Macedon Ranges Shire Council

Final Report:

Environmental Management Plan – Bushland Reserve, Hobbs Road, Bullengarook

Prepared by Atlas Ecology

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Victorian Local Sustainability Accord
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Environmental Management Plan

Bushland Reserve, Hobbs Road, Bullengarook

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Front cover photos, left to right: Blotched blue-tongue lizard *Tiliqua nigrolutea*; Common Wedge-pea *Gompholobium huegelii*; Heathy Dry Forest; Small Grass-tree *Xanthorrhoea minor* subsp. *lutea*; Koala *Phascolarctos cinereus*.

Back cover photo: Milkmaid *Burchardia umbellata*.

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1 VISION

Bushland Reserve, Hobbs Road is highly valued as an ecologically diverse location that supports flora species of state significance.

Biodiversity at Bushland Reserve, Hobbs Road is actively managed by Council and the community to conserve and enhance its values and to provide resilience to the vegetation communities present.

Through successful rehabilitation and revegetation, the old tip site at Hobbs Road has been transformed and contributes to biodiversity values present at the reserve.

Impacts on biodiversity values resulting from active recreational pursuits including mountain biking are carefully managed through engagement and education.

Bushland Reserve, Hobbs Road provides passive recreational and tourism opportunities for photography, bird watching, naturalists and students.

Bushland Reserve, Hobbs Road is valued as an important contributor to the tourism values of the Macedon Ranges and its reputation as a clean, green destination.

2 INTRODUCTION

2.1 Reserve Location and Description

Bushland Reserve, Hobbs Road ('the reserve') is a 34 hectare forest owned by the Macedon Ranges Shire Council. The reserve is located in Bullengarook, approximately two and a half kilometres west of the Gisborne central business district (Figure 1) and approximately 60 kilometres north-west of Melbourne.

The reserve adjoins the Parks Victoria managed Pyrete Range and the Lerderderg State Park. Steep crests, south-facing spurs and sheltered gullies that support a range of remnant and regenerating forest are featured within the reserve. Three forest vegetation communities are present, being Heathy Dry Forest, Grassy Forest and Shrubby Foothill Forest which all vary in quality and cover. A total of 24 indigenous fauna species and 131 indigenous flora species were recorded during site surveys conducted, including three species of state significance; the rare Dwarf Silver Wattle *Acacia nano-dealbata*, Spotted Hyacinth-orchid *Dipodium pardalinum* and Slender Fireweed *Senecio microbasis*.

Close to the Bushland Reserve, Hobbs Road entrance is a decommissioned tip site that once serviced the townships of Gisborne, Bullengarook and surrounds. This tip site has been capped as part of rehabilitation works and will be revegetated using species of local provenance. In time, this tip site will contribute to the biodiversity values present.

Tracks of varying width and slope traverse the site, providing good opportunities for passive recreation visitors. A number of these tracks have been created by mountain bikers, who have established a network of circuits and jumps throughout the reserve and into the adjoining Pyrete Range.

2.2 Regional Context

The reserve is located at the north-eastern edge of the Pyrete Range, a steep and rugged 5,930 hectare reserve managed by Parks Victoria for its conservation and water catchment values. The Pyrete Range now forms part of the Lerderderg State Park for management purposes, occupying 20,180 hectares of land on the fringes of Melbourne. The Bushland Reserve, Hobbs Road effectively forms an extension of this relatively vast conservation area.

North of the reserve past the Bacchus Marsh-Gisborne Road is Rosslynne Reservoir, which supplies drinking water for the township of Gisborne. Beyond the reservoir is the 2,379 hectare Macedon Ranges Regional Park. To the east of the reserve, vast tracts of land have been cleared for grazing, cropping, equine and growing urbanisation. This area supported Plains Grassy Woodland that once dominated Gisborne and surrounds. Land clearing has resulted in isolated patches of native vegetation that remain in an otherwise modified landscape around Gisborne and beyond.

2.3 Zones and Overlays

The Bushland Reserve, Hobbs Road is zoned Public Use Zone (PUZ6). The purpose of this zone is to; recognise public land use for public utility and community services and facilities and; provide for associated uses that are consistent with the intent of the public land reservation or purpose. An Environmental Significance Overlay – Schedule 5 (ESO5), Environmental Audit Overlay (EAO) and a Bushfire Management Overlay (BMO) cover the reserve.

2.4 Bioregion

Victoria is divided into 28 bioregions each representing different ecological characteristics and underlying geological features. The Bioregional Conservation Status of an Ecological Vegetation Class (EVC) (see below) is assessed at this bioregional level.

The reserve occurs within the *Central Victorian Uplands Bioregion* (CVU), which extends from Stawell in the west, to Ballarat and the You Yangs in the south, to the north-east through Alexandra and Mansfield, ending near Bright (DSE 2012).

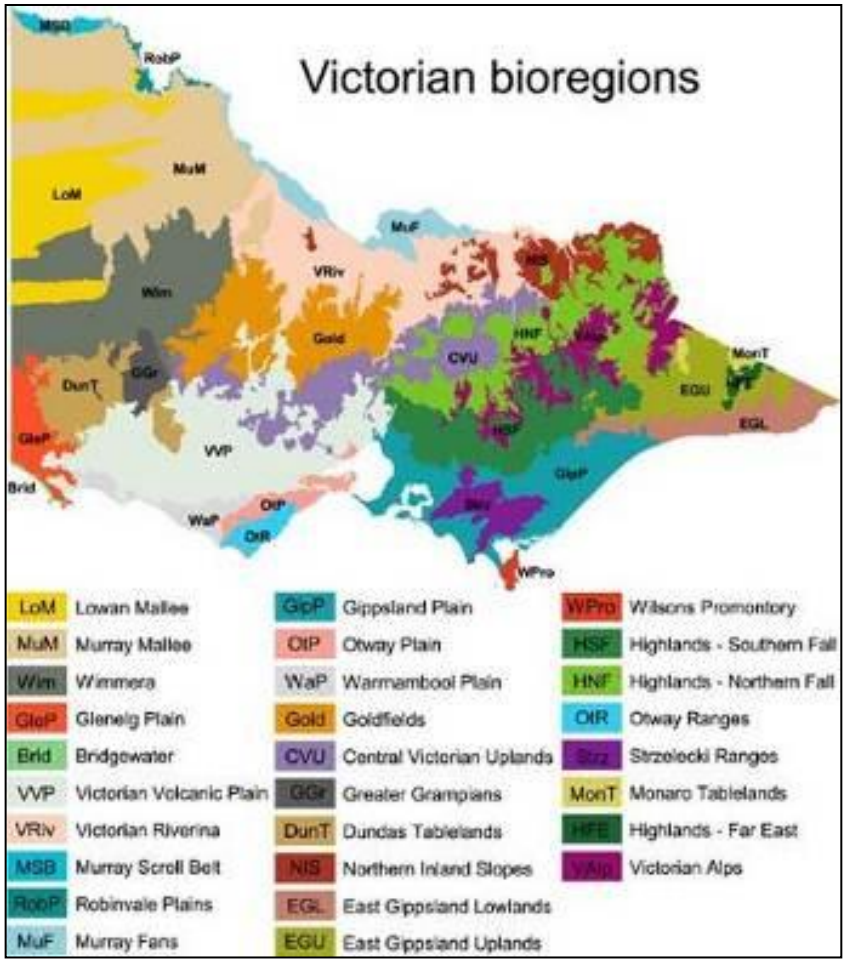
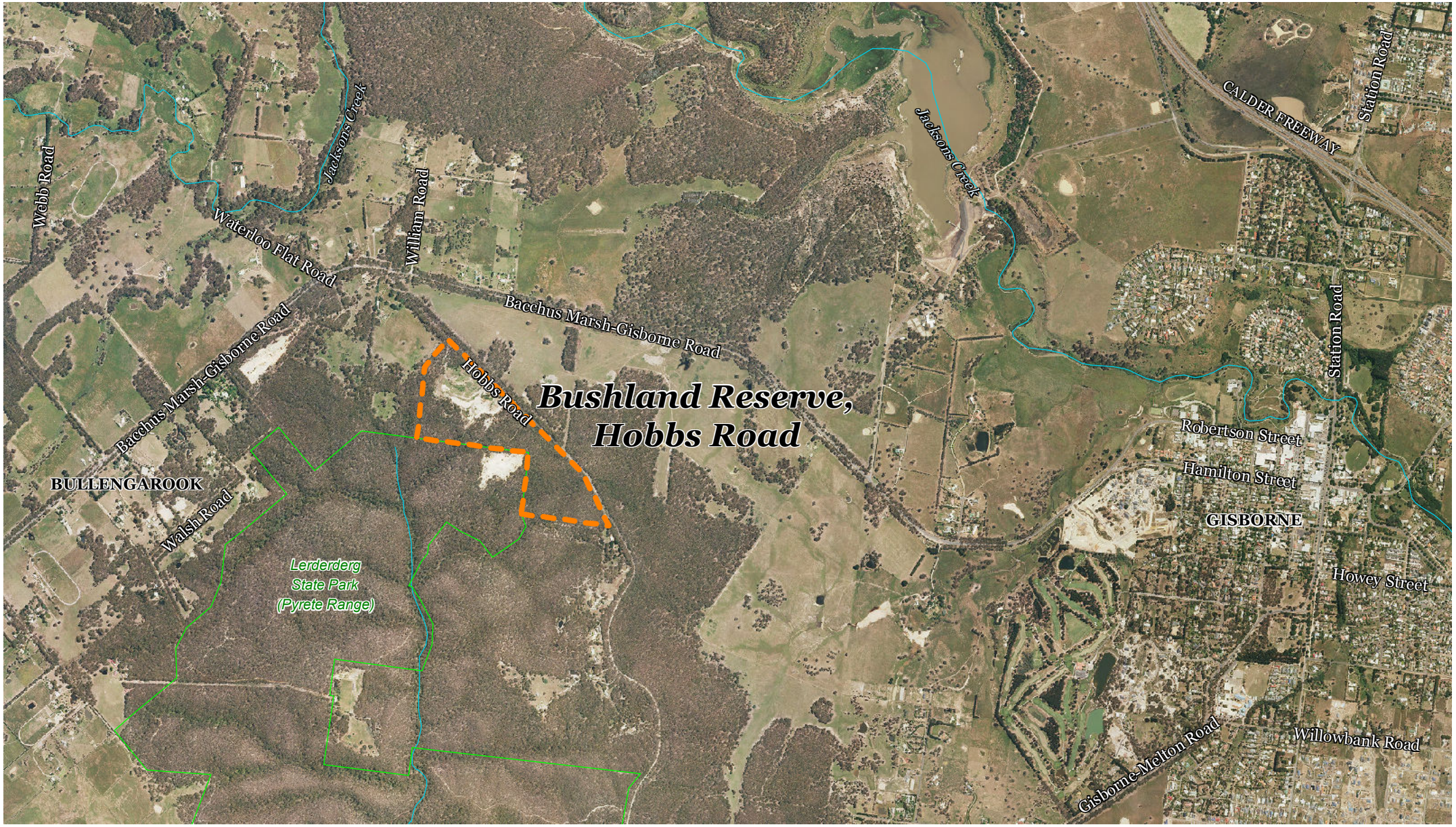


Figure 1 - Location of Bushland Reserve, Hobbs Road



Bushland Reserve, Hobbs Road

N

0 500 1,000m

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Note: Map features are approximate and are to be used as a guide only.

3 EXISTING VALUES AND USES WITHIN RESERVE

3.1 Flora

3.1.1 Ecological Vegetation Class and Vegetation Communities

Ecological Vegetation Classes (EVC's) consist of groups of plants which commonly occur together within a recognisable environmental niche. This is determined by rainfall, soil type, soil moisture levels, slope and altitude (e.g. mountains, plains, and foothills), aspect (e.g. north or south) and type of canopy (e.g. open or closed canopy). An EVC is likely to be made up of a similar group of species where a certain combination of these factors recurs. An EVC typically consists of between one to three different vegetation layers (such as overstorey, mid-storey and ground layer). There are approximately 300 recognised EVCs within Victoria.

Three EVCs are present within the reserve – Grassy Forest (EVC 128), Heathy Dry Forest (EVC 20) and Shrubby Foothill Forest (EVC 45) (see Figure 2). All three EVCs represent differing characteristics with respect to soils, position in the landscape, aspect, vegetation structure and composition. Grassy Forest has a conservation status of 'Vulnerable' within the Central Victorian Uplands bioregion due to its relatively high depletion rates since European settlement. This is due to the position in the landscape that Grassy Forest generally occupies; flat to undulating terrain in the lower foothills which is suited to residential development and agriculture. Heathy Dry Forest and Shrubby Foothill Forest have a conservation status of 'Least Concern' within the Central Victorian Uplands bioregion due to their relatively high rates of retention since European settlement. This can be attributed to their position in the landscape, which largely occupies hill crests and damp steep gullies unsuitable for development and agriculture. Soils within Heathy Dry Forest are also shallow, rocky and infertile and unsuitable for agriculture. These EVCs are described in more detail in Section 3.1.3 below.

3.1.2 Flora Species

No formal flora surveys have previously been undertaken within the reserve. Site visits undertaken in December 2012 and January 2013 identified a total of 188 flora species within the reserve. This includes 131 indigenous and 57 introduced flora species. All of these species, together with their significance rating or status, are listed in Appendix 1.1.

3.1.3 Current Vegetation Description

The reserve consists of a series of crests, west to south-facing spurs and gullies that form the northern extent of the Pyrete Ranges. The reserve is situated within the far upper reaches of the Werribee catchment, with gullies flowing into the Pyrite River to the south and eventually into the Werribee River.

The position of vegetation communities (or EVCs, see Section 3.1.1) within the reserve largely follow the reserve's topography, which in turn influences the soil type, moisture availability, vegetation composition and structure. Bryophyte and lichen micro-habitats, such as logs, woody debris, stones, tussocks and organic litter, are common throughout the reserve.

The entire reserve supports forested vegetation of varying quality and species composition, except for the old rubbish tip site in the centre of the reserve (see Figure 2) which supports a sparse distribution of native vegetation. The tip site has been capped with soil and seeded with a variety of introduced pastoral species, such as Rye Grass *Lolium* spp. The eastern portion of the tip site is currently used to store clean fill and supports a patchy area of disturbed native vegetation.

The highest quality remnant vegetation occurs furthest away from the tip site, within areas of Heathy Dry Forest and Shrubby Foothill Forest to the east (see Figure 2). This eastern 'triangle' has been subjected to the least amount of disturbance. Vegetation within this area is subsequently of a much higher quality than the remainder of the reserve which has been subjected to some degree of soil disturbance and altered hydrology. Areas immediately surrounding the tip site support the highest weed cover and soil disturbance, gully erosion and loose rubbish and debris. The area between the tip site and the higher quality 'triangle' to the east is regenerating forest which has been subject to soil movement and past disturbance.

A description of vegetation quality and composition within each vegetation community is provided below.

Heathy Dry Forest

Heathy Dry Forest occupies exposed crests and spurs within the reserve (see Figure 2, Plate 1) and is characterised by colluvial shallow loam soils of low fertility with low moisture holding capacity. Vegetation here has adapted to these conditions with only a select combination of species occupying these areas. The overstorey eucalypts are generally small, young and uniform in size and consist of Messmate Stringybark *Eucalyptus obliqua*, Bundy *Eucalyptus goniocalyx*, Broad-leaved Peppermint *Eucalyptus dives* and Scentbark *Eucalyptus aromaphloia*. Tree cover is dense and there are few large trees; this is characteristic of Heathy Dry Forest which has had a history of prior disturbance. Fire scars on trees indicate that fire may have been a part of the disturbance history.

Plate 1. Heathy Dry Forest

The mid-storey supports a variety of shrubs such as Bushy Needlewood *Hakea decurrens* subsp. *physocarpa*, Silver Banksia *Banksia marginata* (Plate 2), Hedge Wattle *Acacia paradoxa*, Austral Grass-tree *Xanthorrhoea australis* and Small Grass-tree *Xanthorrhoea minor* subsp. *lutea* (Plate 3).

Plate 2. Silver Banksia

Plate 3. Small Grass-tree

The highest quality Heathy Dry Forest remnant is in the eastern portion of the reserve where the patch size is greatest and where there is more diversity and cover in the ground layer. Ground layer vegetation includes Silvertop Wallaby-grass *Rytidosperma pallidum*, Grey Tussock-grass *Poa sieberiana*, Golden Bush-pea *Pultenaea gunnii*, Common Wedge-pea *Gompholobium huegelii* (Plate 4), Matted Bossiaea *Bossiaea decumbens*, Milkmaids *Burchardia umbellata* (Plate 4) and Common Triggerplant *Stylidium armeria*.

Plate 4. Left- Milkmaids, Right- Common Wedge-pea

Grassy Forest

Grassy Forest occurs on lower slopes and foothills in areas with moderate rainfall and infertile sedimentary soils. Within the reserve the EVC occupies the flattest and highest points along Hobbs Road where the aspect is north to west (Figure 2, Plate 5). Grassy Forest merges to bracken-dominated gully vegetation (Shrubby Foothill Forest) as the terrain slopes south-west deeper within the reserve (Figure 2, Plate 6). The overstorey consists of Messmate Stringybark, Broad-leaved Peppermint and Narrow-leaf Peppermint *Eucalyptus radiata* subsp. *radiata* within its driest extent, merging to Swamp Gum *Eucalyptus ovata* and Manna Gum *Eucalyptus viminalis* subsp. *viminalis* within moister areas.

Grassy Forest to the east of the tip site supports higher quality vegetation with fewer disturbances and lower weed cover. This higher quality vegetation extends into the Hobbs Road reserve which is a sign-posted conservation roadside. The Grassy Forest area along the western boundary supports good quality vegetation, albeit slightly modified. Grassy Forest to the immediate west of the tip site is of moderate quality; supporting a high cover of weeds in the ground layer and general disturbance associated with the tip site.

Plate 5. Higher quality Grassy Forest near Hobbs Road

Plate 6. Grassy Forest (right) merging to moister gully forest with a southern aspect (left)

Smaller trees include Blackwood *Acacia melanoxylon*, Silver Wattle *Acacia dealbata* subsp. *dealbata*, Black Wattle *Acacia mearnsii* and Cherry Ballart *Exocarpos cupressiformis*. Black Sheoak *Allocasuarina littoralis* is dominant to the west of the tip site (Plate 7). Prickly Tea-tree *Leptospermum continentale* is locally dominant within moister gully areas whilst Hedge Wattle *Acacia paradoxa* and Prickly Moses *Acacia verticillata* subsp. *verticillata* are present merging into Heathy Dry Forest. The state significant Dwarf Silver Wattle *Acacia nano-dealbata* (Plate 8) occurs within areas of Grassy Forest (see Figure 2).

Plate 7. Black Sheoak is dominant west of tip site

Plate 8. The state significant Dwarf Silver Wattle

The ground layer to the east of the tip site supports good quality vegetation with a diversity of grasses, herbs, lilies and rushes. Grasses include Grey Tussock-grass, Cluster-headed Mat-rush *Lomandra longifolia* subsp. *exilis*, Veined Spear-grass *Austrostipa rudis* and Reed Bent-grass *Deyeuxia quadriseta*. Herbs and lilies include Blue Pincushion *Brunonia australis*, Variable Plantain *Plantago varia* and Black-anther Flax-lily *Dianella admixta*.

Vegetation quality decreases substantially around the immediate edge of the tip site. The northern and eastern edge of the tip site (Figure 2) supports a high cover of introduced species in the ground layer, including Sweet Vernal-grass *Anthoxanthum odoratum* and other pastoral grasses, Blackberry *Rubus fruticosus* and English Broom *Cytisus scoparius*. Soil movement and disturbance is evident in this area.

Shrubby Foothill Forest

Shrubby Foothill Forest occurs along the moister south-facing gully lines throughout the reserve (Figure 2). This EVC occupies a more sheltered position in the landscape and occurs on rich moderately fertile soils that channel water from the upper ranges into the Pyrite Creek below. Vegetation structure and composition is markedly different here compared to the remainder of the reserve, with a visibly higher cover of shrubs in the mid-storey and a ground layer dominated by Austral Bracken *Pteridium esculentum* (Plate 9). The same eucalypt species occupy the overstorey - Messmate Stringybark, Narrow-leaf Peppermint and

Scentbark; however there are a greater number of large trees present here (Plate 10). Tree cover is relatively dense and younger trees are of a similar age class due to mass regeneration after a previous disturbance event, most likely fire (Plate 11).

Plate 9. Bracken-dominated forest merges into shrubby forest deeper into the gullies

Plate 10. Larger trees are scattered throughout Shrubby Foothill Forest

Plate 11. Evidence that fire plays a part in the reserve's history

Moister areas fringing the gullies, or upper parts of gullies where the channels are wide and shallow, are dominated by Silver Wattle in the mid-storey and Austral Bracken in the ground layer (Plate 9). This structure is typical within large portions of the reserve, particularly within the eastern 'triangle'. Austral Bracken merges to a shrubbier environment deeper within the gullies where shrubs such as Prickly Tea-tree and Prickly Moses dominate (Plate 12). Prickly Tea-tree forms a dense cover in some areas, which is likely due to high moisture levels and soil movement and disturbance. This is particularly evident south and east of the tip site where some areas are virtually impassable. Other shrubs observed include Hop Goodenia *Goodenia ovata* (Plate 13), Common Cassinia *Cassinia aculeata* and Hop Wattle *Acacia stricta*.

Plate 12. Prickly Tea-tree dominates moister gully areas

Plate 13. Hop Goodenia

The ground layer is grassy and herbaceous, with species including Weeping Grass *Microlaena stipoides* var. *stipoides*, Thatch Saw-sedge *Gahnia radula*, Wattle Mat-rush *Lomandra filiformis*, Cluster-headed Mat-rush and Kidney Weed *Dichondra repens*. Orchids observed include the rare Spotted Hyacinth-orchid *Dipodium pardalinum* (Plate 14). Sweet Vernal-grass is locally dominant in some places, and Blackberry occurs adjacent to the tip site and dams (Figure 3).

Plate 14. The rare Spotted Hyacinth-orchid

Refer to Appendix 4 for definitions of vegetation condition.

3.1.4 Significant Flora Species

National Significance

No flora species of national significance have been recorded within the reserve. Two nationally significant flora species have previously been recorded within five kilometres of the reserve: Swamp Fireweed *Senecio psilocarpus* and Swamp Everlasting *Xerochrysum palustre* (see Appendix 1.2). Both of these species are present within the Gisborne Swamp several kilometres to the east and would not occur in the reserve due to a lack of suitable habitat.

State Significance

Three species of state significance were recorded within the reserve –the rare Dwarf Silver Wattle *Acacia nano-dealbata* (see Figure 2), the rare Spotted Hyacinth-orchid *Dipodium pardalinum* and the rare Slender Fireweed *Senecio microbasis*. Dwarf Silver Wattle has not previously been recorded in the local area (FIS 2012).

Dwarf Silver Wattle is a large shrub to small tree that grows two to six metres tall with yellow spherical flowers emerging in mid-winter to early spring (Best and Francis 2008). Green bipinnate leaves with touching or overlapping pinnules (Best and Francis 2008) are a key feature of this species. This species is relatively common within parts of the nearby Macedon Ranges, however the species has not previously been recorded within or near the Lerderderg State Park and Pyrete Ranges. There is one record of the species within the Wombat State Forest near Barrys Reef (FIS 2012).

The Spotted Hyacinth-orchid is a tall leafless orchid (up to 90cm) characterised by its white flowers with 10-40 light pink spots (see Plate 14). The orchid appears in the summer months and until recently had only been recorded within the Wombat State Forest, Brisbane Ranges and alpine areas (FIS 2012). The species has in recent times been recorded by Riddells Creek Landcare and local naturalists within numerous locations across the Macedon Ranges (R. Best, pers.comm.). The species has also been recorded within close proximity to Hobbs Road.

Slender Fireweed is present within areas of Heathy Dry Forest (Figure 2). This species has recently been re-classified, having previously formed part of *Senecio* sp. aff. *tenuiflorus*. Slender Fireweed has been recorded within the nearby Macedon Ranges. This large perennial herb can reach up to 60 centimetres tall and supports narrow leaves at the base of and along the stem, which bears yellow flower heads in spring-summer (FIS 2012).

There is habitat present within areas of Heathy Dry Forest for the state significant endangered Hairy-leaf Triggerplant *Stylidium armeria* subsp. *pilosifolium*. This is a newly discovered species that has only previously been recorded within the Riddells Creek area, but is now being recorded in the wider Macedon Ranges area. The species has been recorded within the Pyrete Range and it is feasible that a population occurs within the reserve-particularly within higher quality areas of Heathy Dry Forest in the east. Any future surveys

within the reserve should target Hairy-leaf Triggerplant populations within Heathy Dry Forest.

Future surveys should record and map any additional Dwarf Silver Wattle that may be present (see Section 4.8). A targeted survey, which includes mapping and monitoring, should also be undertaken for the Spotted Hyacinth-orchid and Slender Fireweed. Other significant species listed below are to be recorded and mapped if found within the reserve.

An additional 12 flora species of state significance have previously been recorded within five kilometres of the reserve (see Appendix 1.2). Several of these species have potential habitat within the reserve and should be included in future flora surveys. These species include Common Cinnamon-wattle *Acacia leprosa* var. *graveolens*, Creeping Grevillea *Grevillea repens*, Wombat Bush-pea *Pultenaea reflexifolia* and Bacchus Marsh Wattle *Acacia rostriformis*.

Regional Significance

Of the 131 indigenous species recorded within the reserve, 52 are considered to be significant at a regional scale (within the Central Victorian Uplands bioregion). Appendix 1.1 contains a list of regionally significant and locally significant flora species.

Definitions of ecological significance for species, communities and sites are provided in Appendix 3.

3.1.5 Significant Vegetation Communities

There are no nationally or state significant vegetation communities within the reserve.

Definitions of ecological significance for species, communities and sites are provided in Appendix 3.

3.2 Fauna

3.2.1 Fauna Assessment

Bushland Reserve, Hobbs Road has not been subject to any formal fauna surveys. A combination of site visits and desktop searches were conducted for this management plan to provide a snapshot of existing fauna species and habitats. This data has informed the recommendations provided regarding future management of the reserve.

3.2.2 Fauna Species at the Reserve

Site assessments conducted in December 2012 recorded a total of 28 fauna species. This comprises six mammals (three native and three introduced) and 20 birds (19 native and one introduced). One unidentified frog species and one Blotched Blue-tongue Lizard were also

recorded incidentally. These species, together with their significance rating or status, are listed in Appendix 2.1.

Native Birds

Three BirdLife Australia area search surveys were conducted– one morning, one afternoon and one evening spotlighting session. The BirdLife Australia area search involves surveying for bird species around a central point; these areas can cover a small area within 500 metres of the central point, or a large area out to 5 kilometres. The search area can be any shape and the search time can be anywhere between 20 minutes and one month. The surveys undertaken at the reserve were all 1 – 2 hours in duration and were focussed within approximately 500 metres of a central point.

The surveys revealed a typical suite of forest birds, with breeding recorded in a number of species, including Laughing Kookaburra, Eastern Yellow Robin, Grey Shrike-thrush, Fan-tailed Cuckoo and White-winged Chough.

Eastern Yellow Robins are regarded as an indicator species for forest health, as they persist in areas with large continuous forest blocks, and are vulnerable to nest predation in edge environments and fragmented landscapes (Zanette and Jenkins 2000). Two nearly fledged Eastern Yellow Robins were observed being fed by parent birds in dense gully vegetation during diurnal surveys.

Overall, the reserve contains high quality and variable habitat for a number of avian forest species, and further surveying would likely contribute new additions to the preliminary list (see Appendix 2.1).

Native Mammals

During the incidental bird surveys mentioned above, the ground was scanned for scats, feeding traces, scratches and other signs that may indicate the presence of mammalian fauna.

Signs of use, and numbers of mammals observed in the reserve were low overall. During three site visits, which comprised two visits during the day and one later afternoon and evening visit, Eastern Grey Kangaroos were observed once and the Common Wombat was recorded by scat signs only. One Koala was observed near dense gully vegetation near the southern boundary of the reserve (see front cover photo). Arboreal spotlighting of 1.5 hours duration recorded a nil result for any fauna.

The low number of mammals recorded may be due to a number of factors. The gully habitats may have the greatest concentration of species and numbers of arboreal fauna, and although a track was followed adjacent to a gully, the gully itself was not penetrated due to thick shrub cover (Prickly Tea-tree). The thick shrub cover reduced visibility during surveys. The area of the reserve surveyed had a low to medium number of hollow bearing trees, with many of the

hollows available of small size. More discussions of the hollow resource may be found in Section 3.2.3.

Finally, arboreal mammal surveying was conducted within the mountain biking area adjacent to the tip site. The chalky quartz soils of this part of the reserve are particularly low in nutrients, and forest mammals and birds will populate areas of forest that have fertile soils (Moore *et al* 2004). The Koala was observed during the day in higher quality vegetation in the southern area of the reserve, and further nocturnal fauna surveys in this area are highly recommended.

The Common Wombat scats were observed along a wombat/wallaby pathway along a steep, moist gully south-west of the tip site. The wombats are using the mountain bike trails nearby as pathways around the reserve, as evidenced by scats positioned prominently on the trail in typical wombat territorial behaviour (Plate 15). The presence of wombats in the reserve indicates that there are sufficient food resources to support them, as well as appropriate soils in which to dig den sites.

Plate 15. Common Wombat scats on mountain bike trail south-west of the tip site

Frogs

The tadpoles of one unidentified species of frog were observed in one of the small dams in the tip area. No frogs were calling during the night surveys, so a positive identification could not be made of any frog species.

Reptiles

No reptiles were recorded in diurnal or spotlighting surveys, however a Blotched Blue-tongue Lizard was noted incidentally in the roadside reserve next to the primary Hobbs Road entrance gate.

Pest animals

The only introduced avian species recorded was a Common Blackbird, recorded in gully vegetation.

The other three mammal pest animal species recorded included Brown Hare, European Rabbit, and Red Fox.

Two European Rabbits were observed close to the tip during the night survey. Fox and Hare scat were observed in the degraded tip area, and noticeably absent within the higher quality vegetation zones. Management recommendations for these species are provided in Section 4.3.7.

3.2.3 Fauna Habitat

Grassy Ground Cover, Grass trees and Silver Banksia in Heathy Dry Forest

The Heathy Dry Forest areas of the reserve support areas of grassy ground cover that provide useful ecosystem functions and dispersal opportunities for a wide range of fauna species. The tussocks provide grazing opportunities for macropods; cover and nesting resources for small mammals, birds, frogs and reptiles; and food resources for seed-eating and insectivorous birds.

A healthy diversity and number of wildflower and orchid species occur in the inter-tussock spaces of the grassy ground cover in the reserve. Wildflowers are key components in the lifecycles of many invertebrate species, which in turn provide food for insectivores such as birds and small mammals. Orchid tubers are a source of food for White-winged Choughs.

When in flower, the tall spikes of the grass trees provide abundant nectar resources for a variety of honeyeaters, small parrots and small mammals such as Feathertail Glider and Sugar Gliders. Insectivorous birds forage upon the insects attracted to the flowering spikes. The ample tussocks of the grass trees provide nesting habitat for birds and mammals. Secluded resting spots for kangaroos and Swamp Wallabies may be found between the grass trees.

Further insect, nectar and seed resources are found in the Heathy Dry Forest in stands of healthy and flowering Silver Banksia *Banksia marginata* (Plate 16).

Plate 16. Silver Banksia flowering in Heathy Dry Forest

Gullies and small dams

There are several gullies of various depth and length running through the reserve, generally in a south-west direction. The gullies have markedly different vegetation from the slopes of Grassy and Heathy Dry Forest, in both species composition and structural habitat. Dense stands of tea-tree provide excellent breeding habitat for forest birds such as Eastern Yellow Robin, offering plenty of insect food resources, and protection from aerial predators such as Brown Goshawks (Plate 17). Large graminoids such as Sword-sedge *Lepidosperma* are present in the gully areas. These plants provide food for seed-eating pigeons, parrots and finches, as well as insectivorous birds, possums and gliders in the form of insect diversity and sap resources.

Plate 17. Prickly Tea-tree and sedges in gully running south-west through the reserve

A number of small dams surrounding the tip site (Figure 2) provide a source of water for a range of avifauna and larger mammals, such as macropods and pest animals including Hares. The dams provide breeding habitat for a range of frog species, as well as invertebrates such as dragonflies. Tadpoles from an unidentified species of frog were observed in one of the dams (Plate 18).

Plate 18. One of the larger dams, located east of the tip site

Tree and Shrub Cover

Tree and shrub cover varies in species, density and age class according to past management history, as well as the natural determinants such as the vegetation type, slope and aspect.

Large old trees, both living and dead, represent significant resources for a wide range of fauna. Compared to younger trees, large old trees produce more nectar when they flower and have higher populations of insects within their peeling bark and dead branches. The larger boughs provide resting sites for larger arboreal mammals such as Brushtail Possums and Koalas. Most importantly, the numerous hollows within large old trees provide nesting and shelter sites for a significant number of bird, mammal, frog and reptile species.

Plate 19. Large old tree with hollows in the Grassy Forest area west of the tip site

Most of the large old trees with hollows are the remains of burnt out stags, both living and dead (Plate 19). These trees may be found throughout the reserve and may provide significant roosting and nesting sites for fauna. Hollow-using fauna require a variety of hollows of differing entrance and internal size. The number of hollows occurring in large healthy living trees was low overall throughout the reserve. The number of hollows in the Heathy Dry forest areas was lower than in the Grassy Forest and gully areas.

Eucalypt tree cover is complemented in the reserve by a healthy and diverse mid-layer of small trees and large shrubs such as Black Sheoak, Silver Wattle and Blackwood, particularly in the Grassy Forest areas. These plants provide food resources for both insectivorous birds such as Eastern Yellow Robins and seed-eating birds such as Crimson Rosellas. Structurally, the shrubs form important pathways and connectivity for arboreal mammals as they move around the reserve.

Prickly plants such as the wattle Prickly Moses and Prickly Tea-tree provide dense cover for nesting and foraging resources for small birds such as honeyeaters, thornbills and Grey Fantails.

Cherry Ballart is present in the reserve, mainly in the Grassy Forest areas. These small parasitic trees provide food for berry eating birds such as Whistlers and dense cover for large predatory birds to rest in during the day. Powerful Owls use Cherry Ballart as daytime roosts, as the thickly covered branches shield the owls from detection and subsequent mobbing by other birds. Cherry Ballart can be used by Koalas as shady rest spots during heat events in summer.

Coarse Woody Debris

The reserve supports a moderate amount of coarse woody debris in the form of fallen trees and shrubs, dead standing stags and litter (Plate 20). Much of this woody debris is in the lower size classes, but it retains high habitat value.

Plate 20. Woody debris in the reserve indicating possible Echidna foraging

Coarse woody debris provides perching and hawking sites for insectivorous birds such as Grey Shrike-thrush, Fan-tailed Cuckoos and Superb Fairy-wren, and structural habitat in the form of runways for small mammals such as antechinus and bush rats. The stags and fallen logs provide hollows for nesting and refuge for a wide range of fauna. Coarse woody debris is an essential component in nutrient cycling as invertebrates and fungi break down the woody debris, and these in turn provide a rich food source for the reserve's fauna.

3.2.4 Significant Fauna Species

No rare or threatened fauna species were recorded during the site visits. A total of five rare and threatened species have previously been recorded within a five kilometre radius of the reserve (VBA 2012). In addition, three rare and threatened butterfly species have previously been recorded within a 30-minute square grid incorporating the study site. All of these species are listed in Appendix 2.2.

The Brown Toadlet *Pseudophryne bibronii* is a small terrestrial frog species that is listed as Endangered under the *Flora and Fauna Guarantee Act 1988* (FFG Act). The Brown Toadlet was recorded in 1980 within five kilometres of the reserve, and may be present throughout the Macedon Ranges, Pyrete and Wombat State Forest in low numbers. This species is very difficult to distinguish from the Southern Toadlet *Pseudophryne semimarmorata*, unless identified in the hand.

In foothill forest areas, the Brown Toadlet tends to occur along floodplains with permanent streams, and gullies between ridge lines (Howard *et al* 2010).

The Brush-tailed Phascogale is listed as Vulnerable under the FFG Act. The last record for the Brush-tailed Phascogale was in the mid-1980s, however there are local reports of this threatened species at Barringo Reserve, New Gisborne. It is unclear whether they are present in the Pyrete State Forest, but the Grassy Forest habitat may be suitable and further surveys for this species at the reserve are strongly recommended.

Southern Brown Bandicoot and Eastern Quoll are significant fauna species that have been recorded within five kilometres of the reserve, but are regionally extinct. Both records are from the eighteenth century.

Growling Grass Frog have been recorded within five kilometres, but as this species requires habitats such as deep dams and wetlands they are not considered likely to occur at the reserve.

3.3 Geology

The reserve is located on marine turbiditic sandstone, mudstone, black shale and minor granule conglomerate of the lower Ordovician period. At the tip site, excavation works have provided a display of Bullengarook Gravels and clays derived from weathering of the underlying Ordovician shales (Rosengren 1986).

3.4 Recreation

Located on the edge of the Pyrete Range, the reserve provides the bushwalker, naturalist or bird watcher with abundant opportunities for recreation, observation and exploration. Single track and vehicular paths traverse the site and provide the visitor with excellent access into the reserve (see Plates 21 and 22). These tracks provide access into and from the Pyrete Range. Aside from the access tracks, there are no other visitor facilities provided at the reserve.

The location of the tip site has likely deterred visitors from undertaking passive recreational pursuits at the reserve. This tip site has not, however, deterred mountain bikers who have constructed elaborate tracks, jumps and signage, especially close to the tip site (see Plate 33). The popularity of the reserve for cycling is, perhaps, not surprising given the popularity of the Pyrete Range for mountain biking.

Plate 21. Single access track, heathy dry forest section

Plate 22. Vehicular access track, near the old tip site

4 MANAGEMENT ISSUES, THREATS AND ACTIONS

4.1 Management Objectives

The key management objectives for the reserve are to:

- Maintain and secure the existing conservation values and biodiversity.
- Rehabilitate and revegetate the old tip site so that this area contributes to the biodiversity values present.
- Restore and enhance native vegetation communities across the reserve and improve their resilience in the face of potential impacts.
- Work with the community in forming a Friends of Group for the reserve with the aim of obtaining a balance between current uses including mountain bike riding and sustainable environmental management/outcomes.
- To mitigate and, where possible, eliminate identified threats to conservation values.
- Ensure adjacent use or development does not compromise the environmental values of the reserve.
- Increase community awareness of the ecological significance of Bushland Reserve, Hobbs Road.
- Promote the opportunities for low impact, passive recreation.
- Conduct and facilitate appropriate monitoring and continued assessment of the site.
- To monitor, identify and manage new threats that may arise.
- To protect in perpetuity the biodiversity values present.

4.2 Management Priorities

Management priorities discussed below include restricting the spread of *Phytophthora cinnamomi,* engagement with cyclists, the local cycling club and other user groups in directing appropriate access into the reserve. Management actions, their timing and level of priority are summarised in the action check list in Appendix 5.

4.3 Biodiversity Management

4.3.1 Invasive Plants

Objective: *To reduce invasive species cover over time through integrated management techniques in cooperation with local user groups.*

Invasive plants (introduced plants and weeds) can be categorised into three broad groups within the reserve (listed in order of priority for control):

- **Sweet Vernal-grass** – the highest weed threat to the biodiversity values of the reserve, in particular the ground layer, is the visible encroachment of Sweet Vernal-grass *Anthoxanthum odoratum*. The grass is most widespread around the tip site and adjacent to Hobbs Road, with dense swards of the grass observed south-west of the tip site within otherwise high quality vegetation (Plate 23). This perennial tufted or rhizomatous grass can occupy a variety of habitats and is widespread within areas receiving high rainfall. The grass is allelopathic (produces chemicals that suppress the growth of surrounding plants) and therefore competes vigorously with indigenous ground flora.

  Sweet Vernal-grass can grow on shallow soils with poor fertility, and subsequently can grow in conditions that normally do not favour other weed species. Heathy Dry Forest within the reserve, for example, occupies shallow soils with poor fertility that generally does not favour other weed species. Areas of Heathy Dry Forest do not support a high cover of Sweet Vernal-grass, however if current populations are left untreated, the species could enter these very high quality environments and substantially decrease their quality and function. Sweet Vernal-grass is a high threat in this environment as it can readily grow and out-compete indigenous vegetation in an otherwise weed-free landscape.

  Sweet Vernal-grass may have entered the reserve through a number of means such as the tip area and subsequent soil movement, nearby agricultural properties and via Hobbs Road itself which supports the species. High rainfall and moist conditions over the previous seasons has likely exacerbated its movement deeper into the reserve. The impact of this species on the reserve's values could potentially be severe if current populations are left untreated. Other reserves in nearby locations with similar vegetation have been detrimentally affected by this species; with entire indigenous ground flora altered by its encroachment. Cover within the reserve is presently at a level which is manageable. If left untreated over the next few seasons, the species may reach very high levels of cover which may negate management opportunities. It is therefore preferable to treat the species *immediately* to minimise its spread through the reserve. Recommended management actions for the species are provided below.

Plate 23. Sweet Vernal-grass dominates some areas south-west of tip site, within otherwise high quality vegetation

- **High-threat and Noxious weeds** – these plants are listed as declared noxious weeds within the Port Phillip and Westernport catchment or Weeds of National Significance (see Appendix 1.1) or are not noxious but pose a high-threat to values within the landscape. Higher priority weeds include Gorse *Ulex europaeus* (Plates 24 and 25), Blackberry (Plate 26), Bluebell Creeper *Billardiera heterophylla*, English Broom *Cytisus scoparius* and Montpellier Broom *Genista monspessulana* (collectively noted as 'Broom' in Figure 2). These species are locally dominant in some areas surrounding the tip site where soil movement and disturbance is high (see Figure 2). Cover for all of these species is currently at manageable levels and should be treated as a priority, together with treatment of Sweet Vernal-grass as noted above. Gorse was observed immediately over the fence within the neighbouring property to the north-west (Plate 25).

Plate 24. Gorse is concentrated within and surrounding the tip site

Plate 25. Gorse within adjacent property to the west

Plate 26. Top- Large Blackberry at edge of tip site, bottom- Blackberry surrounding dams

Other high-threat species include the following declared noxious weeds: Hawthorn *Crataegus monogyna*, St. John's Wort *Hypericum perforatum* subsp. *veronense* and Fennel *Foeniculum vulgare* (Figure 3). Their cover is presently at very low levels and can be easily and rapidly managed at this time. Spread of these species is likely to be much slower than the high-threat weeds listed above and therefore these species are of a lower priority.

- **Low-threat weed populations** – these include non-noxious woody species or isolated plants that are either low in cover or easily eradicated. They include: Cootamundra Wattle *Acacia baileyana*, Cedar Wattle *Acacia elata*, White Sallow Wattle *Acacia floribunda* (Plate 27), Ovens Wattle *Acacia pravissima*, English Oak *Quercus robur* (Plate 28), Cherry Plum *Prunus cerasifera*, Radiata Pine *Pinus radiata* and Pampas Grass *Cortaderia selloana* (Figure 3). Most of these species are present as isolated individuals or discrete small populations and can be readily removed through the cut and paint method.

Plate 27. White Sallow Wattle

Plate 28. English Oak near Hobbs Road

Management measures focused on these three broad weed groups should aim to reduce or eliminate their presence within the reserve. Weed control, together with other measures outlined in this plan, will help to increase native species cover, improve the overall ecological value and resilience of the reserve, strengthen this core area of vegetation and provide improved habitat for native fauna species. These outcomes can only be achieved through an on-going and long-term commitment by the land manager to reduce weed cover.

An integrated, planned and well-timed weed control response, in cooperation with adjoining landholders, is required to successfully eradicate or control targeted weed species. Varying weed control methods need to be utilised dependent on the ecology and morphology of the target species, the environment surrounding the target species and its current spread within the reserve. An integrated weed management approach includes methods such as:

- Manual weed control;
- Foliar spray with herbicide;
- Cut and paint or scrape and paint;
- Drill and fill;
- Slashing; and
- Fire.

Recommended weed control strategies, priorities and timing for target species are provided in Table 1 below. The locations of key weed species are indicated within Figure 3. It should be noted that actions targeting weeds within the reserve need to be implemented in accordance with the aims and objectives of the Macedon Ranges Shire Council's *Weed Management Strategy* (Macedon Ranges Shire Council 2009).

A Timeline and Checklist for Management Actions table (Appendix 5) provides a chronological seasonal guide to the actions listed below.

Actions:

- *Consultation with private property on western boundary*. This private property should be contacted regarding the Gorse along the western boundary. Although no Gorse was observed to be entering the reserve from this Gorse infestation, encroachment will occur in time if the Gorse is not managed. Gorse has the ability to shoot out seed at great distances and small seedlings will eventually emerge in the reserve if not treated. As a noxious weed species listed under the *Catchment and Land Protection Act 1994* (CaLP Act), it is the landholder's responsibility to control this weed and ensure it does not encroach into adjacent bushland.

- *Management of weeds within Hobbs Road roadside*. Several weed species present within the reserve, particularly those within the north-western corner (see Figure 3), are emanating from weed populations within the adjacent road reserve. Broom, Blackberry and other introduced species such as Sweet Vernal-grass are present within the road reserve and should be managed as part of Council's roadside weed management responsibilities. Hobbs Road is known locally for its high biodiversity values and should be managed to encourage these values and discourage any threats to these values (i.e. weeds). Appropriate management within the roadside reserve will also benefit the Bushland Reserve through the reduction in weed cover close to the roadside.

- *Implement a Sweet Vernal-grass control program*. Action should be taken to reduce the species' long-term cover and dispersal opportunities through immediate control of existing, and relatively discrete, populations within the reserve. Sweet Vernal-grass populations are concentrated near Hobbs Road and to the west and south-west of the tip site. A high level of resources and a long-term commitment is required in order to successfully implement the following program:

    - The edges of Sweet Vernal-grass populations should be treated each winter-spring with an appropriate grass-selective herbicide using a spray shield to minimise impacts to other ground flora. This will minimise further dispersal into higher quality areas nearby (i.e. Heathy Dry Forest to the south and other nearby areas, which may in time become engulfed by Sweet Vernal-grass if not controlled). This treatment, if carried out appropriately, will effectively contain the population within its current areas, not allowing it to spread even further.

This treatment should be implemented as a priority if funds are not available to carry out additional works listed below.

  - Treatment of Sweet Vernal-grass with a grass-selective herbicide in winter-spring within the contained area- gradually moving into the infestation from the outer edges in. Higher quality areas (i.e. near Heathy Dry Forest south-west of tip site) to be prioritised for treatment. A linear 'line' of treatment could be followed along the edges of the population, gradually moving inwards. In sensitive areas supporting significant species, herbs or orchids, plants should be wick-wiped with herbicide.

  - Slash infestations to avoid flowering and seed dispersal where timing or funding does not allow for immediate herbicide control.

- *Target the following high-priority high-threat weeds: Gorse, Blackberry, Bluebell Creeper, English Broom and Montpellier Broom* (Figure 3). These species have been listed in priority order for control. All populations of these species are currently at manageable levels occurring within discrete areas, however if no active management begins in the short-term their cover will increase.

- *Target lower threat weed populations* such as the wattles (listed above), English Oak, Cherry Plum, Radiata Pine and Pampas Grass (see Figure 3). These isolated and discrete populations can easily be cut and painted with herbicide, or in the case of Pampas Grass, slashed with the re-growth sprayed.

General recommendations:

- Ensure weed control works are undertaken by qualified and experienced contractors with appropriate licenses and permits. Contractors must be aware of the objectives of this management plan and should be sensitive to the reserve's ecological values. They must possess sound flora identification skills to limit the chance of off-target spot spraying or disturbance to native vegetation.

- Any use of herbicide must take into account the proximity of native vegetation and protective measures must be incorporated accordingly. Ensure the right type and ratio of herbicide is used for the conditions and vegetation to be targeted, avoiding off-target damage. Herbicide run-off should not be allowed to enter into any gully lines.

- Ensure weed control works are undertaken at the appropriate time of year in accordance with the life cycle of plants to be targeted, i.e. weed control works to be undertaken whilst plants are actively growing but before they set seed. Weed control works undertaken at inappropriate times of the year result in poor outcomes and an unnecessary excess of chemical residue entering the environment.

- Ensure noxious weed material is removed from the site without harming native vegetation and appropriately disposed of.

Table 1. Key weeds for control within reserve

Botanical Name	Common Name	Location	Timing	Control Method*	Comments
TREES & SHRUBS					
Pinus radiata	Radiata Pine	Around tip site. Figure 3	Any time	CP, DF	Source population to be identified. Any mature plants to be cut and painted. Care must be taken to avoid damaging surrounding native vegetation when trees are felled. Care to be taken when transporting debris.
Prunus cerasifera	Cherry Plum	Minimal number near tip site. Figure 3	Any time	CP	Source population to be identified. Any mature plants to be cut and painted. Care must be taken to avoid damaging surrounding native vegetation when trees are felled. Care to be taken when transporting debris.
Rubus fruticosus	Blackberry	Around tip site. Figure 3	Sep-Dec	HP, SP, FS	Foliar spray larger plants. Small plants intertwined with native vegetation should be scraped and painted to avoid off-target damage.
Acacia baileyana	Cootamundra Wattle	Around tip site. Figure 3	Any time	CP	Care must be taken to avoid damaging surrounding native vegetation when trees are felled. Care to be taken when transporting debris.
Crataegus monogyna	Hawthorn	One plant observed. Figure 3	Any time	HP, CP	Any emerging seedlings can easily be hand pulled.
Quercus robur	English Oak	Minimal number of plants near tip site. Figure 3	Any time	CP	Care must be taken to avoid damaging surrounding native vegetation when trees are felled. Care to be taken when transporting debris.
Acacia elata	Cedar Wattle	One plant observed. Figure 3	Any time	CP	Care must be taken to avoid damaging surrounding native vegetation when trees are felled. Care to be taken when transporting debris as no vehicle access close to population.
Acacia floribunda	White Sallow Wattle	One plant observed. Figure 3	Any time	CP	Care must be taken to avoid damaging surrounding native vegetation when trees are felled. Care to be taken when transporting debris as no vehicle access close to population.
Acacia pravissima	Ovens Wattle	One plant. Figure 3	Any time	CP	Care must be taken to avoid damaging surrounding native vegetation when trees are felled. Care to be taken when transporting debris as no vehicle access close to population.

Botanical Name	Common Name	Location	Timing	Control Method*	Comments
Ulex europaeus	Gorse	Discrete population in tip site. Figure 3	Any time	CP, FS	Discrete population can easily be foliar sprayed without damaging other native vegetation.
Cytisus scoparius and *Genista monspessulana*	English Broom and Montpellier Broom	Around tip site and in disturbed areas. Figure 3	Any time	CP, SS, HP	Larger plants to be cut and painted.
HERBS & CLIMBERS					
Billardiera heterophylla	Bluebell Creeper	Around tip site. Figure 3	Spring-early summer	HP, CP, CH	Sever vines where they grow in native vegetation (i.e. shrubs and grass trees) and leave to dry out. Stems can be cut and painted. Smaller plants can be hand pulled or chipped out ensuring all root fragments are removed.
Cortaderia selloana	Pampas Grass	One individual observed. Figure 3	Spring-summer	SL. FS	Flowering stems can be cut and appropriately discarded or burnt off-site. Foliage can be slashed with re-growth sprayed.
Hypericum perforatum subsp. *veronense*	St. John's Wort	One small patch observed. Figure 3	Spring-summer	CH, HP, SS	Hand pull or chip out small seedlings ensuring all root fragments removed. Spray mature plants.
Foeniculum vulgare	Fennel	Minimal number of plants. Figure 3	Winter-spring	SS, SL	Spray before flowering stems emerge, slash before seed set.
GRASSES					
Anthoxanthum odoratum	Sweet Vernal-grass	West and south-west of tip site	Winter-spring	SL, SS, WW	Slash where required before seed set. Otherwise spot spray, hand pull or wick-wipe amongst native vegetation. Areas to be prioritised as per actions listed above.

* HP = Hand Pull; CP = Cut and Paint with herbicide; Scrape and paint = scrape 5cm of lower stem and paint immediately with herbicide; FS = Foliar spray; SS = Spot spray with herbicide; SL = Slash or Brushcut; DF = Drill and fill; WW = Wick-wipe

4.3.2 Phytophthora cinnamomi

Objective: *To contain and avoid the further spread of this pathogen within the reserve.*

Phytophthora cinnamomi (Pc) is an introduced water pathogen brought in by the early settlers in the 1800s (DSE 2008). It attacks the roots of susceptible plants and is spread through the movement of water, soil and plant material (DSE 2008). The pathogen spreads through the root systems of infected plants and kills off the plant's vascular system, thereby impeding its ability to absorb nutrients and water (DSE 2008). Symptoms are likened to drought stress or 'dieback' whereby the outer parts of the plant yellow and die first (DSE 2008). Heathy vegetation communities, such as Heathy Dry Forest, are the most susceptible to the pathogen and there is evidence that Pc is present within the reserve, most notably in areas immediately to the west, south and east of the tip site. Austral Grass-trees in these areas have visibly been impacted by the pathogen (Plate 29). Humans are the main cause of Pc

spread through movement of infected plants or contaminated soil (DSE 2008). Affected grass trees were observed adjacent to bike trails (Plate 30) with cyclists/walkers further spreading the pathogen around the reserve, into the adjacent Pyrete Range, Lerderderg State Park and beyond.

Plate 29. Austral Grass-trees affected by the pathogen *Phytophthora cinnamomi*

Plate 30. Affected Austral Grass-tree alongside cycling trail

The pathogen can be spread through movement of soil and vehicle contamination, and may be spread by native animals (DSE 2008). Soil mounds and movement are evident around the tip site and it is possible that soil or gravel brought in to the tip may have introduced the pathogen to the reserve. A combination of walkers, cyclists, vehicles and native animals may have continued the pathogens' spread through the reserve. Fortunately, the higher quality Heathy Dry Forest to the east does not appear to have been impacted by the pathogen. This area has the least amount of tracks passing through it.

Once a site is infected, Pc spreads with the movement of water, therefore in the case of the reserve, the pathogen will likely continue to move downslope possibly into dense areas of vegetation. Movement can occur across and upslope via root to root contact with nearby plants (DSE 2008). Over time, the pathogen can dramatically alter and reduce species composition and structure, which in turn affects the fauna assemblage (DSE 2008). Wilsons Promontory and Brisbane Ranges National Park are prominent reserves well-known for their issues with the pathogen.

The aim within the reserve should be to contain the pathogen and minimise its movement through the landscape. As the pathogen has most likely been introduced through soil or gravel, it is pertinent that all soil fill and gravel still being brought in to the site are from a reputable source. The State Department of Environment and Primary Industries (DEPI) should be contacted for information regarding reputable pathogen-free soil and gravel sources. Access to infected sites should be restricted, i.e. cyclists, walkers and public vehicles. Access to highly susceptible areas nearby should be avoided. The provision of educational signage and foot/bike hygiene stations at the main entrance points to the reserve are key management opportunities.

Actions:

- *Contact the State Department of Environment and Primary Industries (DEPI) for information regarding reputable pathogen-free sources of soil and gravel.* Any additional soil and gravel brought into the reserve should be tested and cleared of the pathogen. Additional efforts to contain the pathogen within the reserve will be futile unless the source of the contamination (most likely movement of contaminated soil and gravel) is identified and halted. The DEPI can carry out testing of soil if required. This is a priority action which should be carried out prior to additional actions outlined below.

- *Establish contact with the local cycling club and discuss how best to manage cycling and the phytophthora issue within the reserve.* At present it is unlikely that the Council has contact with the cycling club who have likely created tracks within the reserve. Various issues require discussion with this club (see other management actions listed in Section 4.6). In particular, the issue of Pc should be discussed as cyclists are likely unaware of this issue and how their activities are accelerating the pathogens' spread through the reserve and beyond. Cycling tracks need to be diverted away from areas prone to the pathogen (i.e. Heathy Dry Forest) and tracks in or near

infected places should be closed off. Signage on this issue at the entrance points to the closed off tracks should be erected. These works should only be undertaken in combination with other measures outlined here and after adequate liaison and discussion with the cycling club. Failure to involve the club in Council works will lead to members continuing to cycle and/or undertake additional track work regardless of Council's position. To halt the spread of the pathogen within the reserve and beyond, every attempt must be made to divert tracks away from infected areas through fencing, signage, engagement and education.

- *Install educational signage at the main entrance points of reserve.* Once appropriate fencing is installed along the Hobbs Road boundary (see Section 4.6.5), signage should be installed at all access points. Signage should include a brief introduction to Pc and how it's affecting the reserve. Signage should warn cyclists/walkers to avoid grass tree areas, and in particular areas where the pathogen exists. A photo of an infected grass tree on the sign could assist here.

- *Establish footwear/bike wash-down point at main entrance gate.* There is no running water at the reserve; however hygiene stations need to be erected at the main entrance points. As a minimum, a scrubbing brush to scrub boots and spray bottles with methylated spirits to disinfect footwear and bike tyres could be set-up. A more formal wash-down station (i.e. such as the 'Anakie Scrubber' footwear station near the Brisbane Ranges National Park, see Plate 31) should be investigated. Hygiene stations for cyclists are also available and have been set up in other conservation reserves. Footwear, equipment and vehicle/bike hygiene is the most important preventative measure for halting Pc spread and should be seriously considered if protection of vegetation is of paramount priority. Signage should be placed at the wash-down point with instructions to remove soil and mud from boots with the scrubbing brush and to spray boots with disinfectant both prior to and upon leaving the reserve. Refilling of spray bottles (which should have at least 70% methylated spirits) may need to be coordinated with Council staff or the local Bullengarook Landcare group on a rotational basis.

Plate 31. The 'Anakie Scrubber' footwear station (Source: D. Peters, Parks Victoria)

- *Consider using a biodegradable fungicide to reduce the impact of Phytophthora cinnamomi.* Phosphonate (also called phosphite) is a biodegradable fungicide that reduces the impacts of Pc on host plants, however it will not eradicate it from a site (Suddaby and Liew 2008). Both infected plants and surrounding uninfected plants could be sprayed with the fungicide to minimise its spread. Further information can be found at the Western Australian Dieback Working Group website: http://www.dwg.org.au/. This should only be applied once the above-mentioned management actions have been implemented.

4.3.3 Tip site revegetation

Objective: *To revegetate the tip site, minimise introduced grass cover and dispersal and contribute to the biodiversity values within the reserve.*

The decommissioned tip site in the centre of the reserve (Figure 2) has been capped and direct seeded with introduced pastoral species including Rye Grass (Plate 32). Other species within this open grassland area are Sweet Vernal-grass and Flatweed *Hypochaeris radicata*. There are no trees or shrubs on the capped tip area. The eastern section of the tip site is currently utilised by the Macedon Ranges Shire for the storage of clean fill. This area was previously used as part of the tip and is now accessed via a gravel road that winds down to the 'pit' below. The fill is deposited in this section.

There are opportunities to incorporate the capped tip area into the wider reserve conservation area. This area presently supports no native vegetation and does not provide adequate habitat for native species. The creation of a native grassland, using locally sourced indigenous seed, will create a natural habitat that local fauna species such as mammals, reptiles and invertebrates can utilise as habitat, refuge and as rest spots. Typically, a direct seeding program involves adequate site preparation over a period of at least two seasons. Site preparation methods prior to direct seeding include scalping of the soil prior to direct sowing, herbicide application over one to two seasons or a slow burn in preparation for direct sowing. Scalping of soil is not feasible in this instance due to restrictions posed on soil disturbance on the capped tip site. Fire in this instance may be a feasible and practical tool to remove introduced pastoral species biomass, to destroy seed in the soil and to prepare the site for sowing.

Direct seeding with native seed will introduce a native ground cover into an otherwise weedy or bare environment, reduce edge effects together with adequate site maintenance, assist with soil stabilisation, create natural habitat and extend native grass cover. A native grassland in the centre of the reserve will also minimise weed seed dispersal into surrounding remnant vegetation. A reputable native grass seed supplier (if outside contractors are to be utilised) should be engaged, i.e. Flora Victoria or Greening Australia. Seed should ideally be sourced from the reserve where feasible.

Plate 32. Tip site capped and sown with Rye Grass

Actions:

- *Seek advice regarding direct seeding and implement a site preparation program over 1-2 seasons*. Herbicide application or, preferably, a burn over the autumn period, will remove weed biomass and destroy weed seed within the soil. Burns, slashing and herbicide application should be undertaken over at least two seasons to exhaust the weed seed bank as much as possible prior to sowing;

- *Consult with seed collector/direct seeder* to determine seed and volume to be collected/provided for the site;

- *Remove any debris* such as residual litter and general waste;

- *Direct seed tip site with locally sourced indigenous species*. Follow-up maintenance over several seasons will be required to ensure that native seeds are encouraged whilst weeds are discouraged. Adequate resources need to be allocated to the direct seeding project to ensure; a) appropriate site preparation is undertaken; b) the seed collecting and direct seeding is undertaken by a reputable contractor; and c) follow-up weed control and maintenance is undertaken over several seasons.

If fire is to be used as a site preparation tool:

- *Fire should not be allowed to enter into nearby forested areas*. Only the open grassland area is to be burnt.
- *Schedule burns, where possible, during the autumn period* to reduce fire intensity and impact on flowering species and active wildlife. Ensure soils at the reserve are dry enough prior to the burn to avoid compaction through vehicle movement.
- *Burns are to be undertaken by the local CFA* under the direction of the Macedon Ranges Shire Council in discussion with DEPI.
- *Minimise fire break areas to three metres in width*. Fire breaks are not to be ploughed or graded but rather cut by a brushcutter or slasher/mower. Fire breaks should be moved slightly each year to avoid repeated slashing in the one location.
- *Fire breaks should be wetted down prior to lighting*. No chemicals or fire retardants are to be used at any stage within the fire break.
- *The precise timing of burns will be determined by the local CFA*. Climatic factors such as temperature, humidity and wind direction and speed will be taken into account. Nearby residences are to be notified of the burn.
- *Scan burnt areas* immediately after a burn for any injured wildlife. If burnt or injured wildlife are observed, they should be carefully and safely transported to the nearest veterinary clinic for treatment (e.g. Gisborne). If this is not possible, Wildlife Victoria should be contacted immediately.
- *Ensure follow up weed control is undertaken in burnt areas within four to six weeks post-burn*. Fire breaks will require follow-up treatments. Fire is likely to trigger germination of both native and non-native species. Non-native species (i.e. weeds) should be identified by an experienced and qualified weed control contractor with excellent flora identification skills, and spot sprayed whilst at the seedling stage. Introduced pastoral species are likely to germinate on a mass scale and this should be assessed after the burn to determine the best follow-up response. This larger area supports no native species therefore can be blanket-sprayed or boom-sprayed. Any native species that do germinate should be protected.
- *Records must be kept* indicating the area burnt, the date and any issues encountered during the burn.
- *Each area burnt will require at least one to two seasons of follow-up weed control* prior to any direct seeding. Weed control works must not impact on any naturally regenerating species. Direct seeding should only be undertaken if the site is adequately prepared prior and must only be undertaken by a specialised contractor.

4.3.4 Pest Animal Management

Objective: *Reduce the number of invasive pest animals within the reserve and reduce weeds which may provide den sites.*

Rabbits have the potential to cause serious environmental damage through the suppression of indigenous plant regeneration, competition with native wildlife for food resources and by providing a ready food source for foxes. Hares have the potential to cause moderate environmental damage through the suppression of indigenous plant regeneration, competition with native wildlife for food resources and by providing a partial food source for foxes.

Foxes prey upon many smaller native animals and have been identified as a known or perceived threat to 34 indigenous fauna species in threat abatement plans provided under the EPBC Act. The European Rabbit, Brown Hare and Red Fox are declared Established Pest Animals under the *Catchment and Land Protection Act 1994* (CaLP Act). Under this Act, landowners/managers must take all reasonable steps to control established pest animals on their property. Competition and land degradation by rabbits and predation by foxes are listed as Key Threatening Processes under both the FFG Act and EPBC Act.

It should be noted that a Pest Animal Strategy is being developed by the Macedon Ranges Shire Council and is due for completion in 2014. Actions targeting pest animal management at the reserve will need to be conducted in accordance with this Strategy's aims and objectives.

Actions:

- *Incorporate an integrated pest animal management approach* that includes a number of measures, including warren and harbour destruction, warren fumigation, poisoning/baiting (e.g. 1080) and shooting. Optimum control is best achieved by integrating more than one control method.
- *Remove pest animal harbour* which provides refuge and potential den sites for pest animals (i.e. Blackberry). Works to be undertaken as part of weed control program outlined in Section 4.2.1.
- *Liaise with Bullengarook Landcare, the Catchment Management Authority, and nearby landholders/managers* to determine opportunities and resources available to target established introduced flora and pest animal harbour. Removal and replacement of these stands will require a long-term commitment from all stakeholders together with intensive long-term resourcing.

4.3.5 Native Fauna Management

Objective: *To retain habitat for the local macropod population whilst not compromising the values of the reserve.*

Macropod density at the reserve is low, with only three individuals, including a female with young at foot, recorded in three site visits. Eastern Grey Kangaroos use forested areas as secluded resting areas that are quiet and largely free from human disturbance.

Grass specialists such as Eastern Grey Kangaroos do not pose a significant grazing threat to the ecological values of the reserve; it is likely they are grazing on the Sweet Vernal Grass found within the reserve.

General recommendations:

- Given the connectivity of the reserve with surrounding forest and open land, it is unlikely that macropod density will reach deleterious levels on site. Active control measures, which require a license/permit from DEPI, are therefore not advised at this stage.

4.3.6 Litter and debris

Objective: *To improve habitat for the local fauna population through the removal of litter throughout the reserve.*

As can be expected from a former tip site, there are parts of the reserve that have large amounts of litter. Litter is concentrated in the main mountain bike trail area east of the tip site, but is distributed throughout the reserve. The litter comprises piles of old glass and metal objects, large pieces of furniture, tyres (both outer and inner) and unidentified plastic objects. Most of the litter is on the ground with minor amounts in the small dams and in surrounding trees.

Litter has deleterious effects upon wildlife in three main ways: ingestion, entanglement and toxicity. Ingestion occurs mainly in waterways and marine environments, and may not be as relevant at Hobbs Road. Entanglement is a very real hazard for wildlife; bird's legs can become entangled in discarded threads, wire or netting, and wildlife such as Platypus can slowly choke to death if a small plastic bracelet or jam jar ring becomes encircled around their neck. Snakes and lizards such as Blue-tongue Lizards may crawl into an old tin can seeking water and become trapped.

Plastic litter, and litter from old furniture, may contain a number of toxic compounds such as plastic organic pollutants or POPs which leach into the surrounding environment,

particularly effecting fauna such as frogs. These compounds have noxious effects upon human health.

Actions:

- *All litter should be removed from the site* by the land owner/managers. Some of the litter is used by the cyclists to mark and decorate trails, so engagement with the mountain bike users during this process is recommended.

4.3.7 The Common Wombat

Objective: *To ensure that the Common Wombat population at the reserve persists into the future.*

The Common Wombat is regarded as secure, and is not listed under the Flora and Fauna Guarantee Act. However, the Common Wombat has declined in parts of its range, such as western Victoria and markedly in South Australia. The species now has a discontinuous and fragmented distribution. Sarcoptic mange occurs throughout the Common Wombat's present distribution and can cause local extinctions in isolated populations (Martin *et al* 1998).

Sarcoptic mange is present in the Wombats in the Wombat State Forest to the northwest of the Pyrete Ranges, and is likely to be present on site. Mange is not a disease but an infestation of the mange mite. The mites burrow under the skin where they deposit eggs, this causes intense discomfort and over time thick plaques that look like scabs and ridges form over the wombat's body. These plaques become dry and split open, then the wounds become infected and flyblown. The wombat often goes blind, and eventually dies of stress and starvation.

General recommendations:

- As the reserve is well connected to the surrounding forest areas in the Pyrete Range, active management of the reserve's wombats is not required.

- Should funding become available, the Bullengarook Landcare group could monitor the health of the reserve's wombats through community reported sightings of manged wombats. A simple den gate with veterinary insecticide has proved very effective in treating sarcoptic mange. A number of Landcare groups and wildlife carers called Mange Management have information on treatment methods: www.mangemanagement.org.au.

- Sarcoptic mange is widespread in Red Fox populations, therefore fox control at the reserve is strongly recommended (see Section 4.3.4).

4.3.8 Retention of large trees, logs and coarse woody debris

Objective: *To enhance habitat for hollow using fauna through the retention of large old trees and large logs.*

There are few large old trees and logs within the reserve. This has a particular impact on hollow dependent species such as Powerful Owls, Brushtail Possum, Sugar Gliders, parrots and other bird species such as the Laughing Kookaburra and Sacred Kingfisher. Hollows are required by smaller mammals such as microbats and antechinus as mating and maternity/roosting sites (Gibbons and Lindenmayer 2002).

Actions:

- *Retain all remaining large old trees and logs in the reserve as a high management priority.*
- *Any prescribed burning or ecological burning operations must rake around remaining large old trees and logs to ensure that fire operations do not reduce this hollow resource further.*
- *If a hollow-bearing tree is deemed unsafe, then a number of alternative actions can be undertaken in place of complete removal.* More than one independent arborist report will help the committee make a decision, as many arborists differ on safety and tree removal decisions. Partial removal, such as lopping branches is preferable to total removal.

  Other management actions to reduce risk to mountain bike users include the establishment of fenced areas beneath the tree canopy, and diversion of paths or equipment to areas that are not within the tree canopy.

General recommendations:

- Nest boxes are often considered as a good solution to low numbers of hollow bearing trees, however the use of nest boxes as a management tool should be approached with care and caution.

  Nest boxes require maintenance at least three times per year, ideally monthly. Their maintenance requires the use of a ladder which must be carried into the site, which may present problems due to the lack of direct access into the reserve. Adherence to relevant regulations and procedures need to be followed when using a ladder, including Worksafe requirements. Volunteers must have access to people with carpentry skills, and expertise in feral bee and ant removal. Nest box programs are best carried out in conjunction with a TAFE, school or university so that there is a ready stream of able-bodied volunteers, and a long term commitment can be

undertaken (Irvine and Bender 1997). Further options include contact with the Friends of Organ Pipes National Parks who construct their own nest boxes or through volunteers with a local Men's Shed.

4.3.9 Habitat Connectivity

Objective: *Secure and broaden habitat corridors on private land and promote conservation programs to nearby landholders.*

The Pyrete Range occupies 5,930 hectares of steep and rugged terrain that is managed by Parks Victoria for its conservation and water catchment values. In recent years, the Pyrete Range has been added to the Lerderderg State Park for management purposes, occupying 20,180 hectares in total of land on the fringes of Melbourne. The Bushland Reserve, Hobbs Road adjoins the north-east Pyrete Range and is essentially an extension of this relatively vast conservation area. Habitat connectivity opportunities for the reserve are considerable.

To the east of the reserve, vast tracts of land have been cleared for grazing, cropping, equine and growing urbanisation. This area supported Plains Grassy Woodland that once dominated Gisborne and surrounds. Land clearing has resulted in isolated patches of native vegetation that remain in an otherwise modified landscape around Gisborne and beyond. Native fauna species are less able to move across this ever changing landscape, becoming more vulnerable to local extinction. Local incidents of fire or disease can devastate populations that exist in remnant patches of vegetation, with species less able to recolonise areas once occupied.

Improving and securing habitat connectivity within the Macedon Ranges will link areas of remnant vegetation within an otherwise modified landscape. It will allow for the movement of wildlife between remnant patches of native vegetation and will provide useful fauna habitat, effectively reversing habitat fragmentation in the local area. Mammals, birds, reptiles, amphibians and invertebrates that would otherwise be isolated in one patch can utilise such connections to travel between patches with relative ease and safety. Habitat connectivity allows animals to respond to environmental variability, e.g. by enabling movement from areas of scarce resources to resource-rich areas. It allows animals to respond to population pressure, e.g. by movement from over-populated to under-populated areas, or to re-colonise areas after a population crash, preventing inbreeding and loss of genetic diversity and allowing the creation of a successful meta-population.

Private landholders along Hobbs Road and Bacchus Marsh-Gisborne Road should be encouraged to revegetate cleared land and to enlarge existing vegetated patches and corridors. This measure would strengthen corridor links between the reserve and Lerderderg State Park and Rosslynne Reservoir to the north. Opportunities for vegetation security arrangements with neighbouring landholders should be encouraged and promoted via Trust for Nature agreements or voluntary Land for Wildlife arrangements. This approach would improve the resistance and resilience of local flora and fauna communities, providing a stronger habitat link between the reserve and other core areas of remnant vegetation.

Actions:

- *Engage and encourage landholders located on Hobbs Road and Bacchus Marsh-Gisborne Road to revegetate cleared areas* and *to enlarge existing vegetated patches and corridors.*

- *Promote and engage local landholders to consider involvement in conservation programs such as Trust for Nature and Land for Wildlife.*

4.3.10 Further Surveys

No formal flora or fauna surveys have previously been undertaken at the reserve. Recent site visits have provided a solid introduction to reserve features, species composition and utilisation within the reserve. Formal species and/or targeted surveys and additional incidental records by council staff and contractors will further add to our knowledge and the aims of this management plan.

Actions:

- *Encourage local council officers, ecologists, on-ground contractors and the community to identify and document new species.* Any new species records should be recorded and provided to local council, the Flora Information System (FIS) or any other relevant database systems available at the time. Local bushwalkers and naturalists use the site for recreation and should be encouraged to submit any new species information. The recording and submission of new species will increase our current knowledge of what is present within the reserve which will in turn further inform management practices.

- *Undertake a more comprehensive flora and fauna survey of the reserve in spring to early summer.* Surveys should include more targeted searches for significant species, including Hairy-leaf Triggerplant. For fauna, the methodology should include a general daytime survey, stag watching, spotlighting, the use of an Anabat detector and call playback and may also include more intensive techniques (e.g. rock rolling, tiling, pit trapping, harp trapping, hair tubing and use of remote infrared cameras). Future bird surveys using the Birdlife Australia 20 minute two hectare search methodology would have the added bonus of including information on bird habitat.

4.3.11 Protection covenant

Objective: *To protect in perpetuity the reserve's biodiversity values.*

Actions and initiatives that aim to improve the reserve's biodiversity values will be greatly assisted by covenant measures that protect the reserve in perpetuity. A Trust for Nature conservation covenant is an agreement between the landowner and Trust for Nature which aims to permanently protect the natural values of the land. The covenants are registered on the Certificate of Title to the land and are legally binding. Costs may be incurred to Council in establishing the covenant.

Registration of a Trust for Nature covenant over the reserve was identified as a priority action (Action 4.3) in the Macedon Ranges Council's Natural Environment Strategy 2009. Councils that neighbour the Macedon Ranges have successfully utilised protection covenants to improve biodiversity outcomes on reserves, including Hume City Council's Evans Street Grassland and Melton Shire's Pinkerton Forest.

Actions:

- *Council to seek funding to enable a Trust for Nature covenant over the reserve.*

4.4 Climate Variability

Objective: *Implement an adaptive management framework that is cognisant of the potential impacts of climate change.*

A changing climate presents a major challenge for conservation planning and for the management of natural assets. Climate change is expected to have a wide range of impacts on species and ecosystems, including changes in species distribution and abundance, ecosystem processes, interactions between species and various threats to biodiversity (DCC 2008). Whilst presenting some unique challenges, the impacts of climate change can be considered yet another stressor that adds to and interacts with existing stressors that have already impacted upon our biodiversity assets (DCC 2008). Furthermore:

'*Without early and vigorous mitigation actions, climate change has the potential by the second half of the century to become an overwhelmingly profound and pervasive driver of change in Australia's biotic fabric, resulting in many extinctions and the formation of many novel ecosystems that might not provide the essential ecosystem services on which humans depend*' (DCC 2008, p. 3).

Predictions for the north central region of Victoria, which includes the Macedon Ranges Shire, are for drier and hotter conditions under climate change scenarios. By 2030 a temperature increase of 0.9^{o}C is predicted, while a temperature increase of between 1.4^{o} C

and 2.8° C can be expected by 2070. Less rainfall events are likely with a total net reduction of 4% annually expected, and bushfire intensity and frequency will rise (State Government of Victoria 2011). In Victoria, climate change has already impacted on flora and fauna species, with preliminary research showing that habitat ranges are presently being affected (State Government of Victoria 2011).

Despite the increasing certainty of climate change predictions, it is not possible to precisely identify the impact on the reserve from a changing climate. There are, however, a number of likely threats and impacts that may arise such as:

- Species distribution and abundance: a reduction in the number of some indigenous flora and fauna species, while other indigenous species will disappear, be unaffected or prosper as temperatures rise and rainfall decreases;
- The appearance of new invasive flora and fauna species, while other pest species might prosper, disappear or be unaffected;
- An increasing vulnerability for aquatic species as rain events become less frequent but more severe; periodic inundation of the reserve to become less frequent but more severe;
- An increasing frequency and severity of fire events.

Consideration and reference to the objectives and outcomes of the Macedon Ranges Shire Council's *Climate Change Risk Assessment and Early Adaptation* project should be made in developing an adaptive management framework for the reserve.

Actions:

- *Implement an adaptive management framework that increases the resistance and resilience of the reserve to the impacts of climate change.* A robust management framework, action and monitoring plan that addresses potential impacts such as the appearance of invasive pest plants and animals, the decline of some indigenous plant and animal species and new fire regimes is required under a changing climate scenario. This management framework should recognise that natural assets are not static systems but undergo change, which is likely to accelerate under a warming climate.
- *Adopt a landscape scale approach to management of the reserve.* A landscape scale management approach provides better options for species distribution and abundance. The location of the reserve, on the north-eastern edge of the Pyrete Range, provides good management opportunities for connectivity and ecosystem resistance and resilience to extreme climatic events.

- *Integrate conservation aims and programs between the various authorities and community groups*. Measures by the Macedon Ranges Shire Council to improve the resilience of the reserve on a landscape scale approach requires effective cooperation, communication and integration with the various authorities and community groups including Parks Victoria, the catchment management authority and local Landcare/Friends groups.

4.5 Cultural Management

Objective: *Explore further partnership opportunities with traditional owners.*

The reserve is located within the traditional land of the Wurundjeri. Under the Victorian *Aboriginal Heritage Act 2006*, Aboriginal people are recognised as the primary guardians, keepers and knowledge holders of Aboriginal cultural heritage. At a local level, the Wurundjeri Tribe Land and Compensation Cultural Heritage Council (WTLaCCHC) is the registered Aboriginal party responsible for the management of Aboriginal cultural heritage. The WTLaCCHC provide advice on applications for Cultural Heritage Permits, decisions about Cultural Heritage Agreements and advice or application for interim or on-going Protection Declarations.

Actions:

- *Through discussion with the Wurundjeri (WTLaCCHC), explore potential partnership approaches*. Partnership opportunities between the WTLaCCHC and Macedon Ranges Shire Council range from informal 'in principal' documents such as a memorandum of understanding or statement of intent through to formal, legally binding agreements such as a Cultural Heritage Management Agreement.

4.6 Recreation Management

Objective*: Limit the impacts to the reserve from mountain biking.*

Encourage low impact, passive recreation opportunities.

Opportunities for low impact engagement with the ecological values of the reserve should be encouraged. This engagement will appeal to bush walkers, bird watchers, photographers, naturalists and students of science. Such interactions are aimed at informing and educating visitors on the values of Grassy Forest, Heathy Dry Forest and Shrubby Foothill Forest communities. It is hoped that this engagement will increase visitor appreciation and, ultimately, awareness and action that results in the protection and conservation of these fragile and diminishing environmental assets.

Measures aimed at encouraging recreational access to the reserve need to be undertaken in a cautionary and sensitive manner. The presence of state significant species and a rich diversity

of indigenous flora and fauna species require careful management to ensure these values are conserved and not damaged through visitor interaction.

4.6.1 Visitor impacts

***Objective**: limit the impacts caused by mountain biking through engagement, education and management of activities.*

Mountain Biking

As highlighted in Section 3.4, the reserve is very popular for mountain bikers. Elaborate tracks, jumps and signage are found across the reserve and especially close to the old tip. Numerous trees have been spray painted and marked. It is likely, given the scale of effort involved, that a cycling club or organising party (e.g. Macedon Ranges Cycling Club) has contributed to or led the works. Given the absence of border fencing or locality signage, cyclists are most likely unaware that they are within a council reserve or riding through areas with high biodiversity values.

The impacts to biodiversity values of cycling within the reserve include the spread of *Phytophthora cinnamomi* (see Section 4.3.2), soil compaction and erosion (see Section 4.6.2 below), continuing track creation and intrusion into sensitive ecological areas, litter, graffiti and clearing of logs and branches from tracks (see Plate 33).

It is not considered desirable, nor necessarily feasible, to exclude cyclists from the reserve. Informal cycling is, indeed, a means by which the public engages with nature and public reserves. Organised competitions and events are, however, not allowed in Council reserves without a permit. A preferred approach is for Council to work together with cyclists or cycling clubs to provide education on permitted and non-permitted activities, the biodiversity values present at the reserve, the potential threats posed by their actions and measures to mitigate impacts. As a minimum, Council should aim to ensure that no new tracks are created and that no organised competition events are being held in the reserve.

Plate 33. Mountain biking activities and impacts

Actions:

- *Liaise with local cyclists and cycling clubs on the issues present at the reserve*. Council officers need to educate and inform cyclists on what activities are permitted within the reserve. The issue of organised competitions and events, the spread of *Phytophthora cinnamomi*, new track creation, litter, graffiti, construction of new infrastructure and use of chainsaws must be addressed in these discussions.

- *Install interpretive signage at the reserve entrance*. Signage will inform cyclists of what is and what is not permitted within the reserve and the biodiversity values present (see Section 4.6.5 below).

- *Install a wildlife friendly fence on Hobbs Road and designate a central access point for cyclists and passive recreational visitors* (see section 4.6.4 below).

4.6.2 Track access

Objectives: *Prevent the creation of new tracks within the reserve.*

Tracks criss-cross the entire reserve and have likely been created by cyclists (see Figure 2 for track location). Use of these tracks causes soil compaction, erosion, the introduction of weed seed and spread of *Phytophthora cinnamomi*. Whilst it is preferable to designate a primary track that centralises impacts, this is likely to be a very difficult task given the large number of tracks present. Rather, a priority is to prevent the creation of any further tracks. As outlined in Section 4.3.2, tracks in general to be diverted away from areas prone to *Phytophthora cinnamomi*.

Actions:

- *Through discussion and signage, inform cyclists of the need to ride on the existing tracks (see Section 4.6.1 above) and to cease new track creation.*

- *Through engagement with cyclists and the local cycling club, divert existing tracks away from areas affected by Phytophthora cinnamomi (see Section 4.3.2).*

4.6.3 Reserve entrance and parking

Objective: *Designate a key entrance point into the reserve from Hobbs Road.*

To direct visitor access and limit the creation of new tracks.

The primary entrance point into the reserve is from Hobbs Road. Walkers and cyclists can, however, enter the reserve from the Pyrete Range to the south or west of the reserve. Three locked vehicular entrances that service the old tip site are located on Hobbs Road (Plate 34, Figure 2). Visitors can access the reserve from any point on Hobbs Road as there is no street

fence, with the exception of a cyclone fence in front of the tip area. At least one informal access point was located on Hobbs Road and is utilised by cyclists and vehicles, etc.

There is no parking provided for visitors aside from a small unpaved section next to the main tip entrance on Hobbs Road. Visitor car parking may require investigation in the future.

Actions:

- *Consider creating a primary walk/ride in entrance point for visitors*. Designating a primary entrance point will contribute to biodiversity management measures. This entrance point will provide visitors with a sense that the reserve is managed and that it contains biodiversity of importance. Information via signage can be provided at this entrance point. The existing vehicular access point at the old tip would be the likely site once rehabilitation and revegetation works are complete.

Plate 34. Main tip entrance point and two subsidiary entrances on Hobbs Road

4.6.4 Fencing

Objective: *To delineate and to create a visible presence for the reserve along Hobbs Road.*

To direct visitor access and limit the creation of new tracks.

The construction of a wildlife friendly fence along Hobbs Road will assist considerably in creating a sense of presence for the reserve and for directing visitor access through a central

point (see Section 4.6.3 above). Further, this fence would contribute to measures aimed at reducing the creation of new tracks, especially along the Hobbs Road entrance.

A fence along the border to the Pyrete Range is not recommended. Although this fence would help further delineate the reserve, it is not considered necessary as most visitor traffic would likely be entering the reserve from Hobbs Road. Further, this fence would detract from measures aimed at encouraging habitat connectivity across the landscape.

Fence lines currently delineate private properties to the south and west (see Figure 2) and appear to be preventing stock access into the reserve.

Actions:

- *Install a wildlife friendly fence along the length of the Hobbs Road entrance.* In conjunction with actions outlined in Section 4.6.3 above, install a central access point through the fence line for cyclists and walkers.

4.6.5 Signage

Objective: *Raise community awareness of the reserve.*

Inform visitors of permitted activities within the reserve.

Inform visitors of the reserve's ecological significance and issues including Phytophthora cinnamomi.

There is currently no signage to indicate the location of a Council reserve, the biodiversity values present or the activities that are permitted within the reserve.

Actions:

- *Install a new street front sign at the main entrance on Hobbs Road.* In conjunction with Section 4.6.3 and 4.6.4, this signage should be located at the central access point on Hobbs Road.
- *Highlight permitted and inappropriate activities within the reserve.* Inappropriate activities within the reserve such as organised cycling competitions and events, the creation of new tracks, the spread of *Phytophthora cinnamomi,* litter and rubbish dumping, chain sawing, camping and seed and flower collecting should be noted.
- *Place interpretive signage at the Hobbs Road entrance.* Detailed information on resident flora and fauna should be provided, including significant species. If signage is installed, use non-fade material and ensure signage areas are weed free and maintained.

4.6.6 Low Impact, Passive Tourism

Objective: *Encourage low impact, passive tourism within the reserve.*

The biodiversity values present at the reserve heightens its appeal as a destination for low impact, nature-based tourists including bushwalkers, bird watchers, photographers, naturalists and students of science and education. Such interactions are aimed at informing and educating visitors on the values of this diverse vegetation community. It is hoped that this engagement will increase visitor appreciation and, ultimately, awareness and action that results in the protection and conservation of these fragile and diminishing environmental assets.

Promotion of the reserve and its conservation values aligns with the vision of the Macedon Ranges as a destination that delivers excellence in nature-based tourism (Macedon Ranges Shire Council 2011). Nature based visitors may deliver significant economic benefits to Gisborne and the wider region.

i. Bushwalkers, Birdwatchers, Photographers, Naturalists

Objective: *Increase the awareness of the reserve as a destination for bushwalkers, bird watchers, photographers and naturalists.*

Promotion of the reserve and its geology will attract low impact visitors interested in bushwalking, photography, bird watching and ecology.

Actions:

- *Promote the values of the reserve to bushwalkers and naturalists* via Council's website, Landcare email broadcast and other promotional methods to members of the Field Naturalists Club of Victoria, Indigenous Flora and Fauna Association, Birds Australia, Landcare, Nature Share etc.
- *Consider an interpretive 'walk and gawk' tour in cooperation with a local Landcare group.*

ii. Education and Science

Objective: *Increase the awareness of the reserve as a destination for science and education.*

Promotion of the reserve's ecological values will likely attract local secondary and regional tertiary institutions across a diverse field of studies that includes ecology, biology, botany, zoology and geology.

Actions:

- *Promote the values of the reserve to local and regional schools and tertiary institutions* via Council's website, Landcare email broadcast and other promotional methods.
- *Consider an interpretive 'walk and gawk' tour in cooperation with a local Landcare group.*

4.7 Adjoining Uses

Objective: *Ensure that adjoining landholders do not impact on the reserve's conservation values.*

Engage landholders in measures to enhance and conserve the reserve.

4.7.1 Hobbs Road

Hobbs Road forms the eastern boundary of the reserve and contains significant roadside vegetation. As such it forms an important corridor link, especially to the north of the reserve. Council has identified the significance of this road reserve and assists Bullengarook Landcare in undertaking works to improve its biodiversity values (Plate 35).

Plate 35. Hobbs Road signage

Actions:

- *Council to continue supporting Bullengarook Landcare with their works to improve biodiversity values on Hobbs Road.*

4.7.2 Private property – west

To the west of the reserve is a grazing property that has been largely cleared of vegetation. In the south-western corner of this property is a deep gully that is vegetated and appears to be in good condition. A fence line separates the property from the reserve. Weeds, especially gorse and pasture grasses, may be entering the reserve from this property (see Section 4.3.1).

Actions:

- *Discuss the creation of a revegetated buffer zone along the boundary to limit the potential for weed intrusion into the reserve.*
- *Encourage adjoining landholders to undertake weed control measures on their property to prevent weeds spreading into the reserve (see Section 4.3.1).*
- *Encourage adjoining landholders to retain and improve remnant vegetation patches on their properties.*
- *Provide information to adjoining landholders on the values of the reserve and potential impacts from adjoining uses including invasive plants and animals.* This information could *be provided via the production of a 'Good Neighbour' brochure (see Frankston City Council 'Good Bushland Neighbour' guide).*
- *Ensure adjoining landholders know their responsibilities regarding pet animals to prevent them from entering the reserve at all times.*
- *Encourage adjoining landholder to sign up with a local Landcare group.*
- *Encourage adjoining landholder to act as champions for the reserve by reporting any illegal activities occurring within the reserve.*

4.7.3 Private property – south-eastern boundary

A residential dwelling is located on the south-eastern boundary. Close to the dwelling, it was noted there are a range of pasture grasses proliferate including Sweet Vernal-grass that could spread into the reserve. The back area of this property contains excellent vegetation in very good condition. A fence line separates this property from the reserve.

Actions:

- *Encourage adjoining landholders to undertake weed control measures on their property to prevent weeds spreading into the reserve.*
- *Encourage adjoining landholders to retain and improve remnant vegetation patches on their properties.*

- *Provide information to adjoining landholders on the values of the reserve and potential impacts from adjoining uses including invasive plants and animals.* This information could *be provided via the production of a 'Good Neighbour' brochure (see Frankston City Council 'Good Bushland Neighbour' guide).*

- *Ensure adjoining landholders know their responsibilities regarding pet animals to prevent them from entering the reserve at all times.*

- *Encourage adjoining landholder to sign up with a local Landcare group.*

- *Encourage adjoining landholder to act as champions for the reserve by reporting any illegal activities occurring within the reserve.*

4.7.4 Property – eastern boundary

To the east of the reserve, across Hobbs Road, is a large property that has been largely cleared of vegetation. It was noted that large power line infrastructure runs through this property and that vegetation has been cleared around this. The presence of this infrastructure will limit opportunities for revegetation.

Actions:

- *Encourage adjoining landholders to undertake weed control measures on their property to prevent weeds spreading into the reserve.*

- *Encourage adjoining landholders to retain and improve remnant vegetation patches on their properties.*

- *Provide information to adjoining landholders on the values of the reserve and potential impacts from adjoining uses including invasive plants and animals.* This information could *be provided via the production of a 'Good Neighbour' brochure (see Frankston City Council 'Good Bushland Neighbour' guide).*

- *Ensure adjoining landholders know their responsibilities regarding pet animals to prevent them from entering the reserve at all times.*

- *Encourage adjoining landholder to sign up with a local Landcare group.*

- *Encourage adjoining landholder/s to act as champions for the reserve by reporting any illegal activities occurring within the reserve.*

4.7.5 Parks Victoria – Pyrete Range

The coordination of management activities between Council and Parks Victoria will provide better ecological outcomes for both Hobbs Road and the Pyrete Range reserves. This coordination may reduce costs for measures such as weed control.

Actions:

- *Liaise with Parks Victoria and seek cooperation and coordination of measures such as weed control.*

4.8 Monitoring

Management actions implemented at the site and outlined within this management plan require monitoring to determine whether they are achieving their stated objectives. Monitoring should generally assess current site values, changes, issues, improvements and the appropriateness of management actions being undertaken. Monitoring should be undertaken by an experienced council officer, bushland management contractor or ecologist at biennial intervals, and should be undertaken within the same period (i.e. spring) of each monitoring year in order to provide comparative results. The following actions should be undertaken as part of the monitoring process, with results provided within a brief letter report to the Macedon Ranges Shire Council:

- *An assessment of management actions undertaken and outlined within this plan.* Objectives and actions outlined in this plan need to be formally assessed and documented. This should include whether they have/have not been undertaken on-site or are in progress, and how objectives are/are not being met. Appendix 5 summarises the plan's management actions and can be used as a check list.

- *Establishment of permanent 10m x 10m quadrats within the reserve.* Quadrats should be strategically placed within areas subject to weed control (i.e. Sweet Vernal-grass, Blackberry). The number of quadrats required will need to be tailored to the area targeted for management, however, as a guide, a minimum of three quadrats should be established in the reserve. Areas selected should ideally represent differing reserve characteristics. The corners of these quadrats should be marked discreetly in the ground (i.e. soil pins or nails with flagging tape) so that the quadrat can be identified on-site by the assessor without being visible to the wider community. Each corner is to be marked with a GPS with the coordinates provided to Council. Species cover and diversity is to be assessed within each quadrat using the Braun-Blanquet scale (or similar). The same quadrats should be assessed biennially to determine any changes, issues or improvements to the quadrat areas. The quadrats should be assessed prior to any works being undertaken in order to provide comparative results. The following needs to be assessed and recorded for each quadrat:

  - All introduced species to be recorded with their % cover;
  - All native species to be recorded with their % cover;
  - Bare earth % cover;
  - Height of tallest plant in quadrat;
  - List of native species successfully recruiting or regenerating;
  - Organic litter % cover;
  - Works undertaken (i.e. weed control).

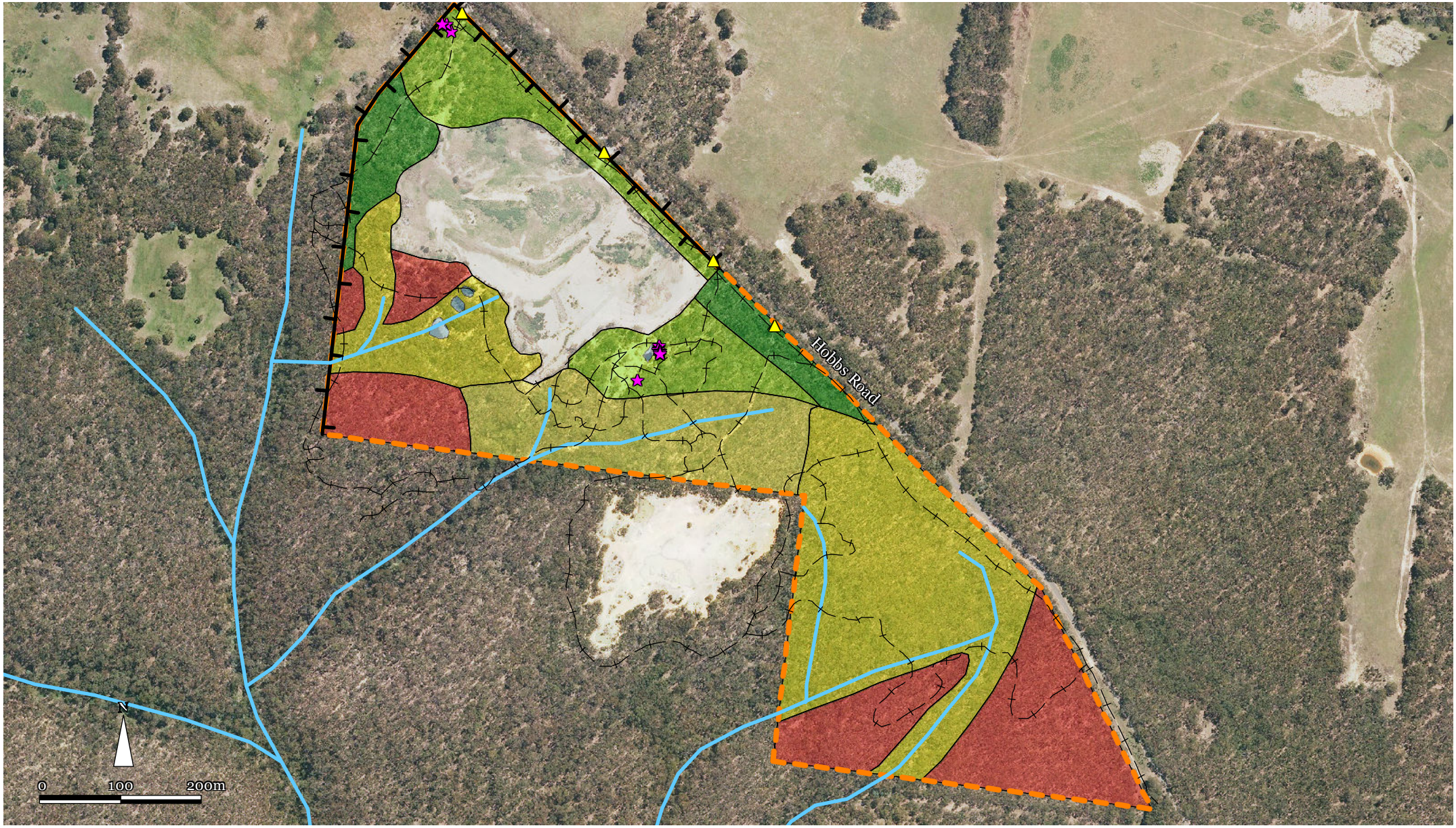
- *Establishment of one photopoint for each quadrat*. One corner of each quadrat is to form a photopoint to visually document changes that occur in the reserve. The photopoint should aim to capture the landscape and ideally incorporate trees, shrubs and weeds. The photopoint GPS coordinate and direction of photo should be documented and provided to Council.

- *Further recommendations or changes to be provided* if the desired results or objectives are not on the way to being achieved.

- *Documentation of any changes and/or new threats to the reserve not outlined within this management plan.* Any new threats or changes need to be incorporated into this management plan as required.

- *This management plan is an adaptable document which needs to be reviewed and modified where necessary in accordance with these monitoring results.* New priorities, issues and management requirements that become apparent may need to be factored into this plan. Monitoring methodology should be reviewed and changed if required.

Figure 2 - Features of Bushland Reserve, Hobbs Road



Grassy Forest
- Higher quality
- Lower quality

Shrubby Foothill Forest
- Higher quality
- Lower quality

Heathy Dry Forest

Dwarf Silver Wattle (State significant)

Trail access point

Gully

Fence

Mountain bike trails

Dam

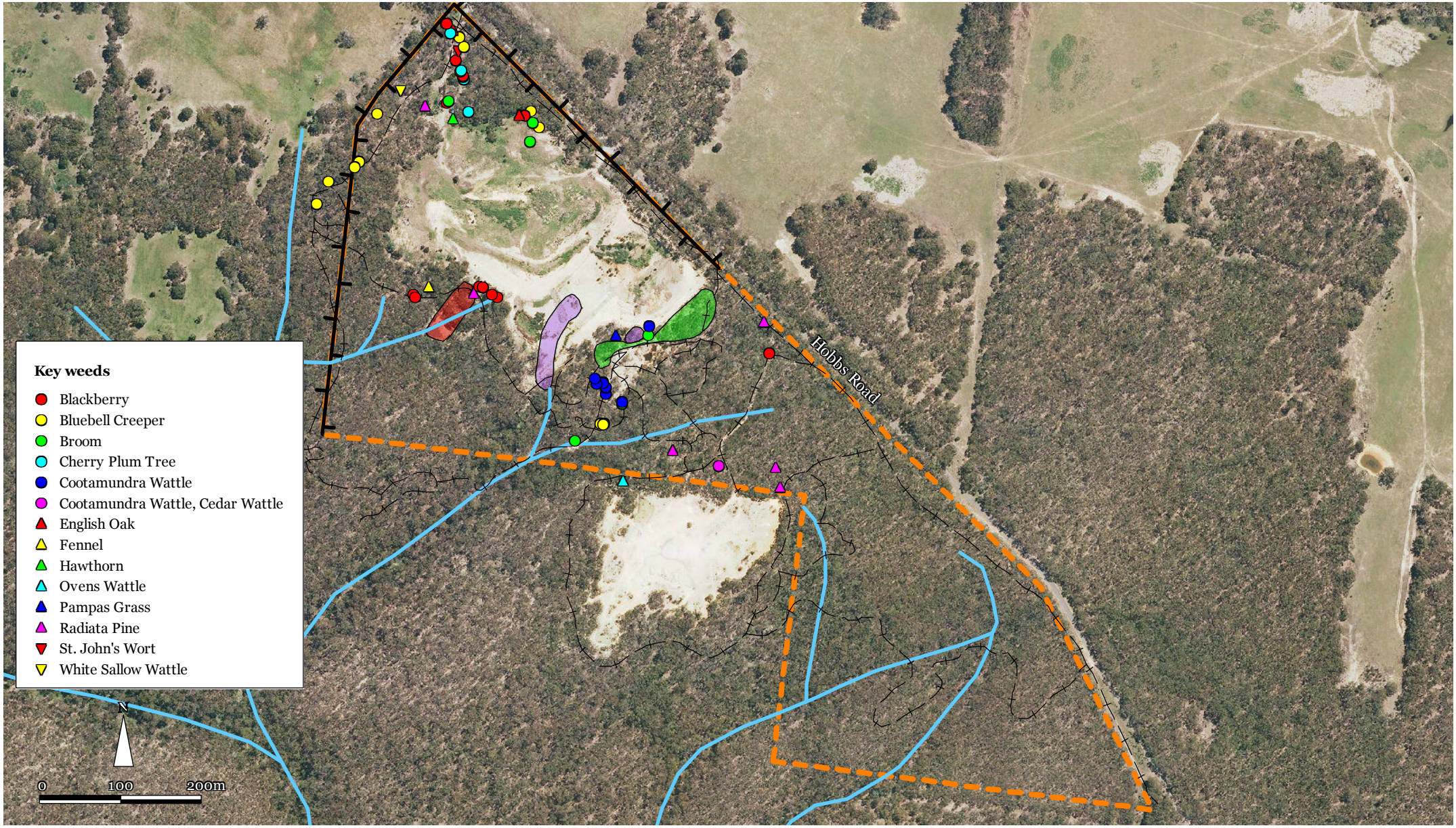
Tip site

Bushland Reserve, Hobbs Road

atlas ecology

Note: Map features are approximate and are to be used as a guide only.

Figure 3 - Key Weeds within Bushland Reserve, Hobbs Road



Blackberry

Broom

Gorse

Mountain bike trails

Gully

Fence

Bushland Reserve, Hobbs Road

atlas ecology

Note: Map features are approximate and are to be used as a guide only.

Glossary

Arboreal: living in or among trees

Avifauna: birds of a specific region or period

Bioregion: an area representing a natural ecological community with characteristic flora, fauna, and environmental conditions

Boughs: a tree branch, especially a large or main branch

Canopy: the cover of foliage of a plant

Ecological Vegetation Class (EVC): groups of plants which commonly occur together within a recognisable environmental niche

Habitat: the environment in which a plant or animal lives

Herbs: a plant that produces a fleshy rather than woody stem

Indigenous: native to a particular area, not introduced

Insectivorous: feeding on insects

Invertebrates: lacking a backbone or spinal column, for example insects

Macropods: a marsupial family that includes kangaroos and wallabies

Passive recreation: non-competitive and unorganised recreational activities

Prostrate: a plant that grows close to the ground

Remnant: areas or patches of vegetation that remains after land has been cleared or altered

Resilience: the ability of systems or landscapes to recover from disturbance events such as drought, floods and fire

Stag: dead standing trees

Vegetation community: different species of plants growing together in a particular habitat

Appendix 1.1 – Flora Species Recorded Within Reserve

Table A1.1. Flora species recorded within reserve – December 2012 and January 2013

INDIGENOUS SPECIES		
Botanical Name	**Common Name**	**Significance**
Acacia aculeatissima	Thin-leaf Wattle	Local
Acacia dealbata subsp. *dealbata*	Silver Wattle	Local
Acacia melanoxylon	Blackwood	Local
Acacia mucronata subsp. *longifolia*	Narrow-leaf Wattle	Regional
Acacia nano-dealbata ***r***	Dwarf Silver Wattle	**State**
Acacia oxycedrus	Spike Wattle	Regional
Acacia paradoxa	Hedge Wattle	Local
Acacia provincialis	Wirilda	Regional
Acacia pycnantha	Golden Wattle	Local
Acacia stricta	Hop Wattle	Regional
Acacia verniciflua	Varnish Wattle	Regional
Acacia verticillata subsp. *verticillata*	Prickly Moses	Local
Acaena echinata	Sheep's Burr	Local
Acaena novae-zelandiae	Bidgee-widgee	Local
Acaena ovina	Australian Sheep's Burr	Regional
Acrotriche prostrata	Trailing Ground-berry	Regional
Acrotriche serrulata	Honey-pots	Local
Allocasuarina littoralis	Black Sheoak	Regional
Amyema pendula subsp. *pendula*	Drooping Mistletoe	Local
Anthosachne scabra	Common Wheat-grass	Local
Arthropodium milleflorum	Pale Vanilla-lily	Regional
Arthropodium strictum	Chocolate Lily	Local
Astroloma humifusum	Cranberry Heath	Local
Austrostipa rudis	Veined Spear-grass	Regional
Banksia marginata	Silver Banksia	Local
Billardiera mutabilis	Common Apple-berry	Regional
Bossiaea decumbens	Matted Bossiaea	Regional
Bossiaea prostrata	Creeping Bossiaea	Local
Brachyloma daphnoides	Daphne Heath	Regional

INDIGENOUS SPECIES		
Botanical Name	**Common Name**	**Significance**
Brunonia australis	Blue Pincushion	Local
Burchardia umbellata	Milkmaids	Local
Caesia parviflora	Pale Grass-lily	Regional
Cassinia aculeata	Common Cassinia	Local
Cassinia arcuata	Drooping Cassinia	Local
Cassinia longifolia	Shiny Cassinia	Regional
Cassytha melantha	Coarse Dodder-laurel	Regional
Centrolepis strigosa subsp. *strigosa*	Hairy Centrolepis	Regional
Chiloglottis valida	Common Bird-orchid	Regional
Comesperma volubile	Love Creeper	Regional
Coronidium scorpioides	Button Everlasting	Local
Daviesia leptophylla	Narrow-leaf Bitter-pea	Local
Deyeuxia quadriseta	Reed Bent-grass	Regional
Dianella admixta	Black-anther Flax-lily	Local
Dichelachne rara	Common Plume-grass	Regional
Dichondra repens	Kidney-weed	Local
Dillwynia cinerascens	Grey Parrot-pea	Local
Dipodium pardalinum ***r***	Spotted Hyacinth-orchid	**State**
Dipodium roseum	Rosy Hyacinth-orchid	Regional
Drosera auriculata	Tall Sundew	Local
Echinopogon ovatus	Common Hedgehog-grass	Regional
Eleocharis sphacelata	Tall Spike-sedge	Regional
Epacris impressa var. *impressa*	Common Heath	Local
Epilobium hirtigerum	Hairy Willow-herb	Regional
Eucalyptus aromaphloia	Scentbark	Local
Eucalyptus dives	Broad-leaf Peppermint	Local
Eucalyptus goniocalyx	Bundy	Local
Eucalyptus obliqua	Messmate Stringybark	Local
Eucalyptus radiata subsp. *radiata*	Narrow-leaf Peppermint	Local
Eucalyptus viminalis subsp. *viminalis*	Manna Gum	Local
Euchiton japonicus	Creeping Cudweed	Local
Exocarpos cupressiformis	Cherry Ballart	Local
Gahnia radula	Thatch Saw-sedge	Local

INDIGENOUS SPECIES		
Botanical Name	**Common Name**	**Significance**
Gompholobium huegelii	Common Wedge-pea	Regional
Gonocarpus tetragynus	Common Raspwort	Local
Goodenia ovata	Hop Goodenia	Regional
Grevillea alpina	Cat's Claw Grevillea	Regional
Hakea decurrens subsp. *physocarpa*	Bushy Needlewood	Regional
Hardenbergia violacea	Purple Coral-pea	Local
Helichrysum luteoalbum	Jersey Cudweed	Regional
Hovea heterophylla	Common Hovea	Local
Hydrocotyle laxiflora	Stinking Pennywort	Local
Hypericum gramineum	Small St John's Wort	Local
Indigofera australis	Austral Indigo	Regional
Isolepis fluitans	Floating Club-sedge	Regional
Juncus pallidus	Pale Rush	Local
Juncus planifolius	Broad-leaf Rush	Regional
Juncus subsecundus	Finger Rush	Local
Kennedia prostrata	Running Postman	Local
Kunzea ericoides	Burgan	Regional
Lachnagrostis filiformis	Common Blown-grass	Local
Lagenophora stipitata	Common Bottle-daisy	Local
Lepidosperma laterale	Variable Sword-sedge	Local
Leptospermum continentale	Prickly Tea-tree	Local
Leucopogon virgatus	Common Beard-heath	Local
Lomandra filiformis subsp. *coriacea*	Wattle Mat-rush	Local
Lomandra filiformis subsp. *filiformis*	Wattle Mat-rush	Local
Lomandra longifolia subsp. *exilis*	Cluster-headed Mat-rush	Local
Lomandra longifolia subsp. *longifolia*	Spiny-headed Mat-rush	Local
Lythrum hyssopifolia	Small Loosestrife	Regional
Microlaena stipoides var. *stipoides*	Weeping Grass	Local
Olearia erubescens	Moth Daisy-bush	Regional
Olearia lirata	Snowy Daisy-bush	Regional
Opercularia varia	Variable Stinkweed	Local
Oxalis perennans	Grassland Wood-sorrel	Local
Pimelea humilis	Common Rice-flower	Local

INDIGENOUS SPECIES		
Botanical Name	**Common Name**	**Significance**
Plantago varia	Variable Plantain	Local
Platylobium formosum	Handsome Flat-pea	Regional
Poa labillardierei	Common Tussock-grass	Local
Poa sieberiana	Grey Tussock-grass	Local
Podolepis jaceoides	Showy Podolepis	Regional
Podolobium procumbens	Trailing Podolobium	Regional
Pteridium esculentum	Austral Bracken	Local
Pultenaea gunnii	Golden Bush-pea	Local
Ranunculus lappaceus	Australian Buttercup	Regional
Rytidosperma geniculatum	Kneed Wallaby-grass	Local
Rytidosperma pallidum	Silvertop Wallaby-grass	Local
Rytidosperma penicillatum	Weeping Wallaby-grass	Regional
Schoenus apogon	Common Bog-sedge	Local
Senecio biserratus	Jagged Fireweed	Regional
Senecio glomeratus	Annual Fireweed	Local
Senecio hispidulus	Rough Fireweed	Regional
Senecio linearifolius var. *linearifolius*	Fireweed Groundsel	Regional
Senecio microbasis ***r***	Slender Fireweed	**State**
Senecio quadridentatus	Cotton Fireweed	Local
Senecio tenuiflorus	Slender Fireweed	Local
Solanum laciniatum	Large Kangaroo Apple	Regional
Stellaria pungens	Prickly Starwort	Local
Stylidium armeria subsp. *armeria*	Common Triggerplant	Regional
Tetrarrhena distichophylla	Hairy Rice-grass	Regional
Tetratheca ciliata	Pink-bells	Local
Thelymitra pauciflora	Slender Sun-orchid	Regional
Themeda triandra	Kangaroo Grass	Local
Typha orientalis	Broad-leaf Cumbungi	Regional
Veronica calycina	Hairy Speedwell	Local
Veronica gracilis	Slender Speedwell	Regional
Viola betonicifolia	Showy Violet	Regional
Viola hederacea	Ivy-leaf Violet	Local
Wahlenbergia stricta subsp. *stricta*	Tall Bluebell	Local

INDIGENOUS SPECIES		
Botanical Name	**Common Name**	**Significance**
Westringia glabra #	Violet Westringia	-
Xanthorrhoea australis	Austral Grass-tree	Local
Xanthorrhoea minor subsp. *lutea*	Small Grass-tree	Local

r = rare in Victoria (DSE 2005)
= this species is listed as rare in Victoria under DSE (2005); however it is likely that the population found within the reserve are garden escapes. Further investigations may be required

INTRODUCED SPECIES		
Botanical Name	**Common Name**	**Declared Noxious Weed ***
Acacia baileyana #	Cootamundra Wattle	-
Acacia elata #	Cedar Wattle	-
Acacia floribunda #	White Sallow-wattle	-
Acacia howittii #	Sticky Wattle	-
Acacia longifolia subsp. *longifolia* #	Sallow Wattle	-
Acacia pravissima #	Ovens Wattle	-
Acetosella vulgaris	Sheep Sorrel	-
Aira spp.	Hair Grass	-
Anthoxanthum odoratum	Sweet Vernal-grass	-
Artemisia spp.	Wormwood	-
Billardiera heterophylla	Bluebell Creeper	-
Brassica spp.	Turnip	-
Briza maxima	Large Quaking-grass	-
Briza minor	Lesser Quaking-grass	-
Bromus diandrus	Great Brome	-
Carduus tenuiflorus	Winged Slender-thistle	Regionally controlled
Centaurium spp.	Centaury	-
Conium maculatum	Hemlock	Regionally controlled
Cortaderia selloana	Pampas Grass	-
Crataegus monogyna	Hawthorn	Regionally controlled
Cyperus eragrostis	Drain Flat-sedge	-
Cytisus scoparius	English Broom	Regionally controlled, WON
Dactylis glomerata	Cocksfoot	-
Daucus carota	Carrot	-

INTRODUCED SPECIES		
Botanical Name	**Common Name**	**Declared Noxious Weed ***
Echium plantagineum	Paterson's Curse	Regionally controlled
Ehrharta erecta var. *erecta*	Panic Veldt-grass	-
Euphorbia peplus	Petty Spurge	-
Festuca arundinacea	Tall Fescue	-
Foeniculum vulgare	Fennel	Restricted
Galium aparine	Cleavers	-
Genista monspessulana	Montpellier Broom	-
Grevillea rosmarinifolia #	Rosemary Grevillea	-
Helminthotheca echioides	Ox-tongue	-
Holcus lanatus	Yorkshire Fog	-
Hypericum perforatum subsp. *veronense*	St John's Wort	Regionally controlled
Hypochaeris radicata	Flatweed	-
Iridaceae spp.	Irid	-
Juncus articulatus subsp. *articulatus*	Jointed Rush	-
Lagurus ovatus	Hare's-tail Grass	-
Lolium spp.	Rye Grass	-
Lotus subbiflorus	Hairy Bird's-foot Trefoil	-
Lysimachia arvensis (Red-flowered variant)	Scarlet Pimpernel	-
Oxalis pes-caprae	Soursob	Restricted
Oxalis purpurea	Large-flower Wood-sorrel	-
Phalaris aquatica	Toowoomba Canary-grass	-
Pinus radiata	Radiata Pine	-
Plantago lanceolata	Ribwort	-
Prunella vulgaris	Self-heal	-
Prunus cerasifera	Cherry Plum	-
Quercus robur	English Oak	-
Rubus fruticosus	Blackberry	Regionally controlled, WON
Rumex conglomeratus	Clustered Dock	-
Rumex crispus	Curled Dock	-
Sisyrinchium iridifolium	Striped Rush-leaf	-

INTRODUCED SPECIES		
Botanical Name	**Common Name**	**Declared Noxious Weed ***
Stellaria media	Chickweed	-
Trifolium repens var. *repens*	White Clover	-
Ulex europaeus	Gorse	Regionally controlled, WON

= Native to Victoria or Australia but not indigenous to the local area

*= Declared noxious weed within the Port Phillip and Westernport catchment under the *Catchment and Land Protection Act 1994 (*CaLP Act*)*. Declared noxious weeds cause environmental or economic harm or have the potential to cause such harm (DPI 2012).

Noxious weeds are categorised into one of four categories:
State Prohibited Weeds: These invasive plants either do not occur in Victoria but pose a significant threat if they invade, or are present, pose a serious threat and can reasonably be expected to be eradicated. If present, infestations of a State prohibited weed are relatively small.

Regionally Prohibited Weeds: Regionally prohibited weeds are not widely distributed in a region but are capable of spreading further. It is reasonable to expect that they can be eradicated from a region and they must be managed with that goal. Land owners, including public authorities responsible for crown land management, must take all reasonable steps to eradicate regionally prohibited weeds on their land.

Regionally Controlled Weeds: These invasive plants are usually widespread in a region. To prevent their spread, ongoing control measures are required. Land owners have the responsibility to take all reasonable steps to prevent the growth and spread of regionally controlled weeds on their land.

Restricted: This category includes plants that pose an unacceptable risk of spreading in this State and are a serious threat to another State or Territory of Australia. Trade in these weeds and their propagules, either as plants, seeds or contaminants in other materials is prohibited.

WON: Weed of National Significance

Appendix 1.2 – Significant Flora Species Previously Recorded Within Local Area

Key

EPBC Act - *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
CR – Critically endangered
EN – Endangered
VU – Vulnerable
K – Poorly known

FFG Act - *Flora and Fauna Guarantee Act 1988* (Victoria)
L – Listed on the *FFG Act*

DSE - Advisory List of Threatened Flora in Victoria (DSE 2005)
x – Extinct
e – Endangered
v – Vulnerable
r – Rare
k – Poorly known

= Information derived from Flora Information System (FIS 2012)
* = EPBC Act Protected Matters Report (DSEWPC 2012)

Table A1.2. Significant flora species previously recorded within 5 kilometres of reserve

Botanical Name	Common Name	Total number of records#	EPBC Act 1999	FFG Act 1988	DSE
NATIONALLY SIGNIFICANT SPECIES					
Senecio psilocarpus	Swamp Fireweed	2	VU	-	v
Xerochrysum palustre	Swamp Everlasting	6	VU	L	v
STATE SIGNIFICANT SPECIES					
Acacia leprosa var. *graveolens*	Common Cinnamon-wattle	1	-	-	k
Lachnagrostis perennis spp. agg.	Perennial Blown-grass	3	-	-	k
Pleurosorus subglandulosus	Glandular Blanket-fern	1	-	-	k
Thelymitra exigua	Short Sun-orchid	1	-	-	k
Calochilus imberbis	Naked Beard-orchid	5	-	-	r
Grevillea repens	Creeping Grevillea	1	-	-	r
Pultenaea reflexifolia	Wombat Bush-pea	1	-	-	r
Acacia rostriformis	Bacchus Marsh Wattle	2	-	-	v
Acacia verniciflua (1-nerved variant)	Seymour Wattle	1	-	-	v
Coronidium scorpioides 'aff. *rutidolepis* (Lowland Swamp)	Pale Swamp Everlasting	4	-	-	v
Eucalyptus leucoxylon subsp. *connata*	Melbourne Yellow-gum	2	-	-	v
Microseris scapigera s.s.	Plains Yam-daisy	1	-	-	v
Stylidium armeria subsp. *pilosifolium*	Hairy-leaf Triggerplant	1	-	L	e

Appendix 2.1 – Fauna Species Recorded within Reserve

Table A2.1. Fauna species recorded within Bushland Reserve, Hobbs Road (December 2012)

Common name	Species Name	Survey information	Comments
BIRDS			
Sulphur-crested Cockatoo	*Cacatua galerita*	S	
Yellow-tailed Black-cockatoo	*Calyptorhynchus funereus*	S	
Crimson Rosella	*Platycercus elegans*	S	
Laughing Kookaburra	*Dacelo novaeguineae*	S	Breeding
Fan-tailed Cuckoo	*Cacomantis flabelliformus*	S	Breeding
Grey Fantail	*Rhipidura fuliginosa*	S	
Superb Fairy-wren	*Malurus cyaneus*	S	
Scarlet Robin	*Petroica boodang*	S	
Eastern Yellow Robin	*Eopsaltria australis*	S	Breeding
Rufous Whistler	*Pachycephala rufiventris*	S	
Grey Shrike-thrush	*Colluricincla harmonica*	S	Breeding
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*	S	
Spotted Pardalote	*Pardalotus punctatus*	S	
Striated Thornbill	*Acanthiza lineata*	S	
Buff-rumped Thornbill	*Acanthiza reguloides*	S	
White-throated Treecreeper	*Cormobates leucophaea*	S	
Yellow-faced Honeyeater	*Lichenostomus chrysops*	S	

Common name	Species Name	Survey information	Comments
Red Wattlebird	*Anthochaera carunculata*	S	
White-winged Chough	*Corcorax melanorhamphos*	SC	Empty mud nest observed
Common Blackbird*	*Turdus merula*	S	
MAMMALS			
Eastern Grey Kangaroo	*Macropus giganteus*	S	
Common Wombat	*Vombatus ursinus*	SC	Scats placed prominently on trails
Brown Hare*	*Lepus capensis*	SC	
Koala	*Phascolarctos cinereus*	S	
European Rabbit*	*Oryctolagus cuniculus*	S	
Red Fox*	*Vulpes vulpes*	SC	
FROGS AND REPTILES			
Frog species	-	S	In dam west of tip area
Blotched Blue-tongue Lizard	*Tiliqua nigrolutea*	S	

* denotes exotic or introduced species.

S – species seen during three area search surveys Dec 2012, H – species heard during three area search surveys in Dec 2012. SC – scat observed only.

Note: no status information is supplied as all species recorded above are regarded as Common or Least Concern.

Appendix 2.2 – Significant Fauna Species Previously Recorded Within the Local Area

Table A2.2. Significant fauna species previously recorded within a 5 kilometre radius of the reserve

Sources used to determine species status:

EPBC	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
FFG	*Flora and Fauna Guarantee Act 1988* (Victoria)
DSE	*Advisory List of Threatened Vertebrate Fauna in Victoria* (DSE 2007) and *Advisory List of Threatened Invertebrate Fauna in Victoria* (DSE 2009)

Conservation Status:

EX	Extinct
RX	Regionally Extinct
CR	Critically Endangered
EN	Endangered
VU	Vulnerable
RA	Rare
DD	Data Deficient (Insufficiently or poorly known)
NT	Near Threatened
LR (NT)	Lower Risk (Near Threatened)
L	Listed as threatened under FFG Act

Common Name	Scientific Name	Most Recent Record (VBA)	Location (VBA)	Conservation Status		
				EPBC	FFG	DSE
NATIONAL SIGNIFICANCE						
Southern Brown Bandicoot	*Isoodon obesulus obesulus*	01/01/1760	10' block containing Gisborne	NT	EN	L
Growling Grass Frog	*Litoria raniformis*	17/09/1988	2km north of Dixon Field	EN	VU	L
STATE SIGNIFICANCE						
Brown Toadlet	*Pseudophryne bibronii*	03/08/1980	5 km south of Lake Merrimu	-	L	EN
Brush-tailed Phascogale	*Phascogale tapoatafa tapoatafa*	01/01/1985	Gisborne Melton Rd, Melton side	-	L	VU
Eastern Quoll	*Dasyurus viverrinus*	02/01/1900	10' block containing Gisborne	-	L	RX
Yellow-ochre Butterfly ^	*Trapezites lutea lutea*	-	Riddells Creek area	-	L	EN
Fiery Jewel ^	*Hypochrysops ignita ignita*	-	Riddells Creek area	-	L	VU
Amethyst Hairstreak #	*Jalmenus icilius*	-	Riddells Creek area	-	L	-

Sources: VBA 2012. Victorian Biodiversity Atlas © The State of Victoria, Department of Sustainability and Environment
^ Data obtained from the Victorian Butterfly Database (Museum Victoria)
# Data obtained from a local record

Appendix 3
Definitions of Ecological Significance

Based on *Standard Criteria for Sites of Biological Significance in Victoria* (Amos 2004)

Nationally Significant

Species of national significance are flora or fauna listed as Extinct, Extinct in the Wild, Critically Endangered, Endangered, Vulnerable or Rare under the *Environment Protection and Biodiversity Conservation* (EPBC) *Act 1999* or under the relevant National Action Plan. Relevant National Actions Plans include: Maxwell *et al.* (1996), Duncan *et al.* (1999), Lee (1995), Garnett and Crowley (2000), Cogger *et al.* (1993), Tyler (1997), Wagner and Jackson (1993) and Sands and New (2002).

Ecological Communities of national significance are those listed as Critically Endangered, Endangered or Vulnerable under the *EPBC Act*

Sites are considered nationally significant if they support:

- Known habitat for nationally significant species or communities.
- Areas with unusually high native species richness, vegetation, habitat types or communities that are exceptional when compared to sites nationally.
- Corridors or habitat components that are important at a national scale. i.e. forming a link with nationally significant vegetation such as a National Park, and/or Ramsar Wetlands.
- Breeding sites, nesting or nursery or other sites where individuals aggregate for a defined part of their life cycle which comprises ≥1% of the national breeding population of a species.
- Areas regularly used by migratory species which are nationally threatened, or used by ≥1% of the world or national population of a taxon.
- Known or potential feeding sites of a nationally significant nomadic, migratory or mobile species within the known range of a species which is known to be reliant on defined dispersed feeding sites and where the species is nationally Critically Endangered, Endangered or Vulnerable.

State Significant

Species of state significance in Victoria are flora or fauna listed as Extinct, Extinct in the Wild, Critically Endangered, Endangered, Vulnerable or Conservation Dependent in the *Advisory List of Rare or Threatened Plants* (DSE 2005), the *Advisory List of Threatened Vertebrate Fauna in Victoria* (DSE 2007), or the *Advisory List of Threatened Invertebrate Fauna in Victoria* (DSE 2009); species listed as Near Threatened, Conservation Dependent

or Least Concern under the *EPBC Act* or the relevant National Action Plan; and/or species listed under the Victorian *FFG Act*. Relevant National Actions Plans include: Maxwell *et al.* (1996), Duncan *et al.* (1999), Lee (1995), Garnett and Crowley (2000), Cogger *et al.* (1993), Tyler (1997), Wagner and Jackson (1993) and Sands and New (2002).

Ecological Communities of state significance in Victoria are those listed as threatened under the Victorian FFG Act.

Sites are considered to be of state significance if they support:

- Known habitat for state significant species or communities.
- Areas that support, or regularly support individuals of a state significant species or community.
- Vegetation which would have a vegetation significance rating of 'Very High' or 'High' if assessed using the DSE Vegetation Quality Assessment Manual (DSE 2004).
- Areas with unusually high native species richness, vegetation, habitat types or communities that are exceptional when compared to sites on a statewide basis.
- Corridors or habitat components that are important at a state scale. i.e. forming a link with state significant vegetation such as State Parks and/or Flora and Fauna Reserves.
- Breeding sites, nesting or nursery or other sites where individuals aggregate for a defined part of their life cycle which comprises ≥1% of the state breeding population of a species.
- Areas regularly used by migratory species which are threatened in Victoria, or used by ≥1% of the state population of a taxon.
- Known or potential feeding sites of a nomadic, migratory or mobile species within the known range of a species which is known to be reliant on defined dispersed feeding sites and where the species is state Endangered, Vulnerable or Data Deficient.

Regionally Significant

Species of regional significance in the Central Victorian Uplands Bioregion are flora species considered rare by the authors or in any relevant regional Native Vegetation Plan, and fauna species considered rare by the authors or listed as Near Threatened or Data Deficient in the *Advisory List of Threatened Vertebrate Fauna in Victoria* (DSE 2007) or the *Advisory List of Threatened Invertebrate Fauna in Victoria* (DSE 2009).

Ecological Communities of regional significance in the Victorian Volcanic Plain Bioregion are those listed as an Endangered, Vulnerable or Depleted ecological vegetation class within a particular bioregion in the relevant catchment Native Vegetation Plan.

Sites are considered to be of regional significance if they support:

- Known habitat for regionally significant species or communities.
- Areas that support, or regularly support individuals of a regionally significant species or community.
- Vegetation, which would have a vegetation significance rating of 'Medium' if assessed under the DSE Vegetation Quality Assessment Manual (DSE 2004).
- Areas with unusually high native species richness, vegetation, habitat types or communities that are exceptional when compared to sites regionally.
- Corridors or habitat components that are important at a regional scale.
- Breeding sites, nesting or nursery or other sites where individuals aggregate for a defined part of their life cycle which comprises ≥5% of the bioregional breeding population of a species.
- Areas regularly used by migratory species which are declining in the bioregion, or used by ≥5% of the bioregional population of taxon.
- Known or potential feeding sites of a nomadic, migratory or mobile species within the known range of a species which is known to be reliant on defined dispersed feeding sites and where the species is regionally significant.

Locally Significant

All indigenous species and communities are considered locally significant within the Central Victorian Uplands Bioregion.

Sites are considered to be of local significance if they support:

- Vegetation which would have a vegetation significance rating of 'Low' if assessed under the DSE Vegetation Quality Assessment Manual (DSE 2004).
- Corridors or habitat components important at a local scale.
- Breeding sites, nesting or nursery or other sites where individuals aggregate for a defined part of their life cycle which comprises ≥25% of the local breeding population of a species.
- Areas regularly used by migratory species which are locally declining, or use by ≥25% of local population of taxon.
- Known or potential feeding site of a nomadic, migratory or mobile species within the known range of a species which is known to be reliant on defined dispersed feeding sites and where the species utilises a feeding resource that is particularly limited in the local area.

Appendix 4
Definitions of Vegetation Condition

Good Condition

Vegetation in good condition supports a diverse range of native floristic and structural components and a low cover of introduced species. Ecosystem processes are likely to be intact.

Moderate Condition

Vegetation of moderate condition supports some range of floristic and structural components with greater than 25% cover of introduced species. Some ecosystem processes may be present or disrupted in some way.

Poor Condition

Vegetation of poor condition is likely to be dominated by introduced species with a low presence of native floristic and structural components. Relevant ecosystem processes are likely to be absent.

APPENDIX 5 – MANAGEMENT ACTIONS

Action #	Management Action	Refer to section within report	Who is involved in undertaking this action?	Description of works undertaken	Issues encountered	Works still to undertake
Immediate and/or ongoing planning and liaison actions						
1	Trust for Nature covenant registered on-title of reserve	Section 4.3.11	Council, TFN			
2	Implement an adaptive management framework that increases the resistance and resilience of the reserve to the impacts of climate change	Section 4.4	Council			
3	Liaise with local cycling club regarding Phytophthora, creation of additional tracks and other site issues	Section 4.3.2, 4.6.1	Council, cycling clubs			
4	Liaise with adjoining landowners on western, south-eastern and eastern boundaries about weed issues and creating natural buffers	Sections 4.3.1, 4.7.2, 4.7.3 & 4.7.4. Figure 3	Council and contractors, adjoining landholders			
5	Council to continue supporting Bullengarook Landcare with their works along Hobbs Road	Section 4.7.1	Council			
6	Determine opportunities to maintain/improve habitat connectivity with surrounding landholders and promote involvement with conservation programs such as Trust for Nature and Land for Wildlife	Section 4.3.9	Council. landholders			
7	Explore potential partnerships with the Wurundjeri	Section 4.5	Council, Wurundjeri (WTLaCCHC)			

8	Contact DEPI for information regarding reputable pathogen-free sources of soil and gravel.	Section 4.3.2	Council, DEPI			
9	Liaise with Parks Victoria staff (Pyrete Range) regarding weed management and recreational user issues with the view of coordinating works	Section 4.7.5	Council and contractors, Parks Victoria			
10	Liaise with adjoining neighbours regarding invasive plants and animals, pet animals and protection and enhancement of native vegetation on their properties	Section 4.7.2, 4.7.3 & 4.7.4	Council, landholders			
11	Promote the values of the reserve to local and regional schools and tertiary institutions	Section 4.6.6 (ii)	Council			
Immediate and/or ongoing ecological management actions						
1	Council officers, local groups and individuals encouraged to submit new species sightings to council, state govt and biological databases	Section 4.3.10	Council, contractors, residents			
2	Retain all large trees, stags, logs and coarse woody debris	Section 4.3.8	Council			
3	Install educational signage about *Phytophthora* at main entrance points	Section 4.3.2	Council			
4	Establish footwear wash-down point at main entrance gate	Section 4.3.2	Council			
5	Consider using a biodegradable fungicide to reduce the impacts of *Phytophthora*	Section 4.3.2	Council			
6	Seek advice regarding direct seeding of tip site and implement a site preparation program over 1-2 seasons	Section 4.3.3	Council, direct seeding contractor			
7	Incorporate an integrated pest animal approach with the assistance of the local Landcare group, landholders and the CMA	Section 4.3.4	Council, Landcare group, landholders, CMA			
8	Remove all litter from the site	Section 4.3.6	Council			

Immediate and/or ongoing recreation management actions						
1	Install a wildlife friendly fence on Hobbs Road	Section 4.6.4	Council			
2	Consider creating a primary walk/ride in entrance point for visitors	Section 4.6.3	Council			
3	Divert existing tracks away from areas affected by *Phytophthora cinnamomi*	Section 4.6.2	Council			
4	Install a street front sign at the entrance of reserve	Section 4.6.5	Council			
5	Consider placing interpretive signage at reserve entrance	Section 4.6.5	Council			
6	Consider installing signage that directs visitors to stay on trails. Inappropriate activities may be highlighted on signage	Section 4.6.5	Council			
7	Promote the values of the reserve to bushwalkers and naturalists	Section 4.6.6 (i)	Council			
8	Consider an interpretive 'walk and gawk' tour in cooperation with the local Landcare group	Section 4.6.6 (i)	Council			
Spring - Summer						
1	Treatment of Sweet Vernal-grass populations	Section 4.3.1. Table 1.	Council and contractors			
2	Control of populations of noxious and high-threat weeds (Gorse, Blackberry, Bluebell Creeper, English Broom and Montpellier Broom)	Section 4.3.1. Table 1. Figure 3	Council and contractors			
3	Control of lower threat weed populations in reserve (Wattles, English Oak, Cherry Plum, Radiata Pine and Pampas Grass)	Section 4.3.1. Table 1. Figure 3	Council and contractors			
4	Undertake site preparation of tip site over 1-2 seasons prior to direct seeding	Section 4.3.3	Council, direct seeding contractor			
5	Undertake comprehensive flora and fauna survey in spring-summer- include targeted surveys for Hairy-leaf Triggerplant and other significant species	Sections 3.1.4 & 4.3.10	Council and contractors			

6	Monitoring (undertaken biennially)	Section 4.8	Council and contractors			

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