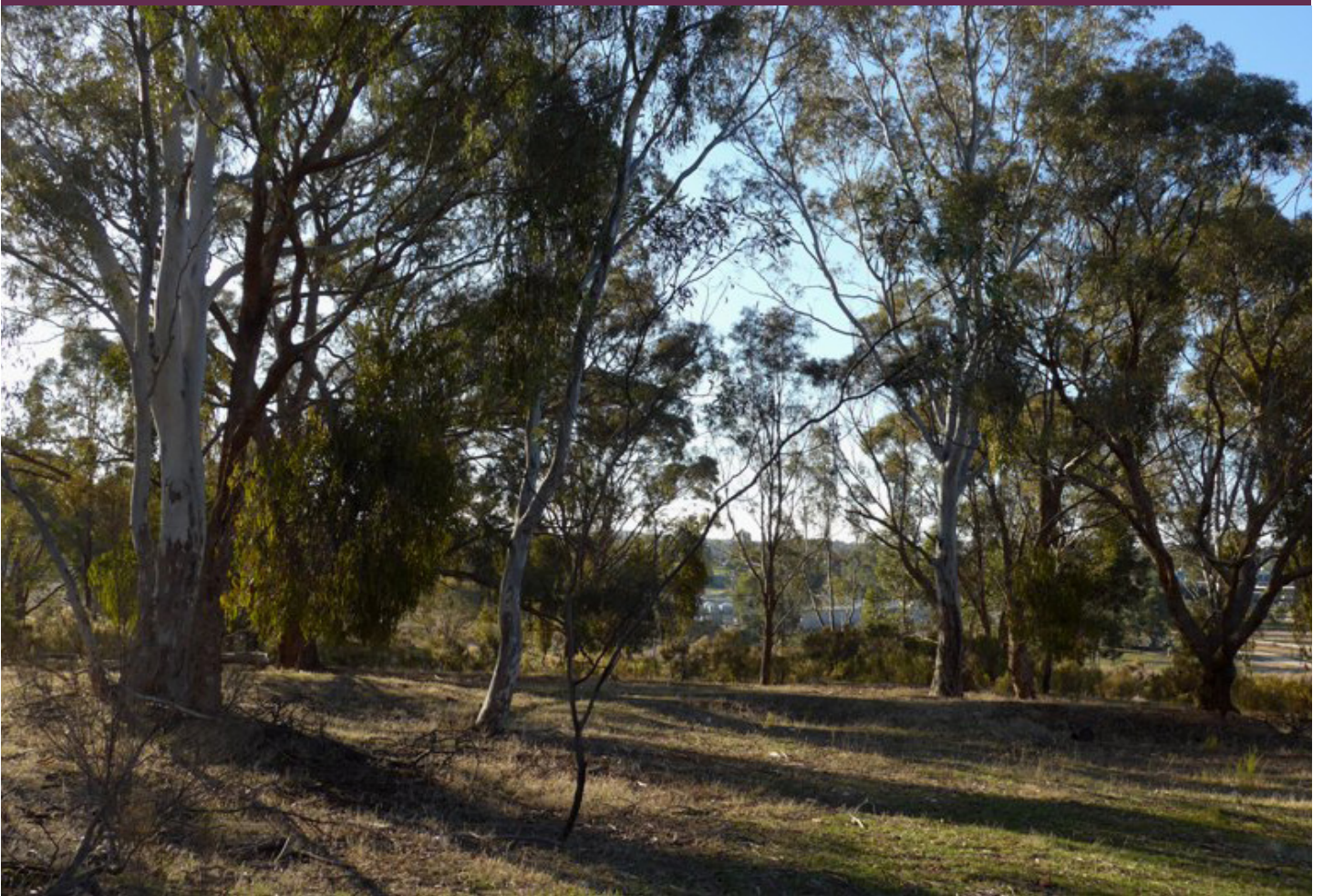


Honeycomb Bushland Reserve

Environmental Management Plan



Honeycomb Bushland Reserve Environmental Management Plan, March 2016

All photographs by Karl Just except where otherwise credited.

Cover photo: Management Zone 13.

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1 Introduction

1.1 Project Background

Honeycomb Bushland Reserve (the Reserve), also known as the 'Castlemaine Landfill Buffer Land', is situated in Campbells Creek south of Castlemaine. The aim of this Honeycomb Reserve Environmental Management Plan (the Management Plan) is to identify and describe the values of the Reserve and to formulate a five year action plan to guide future management. **This plan:**

Identifies the Reserve's natural, cultural heritage and recreation values

Establishes a vision for the Reserve's future use and management

Identifies threats to achieving this vision

Identifies a series of prioritised management actions aimed at mitigating any threats and achieving the vision for the Reserve

Establishes a monitoring and evaluation program to assess changes in the Reserve's natural environment values and the success of the impact of this Management Plan

The Reserve is owned and managed by Mount Alexander Shire Council (Council). Council has a Memorandum of Understanding (MoU) to manage the site with the Friends of Campbells Creek Landcare Group and McKenzies Hill Action and Landcare Group. The current MoU is valid from December 2014 until December 2019. The two Landcare groups, landowners of adjoining properties, as well as the broader community have provided valuable input to develop this Management Plan.

1.2 Vision

The vision for the Reserve is to:

'Ensure the protection and preservation of its natural, cultural and recreational values and to provide a space that is appreciated and enjoyed by all members of the community. The aim is to restore the site's ecological values and to foster the appreciation of these values by improving visitor access and the site's facilities'.

The following Management Plan outlines how this vision is to be achieved.

1.3 Methods

The Management Plan was prepared following numerous site visits, review of published and unpublished literature, and consultation with key stakeholders and experts. The Reserve was mapped into management zones by leading ecological consultant Karl Just in winter 2014. Further site visits were conducted in winter 2015.

Important information and recommendations were gathered from members of the Friends of Campbells Creek Landcare Group and McKenzies Hill Action and Landcare Group during several meetings on and offsite in May and June 2015. Information was also gathered from a review of background reports and through discussions with regional experts. Changes were made to the draft document to incorporate suggestions from neighbouring landowners.

1.4 Desktop review

A variety of documents was reviewed during the preparation of this plan. Key information sources include:

Honeycomb Bushland Reserve (Castlemaine Landfill Buffer Land) Description of Management Zones, prepared by Karl Just (2014)

Diamond Gully Structure Plan, prepared by Beveridge Williams & Co Pty Ltd (2014)

Castlemaine Landfill Buffer Vegetation Management Plan, prepared by Connecting Country (2013)

Heritage assessment – Land to the east of current Castlemaine Landfill, prepared by David Bannear (2009)

Castlemaine 1:100 000 map area geological report. Geological Survey of Victoria Report 121. Prepared by Clive Willman et. al. (2002)

Planting suggestions and vegetation survey for the proposed tip site, prepared by Ern Perkins (1992)

2 Context

2.1 Location and description

The Reserve consists of approximately 17 hectares of land situated in the north-western section of Campbells Creek in central Victoria. The Reserve is located north of Honeycomb Road and is bounded by public land to the east, the Castlemaine Landfill and the Castlemaine Sewage Treatment Works to the north and private lands to the west. The location of the Reserve is shown in Figure 1.

The Reserve is situated within the Goldfields Bioregion, a region that encompasses the relatively drier woodlands and forests of the inland slopes of the Great Dividing Range. The Reserve is owned and managed by Council and is within the jurisdiction of the North Central Catchment Management Authority (NCMA).

During a former project conducted in 2014, the Reserve was delineated into 17 individual management zones to assist with guiding on-ground management works. These management zones are referenced throughout this plan and are shown in Figure 2.

2.2 Regional Context

The bushland at the Reserve forms part of an important and extensive patch of remnant vegetation that extends throughout the local area. To the immediate east of the Reserve are Campbells Creek and its associated floodplain, characterised by a narrow corridor of woodland and riparian vegetation bordered by residential housing to either side. This area contains important habitat and would serve as a corridor for many fauna species. Campbells Creek becomes Barkers Creek where it joins Forest Creek east of Gaulton Street.

To the west of the Reserve there are some important areas of bushland, including the Old Newstead Gravel Reserve to the immediate west of the south-western boundary. This patch is continuous with large areas of public and private bushland, including a Trust for Nature covenanted block south-west of Diamond Gully Road.


The Castlemaine Sewage Works to the north have mostly been disused in recent years, but when in operation the associated treatment ponds were known to attract a small number of regionally significant wetland birds (Chris Timewell pers. comm. May 2015).


2.3 Land tenure and management

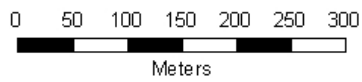
The Reserve is owned and managed by Council.



Legend

 Honeycomb Reserve

 Watercourse



Map Created by: Karl Just
 Date: March 2016
 Datum: GDA 1994

Figure 1 - Location of Honeycomb Bushland Reserve

2.4 Planning Zones and Overlays

A small part of the eastern boundary of the Reserve, extending along the Campbells Creek floodplain, is listed as an 'area of cultural heritage sensitivity' as described under the Aboriginal Heritage Regulations 2007. In some cases a Cultural Heritage Management Plan is required when conducting particular works in such a listed area, particularly where ground disturbance occurs. Considering the very limited area that is affected by this listing, it is unlikely to have future implications for management. Nevertheless, Council should investigate this matter further if considering undertaking any major works along the eastern boundary.

2.5 Native Vegetation Planning Provisions

In Victoria, any clearance of native vegetation is regulated under the 'Native Vegetation Permitted Clearing Regulations'. In general, a permit is required to remove, destroy or lop any native vegetation and in many cases the clearance requires offsetting. It is not anticipated that any major clearance will be required within the Reserve. In the case of any proposed clearance of native vegetation, Council will seek advice from the document 'Permitted clearing of native vegetation – Biodiversity assessment guidelines', available from the website of the Department of Environment, Land, Water and Planning (DELWP).

There is a possibility that the Reserve could be used as a vegetation offset site. This would have the benefit of increasing resources for works within the Reserve by offsetting clearance of vegetation elsewhere in the region. This possibility will be investigated further by Council.

2.6 Policy Context

There is a number of Council policy documents and independent reports that are relevant to the management and protection of the Reserve. These are discussed separately below.

Mount Alexander Environment Strategy 2015-2025

Council's Environment Strategy was released during the development of this plan. Some Environment Strategy aims and goals that are relevant to the management of the Reserve include:

Priority Area 1: Enable the community to take action

Priority Area 1 recognises the great wealth of community knowledge, commitment and experience regarding natural values and sustainability and makes the commitment to support the community in taking positive action. Key strategic tasks include implementation of the grant and workshop programs and development of memoranda of understanding with key community groups.

Priority Area 7: Protect and manage priority natural environment assets

Priority Area 7 recognises the significant environmental assets occurring within the Shire and makes a commitment to protect and improve their ecological condition. Key strategic tasks that are listed include preparation of an open space strategy and implementation of a number of existing Council documents such as the Roadside Conservation Management Plan and Rural Land Study. It is also suggested that the planning scheme be reviewed and amended and that site management plans are prepared for priority areas.

Walking and Cycling Strategy 2010-2020

Council's Walking and Cycling Strategy was developed with the aim of improving and increasing walking and cycling in the Shire. The intention of this Strategy is to develop a continuous walking and cycling trail along Campbells Creek. This trail is currently not complete; instead a trail passes through the Reserve, providing access to Campbells Creek. Neighbouring landowners and the Landcare groups report seeing increasing numbers of people accessing Campbells Creek via this Reserve.

Diamond Gully Structure Plan

The Diamond Gully Structure Plan was commissioned by Council to assist in planning for appropriate and balanced development of the Diamond Gully area. The plan aims to 'promote a high quality, environmentally sensitive and sustainable residential development in the principal growth area for the town'. The structure plan included reference to the Reserve and proposed a walking/cycling trail that could potentially cross the Reserve from Campbells Creek to Sluicers Road.

2.7 Management history

Management of the Reserve's ecological values began over ten years ago, when Council completed a small amount of weed control and planting. Both the Friends of Campbells Creek and McKenzies Hill Action and Landcare Group have been conducting works over this time, including controlling weeds and replanting understorey trees and shrubs, predominately in the eastern section. Council have recently implemented a widespread weed control program that has included treatment of extensive areas of Gorse (*Ulex europaeus*) in the eastern section of the Reserve, control of all large patches of Blackberry (*Rubus anglocandicans*) and cut-paint of woody weeds such as Giant Honey-myrtle (*Melaleuca armillaris*). These combined works have successfully reduced the cover of high ecologically threatening weeds throughout the Reserve and restored the cover and diversity of important understorey species.

3 Natural Values

3.1 Geology

The dominant geology of the Reserve is a combination of gravel and conglomerate rock known as the Calivil Formation. This formation was laid down during the Neogene period (5-23 million years ago) and consists of a series of perched fluvial gravel beds that were deposited by ancient stream systems, in this case by the ancestral Campbells Creek. In the local area the gravel beds have been consistently mapped in scattered beds along the length of extant waterways (i.e. Forest, Barkers and Campbells Creek), indicating that the position of these waterways has remained relatively stable for a long period of time. The Calivil Formation is generally characterised by beds of coarse rocks of various sizes, suggesting that it was laid down in a high energy environment. This possibly indicates that the ancestral streams occurred in a much higher rainfall environment and at higher topographic relief than at present (Clive Willman pers. comm. May 2015). The quartz and sedimentary rock of the Calivil Formation were mostly eroded from the White Hills Gravel (a similar but older formation) and from the surrounding Ordovician rocks of the Castlemaine Group. The gravel beds originally carried rich gold deposits and were heavily targeted for sluicing (Willman et. al. 1995, 2002).



Plate 1 - A cross-section of the Calivil Formation in the eastern section of the Reserve. These gravels were deposited by the ancestral Campbells Creek over five million years ago.

In small parts of the western section of the Reserve, this layer of gravel and conglomerate has been eroded or removed to expose the underlying bedrock of sedimentary material. This rock type is classed within the 'Castlemaine Group', a combination of Ordovician sandstone, siltstone, shale and chert. This is the dominant rock type of the surrounding area, particularly in the higher hills and ranges. The Castlemaine Group sediments were intruded in the mid-Devonian by numerous quartz veins, many of which contained gold. Large quantities of gold were later eroded from the quartz veins and deposited in current and ancient stream beds, creating the basis for the nineteenth century gold rush.

Geology - Priorities and Actions:

Preserve all geological features within the Reserve, particularly cuttings that reveal cross-sections of interest.

3.2 Native Flora

The native vegetation at the Reserve has been significantly impacted by past mining and quarrying activities. The perched gravel beds of the Calivil Formation were targeted for hydraulic sluicing from the early 20th century onwards, a destructive practice that involves blasting away soil cover with high pressure water. Parts of the Reserve also appear to have been targeted for quarrying gravel. These disturbances would have eliminated many of the original plant species, particularly the herbaceous ground layer component. This type and level of disturbance is not uncommon in the goldfields bioregion, extensive areas of public land, including the Castlemaine Diggings National Heritage Park, were similarly altered during the gold rush.

Despite past disturbances, the Reserve still supports valuable remnant vegetation and a diverse range of plant species. Comparison of aerial imagery from 1949 with present day shows a major recovery of the vegetation, largely through natural recruitment of trees and shrubs.



Common Rice-flower (*Pimelea humilis*)



Plate 2 - An aerial image of the Reserve (blue polygon) and surrounding lands taken in 1946. Slicing appears to have removed the vegetation and topsoil from large areas of the Reserve. The Campbells Creek is heavily dredged (photo courtesy of the Castlemaine Historic Society).



Plate 3 - An aerial image of the Reserve (blue polygon) and surrounding lands taken in 2014, showing a major recovery of the vegetation (photo taken from Google Earth).

Ecological Vegetation Classes (EVCs)

The original pattern and distribution of vegetation communities at the Reserve is difficult to determine due to the high degree of past disturbance, however remnants of several Ecological Vegetation Classes (EVCs) can still be identified. The lower slopes and hills in the eastern portion of the Reserve support a combination of River Red Gum (*Eucalyptus camaldulensis*), Yellow Box (*Eucalyptus melliodora*) or Yellow Gum (*Eucalyptus leucoxylon subsp. pruinosa*) dominated vegetation that is best described as EVC Low Rises Grassy Woodland (EVC 175_61). At the Reserve, the majority of remnants of this EVC have had most of the original ground flora removed, although some areas support a high cover of Kangaroo Grass (*Themeda triandra*), Spear-grass (*Austrostipa subsp.*) and Wallaby-grass (*Rytidosperma spp.*) in association with a small range of herbs, notably in Management Zones 3, 8 and 14. An area of River Red Gum (*Eucalyptus camaldulensis*) woodland on the lower flats in Management Zone 12 is possibly derived from Creek-line Grassy Woodland (EVC 68).

This area has however been heavily disturbed by past hydraulic sluicing and quarrying work.

The higher slopes mostly support vegetation dominated by Silver Bundy (*Eucalyptus nortonii*) with an understorey of Drooping Cassinia (*Cassinia arcuata*), Prickly Needlewood (*Hakea decurrens*) and various wattle (*Acacia*) species. This vegetation community tends to occupy drier sites with shallower soil cover and is best described as Heathy Dry Forest (EVC 20). Ground flora species are sparse, but there is often a well-developed layer of cryptogammic crust, including a variety of lichens and mosses.

A small area of Grey Box (*Eucalyptus microcarpa*) dominated Box Ironbark Forest (EVC 61) occurs in the north-western section. This remnant supports scattered wattles and Wallaby-grass (*Rytidosperma sub.sp*) with a high proportion of leaf litter and bare ground.



Plate 4 - Low Rises Grassy Woodland (EVC 175_61) in Management Zone 14. Areas of grassy woodland with such an intact grassy ground layer are not common in the local area.



Plate 5 - Heathy Dry Forest (EVC 20) in Management Zone 10. The area pictured supports several significant plant species.



Plate 6 - An example of the well-developed layer of cryptogmic crust in Heathy Dry Forest (EVC 20). Many of these mosses and lichens are very slow growing and it is impressive to have such a dense cover.

Significant Flora Species

During 2014 vegetation mapping of the Reserve and further visits in 2015, a number local and regionally significant flora species were recorded. These include:

Plains Quillwort (*Isoetes drummondii* subsp. *drummondii*)

One patch of this tiny fern ally was recorded in a wet moss soak in Management Zone 10. This species is very rare in the region with the next known populations occurring at Mount Alexander and near Bendigo.



Plate 7 - The grass-like leaves of Plains Quillwort (*Isoetes drummondii*) in Management Zone 10. This species is very rare in the region with the next known populations occurring at Mount Alexander and near Bendigo.

Moss Sunray (*Hyalosperma demissum*)

Several plants were observed growing with Plains Quillwort in a moss soak. This species is uncommon in the Reserve and in the local area.

Common Rice-flower (*Pimelea humilis*)

Several plants occur in Zone 10 and in grassy vegetation in Zone 8. This species is very uncommon along the Campbells Creek corridor (Ian Higgins pers. comm. May 2015).

Cut-leaf Goodenia (*Goodenia pinnatifida*)

Several patches of this rhizomatous herb were recorded in Management Zone 10. There are only a handful of records for this species in the region.

Curved Rice-flower (*Pimelea curviflora*)

Several old plants were observed on the cutting above a mine shaft in Management Zone 14. This species is uncommon in the region.

Short-stem Sedge (*Carex breviculmis*)

The Reserve supports some relatively large populations of this species (particularly in Zones 10 and 15), which is rare elsewhere in Castlemaine and the surrounding area (Ian Higgins pers. comm. June 2015).

Variable Sword-sedge (*Lepidosperma laterale*)

Several plants were observed in the slash break in Zone 1. This species is not known from elsewhere along the Campbells Creek corridor (Ian Higgins pers. comm. June 2015) but is scattered through the adjacent Newstead Gravel Reserve.

Wax-lip Orchid (*Glossodia major*)

One plant was observed in Management Zone 6. More plants are likely scattered throughout the Reserve. This is a remnant of what was probably once a diverse orchid flora that was removed by sluicing and quarrying works.

Significant plant species should be monitored periodically and protected where necessary. This may include fencing vulnerable patches or propagating and replanting some species to increase population size. The patch of Common Rice-flower in Management Zone 8 is regularly impacted by mowing and could be protected with a guard. The patch of Plains Quillwort in Management Zone 10 occurs on a small and vulnerable patch of moss that may require protection from trampling by walkers or native fauna in future.



Plate 8 - Wax-lip Orchid (*Glossodia major*) was recorded in Management Zone 6. This is a remnant of what was probably once a diverse orchid flora.

Flora - Priorities and Actions:

- Protect and where necessary manage uncommon rare plant species. This may include fencing vulnerable patches or propagating and replanting some species to increase population size.
- Control weeds throughout the Reserve (see invasive species section below).
- Revegetation (see revegetation section below).

3.3 Native Fauna

No detailed fauna surveys have been carried out within the Reserve however a broad overview of the faunal values can be gleaned from anecdotal records and some monitoring data.

Connecting Country have been conducting seasonal bird transects adjacent to the Reserve along Campbells Creek since 2010. For the last several years, this has also included compiling a list of bird species recorded while walking down to the creek along the walking trail in the southern section of the Reserve (Chris Timewell pers. comm. May 2015). The total number of birds recorded across these two areas is currently 52 species, including a range of honeyeaters, raptors, thornbills and riparian species. Notable species include Brown Treecreeper (*Climacteris picumnus*) (listed as 'Near Threatened' in Victoria), Fuscous Honeyeater (*Lichenostomus fuscus*), Brown-headed Honeyeater (*Melithreptus brevirostris*), Varied Sitella (*Daphoenositta chrysoptera*) and Collared Sparrow-hawk (*Accipiter cirrocephalus*). Although some of the 52 recorded bird species are unlikely to frequently utilise the Reserve (particularly the riparian species), the remainder are likely to be present. It is almost certain that further surveys would record a much greater number of species that rely on habitats within the site.

The Reserve is also habitat for several native mammals including Eastern Grey Kangaroo (*Macropus giganteus*), Black Wallaby (*Wallabia bicolor*) and Short-beaked Echidna (*Tachyglossus aculeatus*). The threatened Brush-tailed Phascogale (*Phascogale tapoatafa*), a small carnivorous marsupial could potentially be present within the Reserve or using the site as a corridor to access larger areas of bushland. The Reserve would also support several species of frogs (predominately around the dams), reptiles and a wide range of invertebrates.

Nest boxes have been placed around the Reserve in the past by Landcare to increase nesting areas for birds and mammals. Some of these have been colonised by feral bees and require ongoing management. Additional nest boxes could be installed in future if considered necessary.

Fauna - Priorities and Actions:

- Manage existing nest boxes, install new boxes in future if required.
- Revegetation, species enrichment plantings and weed control to improve habitat values.

3.4 Invasive Species

The high level of disturbance caused by sluicing and other mining activities in the past has facilitated the invasion of a wide range of exotic flora species throughout the Reserve. The most common is Gorse (**Ulex europaeus*), which has formed dense thickets throughout large areas, notably in Management Zones 7 and 12. Several small to large patches of Bridal Creeper (**Asparagus asparagoides*) occur in the north and east, including in Management Zones 10, 13 and 15.

This species appears to be spreading rapidly and has the potential to cover extensive areas. Other notable weed species include Blackberry (**Rubus anglocandicans*) (most prominent in the northern section), Wheel Cactus (**Opuntia robusta*), Spiny Rush (**Juncus acutus*) and Boneseed (**Chrysanthemoides monilifera*). A suite of non-indigenous native species, including several wattles, were also either planted into the Reserve or have spread from the surrounding area. This group of weeds is most common in the southern section of the Reserve.



Plate 9 - There is a high cover of Gorse (**Ulex europaeus*) in management Zone 7.

Although no targeted fauna surveys were conducted during the preparation of this Plan, there appears to be a variety of exotic fauna species present within the Reserve. These include Red Fox (**Vulpes vulpes*), European Rabbit (**Oryctolagus cuniculus*), Common Blackbird (**Turdus merula*), Common Myna (**Sturnus tristis*), Common Starling (**Sturnus vulgaris*), House Sparrow (**Carduelis carduelis*) and domestic cats and dogs straying from the surrounding area.

Weed control programs

Conducting ongoing control programs for invasive plant species is one of the highest management priorities for the Reserve. The five year action plan shown in Section 7 recommends that 1-2 professional bushland managers are contracted for several days in the first two years of the plan to eradicate all high threat weeds that are relatively localised. This should include spraying of all large Bridal Creeper (*Asparagus asparagoides*) patches and cut-paint of less common woody weed and cactoid species. Incidental weed mapping prepared by Just (2014) can be used as a guide for contractors regarding the areas requiring treatment (see Figure 2).

For the remaining weed control, the approach will be to manage from the most intact areas outwards to the worst affected areas (Bradley Method). Effort to control widespread weeds such as Gorse (*Ulex europaeus*) in low quality areas of the Reserve should only be undertaken once the better areas have been adequately improved or for special projects (i.e. revegetation, species enrichment plantings).

Regarding the location of the 'best areas', the Landcare groups have been steadily extending a weed free zone from the east side of the Reserve heading west, to provide a buffer to areas of grassy woodland along Campbells Creek. The eastern section also generally carries the most intact vegetation and should be priority for weed control works. More specific priority areas include Management Zones 12 and 15 which act as a buffer for land along Campbells Creek, parts of Management Zone 10 which support several significant flora species and Management Zone 14 which carries some of the best areas of grassy woodland within the Reserve. It is also proposed that Management Zone 6 in the west be considered a priority area due to the presence of important ground flora species and to provide a weed-free buffer for the adjacent Newstead Gravel Reserve.

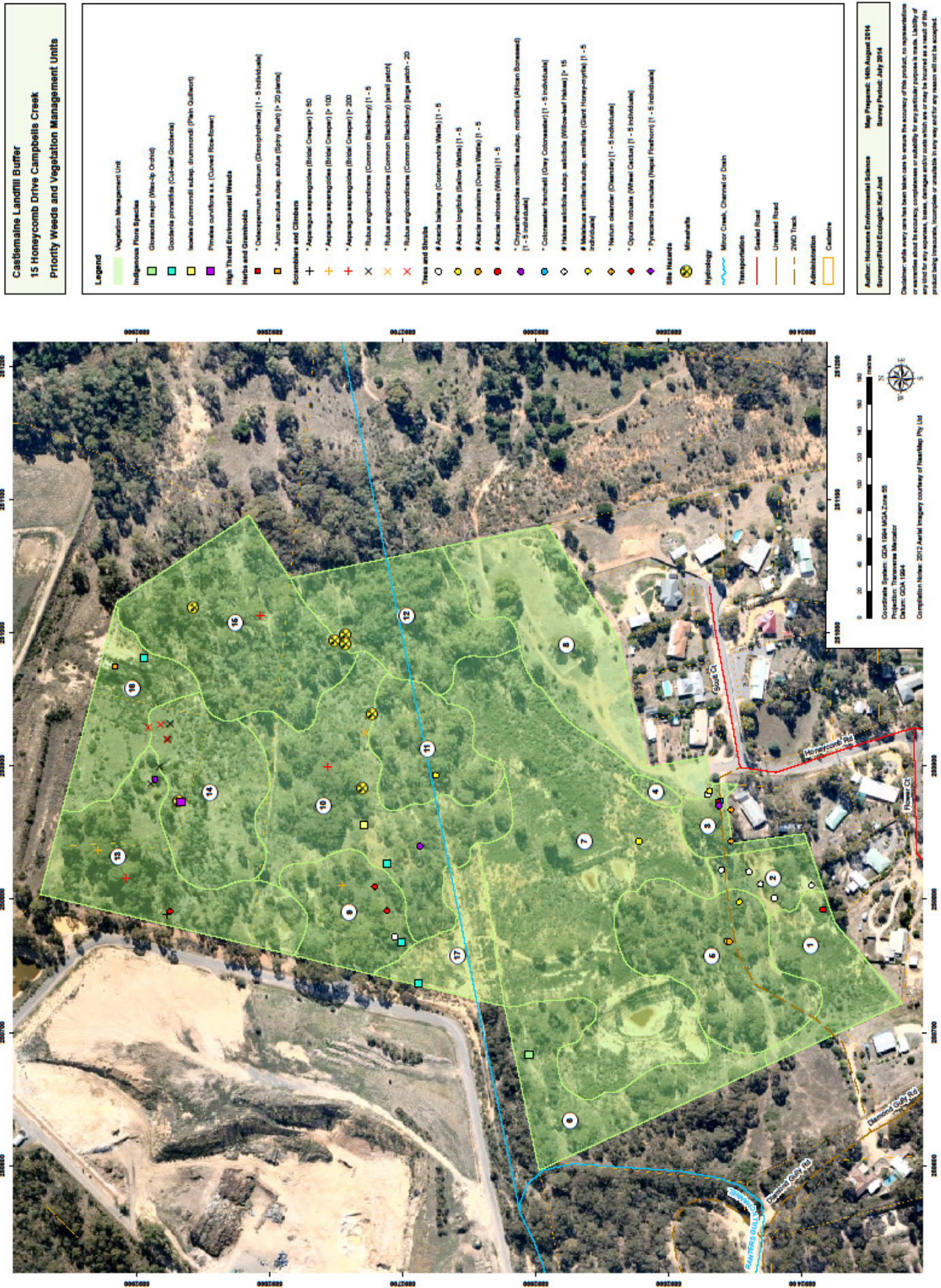
Specific guidelines for weed management in all 17 management zones are provided in Appendix 1.

Gorse control

It is likely that Gorse (*Ulex europaeus*) control will dominate the management program for many years to come and so it is important to implement the most effective control program for this species.

Mature Gorse (*Ulex europaeus*) patches have been shown to produce between 6-21 million seeds per hectare per year, with each seed having a lifespan of at least 25 years (Gouldthorpe 2006). This means that unless efforts are taken to exhaust the seed bank, Gorse (*Ulex europaeus*) plants will continue to germinate in large numbers in perpetuity. It is therefore recommended that wherever feasible, Gorse (*Ulex europaeus*) affected areas are subject to a planned burn to stimulate the recruitment of the seed bank. This should then be followed up by killing germinants with herbicide prior to flowering (i.e. generally within 12 months). Although this approach requires more resources and planning, it would save thousands of dollars in the long term and lead to effective control of infestations.

The Action Plan in Section 7 proposes that Management Zones 12 and 15 are subject to a planned burn in years one or two with the aim of recruiting the Gorse seed-bank. This should only be undertaken once the existing cover of dead Gorse plants are cut and either removed or scattered at ground level to significantly reduce fire intensity and flame height. If the existing cover of dead Gorse is burnt it will likely create a hot fire that will kill many of the surrounding River Red Gum trees. If the burn and follow-up weed control are



successful then further burning should be undertaken in Management Zones 10 and 14 in years 3-5.

Rabbit and hare control

Rabbit numbers are not particularly high in the Reserve but require monitoring and control when necessary. They are likely to be more of a problem along the areas of deep alluvial gravel in the eastern section of the Reserve and to be less common on the skeletal rocky soils in the west.

The European Hare (**Lepus europaeus*) has been observed within the Reserve by Friends of Campbells

Invasive species - Priorities and Actions:

- Control weeds throughout the Reserve. Target localised high threat species throughout the entire site, but focus remaining work in best areas, working outwards (Bradley method).
- Wherever feasible, burn Gorse (**Ulex europaeus*) affected areas to enable control of seed bank.
- Ongoing rabbit control where necessary.

3.5 Fire Management

Council, like all land managers has a responsibility under the *Country Fire Authority Act 1958*:

43 Duties and powers of councils and public authorities in relation to fire

(1) In the country area of Victoria it is the duty of every municipal council and public authority to take all practicable steps (including burning) to prevent the occurrence of fires on, and minimise the danger of the spread of fires on and from— (a) any land vested in it or under its control or management;

Just like most areas of public land that support native or exotic vegetation in the region, the Reserve poses some level of fire risk, particularly if targeted by arsonists. This threat can be lowered by:

- Removing weed species particularly Gorse (**Ulex europaeus*) which elevate fuel levels.
- Maintaining a fire fuel break along boundaries adjacent to houses in the south-eastern and south-western sections.
- Plan revegetation activities for the long term with the aim of replacing Drooping Cassinia (*Cassinia arcuata*) with other local native species that have less elevated fuels.

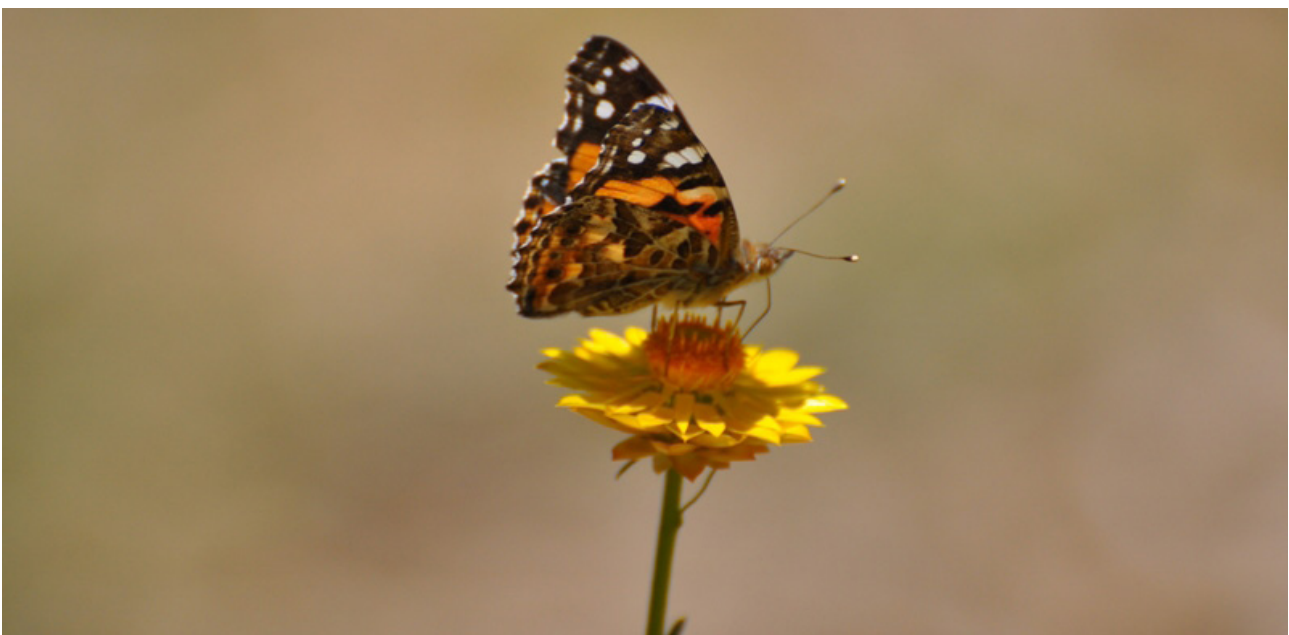
Council has sought written advice from the CFA, and advice from an independent fire ecologist (appendices 2 and 3). This advice recommends Council establish and maintain a fire fuel break adjacent to neighbouring housing to the south. No further revegetation activities will occur between the current walking trail and housing to the south of the Reserve (the majority of zone 8). Consideration will need to be given to extending this fire fuel free zone into parts of management zones 1, 2 and 3, along property boundaries, where housing exists.

Fire has the potential to be an important management tool. Burning Gorse (*Ulex europaeus*) affected areas can greatly assist in eliminating infestations while burning areas with grassy ground flora may be required to reduce grass thatch and promote the recruitment of native species. Care should always be taken when implementing burns, as hot fires have the potential to damage remnant vegetation, particularly gum-barked eucalypts such as River Red Gum (*Eucalyptus camaldulensis*) and Yellow Gum (*Eucalyptus leucoxylon* subsp. *pruinosa*). Large areas should only be subject to burning if there are adequate resources to control the resulting flush of weeds.

To reduce fire risk dead standing sprayed Gorse plants should be removed or compacted on-site.

Fire - Priorities and Actions:

- Sprayed dead standing Gorse should be compacted on-site or removed.
- Utilise fire where possible for managing Gorse (*Ulex europaeus*) infestations or to reduce grass thatch in grassy woodland patches.
- Maintain appropriate fire breaks around southern perimeters adjacent to housing.



Painted Lady (*Vanessa kershawi*) feeding on Sticky Everlasting (*Xerochrysum viscosum*) flower.

3.6 Revegetation

In the past, a small amount of revegetation has been carried out at the Reserve by Council and Landcare groups, including at the end of Honeycomb Road and in open grassy areas along the walking/cycling trail. These plantings have mostly consisted of understorey trees and shrubs such as Tree Banksia (*Banksia marginata*) (tree form), Silver Wattle (*Acacia dealbata*), Black Wattle (*Acacia mearnsii*), Native Hop-bush (*Dodonaea viscosa*) and Inland Wirilda (*Acacia provincialis*).

Further revegetation throughout strategic areas of the site would help to increase species and genetic diversity, replace weed cover, improve habitat quality and connectivity, and reduce the amount of elevated fuel present. While natural recruitment will in time restore plant cover to most of the previously cleared areas, it is likely that the diversity will not recover without intervention due to the local loss of some species caused by mining activities.

As stated in 3.5 no further revegetation will occur in the majority of zone 8, as this area will be set aside for a fire fuel break. Council will also continue exploring whether a fire fuel free zone needs to be continued into management zones 1, 2 and 3.

Potential sites that could be targeted for revegetation include cleared areas in Management Zones 7 and 16. Revegetation throughout Management Zone 7 poses significant challenges due to the high cover of Gorse (**Ulex europaeus*), however even a small number of trees (30-50) throughout the zone would greatly increase connectivity across the Reserve, which is currently disrupted by the cleared area in this zone.

Scattered plantings of understorey shrubs could also be considered for the remaining management zones, but only where adequate natural recruitment is not occurring.

The importance of thorough preparatory and follow-up weed control for any revegetation project within the Reserve has been highlighted by Landcare groups in the past. As a general guide, any revegetation site should have the target weeds controlled 2-3 times prior to planting, beginning 6-12 months before the project. This may include a control run in spring, followed by others in late autumn and early-mid winter the following year. This level of weed control will reduce the amount of post-planting control required and will ensure the eventual success of the planting project.

Revegetation - Priorities and Actions:

- Restore trees and shrubs to previously cleared areas in Management Zone 16.
- Restore trees to previously cleared areas in Management Zone 7.
- Thorough preparatory and follow-up weed control is crucial to success of each planting.

4 Cultural Heritage

4.1 Aboriginal cultural heritage

The traditional owners of the land at the Reserve are the Dja Dja Wurrung (or Jaara people) who have inhabited the region for tens of thousands of years. No sites of cultural significance are known within the Reserve and it is probable that any such sites were destroyed during past mining activities. However a cultural heritage assessment would be required to investigate the presence of significant or sensitive sites.

The story of the Dja Dja Wurrung is an integral part of the current landscape and it is important to educate the community about their history and traditional lifestyle. This could be achieved using interpretive signs along the proposed walking circuit (see Figure 3).

Aboriginal cultural heritage - Priorities and Actions:

- Investigate the potential for interpretive signage that explain the history and culture of the Dja Dja Wurrung.

4.2 Post-settlement cultural heritage

The Reserve has local historical significance due to the presence of numerous relicts of the gold rush as well as remnants of a house site believed to be from the mid 1900's (Bannear 2009). Evidence of gold mining within the Reserve includes numerous mine shafts from the mid 19th century as well as gravel beds disturbed by hydraulic sluicing and gravel extraction in the early 20th century. The house site consists of a concrete floor, sheets of corrugated iron, two small dams and fruit trees (Bannear 2009). With the exception of exotic species in the old garden site, all of these features should be preserved due to their historic significance. If the mine shafts are ever considered to be hazardous, this could be managed by placing steel grates over the shaft entrance, but they should not be filled in.

Post settlement cultural heritage - Priorities and Actions:

- All historical features, with the exception of potential weed species in the old garden site, should be preserved.
- Leave all mine shafts in current condition due to their historic significance. Place steel grates over entrances if deemed hazardous but they are not to be filled in.

5 Recreation Management

5.1 Low impact and passive recreation

Honeycomb Bushland Reserve is ideally suited for passive recreation activities and has been enjoyed by members of the community for many years. The walking/cycling trail that passes through the south-eastern section is regularly used by bike riders and walkers and allows access from Honeycomb Road to Campbells Creek. Several informal walking trails traverse the Reserve which offer opportunities for bushwalking, bird watching, art activities and a variety of nature studies. Excellent views of the surrounding district can be seen from parts of the Reserve, including across to Mount Alexander (Leanganook). The Reserve also offers opportunities to study local geology, including at several old cuttings that reveal cross-sections of ancient gravel beds of the ancestral Campbells Creek.

Passive recreation - Priorities and Actions:

- Continue to improve accessibility within the Reserve to allow passive recreation.

5.2 Visitor Impacts

Recreation within the Reserve must be monitored and managed to prevent visitor impacts. While there are currently minimal negative impacts from visitors, potential impacts may include excessive off-trail walking or cycling, illegal motorbike riding, disturbance to native vegetation or visitors leaving rubbish behind. Due to potentially limited resources available for patrol, the best course of action is to occasionally undertake a site visit to the Reserve and to deal with any impacts that arise. Local landowners and Landcare groups are likely to assist with being the 'eyes and ears' that can alert Council to any issues relating to these activities.

Visitor impacts - Priorities and Actions:

- Monitor the Reserve to identify visitor impacts.

5.3 Tracks, facilities and infrastructure

The current tracks and infrastructure at Honeycomb Bushland Reserve currently include:

- the walking/cycling trail in the south-eastern section;
- two disused dams in the western portion;
- a disused pipe-line that cross the central portion of the Reserve from east to west;
- several informal trails that traverse much of the perimeter of the Reserve (see Figure 3).

Vehicle access for Council and Landcare groups is currently from Honeycomb Road onto the walking/cycling trail. A vehicle track also gives access to a small area of the south-eastern section of the Reserve.

Tracks, facilities and infrastructure - Priorities and Actions:

- Leave the two dams in their current condition.

5.4 Rubbish

Rubbish is a serious issue within the Reserve and has been identified as one of the most pressing management problems by local Landcare groups. This includes two separate issues:

General waste blowing into the Reserve from the adjacent Castlemaine Landfill

This has been ongoing for many years but appears to have worsened in recent times. Since the main waste cell became full, the general waste has been off-loaded into a less contained area adjacent to the Reserve, which has increased the level of rubbish entering the site (Jan Hall pers. comm. May 2015). Landfill operators are currently required to remove all litter from within 20 meters of the perimeter fence.



Plate 10 - Rubbish blown from the adjacent landfill along the north-western perimeter of the Reserve.

Dumping of green waste within the Reserve

There have been instances of green waste being dumped within the Reserve and some burning off on the perimeter. This directly impacts the vegetation and leads to the introduction of garden weeds. In the interest of the Reserve and surrounding residents, the Council will aim to resolve this issue.

Rubbish issues - Priorities and Actions:

- Landfill operators to undertake clean-ups adjacent to the Reserve as required by contract.
- Council will work with neighbouring landowners, to help report dumping of green waste and burning off within the Reserve.

5.5 Walking trail upgrade

There are several informal walking trails. It is proposed to consolidate some trails and to improve an existing circuit that should be properly identified and managed so that it is easier to follow and more appealing to visitors. Some informal trails may need to be closed.

The proposed trail (Figure 3) is a rough circuit that covers large parts of the outer Reserve, linking up with the walking/cycling trail. The combined length is approximately 1.5 kilometres. It is proposed that all parts of the trail with the exception of the walking/cycling trail are signposted every 2-300 metres with a short post marked with an arrow or other appropriate symbol to assist walkers with navigation. The trail is to be maintained as a bare earth trail without gravel or concrete, unless visitor use increases significantly in future. The proposed trail follows a series of existing informal paths and so establishment will only require minimal trimming of vegetation in some sections to complete the circuit. Ongoing management should only require a small amount of maintenance including minimal trimming of vegetation along its length and control of nearby weed infestations to increase the visual appeal. Both Landcare groups have expressed an interest in taking on these management responsibilities.

The Diamond Gully locality has been identified as a key growth area for the Shire and is likely to see significant rise in the local population. Therefore it is likely that there will be increasing interest by walkers and cyclists to use the Reserve and pass through it. The old Newstead Gravel Reserve, when considered with the Reserve, could provide a logically and direct route between the Diamond Gully locality and Campbells Creek. The Landcare groups have identified potential options as shown in Figure 3.

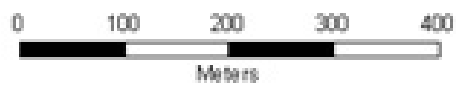
Walking trail upgrade - Priorities and Actions:

- Proposed Reserve walking circuit to be marked with posts every 2-300 metres to assist walkers with navigation.
- Proposed Reserve walking circuit to be occasionally maintained by trimming overhanging vegetation and controlling nearby weeds.



Legend

- Proposed walking circuit
- Reserve boundary
- Potential connector to 70 Foot Reserve
- Potential connector to Diamond Gully Rd



Map Created by: Karl Just
Date: June 2015
Datum: GDA 1994

Figure 3 - Proposed and potential walking trails

5.6 Official naming of the Reserve

It is a priority for Council to investigate officially naming the Reserve as 'Honeycomb Bushland Reserve'.

Official naming of the Reserve - Priorities and Actions:

- Council to investigate officially naming the Reserve
- Council to undertake appropriate community consultation .

5.7 Interpretation

It is proposed that a series of interpretation signs are developed for placement around the walking trail. These could include:

- Welcome signs at key entry points that provide an overview of the Reserve's natural, historic and recreational values and possibly a map of the walking trail. Potential entry locations include near the informal car park at the end of Honeycomb Road, at the point where the walking/cycling trail enters the Reserve in the east and at the point where the informal trail enters the Reserve from the Newstead Gravel Reserve in the west.
- Signage near one of the cuttings that explains the interesting geological history of the Calivil Formation. An ideal location for such a sign is in the north-eastern section of the proposed walking trail where it descends into the gully.
- Signage that describes the history and culture of the traditional owners of the land, the Dja Dja Wurrung.
- Signage that provides some examples of ecological interactions within the Reserve in regards to flora and fauna.
- Signage that discusses the Reserve's mining history and its impact on native ecology.

It is recommended that each sign is constructed using anti-graffiti material and that the support structure is strong enough to resist bending by vandals and so as not to impede access by CFA appliances.

The possibility of funding the interpretation signs through a grant scheme should be investigated by Landcare.

Interpretation - Priorities and Actions:

- Design and install a series of interpretation signs at key points, providing information on the natural, historic and recreation values of the Reserve.
- Signs to be constructed using anti-graffiti material with a support structure that is strong enough to resist bending by vandals.

5.8 Signage

Installing signs that bear the name of Honeycomb Bushland Reserve would be of great benefit to raise the Reserve's community profile. It is proposed that several signs are installed at key entry points into the Reserve that show the name of the Reserve as well as outlining what activities are prohibited (motorbikes, dumping green waste, removing plants or animals etc.). These could be placed alongside interpretation signs as outlined in Section 3.3, including near the informal car park at the end of Honeycomb Road, at the point where the walking/cycling trail enters the Reserve in the east and where the informal trail enters the Reserve from Newstead Gravel Reserve.

Similar to the interpretation signs, it is recommended that each sign is constructed using anti-graffiti material and that the support structure is strong enough to resist bending by vandals.

Signage - Priorities and Actions:

- Signs to be installed at key entrance points that show the name of the Reserve and provide relevant visitor information details.
- Signs to be constructed using anti-graffiti material with a support structure that is strong enough to resist bending by vandals

5.9 Fencing

The majority of the Reserve currently has adequate fencing around the perimeter with the exception of part of the south-western boundary (see Plate 11 below). This section requires a simple post and wire fence to help to delineate the Reserve from the adjacent private lands to the west. The length of the area requiring fencing is approximately 300 meters. It is proposed that the fence is comprised of a post and wire design with only 1-2 strands of wire. Rabbit activity does not appear to be high in this area so there is currently no requirement to increase the cost by adding a rabbit-proof skirt, although this could be added in future if necessary.

Fencing - Priorities and Actions:

- Construct a post and wire fence along south-west boundary of the Reserve.



Plate 11 - The area that is currently unfenced is marked in red. This boundary is proposed to be fenced using a post and wire design with 1-2 strands of wire.

5.10 Accessibility

Entrance to the Reserve from Honeycomb Rd via the walking/cycling trail allows vehicular access. This is the only vehicle access to the adjoining public land, contractors engaged by Council and also the local Landcare groups use this route for management activities and for running engagement events.

Implementation of bollards would restrict unwanted vehicular access to the area, ensuring pedestrian safety along the walking track. Adjoining landholders along Scott Court currently use this track for personal use, including rear and side access to their homes. If bollards were to be installed many local landholders would have the back and side access to their properties restricted. This is an issue that Council recognises and when bollards are to be installed local landholders will need to be consulted.

There is a clearing close to the Honeycomb Rd walking/cycling trail entrance. This area has the potential to be turned into a small carpark to be used the general public.

5.11 Community involvement

Adjoining landholders, community groups and users of the Reserve take an active interest in access to, and benefits of, the Reserve. During the Plan's development Council sought broad stakeholder engagement and were pleased to receive feedback from Reserve users and adjoining landholders. All of this feedback has been thoroughly considered in this final version of the Plan, and all of it was important in strengthening and refining the actions and considerations of the Plan.

There is strong community interest in the Reserve represented by two separate Landcare groups, including Friends of Campbells Creek Landcare Group and McKenzies Hill Action and Landcare Group. While both groups have an interest in the entire Reserve, the activities of Friends of Campbells Creek Landcare Group tend to be concentrated in the eastern section while the activities of McKenzies Hill Action and Landcare Group are concentrated in the western section. Both groups occasionally run working bees within the Reserve and aim to have at least one joint working bee together per year.

Both groups have outlined a series of management activities where they see a role for their group in assisting with, including:

- Weed control, particularly follow-up control actions required around infestations managed by contractors (i.e. digging out smaller Gorse (*Ulex europaeus*) or Blackberry recruits where larger patches have been sprayed in the past). Some smaller infestations may also be targeted by Landcare group members using herbicide from a backpack.
- Trail maintenance, including occasional trimming of overhanging vegetation and control of weeds along trails.
- Revegetation, including potentially planting trees and shrubs in Zone 16 species enrichment plantings elsewhere.

The Landcare groups are also likely to be fundamental in applying for external funding opportunities and monitoring emerging weed infestations across the Reserve.

Community involvement - Priorities and Actions:

- Continue to work with and support community groups using a joint management approach.
- Landcare to assist with the management program
- Maintain a MoU between Landcare groups and Council

6 Monitoring

6.1 Monitoring methods

Monitoring is an essential component of ecological management. Successful monitoring allows land managers to detect important changes across time, which can be particularly useful for assessing weed control works or broad structural and floristic changes. Although detailed monitoring requires a relatively high level of time and resources, some simple methods could potentially be adopted at Honeycomb Bushland Reserve to assist with management. This is a potential activity for Landcare groups to coordinate.

Photopoints

Establishing photopoints is one of the easiest and most effective ways to monitor broad changes. Recommendations and guidelines for establishing photopoints were provided in the previous management plan prepared for the Reserve (see *Connecting Country* 2013). Photopoints should be established across the entire Reserve, with focus given to areas where management is likely to be targeted. The photopoint should be marked permanently with a marker or the photo could be taken from an obvious feature (such a tree stump) and geographically referenced with a GPS. Photos can be taken as often as resources permit, but ideally should be repeated at least once a year. Previous photos should always be taken on site to ensure that the new photo is lined up as accurately as possible with previous images.

Vegetation quadrats

Setting up several permanent vegetation quadrats within the Reserve would provide a valuable tool for assessing floristic change. This method is described briefly below:

- A square quadrat is permanently marked in one corner, usually with a steel star picket marked with yellow capping. The corner should be geographically referenced and its location described.
- A photo point is taken from one corner, usually from the north-west to prevent sunlight blurring photos. Care should be taken to line up the photo each time with prominent features.
- All plant species are recorded within the quadrat and assigned a cover value to the nearest 5% or using the braun blanquet system. The cover should also be recorded for other important attributes such as leaf litter, coarse woody debris, bare ground and rocks.
- Any other notable features are noted for future reference.

The plots can be re-surveyed as often as resources permit, but annual monitoring is recommended for tracking change and maintaining plot markers.

Significant species monitoring

There are several plant species at Honeycomb Bushland Reserve that would be worth monitoring to ensure their long-term survival, with the patch of Plains Quillwort in Management Zone 10 being of particular interest. Recognising that detailed species monitoring may be difficult to implement, at the least an annual check and count of plants could be undertaken. This would ensure that any decline or threat is identified as soon as possible, allowing recovery management to be implemented.

Monitoring - Priorities and Actions:

- Implement a monitoring program to assist in evaluating management works and identifying changes to vegetation and habitat attributes.

6.2 Evaluation of management

The management program at the Reserve should be reviewed on a yearly basis. The target actions outlined for each year should be assessed against the works actually achieved in that time, to determine the overall progress towards the intended outcomes. The 5 year action plan takes an adaptive approach, so that any part of the program can be adapted each year based on the progress of specific works. At the end of each year, land managers should assess the success of important management aims to determine if works proposed for the following year require variation.

Evaluation of management - Priorities and Actions:

- Land managers to assess the success of important management aims at the end of each year, to determine if works proposed for the following year require variation.

7 Action Plan

The following action plan provides a guide for proposed management works at the Reserve over the next 5 years. Because the progress of works cannot be predicted across the 5 years and unforeseen management issues may arise, the plan should be seen as a guide only. An adaptive management approach requires that land managers assess the progress of works at regular intervals and adapt the management regime where considered necessary. The indicative cost provided in the resources section is a very rough estimate only, as the cost will eventually depend on the rate of the contractor or supplier. Specific management guidelines for all 17 management zones are provided in Appendix 1.

Action	Theme	Timing	Method of implementation	Priority	Responsibility	Resources	Management notes
Year 1							
Objective 1 – control high threat plants and animals							
Control Blackberry	Weed control	January-February	Spot-spray larger plants with herbicide, using knapsack to minimise risk of overspray killing non-weed species. Smaller plants to be cut-painted or dug out.	High	Contracted experienced bushland contractors employed by Council with follow-up work from Landcare groups	3 person hours (app. \$200-250)	The majority of larger patches occur in Management Zones 13, 14 and 16. Most were sprayed in early 2015 but require follow-up.
Control Gorse	Weed control	October-February	Spot-spray larger plants with herbicide, using knapsack to minimise risk of overspray killing non-weed species. Smaller plants to be cut-painted or dug out.	High	Contracted experienced bushland contractors employed by Council with follow-up work from Landcare groups	16 person hours (app. \$1000-1300)	Large areas of Gorse (<i>Ulex europaeus</i>) were sprayed in early 2015. Concentrate further works in higher quality areas in the eastern section (Zones 10, 12, 14 and 15) and in the west within Management Zone 6. Follow-up last year's work.
Control Bridal Creeper	Weed control	August-September (when plants are flowering)	Spot-spray larger infestations across the Reserve, using knapsack to minimise risk of overspray killing non-weed species. Remove smaller infestations by hand, taking care to remove all roots.	High	Contracted experienced bushland contractors employed by Council with follow-up work from Landcare groups	8 person hours (app. \$500-700)	Control may take several years.
Control Boneseed	Weed control	April-October (when soil is moist)	Hand-pull smaller plants and cut and paint larger plants.	High	Contracted experienced bushland contractors employed by Council with follow-up work from Landcare groups	2 person hours (app. \$150-200)	Boneseed is scattered at low density so will require some searching to locate plants. Best undertaken while controlling other high threat weeds.

Action	Theme	Timing	Method of implementation	Priority	Responsibility	Resources	Management notes
Control scattered woody weeds mapped by Just (2014)	Weed control	October-February	Cut-paint larger plants, hand pull smaller plants, taking care to remove all roots.	High	Contracted experienced bushland contractors employed by Council with follow-up work from Landcare groups	4 person hours (app. \$300-350)	Follow the mapping of Just (2014) as a guide (Figure 3).
Conduct planned burn in Management Zones 12 and 15 in conjunction with the CFA	Weed control	Autumn	Low-medium intensity burn to be conducted in Management Zones 12 and 15 to stimulate recruitment of Gorse (<i>Ulex europaeus</i>). Existing cover of dead Gorse to be removed or cut to ground prior to the burn to reduce fire intensity.	Moderate	The burn should be conducted by the CFA in consultation with Council and Landcare.	Council, CFA and Landcare time.	Care should be taken to limit fire intensity and prevent impacts to native trees and shrubs.
Objective 2. Manage rubbish and green waste dumping issues							
Reduce rubbish levels	Rubbish management	Throughout the year	Landfill operators to manage rubbish so as to reduce the amount that blows into the Reserve.	High	Landfill operators	Cost is part of contract between Council and the landfill operator	Dependent on agreement with Council.
Reduce green waste dumping	Green waste management	Throughout the year	Council to take measures to eliminate the dumping of green waste and burning off within the Reserve.	High	Council	Council Officers time	Fining offenders as a last resort
Objective 3. Improve walking trail network							
Delineate circuit trail	Trail works	When feasible	Trim over-hanging vegetation along the length of the proposed walking trail.	Medium	Landcare	At least 2 four hour working bees.	
Objective 3. Improve walking trail network							
Mark circuit trail	Trail works	When feasible	Install post markers every 2-300 meters along trail to assist walkers with navigation.	Medium	Council with assistance from Landcare	5-8 marked posts. App. \$2-300.	

Action	Theme	Timing	Method of implementation	Priority	Responsibility	Resources	Management notes
Plan connecting trails	Trail works	When feasible	Council to investigate potential connector trails into Honeycomb Bushland Reserve including from the Newstead Gravel Reserve, Diamond Gully Road and onto Campbells Creek walking/cycling trail.	Medium	Council with assistance from Landcare	Potential costs include installation of gates on Diamond Gully Road and to connecting trail to Campbells Creek.	
Objective 4. – Revegetation and species enrichment plantings							
Prepare sites for revegetation	Revegetation	Throughout the year	Prepare sites for revegetation by removing weeds via herbicide application or hand removal. Ideally treat Gorse (<i>*Ulex europaeus</i>) affected areas with fire to allow recruitment and then control of seed bank.	Medium	Landcare, possibly with assistance from weed control contractors	1-2 four hour working bees	Potential sites include Management Zone 16.
Prepare target areas for species enrichment plantings	Species enrichment	Throughout the year	Prepare sites for species enrichment plantings. Ideally treat Gorse (<i>*Ulex europaeus</i>) affected areas with fire to allow recruitment and then control of seed bank.	Medium	Landcare, possibly with assistance from weed control contractors	1-2 four hour working bees	Potential areas include Management Zones 12 and 15, where understory shrubs could be planted where Gorse (<i>*Ulex europaeus</i>) has been removed.
Objective 5. – Improve community awareness and raise profile of the Reserve							
Officially name the Reserve	Infrastructure	When feasible	Council to investigate officially name the Reserve as 'Honeycomb Bushland Reserve'	High	Council	Council Officer time	This could be accompanied by a media release through Council's newsletter and Landcare networks.
Install signage	Infrastructure	When feasible	Install signs bearing the name of the Reserve at key access points	High	Council	App. \$500-1000	Ideally including two signs, including at the informal car park off Honeycomb Road and where the walking/cycling trail enters the Reserve in the east.
Install bollards	Infrastructure	When feasible	Investigate installing one or two bollards near Honeycomb Road to restrict vehicle access.	Medium	Council	App. \$1-200	Residents to be consulted

Action	Theme	Timing	Method of implementation	Priority	Responsibility	Resources	Management notes
Survey boundaries	Infrastructure	When feasible	Council to commission a land survey to determine the exact alignment of Reserve boundaries, particularly regarding the south-west boundary that requires fencing and the square parcel in the north.	Medium	Council	App. \$3-5000	
Objective 6 - Monitoring and evaluation							
Evaluate the year's work, plan for next year	Planning	At end of year	Council to assess the results of the year's work and adapt the following years plan if necessary based on current conditions.	High	Council	4-8 hours	
Establish photo points	Monitoring	Spring, or whenever feasible	Council or Landcare to establish photopoints at key areas of the Reserve.	Medium	Council and Landcare	4-8 hours	
Establish vegetation monitoring quadrats	Monitoring	Spring	Council or Landcare to establish vegetation monitoring quadrats at key areas of the Reserve.	Medium	Council, consultant or Landcare	8 hours	Requires botanical expertise.
Investigate offsetting potential.	Offsetting	When feasible.	Council to investigate the possibility of assessing the sites potential to be a native vegetation offset site	Medium	Council	Council or consultant time	This may require an updated Habitat Hectare assessment for the Reserve.
Community consultation	Consultation	When feasible	Council to consult with the neighbouring property owners/ residents and Landcare groups, as needed.	High	Council	Council time	
Year 2							
Objective 1 – control high threat plants and animals							
Control Blackberry	Weed control	January-February	Follow-up previous year's work by removing any smaller plants by hand.	High	Landcare groups	3 person hours (app. \$200-250)	
Control Gorse		October-February	Follow-up in previously treated areas, extending out into the best areas. Spot-spray larger plants with herbicide, using knapsack to minimise risk of overspray killing non-weed species. Smaller plants to be cut-painted or dug out.	High	Contracted experienced bushland contractors employed by Council with follow-up work from Landcare groups	16 person hours (app. \$1000-1300)	If Management Zones 12 and 15 were burnt in previous year then follow up control of this area is a high priority.

Action	Theme	Timing	Method of implementation	Priority	Responsibility	Resources	Management notes
Control Bridal Creeper		August-September (when plants are flowering)	Follow-up in previously treated areas. Spot-spray larger infestations, using knapsack to minimise risk of overspray killing non-weed species. Remove smaller infestations by hand, taking care to remove all roots.	High	Contracted experienced bushland contractors employed by Council with follow-up work from Landcare groups	3 person hours (app. \$200-250)	
Control Boneseed		April-October (when soil is moist)	Hand-pull smaller plants and cut and paint larger plants.	High	Landcare groups	2 person hours (app. \$150-200)	If treated in year 1 there are likely to be only young plants present in year 2.
Control scattered woody weeds mapped by Just (2014)		October-February	Follow-up previous year's work if required, although most should have been controlled in year 1. Cut-paint larger plants, hand pull smaller plants, taking care to remove all roots.	High	Landcare groups	4 person hours (app. \$300-350)	Follow the mapping of Just (2014) as a guide.
Conduct planned burn in Management Zones 12 and 15 in conjunction with the CFA		Autumn	Low-medium intensity burn to be conducted in Management Zones 12 and 15 to stimulate recruitment of Gorse (<i>Ulex europaeus</i>). Existing cover of dead Gorse to be removed, bashed or cut to ground prior to the burn to reduce fire intensity.	Moderate	The burn should be conducted by the CFA in consultation with Council and Landcare.	Council, CFA and Landcare time.	Action carried on from Year 1 if outstanding.
Control rabbits	Pest control	Late summer-early autumn	Monitor for excessive rabbit activity and implement baiting if necessary.	High	Council with assistance from Landcare.	Council's time	
Objective 2. Manage rubbish and green waste dumping issues							
Reduce rubbish levels	Rubbish management	Throughout the year	Landfill operators to manage rubbish so as to reduce the amount that blows into the Reserve.	High	Landfill operators	Cost is part of contract between Council and the landfill operator	Dependent on agreement with Council.

Action	Theme	Timing	Method of implementation	Priority	Responsibility	Resources	Management notes
Reduce green waste dumping	Green waste management	Throughout the year	Council to take measures to eliminate the dumping of green waste and burning off within the Reserve.	High	Council	Council Officer time	Fining offenders as a last resort
Objective 3. Improve walking trail network							
Manage circuit trail	Trail works	When feasible	Trim over-hanging vegetation along the length of the proposed walking trail.	Medium	Landcare	At least 1 four hour working bee.	
Plan connecting trails	Trail works	When feasible	Council to investigate potential connector trails into Honeycomb Bushland Reserve including from the Newstead Gravel Reserve, Diamond Gully Road and onto Campbells Creek walking/cycling trail.	Medium	Council with assistance from Landcare	NA	Action carried on from Year 1 if still outstanding
Objective 4. – Revegetation and species enrichment plantings							
Prepare sites for revegetation	Revegetation	Throughout the year	Prepare sites for revegetation by removing weeds via herbicide application or hand removal. Ideally treat Gorse (<i>Ulex europaeus</i>) affected areas with fire to allow recruitment and then control of seed bank.	Medium	Landcare, possibly with assistance from weed control contractors employed by Council	1-2 four hour working bees	Potential sites include Management Zone 16.
Prepare target areas for species enrichment plantings	Species enrichment	Throughout the year	Prepare sites for species enrichment plantings. Ideally treat Gorse (<i>Ulex europaeus</i>) affected areas with fire to allow recruitment and then control of seed bank.	Medium	Landcare, possibly with assistance from weed control contractors employed by Council	1-2 four hour working bees	Current potential areas include Management Zones 12 and 15, where understory shrubs could be planted where Gorse (<i>Ulex europaeus</i>) has been removed.
Objective 5. – Improve community awareness and raise profile of the Reserve							
Prepare and install interpretation signage	Education	When feasible	Landcare groups to assist Council in preparing a series of interpretation signs along the proposed walking circuit.	Medium	Landcare/Council	App. \$500-100 per sign (including installation).	Ideally this project should be funded through a grant scheme.
Install signage	Infrastructure	When feasible	Install signs bearing the name of the Reserve at key access points	High	Council	App. \$500-1000	Action carried on from Year 1 if still outstanding.

Action	Theme	Timing	Method of implementation	Priority	Responsibility	Resources	Management notes
Install bollards	Infrastructure	When feasible	Investigate installing one or two bollards near Honeycomb Road to restrict vehicle access.	Medium	Council	App. \$1-200	Action carried on from Year 1 if still outstanding.
Construct fence along south-west boundary of the Reserve	Infrastructure	When feasible	Construct post and wire fence with 1-2 strands of wire along the currently unfenced south-west boundary.	Medium	Council	App. \$3-5000	Requires land survey to determine exact boundary.
Objective 6 - Monitoring and evaluation							
Evaluate the years work, plan for next year	Planning	At end of year	Council to assess the results of the years work and adapt the following years plan if necessary based on current conditions.	High	Council	4-8 hours	
Repeat photo points	Monitoring	Spring, or whenever feasible	Council or Landcare to repeat photopoints.	Medium	Council and Landcare	4 hours	
Community consultation	Consultation	When feasible	Council to consult with the neighbouring property owners/ residents and Landcare groups, as needed.	High	Council	Council time	
Year 3							
Objective 1 – control high threat plants and animals							
Control Blackberry	Weed control	January-February	Follow-up previous year's work by removing any smaller plants by hand.	High	Landcare groups	3 person hours (app. \$200-250)	
Control Gorse	Weed control	October-February	Follow-up in previously treated areas, extending out into the best areas. Spot-spray larger plants with herbicide, using knapsack to minimise risk of overspray killing non-weed species. Smaller plants to be cut-painted or dug out.	High	Contracted experienced bushland contractors employed by Council with follow-up work from Landcare groups	16 person hours (app. \$1000-1300)	If Management Zones 12 and 15 were burnt in previous year then follow up control of this area is a high priority.
Control Bridal Creeper	Weed control	August-September (when plants are flowering)	Follow-up in previously treated areas. Spot-spray larger infestations, using knapsack to minimise risk of overspray killing non-weed species. Remove smaller infestations by hand, taking care to remove all roots.	High	Contracted experienced bushland contractors employed by Council with follow-up work from Landcare groups	3 person hours (app. \$200-250)	

Action	Theme	Timing	Method of implementation	Priority	Responsibility	Resources	Management notes
Control Boneseed	Weed control	April-October (when soil is moist)	Hand-pull smaller plants cut and paint larger plants.	High	Landcare groups	2 person hours (app. \$150-200)	If treated in year 1 & 2 there are likely to be only young plants present.
Control scattered woody weeds mapped by Just (2014)	Weed control	October-February	Follow-up previous years work if required, although most should have been controlled in years 1 and 2. Cut-paint larger plants, hand pull smaller plants, taking care to remove all roots.	High	Landcare groups	2 person hours (app. \$150-200)	Follow the mapping of Just (2014) as a guide (Figure 3).
Conduct planned burn in Management Zones 10 and 14 in conjunction with the CFA	Weed control	Autumn	Low-medium intensity burn to be conducted in Management Zones 10 and 14 to stimulate recruitment of Gorse (<i>Ulex europaeus</i>). Existing cover of dead Gorse to be removed, bashed or cut to ground prior to the burn to reduce fire intensity.	Moderate	The burn should be conducted by the CFA in consultation with Council and Landcare.	Council, CFA and Landcare time.	Care should be taken to limit fire intensity and prevent impacts to native trees and shrubs.
Control rabbits	Pest control	Late summer-early autumn	Monitor for excessive rabbit activity and implement baiting if necessary.	High	Council with assistance from Landcare.	Council Officer time	
Objective 2. Manage rubbish and green waste dumping issues							
Reduce rubbish levels	Rubbish management	Throughout the year	Landfill operators to manage rubbish so as to reduce the amount that blows into the Reserve.	High	Landfill operators	Cost is part of contract between Council and the landfill operator	Dependent on agreement with Council.
Reduce green waste dumping	Green waste management	Throughout the year	Council to take measures to eliminate the dumping of green waste and burning off within the Reserve.	High	Council	Council Officer time	

Action	Theme	Timing	Method of implementation	Priority	Responsibility	Resources	Management notes
Objective 3. Improve walking trail network							
Manage circuit trail	Trail works	When feasible	Trim over-hanging vegetation along the length of the proposed walking circuit.	Medium	Landcare	At least 1 four hour working bee.	
Plan connecting trails	Trail works	When feasible	Council to investigate potential connector trails into Honeycomb Bushland Reserve including from the Newstead Gravel Reserve, Diamond Gully Road and onto Campbells Creek walking/cycling trail.	Medium	Council with assistance from Landcare	NA	Action carried on from years 1 and 2 if still outstanding
Objective 4. – Revegetation and species enrichment plantings							
Prepare sites for revegetation	Revegetation	Throughout the year	Prepare sites for revegetation by removing weeds via herbicide application or hand removal. Ideally treat Gorse (<i>Ulex europaeus</i>) affected areas with fire to allow recruitment and then control of seed bank.	Medium	Landcare, possibly with assistance from weed control contractors employed by Council	1-2 four hour working bees	Potential sites include Management Zone 16.
Prepare target areas for species enrichment plantings	Species enrichment	Throughout the year	Prepare sites for species enrichment plantings. Ideally treat Gorse (<i>Ulex europaeus</i>) affected areas with fire to allow recruitment and then control of seed bank.	Medium	Landcare, possibly with assistance from weed control contractors employed by Council	1-2 four hour working bees	Current potential areas include Management Zones 12 and 15, where understory shrubs could be planted where Gorse (<i>Ulex europaeus</i>) has been removed.
Plant out sites if available	Revegetation	Autumn-Spring	Plant out site if adequate preparatory weed control has been implemented.	Medium	Landcare	Several four hour working bees	
Objective 5. – Improve community awareness and raise profile of the Reserve							
Prepare and install interpretation signage	Education	When feasible	Landcare groups to assist Council in preparing a series of interpretation signs along the proposed walking circuit.	Medium	Landcare/Council	App. \$500-100 per sign (including installation).	Action carried on from year 2 if still outstanding.
Construct fence along south-west boundary of the Reserve	Infrastructure	When feasible	Construct post and wire fence with 1-2 strands of wire along the currently unfenced south-west boundary.	Medium	Council	App. \$3-5000	Action carried on from year 2 if still outstanding.

Action	Theme	Timing	Method of implementation	Priority	Responsibility	Resources	Management notes
Objective 6 - Monitoring and evaluation							
Evaluate the years work, plan for next year	Planning	At end of year	Council to assess the results of the year's work and adapt the following years plan if necessary based on current conditions.	High	Council	4-8 hours	
Repeat photo points	Monitoring	Spring, or whenever feasible	Council or Landcare to repeat photopoints.	Medium	Council and Landcare	4 hours	
Community consultation	Consultation	When feasible	Council to consult with the neighbouring property owners/ residents and Landcare groups as needed.	High	Council	Council time	
Year 4							
Objective 1 – control high threat plants and animals							
Control Blackberry	Weed control	January-February	Follow-up previous year's work by removing any smaller plants by hand.	High	Landcare groups	3 person hours (app. \$200-250)	
Control Gorse	Weed control	October-February	Follow-up in previously treated areas, extending out into the best areas. Spot-spray larger plants with herbicide, using knapsack to minimise risk of overspray killing non-weed species. Smaller plants to be cut-painted or dug out.	High	Contracted experienced bushland contractors employed by Council with follow-up work from Landcare groups	16 person hours (app. \$1000-1300)	If Management Zones 10 and 14 were burnt in previous year then follow up control of this area is a high priority.
Control Bridal Creeper	Weed control	August-September (when plants are flowering)	Follow-up in previously treated areas. Spots-spray larger infestations, using knapsack to minimise risk of overspray killing non-weed species. Remove smaller infestations by hand, taking care to remove all roots.	High	Contracted experienced bushland contractors employed by Council with follow-up work from Landcare groups	3 person hours (app. \$200-250)	
Control Boneseed	Weed control	April-October (when soil is moist)	Hand-pull smaller plants and cut and paint larger plants.	High	Landcare groups	2 person hours (app. \$150-200)	If treated in year 1-3 there are likely to be only young plants present.

Action	Theme	Timing	Method of implementation	Priority	Responsibility	Resources	Management notes
Control scattered woody weeds mapped by Just (2014)	Weed control	October-February	Follow-up previous year's work if required, although most should have been controlled in years 1-3. Cut-paint larger plants, hand pull smaller plants, taking care to remove all roots.	High	Landcare groups	2 person hours (app. \$150-200)	Follow the mapping of Just (2014) as a guide (Figure 3).
Conduct planned burn in Management Zones 10 and 14 in conjunction with the CFA	Weed control	Autumn	Low-medium intensity burn to be conducted in Management Zones 10 and 14 to stimulate recruitment of Gorse (<i>Ulex europaeus</i>). Existing cover of dead Gorse to be removed, bashed or cut to ground prior to the burn to reduce fire intensity.	Moderate	The burn should be conducted by the CFA in consultation with Council and Landcare.	Council, CFA and Landcare time.	Action carried on from previous year if outstanding.
Control rabbits	Pest control	Late summer-early autumn	Monitor for excessive rabbit activity and implement baiting if necessary.	High	Council with assistance from Landcare.	Council Officer time	
Objective 2. Manage rubbish and green waste dumping issues							
Reduce rubbish levels	Rubbish management	Throughout the year	Landfill operators to manage rubbish so as to reduce the amount that blows into the Reserve.	High	Landfill operators	Cost is part of contract between Council and the landfill operator	Dependent on agreement with Council.
Reduce green waste dumping	Green waste management	Throughout the year	Council to take measures to eliminate the dumping of green waste and burning off within the Reserve.	High	Council	Council Officer time	
Objective 3. Improve walking trail network							
Manage circuit trail	Trail works	When feasible	Trim over-hanging vegetation along the length of the proposed walking circuit.	Medium	Landcare	At least 1 four hour working bee.	
Objective 4. – Revegetate previously cleared areas							
Prepare sites for revegetation	Revegetation	Throughout the year	Prepare sites for revegetation by removing weeds via herbicide application or hand removal. Ideally treat Gorse (<i>Ulex europaeus</i>) affected areas with fire to allow recruitment and then control of seed bank.	Medium	Landcare, possibly with assistance from weed control contractors employed by Council	1-2 four hour working bees	Potential sites include in Management 16.

Action	Theme	Timing	Method of implementation	Priority	Responsibility	Resources	Management notes
Prepare target areas for species enrichment plantings	Species enrichment	Throughout the year	Prepare sites for species enrichment plantings. Ideally treat Gorse (* <i>Ulex europaeus</i>) affected areas with fire to allow recruitment and then control of seed bank.	Medium	Landcare, possibly with assistance from weed control contractors employed by Council	1-2 four hour working bees	Current potential areas include Management Zones 12 and 15, where understory shrubs could be planted where Gorse * <i>Ulex europaeus</i> has been removed.
Plant out sites if available	Revegetation	Autumn-Spring	Plant out site if adequate preparatory weed control has been implemented.	Medium	Landcare	Several four hour working bees	
Objective 5 - Monitoring and evaluation							
Evaluate the years work, plan for next year	Planning	At end of year	Council to assess the results of the years work and adapt the following years plan if necessary based on current conditions.	High	Council	4-8 hours	
Repeat photo points	Monitoring	Spring, or whenever feasible	Council or Landcare to repeat photopoints.	Medium	Council and Landcare	4 hours	
Repeat vegetation monitoring quadrats	Monitoring	Spring	Council or Landcare to repeat vegetation monitoring quadrats.	Medium	Council, consultant or Landcare	8 hours	Requires botanical expertise.
Community consultation	Consultation	When feasible	Council to consult with the neighbouring property owners/residents and Landcare groups as needed	High	Council	Council time	
Year 5							
Objective 1 – control high threat plants and animals							
Control Blackberry	Weed control	January-February	Follow-up previous years work by removing any smaller plants by hand.	High	Landcare groups	3 person hours (app. \$200-250)	
Control Gorse	Weed control	October-February	Follow-up in previously treated areas, extending out into the best areas. Spot-spray larger plants with herbicide, using knapsack to minimise risk of overspray killing non-weed species. Smaller plants to be cut-painted or dug out.	High	Contracted experienced bushland contractors employed by Council with follow-up work from Landcare groups	16 person hours (app. \$1000-1300)	If Management Zones 10 and 14 were burnt in previous year then follow up control of this area is a high priority.

Action	Theme	Timing	Method of implementation	Priority	Responsibility	Resources	Management notes
Control Bridal Creeper	Weed control	August-September (when plants are flowering)	Follow-up in previously treated areas. Spot-spray larger infestations, using knapsack to minimise risk of overspray killing non-weed species. Remove smaller infestations by hand, taking care to remove all roots.	High	Contracted experienced bushland contractors employed by Council with follow-up work from Landcare groups	3 person hours (app. \$200-250)	
Control Boneseed	Weed control	April-October (when soil is moist)	Hand-pull smaller plants and cut and paint larger plants.	High	Landcare groups	2 person hours (app. \$150-200)	If treated in year 1-4 there are likely to be only young plants present.
Control scattered woody weeds mapped by Just (2014)	Weed control	October-February	Follow-up previous year's work if required, although most should have been controlled in years 1-4. Cut-paint larger plants, hand pull smaller plants, taking care to remove all roots.	High	Landcare groups	2 person hours (app. \$150-200)	Follow the mapping of Just (2014) as a guide (Figure 3).
Conduct planned burn in Management Zones 10 and 14 in conjunction with the CFA	Weed control	Autumn	Low-medium intensity burn to be conducted in Management Zones 10 and 14 to stimulate recruitment of Gorse (<i>Ulex europaeus</i>). Existing cover of dead Gorse to be removed, bashed or cut to ground prior to the burn to reduce fire intensity.	Moderate	The burn should be conducted by the CFA in consultation with Council and Landcare.	Council, CFA and Landcare time.	Action carried on from previous year if outstanding.
Control rabbits	Pest control	Late summer-early autumn	Monitor for excessive rabbit activity and implement baiting if necessary.	High	Council with assistance from Landcare.	Council Officer time	
Objective 2. Manage rubbish and green waste dumping issues							
Reduce rubbish levels	Rubbish management	Throughout the year	Landfill operators to manage rubbish so as to reduce the amount that blows into the Reserve.	High	Landfill operators	Cost is part of contract between Council and the landfill operator	Dependent on agreement with Council.
Reduce green waste dumping	Green waste management	Throughout the year	Council to take measures to eliminate the dumping of green waste and burning off within the Reserve.	High	Council	Council Officer time	
Objective 3. Improve walking trail network							

Action	Theme	Timing	Method of implementation	Priority	Responsibility	Resources	Management notes
Manage circuit trail	Trail works	When feasible	Trim over-hanging vegetation along the length of the proposed walking circuit.	Medium	Landcare	At least 1 four hour working bee.	
Objective 4. – Revegetate previously cleared areas							
Prepare sites for revegetation	Revegetation	Throughout the year	Prepare sites for revegetation by removing weeds via herbicide application or hand removal. Ideally treat Gorse (<i>Ulex europaeus</i>) affected areas with fire to allow recruitment and then control of seed bank.	Medium	Landcare, possibly with assistance from weed control contractors employed by Council	1-2 four hour working bees	Potential sites include in Management Zone 16.
Prepare target areas for species enrichment plantings	Species enrichment	Throughout the year	Prepare sites for species enrichment plantings. Ideally treat Gorse (<i>Ulex europaeus</i>) affected areas with fire to allow recruitment and then control of seed bank.	Medium	Landcare, possibly with assistance from weed control contractors employed by Council	1-2 four hour working bees	Current potential areas include Management Zones 12 and 15, where understory shrubs could be planted where Gorse (<i>Ulex europaeus</i>) has been removed.
Plant out sites if available	Revegetation	Autumn-Spring	Plant out site if adequate preparatory weed control has been implemented.	Medium	Landcare	Several four hour working bees	
Objective 5 - Monitoring and evaluation							
Evaluate the year's work, plan for next year	Planning	At end of year	Council to assess the results of the year's work and adapt the following years plan if necessary based on current conditions.	High	Council	4-8 hours	
Repeat photo points	Monitoring	Spring, or whenever feasible	Council or Landcare to repeat photopoints.	Medium	Council and Landcare	4 hours	
Community consultation	Consultation	When feasible	Council to consult with the neighbouring property owners/residents and Landcare groups as needed	High	Council	Council time	

8 References

Bannear, D (2009) Heritage assessment – land to the east of current Castlemaine Land Fill. Unpublished report.

Beveridge Williams (2014) Diamond Gully Structure Plan 2014. Prepared for Mount Alexander Shire Council.

Cahir, F. (2012) Black Gold, aboriginal people on the goldfields of Victoria, 1850-1870, Griffin Press, Victoria.

Connecting Country (2013) Castlemaine Landfill Buffer Vegetation Management Plan Castlemaine, Victoria. Unpublished report.

Gouldthorpe, J et. al. (2006). Managing Gorse **Ulex europaeus* *Ulex europaeus* in Australia. Department of Agriculture, Fisheries and Forestry.

Haw, P, Munro, M (2010). Footsteps across the Loddon Plains, a shared history. Express Printers, Epsom, Victoria.

Hocking, G. (1994) Castlemaine, from camp to city. A pictorial history of Forest Creek and the Mount Alexander Goldfields. New Chum Press.

Just, K (2014) Honeycomb Bushland Reserve (Castlemaine Landfill Buffer Land) Description of Management Zones, Unpublished report prepared for Mount Alexander Shire Council.

Perkins, E. (1992) Planting suggestions and vegetation survey at the proposed tip site, Diamond Gully. Unpublished report.

Willman, C.E., Bibby, L.M., Radojkovic, A.M., Maher, S., Haydon, S.J., Hollis, J.D. & Osborne, C.R., (2002). Castlemaine 1:100 000 map area geological report. Geological Survey of Victoria Report 121.

Willman, C.E., Castlemaine Goldfield - Castlemaine-Chewton, Fryers Creek 1:10 000 maps geological report. Geological Survey of Victoria Report 106.

Appendix 1

ASSETS, THREATS AND MANAGEMENT PRIORITIES FOR MANAGEMENT ZONES AT HONEYCOMB BUSHLAND RESERVE

Zone 1

Assets:

- Regenerating indigenous trees and shrubs.
- The only population of Variable Sword-sedge (*Lepidosperma laterale*) known from the Campbells Creek corridor occurs along the western slash-break.

Threats:

- High cover of Gorse (**Ulex europaeus*) with several introduced wattles in the south-east corner.

Management priorities:

- Non-indigenous native woody species should be controlled in the next one to two years.
- Besides the above action, Zone 1 is likely to remain a low priority for management over the next five years.
- The indigenous vegetation should be allowed to recover while the Gorse (**Ulex europaeus*) will only be controlled when the weed cover in higher quality areas of the Reserve has been significantly reduced.
- Slashing along the perimeter of the zone adjacent to the fence-line will likely continue for fire prevention purposes.

Zone 2

Assets:

- Scattered Silver Bundy (*Eucalyptus nortonii*) trees with an understorey of Prickly Needlewood (*Hakea decurrens*), Golden Wattle (*Acacia pycnantha*), Drooping Cassinia (*Cassinia arcuate*) and Inland Wirilda (*Acacia provincialis*).
- There is a high cover of bare rock and bryophyte cover whilst the ground flora includes scattered Wallaby-grass *Rytidosperma subpp.* with a sparse cover of herbs.

Threats:

- Localised infestations of Cootamundra Wattle (**Acacia baileyana*), Willow-leaf Hakea (**Hakea salicifolia*) and Gorse (**Ulex europaeus*).

Management priorities:

- Non-indigenous native woody species should be controlled in the next one to two years.
- Species enrichment plantings of woody understorey species should be considered while Gorse (**Ulex europaeus*) could be targeted once the weed cover in higher quality areas of the Reserve has been significantly reduced.
- Slashing along the perimeter of the zone adjacent to the fence-line will likely continue for fire prevention purposes.

Zone 3

Assets:

- Relatively large Yellow Box (*Eucalyptus melliodora*) and Yellow Gum (*Eucalyptus leucoxylon* ssp. *pruinosa*) trees with some areas supporting a native grassy groundflora dominated by Wallaby-grass (*Rytidosperma* spp).
- Scattered native shrubs including Golden Wattle (*Acacia pycnantha*), Drooping Cassinia (*Cassinia arcuata*) and Inland Wirilda (*Acacia provincialis*).

Threats:

- A variety of woody and climbing weeds including Gorse (*Ulex europaeus*), Oleander (*Nerium oleander*), Nepal Firethorn (*Pyracantha crenulata*), Sallow Wattle (*Acacia longifolia*), Cootamundra Wattle (*Acacia baileyana*), Bridal Creeper (*Asparagus asparagoides*) and Grey Cotoneaster (*Cotoneaster franchetii*).
- This zone may also be targeted for rubbish dumping due to its close proximity to Honeycomb Road.

Management priorities:

- This zone is near the entrance to the Reserve and it would be ideal to improve its condition and appearance to raise the Reserve profile for visitors.
- Control of high threat weeds should be undertaken over the next one to two years while species enrichment plantings of woody understorey species could be considered.
- Slashing along the perimeter of the zone adjacent to the fence-line will likely occur for fire prevention purposes.

Zone 4

Assets:

- Relatively high cover of Wallaby-grass (*Rytidosperma* spp), Spear-grass (*Austrostipa* spp.) and bryophytes but few herbs.
- Scattered, mostly planted shrubs include Wedge-leaf Hop-bush (*Dodonaea viscosa*), Golden Wattle (*Acacia pycnantha*), Inland Wirilda (*Acacia provincialis*), Rough Wattle (*Acacia aspera*) and Drooping Cassinia (*Cassinia arcuata*).

Threats:

- Low cover of Gorse (*Ulex europaeus*) and Toowoomba Canary-grass (*Phalaris aquatica*).
- This zone may also be targeted for rubbish dumping due to its close proximity to Honeycomb Road.

Management priorities:

- Zone 4 is in relatively good condition but should be a priority for maintenance due to its location at the entrance to the Reserve.
- Some further species enrichment planting into the grassy ground flora could be considered to create a feature for visitors, including plantings of locally indigenous flowering herbs such as Sticky Everlasting (*Xerochrysum viscosum*), Magenta Stork's-bill (*Pelargonium rodneyanum*), Common Rice-flower (*Pimelea humilis*), Blue Bells (*Wahlenbergia* spp.) and Black-anther Flax-lily (*Dianella admixta*).

Zone 5

Assets:

- One of the larger patches of Silver Bundy (*Eucalyptus nortonii*) dominated forest within the Reserve with a mostly shrubby understorey comprised of Golden Wattle (*Acacia pycnantha*), Rough Wattle (*Acacia aspera*), Prickly Needlewood (*Hakea decurrens*), Drooping Cassinia (*Cassinia arcuata*) and Inland Wirilda (*Acacia provincialis*).
- The zone includes some open areas with a good groundcover of Wallaby-grass (*Rytidosperma* spp.) and bryophytes. Some planting of indigenous understorey shrubs has occurred in the past.
- The proposed walking circuit passes through this zone.

Threats:

- Scattered Gorse (**Ulex europaeus*) and other woody weeds.
- A large Giant Honey-myrtle (**Melaleuca armillaris*) was frilled and poisoned earlier in 2015.

Management priorities:

- Management within this zone is a relatively low priority for the next five years, however Gorse (**Ulex europaeus*) should be sprayed when resources permit.
- Control of other woody weeds requires follow up over the next few years.
- The proposed walking circuit requires occasional trimming of over-hanging vegetation.

Zone 6

Assets:

- Forest dominated by Silver Bundy (*Eucalyptus nortonii*) with an understorey of Drooping Cassinia (*Cassinia arcuata*), Cherry Ballart (*Exocarpos cupressiformis*) and occasional Hedge Wattle (*Acacia paradoxa*).
- Some areas are relatively open with a high cover of native bryophytes and indigenous herbs including Sun-orchids (*Thelymitra* spp.), Wax-lips (*Glossodia major*), Trailing Speedwell (*Veronica plebeia*), Black-anther Flax-lily (*Dianella admixta*) and Variable Crane's-bill (*Geranium* sp. 2).
- The connecting walking trail into the Newstead Gravel Reserve runs through this zone.

Threats:

- Relatively high cover of Gorse (**Ulex europaeus*).

Management priorities:

- Management within Zone 6 should be a priority to maintain the herbaceous ground-layer component and create a buffer around Newstead Gravel Reserve.
- Gorse (**Ulex europaeus*) plants should be controlled in the next 1-2 years.
- Occasional trimming of over-hanging vegetation is required along the proposed connecting trail that leads into the Newstead Gravel Reserve.

Zone 7

Assets:

- Although mostly highly modified, the zone includes two dams that are habitat for a small range of bird and frog species as well as scattered Yellow Box (*Eucalyptus melliodora*), Silver Bundy (*Eucalyptus nortonii*), Prickly Needlewood (*Hakea decurrens*), Golden Wattle *Acacia pycnantha*, Black Wattle *Acacia mearnsii* and Silver Wattle (*Acacia dealbata*) (the latter two restricted to the gully).
- The ground layer is a combination of native grasses, bare ground, bryophytes and grassy weeds. Black Wallabies (*Wallabia bicolor*) frequents this zone due to the thick cover of vegetation.

Threats:

- High cover of Gorse (**Ulex europaeus*) and other woody weeds scattered throughout such as Sallow Wattle (**Acacia longifolia*).

Management priorities:

- Working from the principle of managing the best areas first, this zone is a low priority for management over the next five years.
- Restoring the canopy to the zone would be ideal in future to increase habitat connectivity across the Reserve. This could be achieved by revegetating a series of scattered stepping stones or islands through the zone, by controlling Gorse (**Ulex europaeus*) in limited areas and planting with native trees and shrubs.
- Control of Gorse (**Ulex europaeus*) is only likely to be effective in the long-term if the ground is burnt to stimulate the seed bank.
- Gorse (**Ulex europaeus*) should also be cleared around the uncommon (on the Reserve) wattles and other vulnerable vegetation assets in the gully line to protect them from potential future herbicide drift and/or fire.

Zone 8

Assets:

- Relatively open area of woodland with some large patches of native grass.
- The zone contains one of the only known populations of Common Rice-flower (*Pimelea humilis*) in the Reserve (also in Zone 10) as well as some relatively large Yellow Box (*Eucalyptus melliodora*) and River Red Gum (*Eucalyptus camaldulensis*) trees.
- Some areas have been revegetated in the past using Tree Banksia (*Banksia marginata*) (tree form), Prickly Needlewood (*Hakea decurrens*), Golden Wattle (*Acacia pycnantha*), Drooping Cassinia (*Cassinia arcuata*), Black Wattle (*Acacia mearnsii*), Wedge-leaf Hop-bush (*Dodonaea viscosa*) and Inland Wirilda (*Acacia provincialis*).
- The walking/cycling trail linking to the Campbells Creek Primary Trail passes through the zone.

Threats:

- Some patches of Gorse (**Ulex europaeus*) (predominately in eastern section), scattered St John's Wort (**Hypericum perforatum*) and some large patches of Toowoomba Canary-grass (**Phalaris aquatica*).
- The quality and integrity of the vegetation has been reduced over recent years by several local residents along Scott Court dumping green waste, burning off and driving through the site.

Management priorities:

- The majority of this zone (section between the trail and the housing to the south) will be maintained as a fire fuel break. Existing vegetation in this area will remain but on advice from the CFA and Cheal (appendices 2 and 3) regular mowing and/or slashing will occur.
- Further weed control should be considered to control Gorse (**Ulex europaeus*), St John's Wort (**Hypericum perforatum*) and Toowoomba Canary-grass (**Phalaris aquatica*) a priority.
- Supporting and working with the local landowners to prevent further dumping and burning off of green garden waste is integral to the management of this area.

Zone 9

Assets:

- The only substantial patch of vegetation dominated by Grey Box (*Eucalyptus microcarpa*) within the Reserve with an open understorey comprised of scattered Drooping Cassinia (*Cassinia arcuata*), Golden Wattle (*Acacia pycnantha*), Cherry Ballart (*Exocarpos cupressiformis*) and Gold-dust Wattle (*Acacia acinacea*).
- The ground layer is mostly comprised of leaf litter, bryophytes, scattered Wallaby-grass (*Rytidosperma* spp.) and small herbs.
- Several plants of the regionally uncommon Cut-leaf Goodenia (*Goodenia pinnatifida*) occur within the zone.

Threats:

- Several Gorse (**Ulex europaeus*) and Wheel Cactus (**Opuntia robusta*) plants and an infestation of Bridal Creeper (**Asparagus asparagoides*) containing several hundred plants.
- This zone is part of the main area affected by rubbish blowing into the Reserve from the adjacent landfill.
- A swale has been cut through the zone by the landfill operators with the aim of improving drainage. However this appears to be ineffectual and needs to be improved to avoid erosion.

Management priorities:

- The Bridal Creeper (**Asparagus asparagoides*) infestation should be controlled in the next one to two years.
- The Gorse (**Ulex europaeus*) and Wheel Cactus are also a high priority.
- The landfill operators should undertake occasional clean-up of any rubbish that blows into the zone.
- They should also partially refill the swale to promote regeneration of the ground flora and prevent gully erosion worsening in this area. They could repair the damage caused by constructing the 'drain' by replacing the removed earth in a way that diverts water out of the eroding drain-line.

Zone 10

Assets:

- The largest patch of Silver Bundy (*Eucalyptus nortonii*) dominated forest within the Reserve with a variously shrubby to open understorey of Drooping Cassinia (*Cassinia arcuata*), Golden Wattle (*Acacia pycnantha*), Gold-dust Wattle (*Acacia acinacea*), Prickly Needlewood (*Hakea decurrens*) and Cherry Ballart (*Exocarpos cupressiformis*).
- The ground layer includes Wallaby-grass (*Rytidosperma* spp.) and Spear-grass (*Austrostipa* spp.) with scattered herbs such as Cut-leaf Goodenia (*Goodenia pinnatifida*), Common Rice-flower (*Pimelea humilis*), Cranberry Heath (*Astroloma humifusum*), Sheep's Burr (*Acaena echinata*), Scented Sundew (*Drosera aberrans*), Wattle Mat-rush (*Lomandra filiformis* ssp. *coriacea*) and Common Raspwort (*Gonocarpus tetragynus*).
- A small moss soak supports a population of the locally rare Plain Quillwort (*Isoetes drummondii*) as well as Moss Sunray (*Hyalosperma demissum*).
- The zone contains two historic mine shafts.

Threats:

- Scattered patches of Gorse (*Ulex europaeus*), several hundred plants of Bridal Creeper (*Asparagus asparagoides*) and scattered Boneseed (*Chrysanthemoides monillifera*) and small Blackberry (*Rubus anglocandicans*).

Management priorities:

- This zone is a priority for management due to the presence of relatively intact ground flora supporting several significant plant species.
- Bridal Creeper (*Asparagus asparagoides*) should be controlled in the next 1-2 years and woody weeds controlled as soon as resources permit.

Zone 11

Assets:

- Remnant grassy woodland vegetation dominated by Yellow Box (*Eucalyptus melliodora*).
- The understorey is relatively disturbed and is dominated by Drooping Cassinia (*Cassinia arcuata*) with occasional Cherry Ballart (*Exocarpos cupressiformis*) and Golden Wattle *Acacia pycnantha*.
- The zone includes some open grassy areas dominated by Wallaby-grass (*Rytidosperma* spp.), Spear-grass (*Austrostipa* spp.) and Mat-grass (*Hemarthria uncinata*).

Threats:

- Until recently the zone had a relatively high cover of Gorse (*Ulex europaeus*) but this was sprayed early in 2015.
- Also scattered Sallow Wattle (*Acacia longifolia*) and small immature Blackberry (*Rubus anglocandicans*).

Management priorities:

- Woody weeds should be controlled in the next 1-2 years while the Gorse (**Ulex europaeus*) will require follow up management.
- Ideally the zone should be burnt at some stage to recruit the long-lived seed bank, allowing more effective control.

Zone 12

Assets:

- Large patch of River Red Gum (*Eucalyptus camaldulensis*) with a groundflora that is patchy in cover but includes some good areas of Wallaby-grass (*Rytidosperma* spp.), Kangaroo Grass (*Themeda triandra*), Spear-grass (*Austrostipa* spp.) and Brown's Love-grass (*Eragrostis brownii*).
- The zone contains at least three historic mine shafts.

Threats:

- The zone previously had a very high cover of Gorse (**Ulex europaeus*) which has now been sprayed, however a substantial seed bank will still be present.
- Also several hundred plants of Bridal Creeper (**Asparagus asparagoides*), Toowoomba Canary-grass (**Phalaris aquatica*) and scattered Blackberry (**Rubus anglocandicans*).

Management priorities:

- This zone should be a priority for management to follow-up previous weed control work and to create a buffer for the public land with the Campbells Creek floodplain to the immediate east.
- The Gorse (**Ulex europaeus*) infestation is likely to require ongoing follow-up management.
- Ideally, the zone should be subject to a planned burn to stimulate the Gorse (**Ulex europaeus*) seed bank, allowing effective control. Otherwise, control of germinants will be required for decades.
- Bridal Creeper (**Asparagus asparagoides*) and Toowoomba Canary-grass (**Phalaris aquatica*) also require control programs.
- Species enrichment plantings should be undertaken to replace the gaps created by Gorse (**Ulex europaeus*) removal including plantings of locally indigenous shrubs such as Silver Wattle (*Acacia dealbata*), Blackwood (*Acacia melanoxylon*), Black Wattle (*Acacia mearnsii*) and Inland Wirilda (*Acacia provincialis*).

Zone 13

Assets:

- Disturbed remnants of grassy woodland dominated by River Red Gum (*Eucalyptus camaldulensis*), Yellow Box (*Eucalyptus melliodora*) and Grey Box (*Eucalyptus microcarpa*) with an understorey dominated by Drooping Cassinia (*Cassinia arcuata*) with occasional Golden Wattle (*Acacia pycnantha*), Prickly Needlewood (*Hakea decurrens*) and Cherry Ballart (*Exocarpos cupressiformis*).
- The ground layer includes some areas with a good cover of native grasses and bryophytes interspersed with areas dominated by grassy weeds.
- The zone contains the remains of a house site and garden believed to be from the mid 1900's (Bannear 2009).

Threats:

- Scattered Gorse (*Ulex europaeus*) (sprayed in early 2015) several plants of Wheel Cactus (*Opuntia robusta*) and an infestation of Bridal Creeper (*Asparagus asparagoides*) comprising several hundred plants.
- The zone is part of the main area affected by rubbish blowing into the Reserve from the adjacent landfill.
- A swale has been cut through the zone by the landfill operators with the aim of improving drainage however this is pointless and ineffectual.

Management priorities:

- The Bridal Creeper (*Asparagus asparagoides*) infestation should be controlled in the next one to two years while the Gorse (*Ulex europaeus*) and Wheel Cactus (*Opuntia robusta*) are also a high priority.
- Ideally, the zone should be subject to a planned burn when feasible to stimulate the Gorse (*Ulex europaeus*) seed bank, allowing effective control.
- The landfill operators should undertake occasional clean-up of any rubbish that blows into the zone.
- They landfill operators could repair the damage caused by constructing the 'drain' by replacing the removed earth in a way that diverts water out of the eroding drain-line.

Zone 14

Assets:

- The most intact area of River Red Gum (*Eucalyptus camaldulensis*) grassy woodland within the Reserve.
- Dominated by River Red Gum (*Eucalyptus camaldulensis*) and occasional Grey Box (*Eucalyptus microcarpa*) over a grassy understorey dominated by Kangaroo Grass (*Themeda triandra*), Wallaby-grass (*Rytidosperma* spp.), Wheat-grass (*Anthosachne scaber*) and Spear-grass (*Austrostipa* spp.).
- Native ground flora include Common Bog-sedge (*Schoenus apogon*), Sun-orchids (*Thelymitra* sp.), Sheep's Burr (*Acaena echinata*), Trailing Speedwell (*Veronica plebeia*), Cranberry Heath (*Astroloma humifusa*), Curved Rice-flower (*Pimelea curviflora*), Wattle Mat-rush (*Lomandra filiformis* ssp. *coriacea*), Stinking Pennywort (*Hydrocotyle laxiflora*) and Tall Sundew (*Drosera auriculata*). Scattered shrubs include Drooping Cassinia (*Cassinia arcuata*), Golden Wattle (*Acacia pycnantha*) and Prickly Needlewood (*Hakea decurrens*).
- The proposed walking circuit runs along the southern boundary of the zone.
- The zone contains at least one historic mine shaft.

Threats:

- Relatively high cover of Gorse (**Ulex europaeus*) (sprayed in early 2015)
- Some large patches of Blackberry (**Rubus anglocandicans*) (sprayed in early 2015) and several hundred plants of Bridal Creeper (**Asparagus asparagoides*).

Management priorities:

- This zone is a priority for management as it contains the best areas of grassy woodland within the Reserve.
- Management within the zone would also improve the visual appeal of the walking circuit.
- The Bridal Creeper (**Asparagus asparagoides*) infestation should be controlled in the next one to two years.
- Ideally, the zone should be subject to a planned burn when feasible to stimulate the Gorse (**Ulex europaeus*) seed bank, allowing effective control.
- The walking trail will require occasional trimming of over-hanging vegetation.
- Planting of locally indigenous herbs into the grassy woodland should be considered to increase diversity.

Zone 15

Assets:

- Large stand of River Red Gum (*Eucalyptus camaldulensis*) and occasional Grey Box (*Eucalyptus microcarpa*), including one large old tree.
- The ground layer includes a complex of areas dominated by grassy weeds interspersed with areas supporting Wallaby-grass (*Rytidosperma* spp.), Spear-grass (*Austrostipa* spp.), the locally rare Short-stem Sedge (*Carex breviculmis*) and herbs such as Stinking Pennywort (*Hydrocotyle laxiflora*), Sprawling Bluebell (*Wahlenbergia gracilis*) and Slender Dock (*Rumex brownii*).
- The zone contains at least two historic mine shafts.

Threats:

- The zone previously had a high cover of Gorse (**Ulex europaeus*) which has now been sprayed, however a substantial seed bank will still be present.
- The zone also has a large infestation of Bridal Creeper (**Asparagus asparagoides*) comprising over several hundred plants and occasional small Blackberry (**Rubus anglocandicans*) plants.

Management priorities:

- Similar to Zone 12 to the south, this zone should be a priority for management to follow-up previous weed control work and to create a buffer for the Campbells Creek public land to the immediate east.
- The Gorse (**Ulex europaeus*) infestation is likely to require ongoing follow-up management.
- Ideally, the zone should be subject to a planned burn to stimulate the Gorse (**Ulex europaeus*) seed bank, allowing effective control. Otherwise, control of seedling germination will be required for decades.
- Bridal Creeper (**Asparagus asparagoides*) and Toowoomba Canary-grass (**Phalaris aquatica*) also require control programs.
- Species enrichment plantings should be undertaken to replace the gaps created by Gorse (**Ulex europaeus*) removal including plantings of locally indigenous shrubs such as Silver Wattle (*Acacia dealbata*), Blackwood (*Acacia melanoxylon*), Black Wattle (*Acacia mearnsii*) and Inland Wirilda (*Acacia provincialis*).

Zone 16

Assets:

- Mostly cleared and highly modified but supporting some patches of native grass and scattered Drooping Cassinia (*Cassinia arcuata*).

Threats:

- High weed cover including exotic grasses and target species such as Gorse (*Ulex europaeus*), Blackberry (*Rubus anglocandicans*) (sprayed in early 2015), Toowoomba Canary-grass (*Phalaris aquatica*) and Spiny Rush (*Juncus acutus*) along the gully.

Management priorities:

- Most of this zone is possibly owned and managed by Coliban Water, however this requires confirmation.
- The zone would be ideally suited for revegetation of trees and shrubs, but no work should commence until the land tenure is confirmed.

Zone 17

Assets:

- Although previously disturbed and containing no mature canopy, the zone has a relatively good cover of regenerating trees and shrubs including Golden Wattle (*Acacia pycnantha*), Gold-dust Wattle (*Acacia acinacea*), Red Box (*Eucalyptus polyanthemos*), Yellow Box (*Eucalyptus melliodora*), Silver Bundy (*Eucalyptus nortonii*), Drooping Cassinia (*Cassinia arcuata*) and Prickly Needlewood (*Hakea decurrens*).
- The ground flora includes scattered Wallaby-grass (*Rytidosperma* spp.), Cut-leaf Goodenia (*Goodenia pinnatifida*), Cranberry Heath (*Astroloma humifusa*) and a high cover of bare rock and bryophytes.

Threats:

- Scattered Gorse (*Ulex europaeus*).
- This zone is part of the main area affected by rubbish blowing into the Reserve from the adjacent landfill.

Management priorities:

- The Gorse (*Ulex europaeus*) should be controlled as soon as resources permit.
- The landfill operators should undertake occasional clean-up of any rubbish that blows into the zone.

Appendix 2

FIRE MANAGEMENT ADVICE
David Cheal

Honeycomb Bushland Reserve

15th February 2016

COMMENT ON WILDFIRE AND PLANNED FIRE MANAGEMENT

prepared for

Mount Alexander Shire Council

by

**(Assoc. Adj. Prof.) David Cheal Centre For
Environmental Management Federation
University**



SUMMARY RECOMMENDATIONS

- I. A perimeter firebreak be constructed and maintained where Honeycomb Bushland Reserve abuts housing.
- II. Localized planned burning be implemented as part of the control program for dense Gorse.
- III. Dead bushes resulting from Gorse control be removed or compacted *in situ*.
- IV. Broad-acre planned burning is not recommended as a strategy to reduce the currently low likelihood of wildfires in the Reserve.
- V. Vegetation maturation should be encouraged.
- VI. Consideration be given to reducing the extensive (informal) track network, in order to reduce access for arsonists and to discourage non-conforming uses that increase fire risk (e.g. motorised trail bike use on fire danger days).

OVERARCHING CONSIDERATIONS

1. **FIRE MANAGEMENT GIVENS** – There are no guarantees in fire management and protection. It is possible (indeed, it is commendable) to reduce the likelihood of loss and damage in and from wildfires, but there are no 100% guarantees. There remains a finite possibility (not a probability) that the most well-protected home will be destroyed in fire, while nearby residents, who may have given no attention to fire safety, may survive intact. We can change the probabilities, reduce the likelihood, of a house being taken by wildfire and this reduction in risk can be substantial. But there are no iron-clad guarantees.
2. **FIRE MANAGEMENT** – Fire management is part of Reserve management. Plant and animal species, and habitat/vegetation management, may all require consideration of fire as a useful management tool. Fire management may have a role in weed control, in habitat development and in wise species management. Wildfire is a possible intrusion into planned habitat management. Escapes from planned burns are not common, but they happen. The likelihood of these fires must not be ignored.
3. **IGNITION LIKELIHOOD** – Fires cannot start without ignition. In remote landscapes, ignition by lightning is a significant risk, particularly as it's often very difficult to detect first ignition and even more difficult to safely access the ignition site(s) for immediate suppression. In near-urban bushland the principal ignition sources are, probably in order, (a) arson, (b) carelessness on-site, (3) escape from nearby residences and (d) escape from planned burning. Honeycomb Bushland Reserve is a near-urban bushland.
4. **FUEL LOADS** – Fires require fuel to burn. Without suitable fuel, fires cannot burn. The 'fuel load' in the event of a wildfire or a planned burn is dependent on a number of fuel characteristics, notably including aeration, fuel moisture levels, homogeneity across the site (whether fuel is continuously distributed or there are substantial fuel breaks) and overall fuel quantity. There is a further consideration in fuel 'quality', which includes whether the likely fuel contains particularly flammable chemicals, such as eucalypt oils. Of itself, fuel quantity is a very poor indicator of the suitability of the local fuel to support a wildfire or a planned fire.

5. **FUEL DEVELOPMENT** – Fuel reduction (planned burns) immediately reduce fuel quantities. However, the period of useful fuel reduction may be very short (dependent on fuel types, regrowth rates & other features). Hence applying a ‘fuel reduction’ planned burn may also impel inception of a long-term plan of repeated intervention (usually repeated planned burns). This may be necessary to deal with the likelihood of regrowth soon becoming more flammable than the original pre-burn bushland and more flammable than mature, long-unburnt bushland.
6. **RESPONSIBILITY TO MINIMISE LOSSES** – The responsibility to minimise the likelihood of losses and the size of those losses lies jointly with the land management agency of the bushland Reserve, the adjoining landowners and the Reserve users. Responsibility does not lie solely with the Reserve managers. Adjoining landowners gain significant benefits from living adjacent to the Reserve. Indeed, this proximity is often a major part of the reason why the adjoining landowners chose to live in this locality. Adjoining landowners do not have sole responsibility for fire protection of their properties, but they retain some responsibility to minimise the likelihood of losses due to fires. Similarly, the Reserve managers retain some responsibility to minimise the likelihood of fires starting in the Reserve spreading to adjoining properties, and to minimise the likelihood that fires on adjoining properties may spread into the Reserve.

FIRE AND WEEDS

1. **FIRE REGROWTH** – There are many impacts from fires. One of the most notable post-fire effects on the natural environment is ‘ash fertilization’. Many plants grow vigorously in the relatively benign conditions of the first season after fire (whether planned for or a wildfire). This is due to a number of changed environmental conditions, notably including more moisture in the soil, more sunlight at ground level (where seeds germinate) and a nutrient flush from the ash. As a result, many weeds experience particularly lush growth straight after fires (weeds are ‘pre-adapted’ to grow vigorously when nutrients and water are not limiting; that’s why they’re weeds). Post-fire regrowth is likely to soon eventuate in a flush of fuel, which rapidly cures at the onset of dry summer conditions.
2. **GORSE CONTROL** – Just (2015) recommended that Gorse (*Ulex europaeus*) be managed as the most significant weed species present in Honeycomb Bushland Reserve. His recommendation is supported. Gorse is pervasive throughout most of the Reserve, and thrives in the soil disturbance associated with past gold-mining (as at Honeycomb Bushland Reserve). It regenerates well, even without fires, but is particularly prone to regenerating en masse post-fire. It has recalcitrant seed (requires some special environmental cue to trigger germination). With Gorse that environmental cue is often the heat associated with a fire.

Just’s (2015) recommendation to concentrate weed control efforts on Gorse is supported, working from the least-infested areas towards the most-infested areas. The most cost-effective and comprehensive approach to Gorse control includes the use of glyphosate or similar herbicides. Herbicide spraying, as has happened in the recent past, successfully kills large, mature Gorse bushes. However, there are two contingent issues –

- i. The dead Gorse bushes soon develop into a significant fire hazard, something that may prove attractive to arsonists. They are an on-going fire hazard and will persist in this dangerous condition for 2-4 years (depending on local rainfall). After this 2-4 years, the collapse and break down of the dead material will reduce the fire hazard, by reducing the fuel quantity and compacting what's left (this reducing fuel aeration). The dead bushes may be physically removed. If this proves impractical, compaction by laying thick boards over the dead bushes and applying (foot) pressure onto the boards will reduce the fuel hazard in the interim.
- ii. Burning mature Gorse bushes, whether alive or dead, will produce mass seedling regeneration from soil-stored seed. Seed retains its viability in the soil for an extended period (a number of decades). But these two troublesome features of Gorse biology enable an attack strategy, based on an initial fire to burn live (or dead) standing Gorse, followed, in the first post-fire season, by herbicide attack on the regenerating seedlings. It's likely that a single such attack will not eliminate Gorse, but it will dramatically decrease the Gorse infestation and decrease the store of seed in the soil. Subsequent, follow-up, as required, should dramatically reduce not just the Gorse presence and impacts, but also future control costs.

FIRE AND NATIVE BUSHLAND

1. **CURRENT VEGETATION** – The current native vegetation is a disturbed version of Ironbark-Box Ecological Vegetation Division no. 24 (see Cheal 2010, pp.173-177). The recommended Minimum Tolerable Fire Intervals for this vegetation community are 30 years (for high intensity fires, most wildfires) and 12 years (for low intensity fires, mostly planned fires) (ibid.). The Maximum Tolerable Fire Interval is recommended as 150 years plus, i.e. the maximum that could be set during that process. This latter figure means that the vegetation has no ecological requirement for fire. Fire is not required to prevent the vegetation from changing into another vegetation community type and is not required for persistence of the component plant species. Even noted fire-responsive species, such as Golden Wattle *Acacia pycnantha* are able to maintain their presence in the community by the occasional successful establishment of seedlings in gaps and disturbed patches in unburnt forest.

Furthermore, the Minimum Tolerable Fire Intervals are the recommended intervals that should apply for vegetation recovery after high and low intensity fires. Fires more frequent than these figures will likely degrade the vegetation, by locally eliminating species or by removing important habitat features.

2. **VEGETATION MATURATION** – Ironbark-box is not notably prone to high intensity (wild) fires. High intensity wildfires are described as “ ... neither common nor likely in Ironbark / Box, but they are possible, particularly following a run of years of relatively high rainfall, including rain extending into the normally dry summer” (ibid., p. 173). Mature Ironbark / Box is not notably prone to wildfires. Intermediate-aged stands of Ironbark / Box are more prone to wildfires, but are still not the higher fire risk seen in coastal heathland, mallee scrub, grasslands or the forests of the Ranges south and east of the Bendigo region. Forest maturation should be encouraged as a way or further reducing the (currently low) fire risk.

Long-term prospects are for forest maturation leading to vegetation that is less fire-prone than currently in Honeycomb Bushland Reserve, particularly if Just's (2015) recommendations regarding vegetation restoration by (lost) species in-planting are followed.

FIRE AND ADJOINING PROPERTIES

- 1. THREAT TO PRIVATE PROPERTY** – The current native vegetation poses only a small threat to adjoining properties, but that threat can be reduced further by instituting and maintaining a fuel break at the edge of Honeycomb Bushland Reserve, where it abuts housing. Maintenance of such a fire (fuel) break will also reduce the likelihood of fires burning into the Reserve from these adjoining properties.

The species of trees that occur in the Reserve are not a major risk in fire spread. Grey Box (*Eucalyptus microcarpa*), Yellow Box (*Eucalyptus melliodora*), Yellow Gum (*Eucalyptus leucoxylon*) and River Red Gum (*Eucalyptus camaldulensis*) do not characteristically produce long ribbons of kindling bark (and are thus not prone to cause long distance spotting, ahead of any fire front). Furthermore, their bark types are not conducive of carrying the ground fire into the canopies and those canopies are mostly too far apart to support a (purely) crown fire¹. Then main threat for wildfires comes from a dense, cured ground layer of seasonal herbs and a dense shrub layer of fire prone species. As such, an effective fuel break can include occasional large trees.

A perimeter fire break, where the Reserve abuts private housing, would greatly reduce the likelihood of fires burning from the Reserve into the housing and fires burning from the housing into the Reserve. This break should be 20 (-30) metres wide and consist of a regularly mown strip under the existing trees. All shrubs should be removed from this break, for maximum effectiveness and there must be a solid commitment for regular mowing, as required by seasonal conditions (which may vary from year to year). Council should consider permitting adjoining landholders to maintain this mowing régime, after the break has been constructed by Council (or contract) staff.

- 2. BROADSCALE PLANNED BURNING** – Recent research has demonstrated that landscape burning, remote from infrastructure, has little effect on the likelihood of loss of that infrastructure (Gibbons *et al.* 2012). The low likelihood of wildfires in Honeycomb Bushland Reserve and the likely low intensity of any wildfires suggest that broad-acre planned burning is neither necessary nor desirable within the Reserve (except over constrained areas as a focus for weed control, specifically Gorse).

¹ crown fires occur when the fire conditions are suitable (fire risk is assessed as severe or higher and the tree crowns are close enough to propagate the fire from crown to crown to crown).

REFERENCES

Cheal, D. C. (2010) *Growth stages and tolerable fire intervals for Victoria's native vegetation data sets* Pub. Department of Sustainability and Environment, East Melbourne, Victoria

Just, K. (2015) *Honeycomb Bushland Reserve Environmental Management Plan* Report to Mount Alexander Shire, Castlemaine

Gibbons, P., van Bommel, L., Gill, A. M., Cary, G. J., Driscoll, D. A., Bradstock, R. A., Knight, E., Moritz, M. A., Stephens, S L. and Lindenmayer, D. B. (2012) *Land Management Practices Associated with House Loss in Wildfires* PLoS ONE Volume, DOI: e29212.doi:10.1371/journal.pone.0029212

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Ecologist with broad experience across a range of Australian landscapes. Particular interests in fire ecology and endangered species management.

23 February 2016

Luke Ryan
Municipal Fire Prevention Officer
Mount Alexander Shire Council
PO Box 185
Castlemaine Vic 3450
TRIM Ref # D16/13608

Dear Luke

Honeycomb Reserve – Campbell's Creek

I refer to the site inspection on the 9th February during which an assessment of the vegetation and fire risk was undertaken.

Site Description:

The reserve adjoins the northern end of Honeycomb Road, and the rear boundaries of residential properties that face onto Scott Court abut the southern section of the reserve. To the north and west the reserve is contiguous with the Castlemaine landfill site and the sewerage treatment works.

A ridgeline bisects the site in an east west direction with the southerly aspect dropping into a slight gully before the ground rises toward the residential area. This part of the reserve has been slashed to create a fuel reduced fire break and open space around the walking track.

Vegetation within the reserve is predominantly red box (*Eucalyptus polyanthemos*) with an understorey of Chinese Tea-scrub (*Cassinia aculeate*). This elevated fuel would be a significant factor in fire spread and intensity.

A shared walking/cycling track runs through the reserve from Campbell's Creek past the residential area and joins with the end of Honeycomb Road.

Fire Risk Assessment:

The size and location of the reserve is such that if a fire occurred it would provide a real threat to adjoining residential assets but unlikely to initiate a large bushfire scenario.

An overall fuel hazard assessment of the site reflects a rating of extreme which would, without suppression or continued fuel management impact on the developed residential area to the south. Additionally, the reserve contains an infestation of introduced gorse which will, if subjected to fire, contribute significantly to the intensity and rate of spread.

The track and slashed area, recently widened to approximately 40 metres, provides an appropriate fuel reduced zone limiting the intensity and rate of spread of any fire within the reserve toward the private properties.

The walking/cycling track together with the existing slashed area provides access for fire appliances should a fire occur, enabling direct attack and defence of these properties. Constructed furniture however has been erected against the track which could hinder emergency vehicle easily moving through the reserve for suppression operations.

Future Fire Risk Management

Further assessment of the reserve could be undertaken to investigate the use of planned burning to manage the fuel loads and mitigate the fire risk to adjoining land and assets. This option would however detract from the aesthetic and potential value of the reserve.

Maintaining the established slash break as a fuel reduced area will continue to provide strategic value in mitigating the behaviour of fire, reducing flame height and the rate of spread. Suppression operations under these conditions could enable direct attack for the protection of life and property in the adjoining properties

Yours sincerely

Trent McKinnon
Operations Officer
CFA district 2

Eain McRae
Vegetation Management Officer
CFA North West Region

