 2014, while VMU 11 is planned to be burned again in 2017. Additional VMU's could be scheduled for burning after the Bushfire Management Program is reviewed after 2016. The setting up of monitoring plots should be organised in accordance with the burn schedule to ensure that burnt areas are monitored prior to burning taking place. The VMU's and burn schedule are included in Appendix 11 for reference.

Vegetation monitoring plots can also be used to monitor changes in the vegetation over time. Five monitoring plots should be set up within the Reserve; each in different vegetation management units, and one in each vegetation community, with two in the larger DAM community. Plots should be assessed using the vegetation condition analysis methodology.

Photopoints are fixed points from which a photograph is taken of a particular subject at different times for comparison. They can be set up to monitor a particular weed species or to

monitor an important location, such as where a threatened flora population occurs or within a threatened vegetation community. A photopoint should be set up at each vegetation monitoring plot. Vegetation monitoring plots and photopoints should be set up before any planned burning takes place, and be re-monitored in the first and fifth years after burning and then every five years.

The vegetation condition analysis methodology has been created by the Vegetation Section of DPIPWE to assess vegetation condition[13]. This methodology uses a scoring system to objectively assess vegetation condition for different vegetation types across Tasmania. Vegetation is scored according to attributes including the density of trees, species diversity, species recruitment, landscape context and weeds. Once a site has been assessed and assigned a vegetation condition score, this score should be used as a baseline for the site. Future measurements of the vegetation condition score can then be compared to this baseline to monitor changes in the score and hence changes in condition of the vegetation at the site.

The current weed mapping within this plan gives a snap shot of the Reserve's current weed status. For monitoring purposes the survey process can simply be repeated at a later date, and the abundance and distribution of weeds compared to see what the difference is. The current bird species list can be used in a similar way, with a later survey being able to convey if the species composition has changed. It is recommended that bird and weed surveys be undertaken every five years.

Recommendations:

13. **Set up five vegetation monitoring plots and photopoints before planned burning is implemented**
14. **Re-monitor vegetation monitoring plots and photopoints in the first and fifth years after burning and then every five years.**
15. **Undertake a weed survey every five years.**
16. **Undertake a bird survey every five years.**

7.5 Reserve Entrances

Public access to the Reserve is currently served from five entrances (E1 to E5) as shown on Figure 6. The extent of use of each of these entrances is currently unknown. To better understand the use by the public and to help to determine the most appropriate places for future infrastructure improvements, it is recommended that a public use survey be carried out. The five entrances are described in Table 4 below.

[13] DPIPWE (2006) Tasveg Vegetation Condition Manual

Table 4: Reserve Entrances, Current Status and Recommendations

Reserve Entrance	Status	Recommendations
Entrance 1 (E1) **Betsy Mack Entrance (Betsy Mack Place)**	Has been landscaped as part of the Glebe Hill Subdivision but in January 2014 was poorly maintained and overgrown with weeds. This is currently the entrance to nowhere as no formal tracks run from this entrance. This is aimed to be rectified with the installation of the proposed Betsy Mack Track. The track has been quite heavily eroded from water runoff. Access is open to bikes and trail bikes from adjacent roads. Although this does not appear to currently be a problem, a restriction of access is recommended. Car parking is available on adjacent streets.	• Install Reserve signage (refer to Section 6.7 on Infrastructure for details) • Install fencing and stationary bike barrier. Concept design provided in Appendix 10. • Maintain current landscaping or improve with local native plantings • Install dog waste bag dispensers and bin • Install water runoff diverters on entrance path
Entrance 2 (E2) **Wendy Andrew Entrance (Desailly Place and Glebe Hill Road)**	Access to the Glebe Hill Track and Highclere Track. Mown grass leads up to the entrance, after which native vegetation begins immediately. This entrance has two lead ins, one from Highclere Court and the other from the mown grassy area leading to Glebe Hill Road. Access is open to bikes and trail bikes from adjacent roads Although this does not appear to currently be a problem, a restriction of access is recommended. Access to emergency and council vehicles is through removable bollards at Highclere Court and Desailly Place. Car parking is available in a public car park on Glebe Hill Road.	• Install Reserve and interpretive signage • Initiate and implement landscape plan design (see Appendix 9) • Install seating • Install fencing and stationary bike barrier. Concept design provided in Appendix 10. • Install dog waste bag dispensers and bin
Entrance 3 (E3) **Norfolk Drive Entrance**	Access to the Highclere Track. Consists of stairs leading up from Norfolk Drive to a track leading in to the Reserve. There has been no landscape planting with exotic and native grasses pre-dominating. Car parking is available on adjacent streets. Stairs provide a disincentive to bikes. Further a restriction of access is not recommended.	• Install Reserve signage • Install seating above stairs • Install dog waste bag dispensers and bin
Entrance 4 (E4)	Access to the Highclere Track. Entrance to	• Install Reserve signage

Reserve Entrance	Status	Recommendations
Watton Place Entrance	a fire trail that is important access for fire fighting crews in the event of a fire. It is currently not landscaped; native vegetation grows up to the entrance. Car parking is available on adjacent streets.	• Maintain fire fighting access but limit vehicle access with a steel lockable boom gate. • Install dog waste bag dispensers and bin
Entrance 5 (E5) **Vienne Drive Entrance**	Currently accesses tracks running through private property. It is intended that the Glebe Hill Track be extended to this entrance and possibly be a future link through to the proposed Rokeby Hills Trail. A limestone retaining wall and stairs lead in to this obscure entrance. Without local knowledge it may be unclear that this is actually part of the reserve as it could appear to be private property. Stairs are the only barrier to bikes and trail bikes, but as this does not appear to currently be a problem, a restriction of access is not recommended.	• Install Reserve signage • Initiate and implement landscape plan design (see Appendix 9) • Install dog waste bag dispensers and bin
Mookara Street Entrance	Is a narrow laneway running from Mookara Street in to the Reserve, and it is recommended that this access be left as is except for the addition of a Reserve sign, as it is currently unclear where this pathway leads to.	• Install Reserve signage
Monique Street Entrance	The Monique Street access is through private property so is currently not accessible. This access is relatively overgrown and narrow in parts and is blocked by a wire fence on the edge of the Reserve. The formalisation of this access is subject to negotiation with landholders, but it could provide another option for a through-track in the Reserve and also another access option for fire fighting crews. Negotiations with landholders should be implemented to facilitate this happening.	• Initiate negotiations with landholders to discuss access options

Entrance Landscaping

Landscape designs could be planned and implemented for two entrances into the Reserve - the Wendy Andrew Entrance and the Vienne Drive Entrance. However any such works require adequate funding for establishment and long term maintenance to succeed. All other entrances to the Reserve are considered too minor for landscaping works and are likely to require too much of a financial commitment.

Bearing these constraints in mind, the entrances where landscaping would most benefit the Reserve have been highlighted. In doing this it is hoped that a process can be initiated, properly budgeted, designed and implemented. Images of the two entrances are shown in Appendix 9.

Recommendations:

17. **Implement Reserve entrance recommendations for all as per this plan.**

18. **Undertake a reserve entrance public use survey.**

19. **Initiate and implement landscape designs for Wendy Andrew and Vienne Drive Entrances.**

7.6 Tracks

Tracks within the Reserve consist of upgraded vehicle tracks suitable for emergency vehicles, old fire tracks suitable for 4WD vehicles, formal constructed walking tracks and informal walking tracks. The predominant use of these tracks is by pedestrians, with occasional use by Council maintenance vehicles.

The Glebe Hill Reserve Bushfire Management Plan requires that tracks be upgraded or maintained to a certain standard to allow for emergency vehicle access in the event of a fire. Track upgrades detailed in the BMP should be implemented. Vehicle tracks must be upgraded to fire trail usage classes as described in Management Procedure 1 in the Best Management Practices Guidelines Section of the Clarence Bushfire Management Strategy. Tracks can be seen in Figure 6 and Section 3.1.2 of the BMP and are not repeated here. Table 8 also from this plan is shown in Appendix 8 for reference. The implementation of these upgrades will also benefit pedestrians by improving track stability and accessibility.

Upgrading of some walking tracks is recommended along with additional track recommendations focusing on other sections of the Reserve (see Table 5). Walking track upgrades are all to be constructed and maintained to Australian Standard (AS) Walking Track Class 3, except for the Glebe Hill Track which is AS Walking Track Class 2. Full details of walking track designs and specifications can be found in the following AS document - AS 2156.1-2001 Walking tracks - Classification and signage[14].

Table 5: Track Upgrades

Track/ Location	Issue	Recommendations
Tracks GH1, GH2 & GH3* (and associated tracks) as detailed in the BMP.	Various non-compliance issues for fire management track standards	• Implement track upgrades and maintenance as per the recommendations in Table 8 (see Appendix 8) and Section 3.1.2 of BMP.

[14] http://infostore.saiglobal.com/store/results2.aspx?searchType=simple&publisher=AS&keyword=walking+tracks

Track/ Location	Issue	Recommendations
Highclere Track and associated side tracks south of the Glebe Hill Track	Informal foot track that needs upgrading to a better and safer standard.	• Upgrade foot track to a minimum standard of gravel walking track.
Betsy Mack Track	No track exists currently.	• Construct walking track to a minimum standard of gravel walking track.
Highclere Track to Vienne Drive Entrance	No track exists currently.	• Construct walking track to a minimum standard of walking track.
Tracks GH1 (and the connector to GH2) &	Minor erosion issues exist on some tracks.	• Install water runoff diverters where water erosion is most severe.

* - Track names GH1, GH2 and GH3 are from the BMP (BMP). The location of these tracks is shown on Figure 6.

A proposal for a loop track running to the north of the Reserve connecting the north-western part of the Reserve with the north-eastern part has been made. This is currently private property and would need an agreement with the local landholders. All landholders to the north of the Reserve were contacted regarding this issue and asked for comment. Comments received are summarised in Appendix 4. Further negotiation is beyond the scope of this project; however it is recommended that Council continue negotiations with key landholders.

Recommendations:

20. Implement track upgrade and maintenance recommendations as per this plan.

21. Negotiate with landholders re the feasibility of a northern loop track.

7.7 Infrastructure

There is currently no infrastructure within the Reserve itself in terms of seating, signage or any other public information or facilities. A balance between providing infrastructure to facilitate visitor access and retaining the natural amenity of the area needs to be found. Whilst certain infrastructure will be recommended, it should be low key and minimalistic so that it is unobtrusive where possible.

Members of the public who enjoy walking in native Reserves often enjoy sitting down on a seat to enjoy views or take a break. There are currently no seats within the Reserve and it is recommended that several seats are installed as per Figure 6. Similarly dog-walking is a popular activity; however the negative of dog faeces both to humans and the natural environment can be a problem. It is recommended that dog waste bag dispensers and bins be placed at several of the reserve entrances to facilitate the responsible behaviour of dog owners.

Information signage and trail direction signs are obvious in their absence in the Reserve. Unless you know the tracks well it could be easy to misplace your location and not have direction

signs to help you out. There is also a lack of Reserve signage telling the public that they are actually in the Reserve, and interpretive signs to educate and inform. To improve this situation Table 6 below details the infrastructure that should be installed and where.

Table 6: Infrastructure

Infrastructure Type	Details	Locations
Seats	• For the rest and relaxation of the general public • Should blend in to the environment and be as vandal proof as possible	• In four locations as per 3
Dog waste bag dispensers and bins	• For the bagging and removal of dog waste	• Install at each main entrance (E1 to E5)
Trail direction signs	• To be placed at track junctions to assist in direction finding and track location	• At all track intersections

Reserve signs	• To include the following information:
	  • Reserve name
	  • regulations (e.g. limitation on trail bikes, dogs on or off leash)
		• At all entrances, including Mookara St. Access (excluding Monique St. Access)

Interpretive signs	• To include the following information:
	  • track map
	  • Information on the history and natural values of the Reserve
		• At entrance E2

Gates	• steel lockable boom gate to permit fire and maintenance vehicle access but restrict other vehicles	• At entrance E4

Recommendations:

22. Implement infrastructure upgrade recommendations as per this plan.

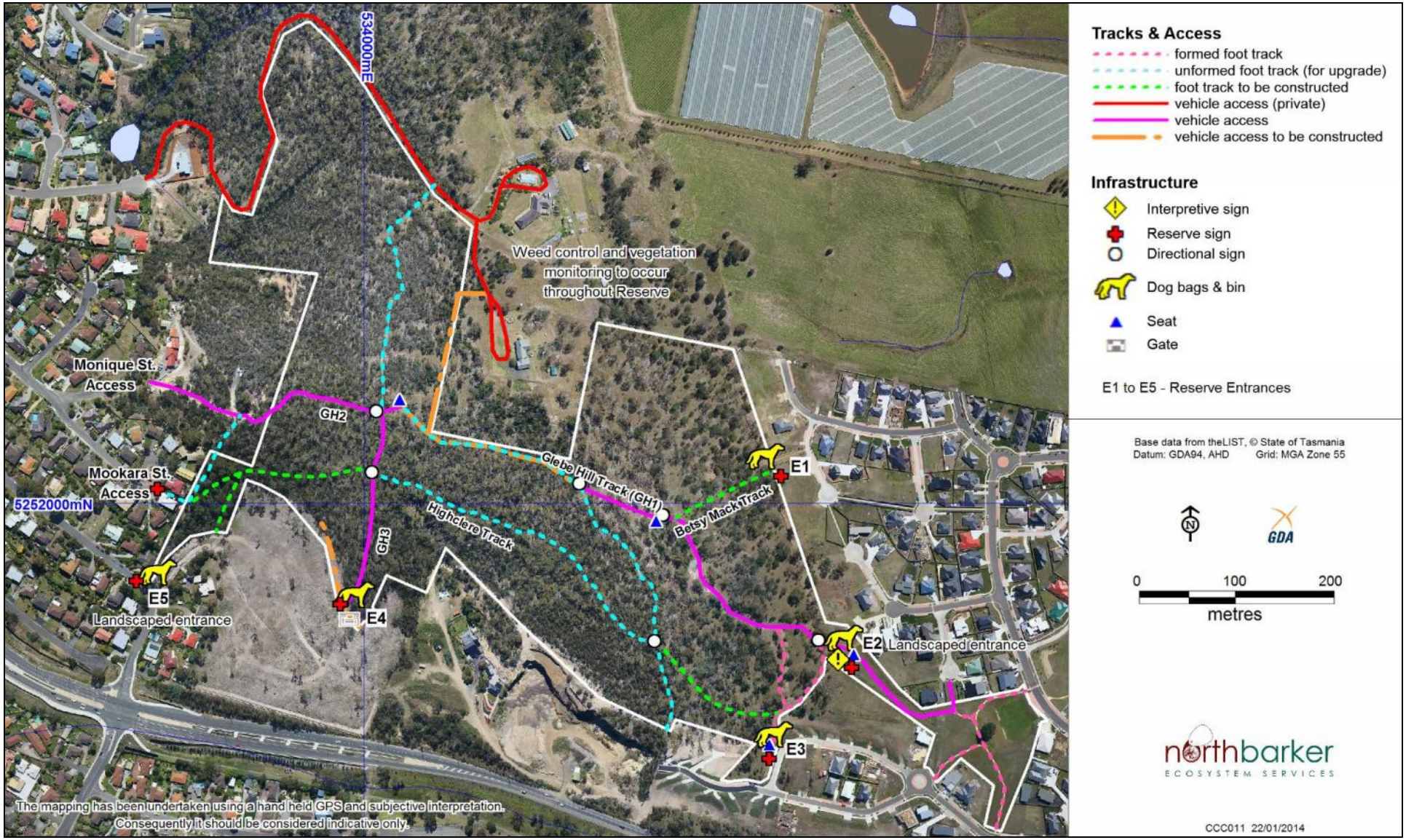


Figure 6: Location of proposed on-ground management activities, tracks & access

7.8 Bushfire Management

Bushfire management is a critical issue in the Reserve, particularly due to the potential for loss of assets and life, but it also has implications for flora and fauna management. The implications and management of bushfire are thoroughly addressed in the Glebe Hill Reserve Bushfire Management Plan (2012 - 2016)[15] (BMP). Consequently the issue will not be addressed in detail here, except to raise one particular management issue (see below).

One of the major recommendations of the BMP is the implementation of a planned burning program, the responsibility of which rests with the Council. Recommendations made within the BMP in relation to planned burning, weed control, track maintenance and vegetation clearance should be implemented as documented. Many of these recommendations will overlap with those made within this plan. Even so, it is recommended that the implementation of management actions recommended in this plan is made in consultation with the BMP and vice versa.

The timber fence constructed along the Reserve's eastern and south-eastern boundary with the newly constructed houses is a major fire hazard that occurs within the building protection zone. In a bushfire event the combustion of this fence could pose further risks to the adjacent houses. This risk could be substantially reduced by replacing the timber fence with a solid steel (e.g. Colorbond) fence. Residents should be aware that their Bushfire Attack Level (BAL) ratings for their homes are compromised by this wooden fence line, even though the Council is maintaining the Tasmanian Fire Service Standard Asset Protection Zone in the adjoining reserve. As a wooden rather than a metal fence line it also compromises the ecological values of the bush adjoining the properties by requiring substantially more clearing of bushland behind the highly combustible wooden fence lines compared to metal fence lines. The Council aims to encourage the replacement of these fences to reduce the fire risk and the level of management required.

Recommendations:

23. **Implement the management actions recommended in the BMP in consultation with this Plan.**

24. **Promote the major reduction in fire risks to neighbouring properties via wooden fence replacement.**

7.9 Community Participation and Awareness

It is very important to involve community in the activities and management of the Reserve to instil a sense of ownership and value of the Reserve itself. If this is successful the Reserve becomes an asset in the eyes of the community and local residents rather than a burden or a threat.

To facilitate this Council needs to be active in promoting the Reserve and community involvement in management and recreational activities. Many of the reserves in the Council area have active community groups that focus on weed management and revegetation. Such a group is an ideal way of engaging the community and involving people in the Reserve.

[15] AVK Environmental Management (2012) Bushfire Management Plan. Glebe Hill Reserve, Howrah. Clarence City Council.

The most successful groups are driven by one or more highly motivated local residents, and the formation of the group is usually initiated by these people. This is the preferred option. If initially a motivated individual is not present, the Council can look to initiate the formation of a group and drive it.

Several methods can be used to help raise awareness of the Reserve and its issues, including the following;

- "walk and talk" field mornings to take people through the Reserve and highlight the natural values, history, amenity and management issues of the Reserve
- A letter box drop to local residents with information on the Reserve and its issues. Issues raised should include bushland weeds and garden plantings, garden waste dumping, cats and dogs and their interaction with native fauna, trail bike riding etc. The "report card" for the Reserve should also be sent out with this information.
- Actively support the formation of a Glebe Hill Bushland Reserve Landcare Group. Alternatively seek a role for the Tranmere & Clarence Plains Landcare & Coastcare Incorporated group
- install signage to inform people of the values of the Reserve (see Infrastructure section for details)

Recommendations:

25. **Facilitate the formation of a community group to undertake management activities within the Reserve.**

26. **Organise an annual "walk and talk" within the Reserve.**

27. **Organise a letter box drop to highlight the Reserve report card and other management issues. Enquire interest in participation on a Friends Of Glebe Hill Bushcare Group**

28. **Implement signage recommendations as per this plan.**

7.10 Review and Reporting

A review of the Glebe Hill Bushland Reserve Activity Plan should be undertaken after five years of the plan having been implemented. A thorough assessment of the recommendations and progress made towards their implementation needs to be made. Additionally data collected from vegetation monitoring plots, photopoints and weed and bird surveys needs to be analysed and reported on to see if natural values are improving, declining or being maintained. Finally recommendations need to be made as to the management priorities for the next five years of the plan.

The Glebe Hill Bushfire Management Plan is due to be reviewed after 2016. This plan is due to be reviewed after 2018. Since these plans intertwine in their objectives and some recommended actions, and vegetation monitoring should be synchronised with the planned burning program, it would be beneficial if the dates and time periods were more aligned. Preferably this would involve the time periods aligning in the future and the reviews of both documents occurring at the same time and with consultation occurring to ensure objectives, actions and recommendations are complementary.

Recommendations:

29. **Undertake a review and reporting process after five years of the operation of this plan.**

30. **Re-align time periods for the Bushfire Management Plan and the Reserve Activity Plan so that they occur over the same time period and are complementary.**

8 IMPLEMENTATION PLAN

The following implementation plan includes all of the recommendations made throughout the Reserve Activity Plan. Each recommendation has an associated performance measure, responsible organisation, and an estimated funding cost. Funding costs are estimates only and due to changes in price over time should be revisited closer to the implementation date. Recommendations have also been assigned a priority ranking based on the following system:

- Priority 1 - short term activities (6-12 months)
- Priority 2 - medium term activities (1-3 years)
- Priority 3 - long term activities (3-5 years)

The implementation plan should be used as a guide to the estimated costs and what order tasks should be carried out in based on the priority order. If a community group is eventually formed considerable cost savings could be made. Recommendations are aspirational and a best case scenario given unlimited funding. Given that this is not the case; decisions will need to be made as to what is achievable with the current resources. Alternative funding may need to be sought in the form of government grants to make some of the recommendations achievable.

Table 7: Implementation Plan

Priority	Recommendation No.	Action	Performance Measure	Responsibility	Estimated Funding*
Weeds					
1	1	Control all declared and environmental weeds in an initial control effort	Initial control of weeds completed	Council, contractor or community group	$2,400
1	2	Integrate weed control activities with the management burning program	Planned burn areas have weed control before and after burn event	Council, contractor or community group	$600
2,3	3	Undertake follow up control of weeds in areas previously treated	Areas previously treated remain weed free	Council, contractor or community group	$1,500 per annum
2,3	4	In conjunction with weed control efforts, monitor the Reserve for new weed infestations	Reserve remains free of declared and environmental weeds	Council, contractor or community group	included in Rec. No. 1 & 3
Regeneration and Revegetation					
2,3	7	Encourage natural regeneration of native species by undertaking initial weed control and ensuring follow up control protects this regeneration	Native species are regenerating in areas treated for weeds	Council, contractor or community group	included in Rec. No. 1 & 3
2,3	8	Ensure the management burning program allows for ongoing recruitment of woody vegetation	Native woody species are regenerating and persisting	Council, contractor or community group	included in Rec. No. 1 & 3
Fauna and Habitat Protection					
1	9	Ensure the management burning program takes into account fauna habitat requirements	A mosaic of habitat types and regrowth levels has resulted in the Reserve as a	Council or contractor	NA - Funding part of the fire management

Priority	Recommendation No.	Action	Performance Measure	Responsibility	Estimated Funding*
			result of the planned burn program		program
1	10	Maintain fauna habitat values by implementing weed control	Weed control program implemented	Council, contractor or community group	included in Rec. No. 1 & 3
2	11	Council to undertake an awareness raising campaign with local residents about responsible cat and dog ownership within the Reserve	Awareness raising campaign implemented to local residents	Council	NA - Normal council activity
2	12	Council to designate the Reserve as a "dog under effective control" site	The Reserve is designated as a "dog under effective control" site under the Council's Dog Management Policy and listed on the Council website	Council	NA - Normal council activity
Vegetation and Fauna Monitoring					
1	13	Set up five vegetation monitoring plots and photopoints before planned burning is implemented	Five vegetation monitoring plots and photopoints set up	Contractor	$2,000 (includes data analysis and basic reporting)
2,3	14	Re-monitor vegetation monitoring plots and photopoints in the first and fifth years after burning and then every five years	Five vegetation monitoring plots and photopoints re-monitored in the first and fifth years after burning and then every five years	Contractor	$1,500 (includes data analysis and basic reporting)
3	15	Undertake a weed survey every five years	Weed survey completed after fifth year	Contractor	$1,500 (includes data analysis and

Priority	Recommendation No.	Action	Performance Measure	Responsibility	Estimated Funding*
					basic reporting)
3	16	Undertake a bird survey every five years	Bird survey completed after fifth year	Contractor or Birds Tasmania	$1,500 (includes data analysis and basic reporting)
Reserve Entrances					
1	17	Maintain current landscaping at Betsy Mack Entrance (E1) or improve with local native plantings	Betsy Mack Entrance landscaping maintained and in good condition	Council	$1,000
1	17	Install water runoff diverters on entrance path at Betsy Mack Entrance (E1)	Runoff diverters installed on Betsy Mack Entrance path	Council	$2,000
1	17	Maintain landscaping at entrances E1, E2 & E3	Maintenance carried out and landscaping in good condition	Council	$1,000 per annum
1	18	Undertake a reserve entrance public use survey			
1	19	Initiate landscape designs for Wendy Andrew and Vienne Drive Entrances	Landscape designs prepared for Wendy Andrew and Vienne Drive Entrance	Council	Separate costing required
2	19	Implement concept landscape plan at Wendy Andrew Entrance (E2) and Vienne Drive Entrance (E5)	Landscaping completed and maintained at Wendy Andrew Entrance and Vienne Drive Entrance	Council	Separate costing required
Tracks & Infrastructure					

Priority	Recommendation No.	Action	Performance Measure	Responsibility	Estimated Funding*
1	20	Cost and implement track upgrades and maintenance as per the recommendations in Table 8, Figure 6 and Section 3.1.2 of the BMP	Track upgrades and maintenance completed	Council or contractor	Separate costing required
2	20	Construct walking track to a minimum standard of gravel walking track on those sections of the Highclere Track and associated side tracks south of the Glebe Hill Track	Track upgrades and maintenance completed on Highclere Track and associated tracks	Council or contractor	$55,000
2	20	Construct Betsy Mack walking track to a minimum standard of gravel walking track	Betsy Mack Track constructed and maintained	Council or contractor	$10,000
2	20	Construct Highclere Track to Vienne Drive Entrance walking track to a minimum standard of gravel walking track	Highclere Track to Vienne Drive Entrance walking track constructed and maintained	Council or contractor	$23,000
3	20	Install water runoff diverters where water erosion is most severe on GH1 and the connector to GH2	Water runoff diverters installed	Council or contractor	$10,000
2	21	Negotiate with landholders re the feasibility of a northern loop track	Negotiations undertaken with landholders	Council	NA
2	22	Install seats at four locations as per Figure 6	Four seats installed	Council or contractor	$8,000
2	22	Install dog waste bag dispensers and bins at each reserve entrance	Five dog waste bag dispensers and bins installed	Council or contractor	$7,000
2	22	Install trail direction signs as per Figure 6	Six trail direction signs installed	Council or contractor	$3,000

Priority	Recommendation No.	Action	Performance Measure	Responsibility	Estimated Funding*
2	22	Install reserve signs at all entrances, including Mookara St. Access (excluding Monique St. Access)	Six reserve signs installed	Council or contractor	$9,000
2	22	Install interpretive signs at entrance E2	One interpretive sign installed	Council or contractor	$3,000
2	22	Install steel lockable boom gate at entrance E4	One steel lockable boom gate installed	Council or contractor	$10,000
Bushfire Management					
1	23	Implement the management actions recommended in the BMP in consultation with this Plan	Management actions recommended in the BMP implemented in consultation with this Plan	Council	NA
1	24	Promote the major reduction in fire risks to neighbouring properties via wooden fence replacement	Letters sent to landholders with wooden fences backing on to the Reserve to raise the issue.	Council	NA
Community Participation and Awareness					
2	25	Facilitate the formation of a community group to undertake management activities within the Reserve	Reserve community group formed and active	Council or local residents	NA
2	26	Organise an annual "walk and talk" within the Reserve	Annual "walk and talk" completed	Council	NA
1	6, 27	Organise a letter box drop to highlight the Reserve report card and other management issues	Letter box drop completed	Council	NA
2	21, 28	Implement signage recommendations as per this plan	Signage installed	Council	See above

Priority	Recommendation No.	Action	Performance Measure	Responsibility	Estimated Funding*
Review and Reporting					
3	5, 29	Undertake a review and reporting process after five years of the operation of this plan	Review on the Reserve Activity Plan completed	Council or contractor	$8,000
3	30	Re-align time periods for the BMP and the Reserve Activity Plan so that they occur over the same time period and are complementary	BMP and RAP occur over same time period and are complementary	Council or contractor	NA

* - all costs are GST exclusive

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Tasmanian State Government (2002). *Nature Conservation Act 2002.* No.63 of 2002. Government Printer, Hobart, Tasmania.

APPENDIX 1 - VASCULAR PLANT SPECIES LIST

Status codes:

ORIGIN	NATIONAL SCHEDULE	STATE SCHEDULE
i - introduced	EPBC Act 1999	TSP Act 1995
d - declared weed WM Act	CR - critically endangered	e - endangered
en - endemic to Tasmania	EN - endangered	v - vulnerable
t - within Australia, occurs only in Tas.	VU - vulnerable	r - rare

Name	Common name	Status
DICOTYLEDONAE		
APIACEAE		
Hydrocotyle foveolata	yellow pennywort	
ASTERACEAE		
Bedfordia salicina	tasmanian blanketleaf	en
Brachyscome aculeata	hill daisy	
Chrysanthemoides monilifera subsp. monilifera	boneseed	d
Chrysocephalum apiculatum	common everlasting	
Chrysocephalum semipapposum	clustered everlasting	
Coronidium scorpioides	curling everlasting	
Craspedia glauca	common billybuttons	en
Euchiton collinus	common cottonleaf	
Hypochoeris radicata	rough catsear	i
Leptorhynchos nitidulus	shiny buttons	
Leptorhynchos squamatus	scaly buttons	
Ozothamnus obcordatus	yellow everlastingbush	
Ozothamnus purpurascens	columnar everlastingbush	en
Ozothamnus scutellifolius	buttonleaf everlastingbush	en
Senecio glomeratus	shortfruit purple fireweed	
Senecio hispidulus	rough fireweed	
Senecio quadridentatus	cotton fireweed	
Sonchus oleraceus	common sowthistle	i
CAMPANULACEAE		
Wahlenbergia sp.	bluebell	
CASUARINACEAE		
Allocasuarina littoralis	black sheoak	
CRASSULACEAE		
Crassula sieberiana	stone-crop	
DILLENIACEAE		
Hibbertia hirsuta	hairy guineaflower	en
EPACRIDACEAE		
Acrotriche serrulata	ants delight	
Astroloma humifusum	native cranberry	
Epacris impressa	common heath	
Lissanthe strigosa	peach berry	
EUPHORBIACEAE		
Poranthera microphylla	small poranthera	

FABACEAE		
Bossiaea prostrata	creeping bossiaea	
Daviesia latifolia	hop bitterpea	
Daviesia ulicifolia subsp. ulicifolia	yellow spiky bitterpea	
Dillwynia cinerascens	grey parrotpea	
Pultenaea pedunculata	matted bushpea	
GENTIANACEAE		
Centaurium erythraea	common centaury	i
GERANIACEAE		
Geranium sp.	native geranium	
GOODENIACEAE		
Goodenia lanata	trailing native-primrose	
Goodenia ovata	hop native-primrose	
HALORAGACEAE		
Gonocarpus tetragynus	common raspwort	
LAMIACEAE		
Prostanthera lasianthos var. lasianthos	christmas mintbush	
LAURACEAE		
Cassytha pubescens	downy dodderlaurel	
LINACEAE		
Linum marginale	native flax	
Linum trigynum	french flax	i
MIMOSACEAE		
Acacia baileyana	cootamundra wattle	i
Acacia dealbata subsp. dealbata	silver wattle	
Acacia genistifolia	spreading wattle	
Acacia mearnsii	black wattle	
Acacia melanoxylon	blackwood	
MYRTACEAE		
Eucalyptus amygdalina	black peppermint	en
Eucalyptus globulus	Tasmanian blue gum	en
Eucalyptus risdonii	risdon peppermint	en r
Eucalyptus viminalis subsp. viminalis	white gum	
OXALIDACEAE		
Oxalis perennans	grassland woodsorrel	
PITTOSPORACEAE		
Bursaria spinosa subsp. spinosa	prickly box	
Pittosporum undulatum	sweet pittosporum	i
Rhytidosporum procumbens	starry appleberry	
PLANTAGINACEAE		
Plantago varia	variable plantain	
POLYGALACEAE		
Comesperma volubile	blue lovecreeper	
PROTEACEAE		
Grevillea rosmarinifolia	grevillea	i
RHAMNACEAE		
Pomaderris apetala	common dogwood	
Pomaderris elliptica	yellow dogwood	

Pomaderris pilifera	hairy dogwood	
ROSACEAE		
Rosa rubiginosa	sweet briar	i
Rubus fruticosus	blackberry	d
RUBIACEAE		
Galium aparine	cleavers	i
Opercularia varia	variable stinkweed	
SANTALACEAE		
Exocarpos cupressiformis	common native-cherry	
SAPINDACEAE		
Dodonaea viscosa subsp. spatulata	broadleaf hopbush	
STYLIDIACEAE		
Stylidium graminifolium	narrowleaf triggerplant	
THYMELAEACEAE		
Pimelea humilis	dwarf riceflower	
TREMANDRACEAE		
Tetratheca labillardierei	glandular pinkbells	
VIOLACEAE		
Viola hederacea	ivyleaf violet	

MONOCOTYLEDONAE

CYPERACEAE		
Carex breviculmis	shortstem sedge	
Lepidosperma gunnii	narrow swordsedge	
Lepidosperma laterale	variable swordsedge	
Schoenus apogon	common bogsedge	
JUNCACEAE		
Juncus pallidus	pale rush	
IRIDACEAE		
Diplarrena moraea	white flag-iris	
LILIACEAE		
Arthropodium milleflorum	pale vanilla-lily	
Arthropodium strictum	chocolate lily	r
Dianella revoluta	spreading flaxlily	
Thysanotus patersonii	twining fringelily	
Wurmbea dioica subsp. dioica	early nancy	
ORCHIDACEAE		
Chiloglottis sp.	bird orchid	
Diuris pardina	leopard orchid	
Pterostylis nutans	nodding greenhood	
Thelymitra rubra	pink sun-orchid	
Thelymitra sp.	sun-orchid	
POACEAE		
Agrostis sp.	blown grass	
Aira elegantissima	delicate hairgrass	
Austrodanthonia caespitosa	common wallabygrass	
Austrodanthonia setacea	bristly wallabygrass	
Austrodanthonia sp.	wallabygrass	

Austrostipa mollis	soft speargrass	
Austrostipa pubinodis	tall speargrass	
Austrostipa rudis subsp. australis	southern speargrass	
Austrostipa sp.	speargrass	
Austrostipa stuposa	corkscrew speargrass	
Briza maxima	greater quaking-grass	i
Briza minor	lesser quaking-grass	i
Cynosurus echinatus	rough dogstail	i
Dactylis glomerata	cocksfoot	i
Deyeuxia monticola	mountain bentgrass	
Deyeuxia quadriseta	reed bentgrass	
Dichelachne rara	common plumegrass	
Ehrharta stipoides	weeping grass	
Elymus scaber	rough wheatgrass	
Holcus lanatus	yorkshire fog	i
Poa rodwayi	velvet tussockgrass	
Rytidosperma indutum	tall wallabygrass	r
Themeda triandra	kangaroo grass	
XANTHORRHOEACEAE		
Lomandra longifolia	sagg	

PTERIDOPHYTA

ASPIDIACEAE		
Polystichum proliferum	mother shieldfern	
DENNSTAEDTIACEAE		
Pteridium esculentum	bracken	

APPENDIX 2 - BIRD SPECIES LIST

This species list is a combination of a list from a Birds Tasmania 2013 survey and North Barker Ecosystem Services survey observations.

Status codes:

ORIGIN	NATIONAL SCHEDULE	STATE SCHEDULE
i - introduced	EPBC Act 1999	TSP Act 1995
d - declared weed WM Act	CR - critically endangered	e - endangered
en - endemic to Tasmania	EN - endangered	v - vulnerable
t - within Australia, occurs only in Tas.		VU - vulnerable r - rare

Common Name	**Scientific Name**	**Status**
Australian magpie	*Gymnorhina tibicen*	
Blackbird	*Turdus merula*	i
Brown thornbill	*Acanthiza pusilla*	
Common bronzewing	*Phaps chalcoptera*	
Eastern rosella	*Platycercus eximius*	
Forest raven	*Corvus tasmanicus*	
Green rosella	*Platycercus caledonicus*	
Grey currawong	*Strepera versicolor*	
Grey fantail	*Rhipidura fuliginosa*	
Golden whistler	*Pachycephala pectoralis*	
Laughing kookaburra	*Dacelo novaeguineae*	i
Musk lorikeet	*Glossopsitta concinna*	
New Holland honeyeater	*Phylidonyris novaehollandiae*	
Noisy miner	*Manorina melanocephala*	
Pallid cuckoo	*Cuculus pallidus*	
Shining bronze cuckoo	*Chalcites lucidus*	
Silvereye	*Zosterops lateralis*	
Spotted pardalote	*Pardalotus punctatus*	
Spotted turtle-dove	*Streptopelia chinensis*	i
Striated pardalote	*Pardalotus striatus*	
Superb fairy-wren	*Malurus cyaneus*	

APPENDIX 3 - UNANTICIPATED DISCOVERY PLAN

Unanticipated Discovery Plan

For proponents and consultants dealing with Aboriginal Heritage in Tasmania

This paper provides a Plan that should be followed when dealing with unanticipated discoveries of Aboriginal Cultural Heritage such as sites and objects. The plan provides guidance to project personnel so that they may meet their obligations with respect to Aboriginal heritage in accordance with the *Aboriginal Relics Act 1975* and the *Coroners Act 1995*.

The Unanticipated Discovery Plan is in two sections. The first section primarily explains mitigation strategies that should be employed when any Aboriginal Cultural Heritage sites or items are discovered excluding skeletal remains (burials), while the second process deals specifically with skeletal remains (burials).

Discovery of Cultural Heritage Items

Step 1: Any person who believes they have uncovered Aboriginal Cultural Heritage material should notify all employees or contractors that are working in the immediate area that all earth disturbance works must cease immediately.

Step 2: A temporary 'no-go' or buffer zone of at least 10m x 10m should be implemented to protect the suspected Aboriginal Cultural Heritage site or relics. No unauthorised entry or works will be allowed within this 'no-go' zone until the suspected Aboriginal Cultural Heritage relics have been assessed by a recognised Aboriginal Heritage Officer or Archaeologist.

Step 3: Aboriginal Heritage Tasmania (AHT) in Hobart (ph 6233 6613) needs to be notified and consulted as soon as possible and informed of the discovery. AHT will then provide further advice in accordance with the *Aboriginal Relics Act 1975*.

Discovery of Skeletal Material

Step 1: Call the Police immediately. Under no circumstances should the suspected skeletal remains be touched or disturbed. The area must now be considered a crime scene. It is a criminal offence to interfere with a crime scene.

Step 2: Any person who believes they have uncovered skeletal material should notify all employees or contractors that are working in the immediate area that all earth disturbance works must cease immediately.

Step 3: A temporary 'no-go' or buffer zone of at least 50m x 50m should be implemented to protect the suspected skeletal remains. No unauthorised entry or works will be allowed within this no-go' zone until the suspected skeletal remains have been assessed by the Police and or Coroner.

Step 4: Should the skeletal remains be determined to be of Aboriginal origin, the Coroner will contact the Tasmanian Aboriginal Land and Sea Council (TALSC) to arrange for repatriation of the remains, as per the *Coroners Act 1995*.

Aboriginal Heritage Tasmania
Department of Primary Industries, Parks, Water and Environment

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Unanticipated Discovery Plan

Guide to the most common sites of Aboriginal Significance

Stone Artefact Scatters

Stone artefacts are the tangible evidence found in regard to past Aboriginal lifeways. Stone artefacts indicate areas that were used by Aboriginal People, either for camping, hunting or other activities such as the manufacture of stone tools. Archaeologists can also determine the duration a site may have been occupied, the amount of times that the site may have been occupied, and the number of people that the area may have supported at any given time.

Some stone artefacts are the result of Aboriginal People fracturing or 'flaking' fine-grained rocks to produce sharp cutting or scraping implements. These were then used, for example, for cutting up animals and then scraping the hides. Volcanic rocks such as basalt were flaked and then ground down to form axes for a number of chopping and cutting tasks. The results of such activities can be seen in the archaeological record (i.e. scatters) in the form of modified stones such as cores, retouched flakes, hammerstones and flaked pieces. From these scatters, by understanding site density and frequency patterns, inferences can be made in relation to past Aboriginal lifeways.

Shell Middens

Shell middens by definition are prehistoric refuse pits. They are the leftover waste of resources exploited which formed the basis of Aboriginal diet. Midden sites can range in size from large mounds to small scatters of shell. Middens usually also contain as well as shell, the remains of animals exploited for food as well as artefacts of stone, bone and shell. These sites are usually found near waterways and coastal areas.

Rockshelters

Rockshelters can either be shelters which contain archaeological deposits from living floors or art rock shelters, and may occur in any area of rocky terrain. Sediments on the floor of the rockshelter can contain preserved stratified deposits of archaeological material. Art types found in rockshelters can vary greatly. It can be in the form of painting, stencils of body parts, tools and equipment, or engravings. Style variations in painting can cover animal or human figurines, supernatural beings, and geometric patterns. Engravings can have similar variations as they can depict tools, humans, human parts, animals and birds and their tracks, geometric patterns and supernatural beings. Pecking is also a form of engraving.

Quarries or Stone Procurement Sites

Quarry sites occur where outliers of suitable tool-making stone appear. A quarry can be generally recognised by evidence of human manipulation and extraction of suitable material and the debris left by the processing of the suitable material. Some quarries can cover vast areas with extremely high amounts of lithic discard. Ochre or pigment was also quarried.

Burials

Burials can occur anywhere, though they are generally found close to areas where there was a high population concentration. Burials can occur where there are soft sediments such as sand hills, they can be found in caves and rockshelters and sometimes they can be associated with hollow trees.

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APPENDIX 4 - STAKEHOLDER ISSUES SUMMARY

A "Walk and Talk" meeting was held with interested local residents on Sunday 10th November 2013 between 3 and 5pm. Following the "Walk and Talk", attendees were invited to submit formal written responses. Several major adjacent landholders who were unable to attend the "Walk and Talk" were approached via phone or email. In all, eleven residents provided written comments or comments over phone or email. A summary of issues raised in this feedback is provided in Table 8 below.

Table 8 - Summary of written responses received during public consultation period

Management Issue/ Use of the Reserve	Number of Respondents
Access/ Tracks	
Improved access into the Reserve from Watton Place	1
Improved access into the Reserve from Mookara Street	1
Safety of some tracks due to left - right slopes, particularly in wet weather	1
Complete the track from the steps at Merindah Street to join existing tracks	1
Retain loop track around vegetation management unit 5 (see Fire Plan), and this should be the primary loop track in the Reserve	2
Extend track to the west of the Cannon property north to edge of Reserve, continuing on to Knopwoods Hill, and potentially Waverley Flora Park.	2
Provide links from the Reserve tracks to tracks (cycle and foot) south of the highway.	1
Ensure all access points to the Reserve are restricted to pedestrian access only - particularly no trail bikes	1
Create a good quality track that connects Glebe Hill suburb with the shopping area in Howrah. This should run through access points currently at Monique Street or Mookara Street, and not further to the north. A stile or gate would be needed where the fence crosses the fire trail.	2
Develop a longer loop track running north of the Reserve through private property, joining the western and eastern sides of the Reserve. If this were to occur safety of pedestrians at the road crossing is paramount. Protection of privacy of residents also needs to be a priority. Ensure thorough consultation with private landholders.	3
Not keen on members of the public crossing or accessing driveway/ access road that forms the current north-western boundary of the reserve	1
Main Reserve access to be from Glebe Hill Road area	1
Additional Reserve access point from fire trail leading in to Watton Place	1
To protect privacy of landholders north of the reserve, no additional tracks or infrastructure should come closer to current boundaries	1
Possible extension of tracks in to the newly added north-western section	1

bearing in mind the steepness of this area	
Consider possible track linkages across Pass Road and further in to the Meehan Range and across South Arm Highway to public open space in the Rokeby Hills	1
Recreational Activities	
Would like to use tracks for mountain biking	1
Would like to use area for "off leash" dog walking area	2
Mountain biking should not be allowed	1
Flora and Fauna	
Retain natural feel of area	1
Protect remaining habitat and habitat for birds, fauna, native orchids etc	4
Implement a weed management strategy	2
Set up voluntary community group (Friends of/ Landcare) to assist with weed control and other activities	1
Supports the concept of wildlife corridors, but concerned that the Pass Road crossing would lead to wildlife casualties	1
Concerned about predation of fauna from suburban cats and dogs	1
Infrastructure	
Installation of signage detailing the history of the area	2
Installation of signage detailing the natural values of the Reserve	1
Excluding tracks and signage, infrastructure should be kept to a minimum	1
Consider a style or even a gate at a couple of points along the line of the fence installed by the contractor for the Glebe hill subdivision	1
Fire Management	
Council to continue with hazard reduction burns and fuel reduction	2
Fuel reduction burns should be carried out in the newly added north-western part of the Reserve	1
Ensure access to Desailly Court for fire vehicles and as an alternate escape route for residents if unsafe to do so from the north	1

APPENDIX 5 - WEED SPECIES DESCRIPTION AND CONTROL

Common Name	Species Name	Weed Status	Life Form	How Spread	Control Methods	Control Timing
aeonium	*Aeonium* sp.	Environmental	succulent	seed, stem rooting, vegetative reproduction	spray, dig out	all year
blackberry	*Rubus fruticosus*	WONS, Declared	shrub/ scrambler	seed, stem rooting, suckering	spray, cut & swab, stem scrape	all year
bluebell creeper	*Sollya heterophylla*	Environmental	climber	seed, stem and root fragments	hand pull seedlings, cut & swab larger plants	spring/ summer/ autumn
boneseed	*Chrysanthemoides monilifera*	WONS, Declared	shrub	seed	hand pull seedlings, cut & swab larger plants	all year
Cape Leeuwin wattle	*Paraserianthes lophantha*	Environmental	shrub	seed	hand pull seedlings, cut & swab larger plants	spring/ summer/ autumn
cotoneaster	*Cotoneaster sp.*	Environmental	shrub	seed	spray, cut & swab	all year
fennel	*Foeniculum vulgare*	Declared	herb	seed	spray, cut & swab	winter/ spring/ summer
fuschia	*Fuchsia magellanica*	Environmental	shrub	seed	spray, cut & swab	all year
garden geranium	*Geranium* sp.	Environmental	shrub	seed, stem and root fragments	hand pull seedlings, cut & swab larger plants	spring/ summer/ autumn
grevillea	*Grevillea rosmarinifolia*	Environmental	shrub	seed	cut & swab	spring/ summer/ autumn
Himalayan firethorn	*Pyracantha* sp.	Environmental	shrub	seed, berries spread by birds and water	cut & swab	spring/ summer/ autumn
holly	*Ilex aquifolium*	Environmental	tree	seed	cut & swab	spring/ summer/ autumn
mirrorbush	*Coprosma repens*	Environmental	shrub	seed, berries spread by birds and water	cut & swab	spring/ summer/ autumn
Montpellier broom	*Genista monspessulana*	WONS, Declared	shrub	seed	hand pull seedlings, cut & swab larger plants	all year

Common Name	Species Name	Weed Status	Life Form	How Spread	Control Methods	Control Timing
radiata pine	*Pinus radiata*	Environmental	tree	seed	hand pull seedlings, cut down, ring bark	all year
red valerian	*Centranthus ruber*	Environmental	herb	seed	hand pull, cut and swab or spray	spring/ summer/ autumn
slender thistle	*Carduus pycnocephalus and Carduus tenuiflorus*	Declared	herb	seed	hand pull, spray	winter/ spring/ summer
sweet briar	*Rosa rubiginosa*	Environmental	shrub	seed	spray, cut & swab, stem scrape	all year
sweet pittosporum	*Pittosporum undulatum*	Environmental	tree	seed	cut & swab, drill & fill	all year
tagasaste	*Chamaecytisus palmensis*	Environmental	tree	seed	cut & swab, drill & fill	spring/ summer/ autumn

APPENDIX 6 - WEED PHOTOS

blackberry (*Rubus fruticosus*) D, WONS

boneseed (*Chrysanthemoides monilifera* subsp. *monilifera*) D, WONS

Montpellier broom (Genista monspessulana) D, WONS

fennel (Foeniculum vulgare) D

slender thistle (*Carduus pycnocephalus* and *Carduus tenuiflorus*) D

aeonium (*Aeonium* sp.) E

bluebell creeper (Billardiera heterophylla) E

cotoneaster (*Cotoneaster* sp.) E

fuschia (*Fushcia magellanica*) E

garden geranium (*Geranium* sp.) E

grevillea (*Grevillea rosmarinifolia*) E

Himalayan firethorn (*Pyracantha* sp.) E

holly (*Ilex aquifolium*) E

mirror bush (*Coprosma repens*) E

radiata pine (*Pinus radiata*) E

red valerian (*Centranthus ruber*) E

sweet briar (*Rosa rubiginosa*) E

sweet pittosporum (*Pittosporum undulatum*) E

tagasaste (*Chamaecytisus palmensis*) E

Texas needle grass (*Nassella neesiana*) E

APPENDIX 7 - WEED CONTROL METHODS

The following weed control methods are adapted from Robertson (2005) and are intended to give a general description of some of the more commonly used methods available. They are not intended to be a definitive all encompassing coverage of the methods available for weed control. For further information on weed control methods, the sources in the following list should be consulted. The best way to learn weed control methods though is always by learning from an experienced weed controller, such as a weed control contractor, bushcare volunteer or land manager.

Recommended references on weeds and weed control methods:

- Bush Invaders of South-east Australia - a guide to the identification and control of environmental weeds in south-east Australia. (2001) Adam Muyt
- Bush Regenerator's Handbook – Third edition (2010). The National Trust of Australia (NSW)
- Bushland Weeds – a practical guide to their management (2003). Kate Brown and Kris Brooks.
- DPIPWE Weed info: http://www.dpiw.tas.gov.au/inter.nsf/ThemeNodes/SSKA-52J2K4?open
- Statutory Weed Management Plans, various species (DPIPWE website). http://www.dpiw.tas.gov.au/inter.nsf/WebPages/SSKA-73U3QA?open
- Stop Bushland Weeds. (2005) Meg Robertson
- Weeds of National Significance Management Guides, various species (WONS website). http://www.weeds.org.au/WoNS/
- Weeds of Southern Tasmania Booklet (2010). NRM South and Southern Tasmanian Councils Authority. http://stca.tas.gov.au/weeds/wp-content/uploads/2010/01/Weeds-of-S-Tas-booklet-smaller.pdf

Some of the recommended methods for controlling environmental weeds within bushland include the following:

Hand Pulling

- Hand pulling of smaller plants is easiest in the wetter months of the year when the soil is soft and the seedlings are much easier to pull out.
- Seedlings: take hold of the plant at ground level and pull. If you pull at any point higher on the stem it may break and the plant will then require swabbing with herbicide.
- Small woody plants: Take hold of the stem at ground level and gently rock the plant back and forth until it comes away cleanly.
- If possible place both feet or fingers on either side of the plant when pulling out. This helps to keep the soil in place and avoids unnecessary disturbance of the soil.

Cutting and Swabbing

- The most effective time of the year to cut and swab plants is when they are actively growing, which varies between species.
- Get professional advice on which herbicide mix to use and follow herbicide instructions carefully.
- Cut off all stems as low as possible using a chainsaw or pruning saw, secateurs or long handled loppers. The cut must be horizontal so that the herbicide rests on the cut area while being absorbed, rather then running down the side of the stem.
- Remove all stems from the stump, so that no active (or green) branches/shoots remain

no matter how small they are.
- Make extra cuts into the stump surface to expose the sapwood and provide more surface area for the herbicide to penetrate. For trees with a lignotuber such as olives, it helps to cut the stump deeply with an axe or machete.
- Liberally swab all cut surfaces immediately with the herbicide mixture. This must be done preferably within half a minute, or immediately if possible. The cut surface can not be allowed to dry out; otherwise the herbicide will be much less effective. Use a paintbrush or squeeze bottle to apply the herbicide mixture. Add a dye to the herbicide mixture that will help indicate where swabbing has already been done.
- The tissues that take up and move the poison are immediately under the bark layer, so concentrate on applying the poison around the outer rim of the stump.
- Follow up your work. If the stumps re-sprout which can be common with some species, then cut and swab or spray the new regrowth with the herbicide.
- Keep doing this until the plant dies. Large trees can take several poisonings before they are killed.

Spraying

- The most effective time of the year to spray is when the plant is actively growing.
- Look for native plants and cover with plastic bags or sheeting while spraying. If there are too many native plants amongst the weeds then this method should not be used.
- Get professional advice on which herbicide mix to use and follow herbicide instructions carefully.
- Always read the label on the herbicide container, follow the instructions and wear protective clothing. Dilute the mixture as recommended. Add a dye to the herbicide mixture that will help to indicate where spraying has already been done.
- If spraying regrowth near creeks or other water bodies, do not spray herbicide in or near the water, because it can have a negative effect on aquatic fauna such as frogs. In such cases using Roundup Biactive is more desirable because it has less of an impact on the aquatic fauna. It is preferable to use other more accurate methods such as cutting and swabbing along creeklines.
- Surfactants can also be used when spraying plants such as blue periwinkle or ivy which have a waxy leaf surface. A surfactant (e.g. Pulse) can be added to the herbicide mix which will increase the uptake of the poison through the waxy leaf surface. Surfactants should not be used on or near plants growing in water as they are suspected of harming frogs and other aquatic life.
- Treat bulb plants when the old bulb is exhausted and before new bulbs have formed, generally just before or during flowering. Poisoning at this stage will minimise the chance that the plant will resprout in the next growing season.
- Where weeds have narrow vertical leaves, spraying might result in herbicide running off or drifting onto non-target plants. In this situation, wipe on the herbicide mixture with a weed wand, sponge or wick applicator.

Grubbing

- Grubbing is easiest in the wetter months of the year, between April and October, as the soil is soft and the seedlings are much easier to grub out.
- The damage to the soil and adjacent native plants must be weighed up when assessing whether or not to use this method.
- Using a grubber or a mattock, use a levering action to lift the base of the plant including the tubers, or growing points, depending on the species.
- Remove the plant, making sure that all of the tubers or growing points are completely removed. If part of this is left in the ground it may reshoot.
- If the base of the plant can not be dug out, it can be poisoned using the cut and swab method.
- Follow up regularly. Any regrowth from underground roots can be sprayed with herbicide or removed manually. Spot spray the plant when it is actively growing.

Hand Digging (dig out)

- Push a knife into the soil next to the plant, aiming towards the plant with the intention of levering out the bulb or severing the root system, depending on the species.
- Repeat at right angles, then carefully remove the plant, and then repair any disturbance to the soil or mulch by pressing down the bare soil.

Hand Paint/ Wipe

- This method is useful for species such as Watsonia, especially in areas where spraying will cause off-target damage.
- Get professional advice on which herbicide mix to use and follow herbicide instructions carefully.
- Hold the leaf of the plant with one hand and with the other paint the herbicide onto the leaf using a paintbrush, sponge bottle or other applicator.

Slashing

- Aims to encourage the growth and seeding of native grasses, over the introduced grasses which through slashing are unable to produce seed. Gradually if the introduced grasses are stopped from seeding each year, the seed bank will be reduced and fewer will germinate. In conjunction with this the native grasses are allowed to seed, and with less competition from the introduced grasses, they will begin to increase in numbers and dominate.
- Slashing should be done after the annual grasses have flowered and before their seeds have matured. Most of the native perennial grasses flower later hence their seed set is almost certain to still occur. As a general rule slashing of annual grasses should occur between September and November, but will vary depending on the season, and location. Slasher operators will need to interpret the readiness of annual grasses for slashing through field inspections to ensure that it occurs at the correct time.
- Slasher operators need to have good plant identification skills to ensure that native plants are not accidentally slashed. Slasher operators should attempt to avoid native grasses in the process, although if some are accidentally cut, they should reshoot. Other native plants should be avoided as they may not regenerate so well if slashed.
- As many annual grasses will reshoot, slashing may need to occur more than once.
- Slashing of perennial grasses to reduce biomass and seed set should be followed up by spraying of the regrowth.

APPENDIX 8 - GLEBE HILL BUSHFIRE MANAGEMENT PLAN - TABLE 8

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

Assigned vehicle 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 (see MP 1 of the Best Management Practices Guidelines of the Clarence Bushfire Management Strategy).

FIRE TRAIL Ref. No.	USAGE CLASS1	MAINTENANCE PRIORITY	LOCATION AND CONDITION AT FEBRUARY 2012	ACTION REQUIRED
GH1	3	High	Runs from the end of Desailly Place to near the top of Glebe Hill. The trail has recently been surfaced, but is currently a dead end. Trail currently meets usage class 3 standard.	Link the trail to GH2 by widening the exiting walking track to Class 5 specifications. Inspection and maintenance as specified in MP2.
GH2	3/5	High	Runs from the end of Monique Street to near the top of Glebe Hill. The trail is currently a dead end. The section from the end of Monique Street to the mobile phone tower near the reserve boundary is in good condition and meets usage class 3 standard. The section of the trail in the reserve is currently substandard. It is overgrown and lacks adequate drainage. This section needs to be upgraded to usage class 5 standard and extended to GH1 to form a through route. The extended trail should also be linked to the private access road on the northern boundary of the reserve to provide a fire control line and alternative access to the dwellings on the top of Glebe Hill.	Install a gate in the fence at the reserve boundary. Clear encroaching vegetation to usage class 5 specifications. Provide drainage on the steeper sections of the trail. Extend the trail to connect with the end of GH1 along the existing walking track. Link the extended trail to the private road on the northern boundary of the reserve.
GH3	5	Moderate	Runs from Watton Place to GH2, though the link to Watton Place has not yet been constructed. The trail in the reserve is currently substandard and impassable. It is overgrown and lacks adequate drainage. The trail needs to be upgraded to usage class 5 standard.	Install a gate where the trail leaves Watton Place or at the reserve boundary. Clear encroaching vegetation and grade trail to usage class 5 specifications and provide adequate drainage.

1 – Fire trail usage classes are described in Management Procedure (MP) 1 in the Best Management Practices Guidelines section of the Clarence Bushfire Management Strategy.

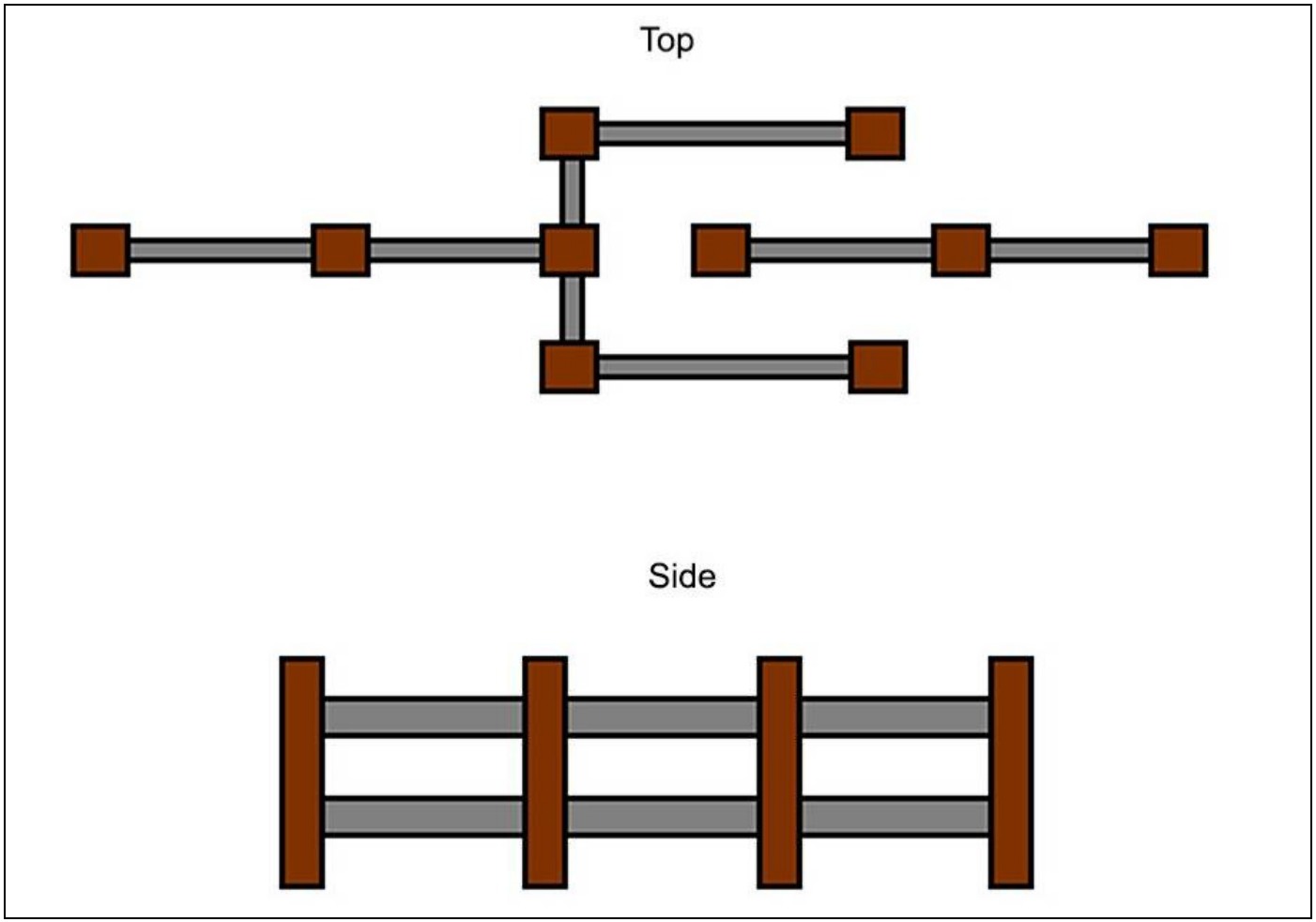
APPENDIX 9 - RESERVE ENTRANCES FOR LANDSCAPING

Wendy Andrew Entrance

Vienne Drive Entrance

APPENDIX 10 - PEDESTRIAN ACCESS DESIGN

This is designed to limit vehicle including motorbike access



APPENDIX 11 - GLEBE HILL BUSHFIRE MANAGEMENT PLAN - VMU'S AND BURN SCHEDULE

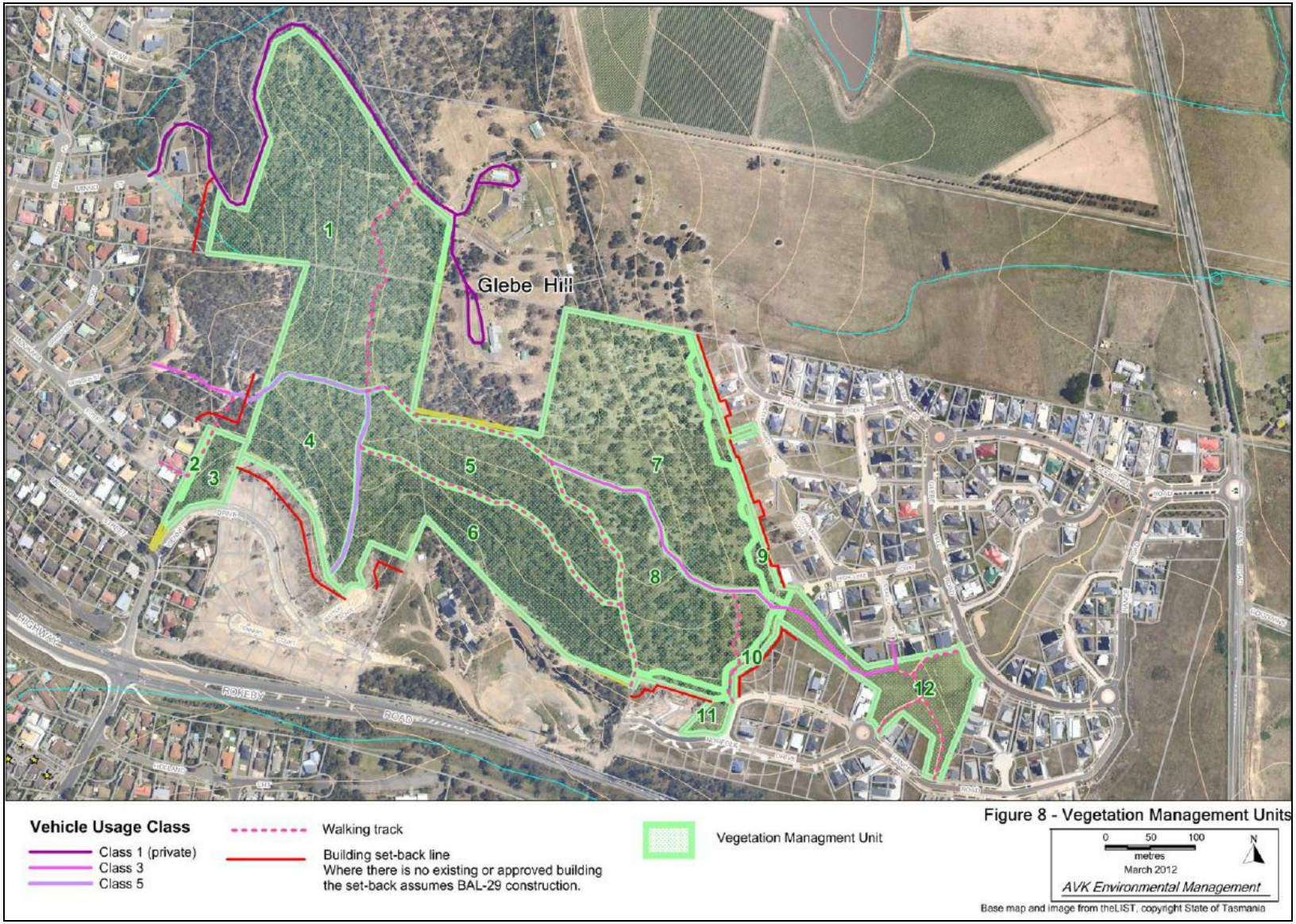


Figure 8 - Vegetation Management Units

Table 10 – Bushfire management in the reserve

VMU[1]	AREA (ha)	BUSHFIRE MANAGEMENT OBJECTIVES and PRESCRIPTIONS	NOTES and PRECAUTIONS	LAST BURNT	NEXT BURN
1 DAM DRI GRP	6.0	OBJECTIVES: Maintain the structure and floristics of the vegetation community. Maintain visual amenity. Reduce the extent and density of weeds. PRESCRIPTION: Autumn or spring burn every 15 to 30 years.	Protect power line during burns. Protect perimeter fence during burns. Contains the threatened plant species *Eucalyptus risdonii*, *Arthropodium strictum* and *Austrodanthonia induta*. Obtain a permit from DPIPWE Threatened Species Section before burning.	Not known	Assess next plan
2 DAM	0.05	OBJECTIVE: Maintain as a 6 m wide building protection zone zone to protect adjoining dwellings. PRESCRIPTION: See specifications for building protection zones in MP 5 in the Best Management Practices Guidelines.		Not known	No burning
3 DAM	0.3	OBJECTIVES: Maintain the structure and floristics of the vegetation community. Reduce the extent and density of weeds. PRESCRIPTION: Autumn or spring burn every 15 to 30 years.	Protect perimeter fence and nearby dwellings during burns. Heavily weed infested, pre and post burn weed control required.	Not known	2012
4 DAM	1.7	OBJECTIVES: Maintain the structure and floristics of the vegetation community. Promote regeneration of canopy species and limit density of she oaks to 60 % total canopy cover. Maintain visual amenity. Reduce the extent and density of weeds, particularly boneseed. PRESCRIPTION: Autumn or spring burn every 15 to 30 years.	Protect adjoining property during burns. Protect perimeter fence during burns. Contains the threatened plant species *Eucalyptus risdonii* and *Austrodanthonia induta*. Obtain a permit from DPIPWE Threatened Species Section before burning. Pile burns only if required to dispose of weeds and she oak. She oak removal will require written approval of the Minister if Conservation Covenant is enacted.	Not known	Assess next plan
5 DAM	2.0	OBJECTIVES: Maintain the structure and floristics of the vegetation community. Maintain visual amenity. Reduce the extent and density of weeds. PRESCRIPTION: Autumn or spring burn every 15 to 30 years.	Protect adjoining property during burns. Protect perimeter fence during burns. Contains the threatened plant species *Eucalyptus risdonii*, *Arthropodium strictum* and *Austrodanthonia induta*. Obtain a permit from DPIPWE Threatened Species Section before burning. Burn will require written approval of the Minister if Conservation Covenant is enacted.	Not known	2014

VMU[1]	AREA (ha)	BUSHFIRE MANAGEMENT OBJECTIVES and PRESCRIPTIONS	NOTES and PRECAUTIONS	LAST BURNT	NEXT BURN
6 DAM	2.9	OBJECTIVES: Maintain the structure and floristics of the vegetation community. Promote regeneration of canopy species and limit density of she oaks to 60 % total canopy cover. Maintain visual amenity. Reduce the extent and density of weeds, particularly boneseed. PRESCRIPTION: Autumn or spring burn every 15 to 30 years.	Protect adjoining property during burns. Protect perimeter fence during burns. Pile burns only if required to dispose of weeds and she oak. Contains the threatened plant species *Arthropodium strictum* and *Austrodanthonia induta*. Obtain a permit from DPIPWE Threatened Species Section before burning. She oak removal will require written approval of the Minister if Conservation Covenant is enacted.	Not known	Assess next plan
7 DAM DVG	4.2	OBJECTIVES: Maintain as open grassy woodland. Maintain visual amenity. Reduce the extent and density of weeds. PRESCRIPTION: Autumn or spring burn every 15 to 30 years.	Burn following the end of the bird nesting/seed setting period. Protect adjoining property during burns. Protect perimeter fence during burns. Pile burns only if required to dispose of weeds and she oak. Contains the threatened plant species *Arthropodium strictum*. Obtain a permit from DPIPWE Threatened Species Section before burning. Shrub removal will require written approval of the Minister if Conservation Covenant is enacted	Not known	Assess next plan
8 DAM DVG	2.3	OBJECTIVES: Maintain the structure and floristics of the vegetation community. Promote regeneration of canopy species and limit density of she oaks to 60 % total canopy cover. Maintain visual amenity. Reduce the extent and density of weeds. PRESCRIPTION: Autumn or spring burn every 15 to 30 years.	Burn following the end of the bird nesting/seed setting period. Protect adjoining property during burns. Protect perimeter fence during burns. Contains the threatened plant species *Arthropodium strictum*. Obtain a permit from DPIPWE Threatened Species Section before burning. Pile burns only if required to dispose of weeds and she oak. She oak removal will require written approval of the Minister if Conservation Covenant is enacted.	Not known	Assess next plan
9 DVG	0.4	OBJECTIVE: Maintain as a building protection zone to protect adjoining dwellings. PRESCRIPTION: See specifications for building protection zones in MP 5 in the Best Management Practices Guidelines.		Not known	No burning

VMU[1]	AREA (ha)	BUSHFIRE MANAGEMENT OBJECTIVES and PRESCRIPTIONS	NOTES and PRECAUTIONS	LAST BURNT	NEXT BURN
10 DAM DVG	0.2	OBJECTIVE: Maintain as a building protection zone to protect adjoining dwellings. PRESCRIPTION: See specifications for building protection zones in MP 5 in the Best Management Practices Guidelines.		Not known	No burning
11 GRP	0.1	OBJECTIVEs: Maintain as rockplate grassland. Reduce the extent and density of weeds. PRESCRIPTION: Burn every 3 to 5 years in autumn.	Contains the threatened plant species *Hypoxis vaginata*. Obtain a permit from DPIPWE Threatened Species Section before burning. Burn will require written approval of the Minister if Conservation Covenant is enacted.	Not known	2013 and 2017
12 FUM	1.3	OBJECTIVE: Maintain as managed grassland PRESCRIPTION: No burning for the duration of this plan.		Not known	No burning

1 – includes TASVEG codes of vegetation types in the unit.