



The 100 Acres Reserve Management Plan



Economic and Environmental Planning
November 2010



CONTENTS

1. Introduction	6
1.1. Purpose of Management Plan	6
1.2. Structure of Management Plan	7
2. BACKGROUND	8
2.1. Study Area	8
2.2. Regional Context	8
2.3. Methodology	11
3. VISION and OBJECTIVES for 100 ACRES RESERVE	12
3.1. Vision	12
3.2. Objectives	12
4. RECOMMENDATIONS	13
4.1. Implementation Plan	13
5. PLANNING AND POLICY CONTEXT	34
5.1. Local Studies and Policies	35
6. RESERVE IDENTITY AND CHARACTER	39
7. CULTURAL HERITAGE VALUES	41
8. NATURAL ENVIRONMENT	42
8.1. Flora	42
8.2. Fauna	47
8.3. Pest Plants and Animals	50
8.4. Other Influences	51
9. FIRE MANAGEMENT	52
9.1. Relevant Legislation, Policy and Plans	52
9.2. Current Management	53
9.3. Fire Management Works	53
9.4. Risk Analysis	54
9.5. Exposure and Vulnerability	56
10. VISITOR EXPERIENCES AND RECREATION OPPORTUNITIES	59
10.1. Community Survey (2008)	59
10.2. Themes and Issues	60
10.3. Further consultation	61
10.4. Walking and Nature Appreciation Opportunities	61
10.5. Dog Walking	62
10.6. Horse Riding Access	64
10.7. Cycling	65
11. INFRASTRUCTURE AND FACILITIES Path Network	66
11.1. Path Network	66
11.2. Future Link to Yanggai Barring Linear Park	67
11.3. Boardwalks/Crossing Points	67
11.4. Roads within the 100 Acres Reserve	67
11.5. Signage/Interpretation	67
11.6. Seating	67
11.7. Fencing	68
11.8. Car Parking	68
11.9. Public Toilets	68
12. COMMUNITY AWARENESS AND INVOLVEMENT	69
13. Management	70
13.1. Monitoring, Co-ordination and Review	70
14. REFERENCES	71

EXECUTIVE SUMMARY

The 100 Acres Reserve Management Plan has been prepared to continue to protect and enhance the biodiversity and conservation values of the reserve balanced with the provision of recreational opportunities and experiences in a natural setting, including, walking, jogging, dog walking, horse riding and nature appreciation.

The 100 Acres Reserve is located 21 kilometres from Melbourne in the east of the municipality of Manningham in the suburb of Park Orchards. The Reserve is 41 hectares in area. The Study Area comprises the 100 Acres and two other minor land areas including Wirth Road and a small section of the adjacent Domeney Reserve comprising an interpretation facility which serves as the major entrance point to the 100 Acres.

The Management Plan outlines recommendations for the future use, development, management and maintenance for the reserve based on a detailed analysis of the study area and feedback from user groups and the local community. The Management Plan provides the basis for new capital works funding to improve the Reserve over the next five to ten years.

The 100 Acres Reserve is classified in Manningham's *Public Open Space Strategy (2004)* as a Conservation Reserve of Regional Significance. It has been identified as being of State Significance in the *Manningham Biosites Sites of (Biological) Significance Review*. It is also listed on the Register of the National Estate and contains vegetation that is rarely rivaled in the Melbourne Region, even in National Parks.

Several key studies of the 100 Acres Reserve were undertaken to inform the Management Plan and included:

- *The 100 Acres Ecological Assessment (2009)* which provided a description and assessment of the vegetation regime, the conservation significance, flora and fauna and habitat management;
- *The 100 Acres Reserve Bushfire Prevention and Preparedness Plan (2009)* which provided an assessment of the level of wildfire risk and recommendations to mitigate and manage that risk for the protection of the general community, adjoining properties and residences as well as Council buildings, facilities and assets and improve the ecological health of areas of environmental significance.

Extensive community consultation to inform the Management Plan included:

- A community survey of 408 households surrounding the reserve in October 2008;
- On site visits with the Friends of 100 Acres and members of Friends of Manningham Dogs and Cats;
- Public Exhibition of the Draft Management Plan for a six week period in March 2010.
- Circulation of the draft plan to people who responded to the initial questionnaire and key park users groups;
- Advertisement of the public exhibition in the local newspapers and on Council's web site.

Nineteen submissions were received. Key issues raised in the submissions related to proposed dog controls, fire and ecological management and proposed seating within the reserve. Sixteen of the nineteen submissions requested that the perimeter track should be a designated dog off lead area.

A further community survey was undertaken of the same 408 households as those surveyed in October 2008 to gauge local opinion in relation to a proposal to allow dogs off lead on the perimeter path.

In response to the submissions received, including the results of the further survey Council endorsed the final 100 Acres Reserve Management Plan in November 2010. Recommendations of the Management Plan will be implemented through Council's capital works program and other Council processes.

The 100 Acres Reserve Management Plan proposes the following specific improvements to the reserve:

- Continue to improve the biodiversity of the reserve with sustainable environmental management, weed and pest control programs;
- Maintain the existing northern and southern firebreaks to current standard and enhance the Fire Management Zones in specific locations;
- Rationalize path network in accordance with Manningham City Council's Park Design Guide;
- Confine horse riding to the perimeter track of the reserve and along Berringa Road;
- Dog controls:
 - Continue to prohibit walking dogs off lead within the reserve, including the perimeter path;
 - Permit walking dogs on lead on all paths within the reserve except on paths and in areas of high quality and conservation significance located in the north-west of the reserve where dogs will be prohibited; and
- Update / improve interpretation, directional and information signage.

Part One

Management Plan Report

1. INTRODUCTION

The 100 Acres Reserve is Council owned land and located 21 kilometres from Melbourne in the east of the municipality of Manningham in the suburb of Park Orchards. It is bounded by Knees, Berringa and Arundel Roads and Domeney Recreation Reserve. Refer Figure 1 for the location of the study area within Manningham.

The 100 Acres Reserve is classified in Manningham's Public Open Space Strategy (2004) as a Conservation Reserve of Regional Significance. It has been identified as being of State Significance in the Manningham Biosites Sites of (Biological) Significance Review and Council's Heritage Study.

The reserve is managed primarily for biodiversity conservation whilst also providing a range of recreation opportunities in a natural setting, including, walking, jogging, dog walking, horse riding and nature appreciation. Horse riding is confined to a track around the perimeter of the reserve and along Berringa Road

Over the years Council has implemented recommendations of the 100 Acres Reserve Management Plan endorsed by Council in 1996. Improvements to the reserve included a significant increase in weed control particularly groundstorey weeds as well as the formation of the 100 Acres Friends Group. Repair and maintenance activities were carried at one of the existing dams and a retention basin was developed to filter stormwater run-off from Knees Road. Interpretation facilities have been constructed which complement the existing nature trail and include the development of the major entrance to 100 Acres from Domeney Reserve. A smaller interpretation facility has also been constructed at the Arundel Road entrance and new Reserve signs have been installed at strategic locations.

1.1. Purpose of Management Plan

The purpose of the 100 Acres Management Plan is to provide a preferred future vision for the use, development and management of the reserve. It builds on the outcomes of previous planning including the 100 Acres Management Plan (1996) and aims to provide a clear future park vision articulated through objectives, actions, resources and responsibilities and provides the basis for new capital works funding to improve the Reserve over the next five to ten years. The Management Plan will be used as a resource document for Council Officers involved in the planning, development and management of the Reserve.

1.2. Structure of Management Plan

The 100 Acres Management Plan is structured in two parts.

Part One

- Background information;
- Outline of how the Management Plan was developed;
- Vision for the 100 Acres and a set of objectives on how to implement that Vision;
- Recommendations for environmental management, recreational opportunities, fire management, cultural heritage, community involvement, ongoing management, maintenance and monitoring; and
- A capital works program to implement recommendations of the Management Plan.

Part Two

- Outline of planning and policy context;
- Identification and analysis of existing conditions and discussion of issues in relation to the natural environment, cultural values, fire management; and
- Overview of key findings from community consultation.

2. BACKGROUND

2.1. Study Area

The 100 Acres study area is 41 hectares in area. The study area comprises the 100 Acres Reserve and two other minor land areas including Wirth Road Reserve and a small section of the adjacent Domeney Reserve comprising an interpretation facility which serves as the major entrance point to 100 Acres.

100 Acres Reserve is set within a predominantly urban landscape surrounded to the east, north and south by low density housing with Berringa Road as the eastern boundary. Access to the Reserve is from Knees Road, Arundel Road, Berringa Road, Wirth Road, Villanova Court, Iolanthe Close, Yeoman Court and Domeney Reserve.

The 100 Acres Reserve study area is shown in Figure 2.

2.2. Regional Context

100 Acres Reserve is located in the eastern half of the municipality within the Andersons Creek Valley comprising rural landscapes with large rural residential properties, remnant agricultural properties and significant bush blocks in Warrandyte, South Warrandyte, Wonga Park, Park Orchards and Donvale.

The reserve is part of a broader public open space network along the Andersons Creek Corridor which provides opportunities for nature based recreation in natural settings. The continuity of native vegetation from the reserve to Andersons Creek and its eastern branch, immediately east of Wirth Road Reserve links upstream to Yanggai Barring Linear Park in Warrandyte South and to open space linkages along Andersons Creek to Quambee Reserve in Ringwood South in the City of Maroondah.

Open space areas located along the Andersons Creek downstream of 100 Acres include Council owned reserves, Husseys Reserve, Harris Gully Reserve and Warrandyte Reserve, a sporting recreation Reserve, and two areas within the Warrandyte State Park, Harris Gully Reserve and Tarooma Reserve where Andersons Creek joins the Yarra River. The State Park is considered one of the most important natural areas close to Melbourne, forming part of a major habitat corridor extending along the Yarra River and north to Kinglake National Park. There are also two land parcels in this vicinity managed by the Department of Sustainability, which are located over Andersons Creek from Warrandyte Reserve and immediately upstream of the Warrandyte Country Fire Authority.

There are other substantial public open space areas nearby including, Domeney Reserve, a sporting and recreation reserve which is adjacent to 100 Acres, Stintons Reserve in Park Orchards and Colman Reserve in Warrandyte South.

The regional context of the 100 Acres Reserve is shown in Figure 3.

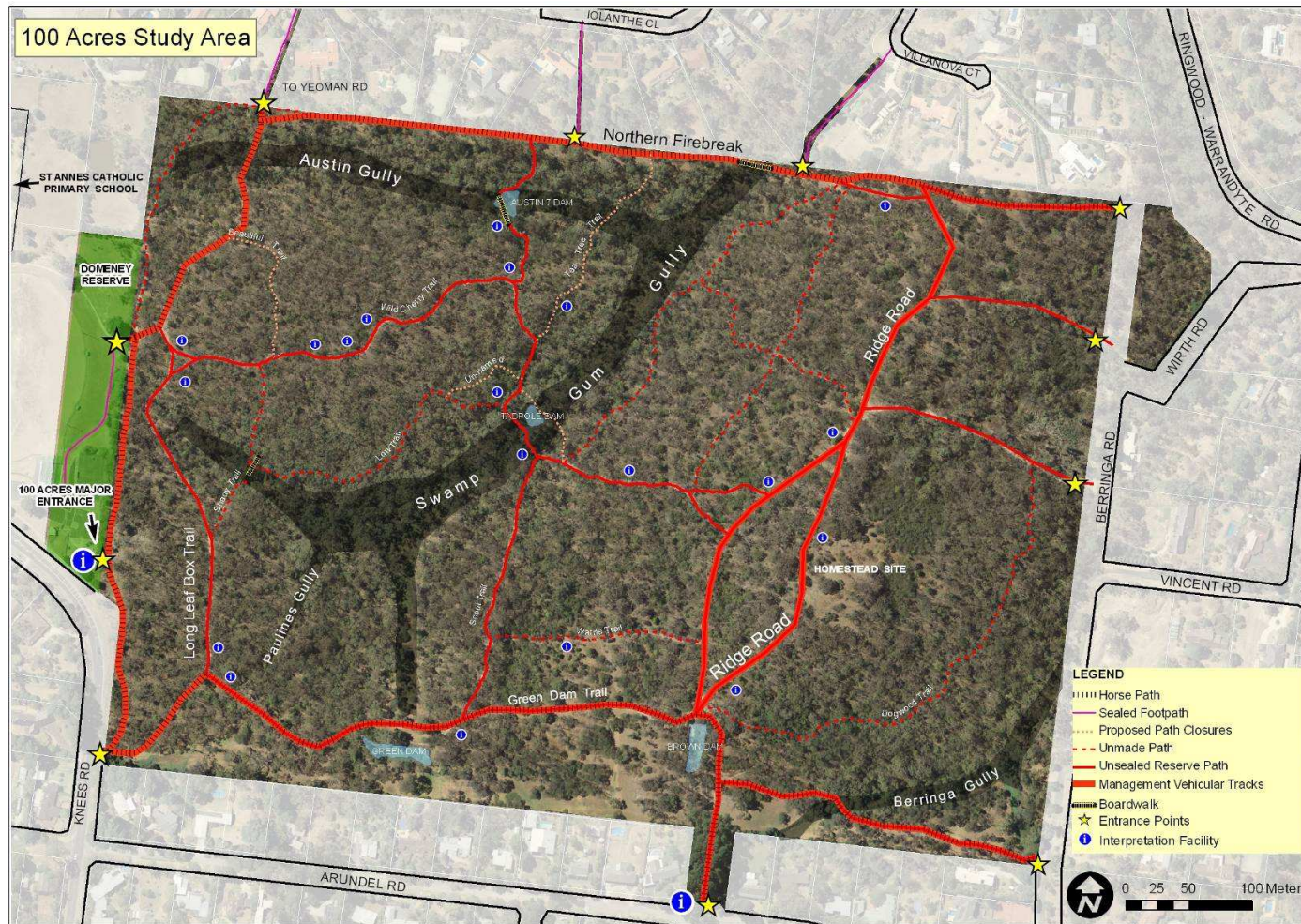


Figure 2 – The 100 Acres Reserve Study Area



Figure 3 – The 100 Acres Reserve Regional Context

2.3. Methodology

The 100 Acres Reserve Management Plan was prepared on the basis of a detailed analysis of the study area coupled with an extensive consultation process with residents and key stakeholders.

Several key studies of the 100 Acres were undertaken to inform the Management Plan and included:

- *The 100 Acres Ecological Assessment (2009) which provided a description and assessment of the vegetation regime, the conservation significance, flora and fauna and habitat management;*
- *The 100 Acres Reserve Bushfire Prevention and Preparedness Plan (2009) which provided an assessment of the level of wildfire risk and recommendations to mitigate and manage that risk for the protection of the general community, adjoining properties and residences as well as Council buildings, facilities and assets and improve the ecological health of areas of environmental significance.*

Extensive community consultation to inform the Management Plan included the following:

- A community survey of 408 households surrounding the reserve in October 2008;
- On site visits with the Friends of 100 Acres and members of Friends of Manningham Dogs and Cats;
- Public Exhibition of the Draft Management Plan for a six week period in March 2010 which comprised:
 - Circulation of the draft to people who responded to the initial questionnaire and key park users groups;
 - Advertisement of the public exhibition in the local newspapers and on Council's web site; and
 - A call for submissions.

Nineteen submissions were received. Key issues raised in the submissions related to proposed dog controls, fire and ecological management and proposed seating within the reserve. Sixteen of the nineteen submissions requested that the perimeter track should be a designated dog off lead area.

A further community survey was undertaken of the same 408 households as those surveyed in October 2008 to gauge local opinion in relation to a proposal to allow dogs off lead on the perimeter path.

In response to the submissions received, including the results of the further survey Council endorsed the final 100 Acres Reserve Management Plan in November 2010. Recommendations of the Management Plan will be implemented through Council's capital works program and other Council processes.

3. VISION AND OBJECTIVES FOR 100 ACRES RESERVE

3.1. Vision

To protect the natural and cultural values and continue to improve the biodiversity values of 100 Acres Reserve balanced with the need to provide low impact recreational opportunities associated with the natural environment for the benefit of existing and future generations.

3.2. Objectives

- **Natural Environment**
Protect and enhance the biodiversity and conservation values of vegetation communities and flora and fauna species of 100 Acres Reserve and enhance the habitat link with Andersons Creek habitat corridor.
- **Cultural Heritage**
Protect Cultural Heritage Sites
- **Landscape Values**
Maintain and Enhance the Landscape Values
- **Fire Management**
Plan and implement effective and integrated fire management planning for 100 Acres Reserve, in conjunction with other fire and land management agencies.
- **Visitor Experiences and Recreation**
Continue to provide sustainable nature-based recreation and educational opportunities and experiences that promote visitor appreciation of the natural environment leading to increased health and well being balanced with the need to protect the natural, cultural and landscape values of 100 Acres Reserve.
- **Community Awareness and Involvement**
Promote community awareness of the significant natural features of 100 Acres Reserve and foster community partnerships in the ongoing management of the Reserve.
- **Management**
Monitor the implementation of the 100 Acres Management Plan Acres on a regular basis.

4. RECOMMENDATIONS

4.1. Implementation Plan

Table 1 provides a summary of recommendations contained in the 100 Acres Reserve Management Plan. The Council Unit responsible for implementing each recommendation is identified. For those recommendations which have a capital and ongoing maintenance cost this cost is included.

The proposed development works are to be undertaken in 3 stages with provision for ongoing management and maintenance of the 100 Acres Reserve.

The implementation of the Management Plan will be monitored and reviewed by Council officers in consultation with the stakeholders and the local community. In this way problems can be addressed and where appropriate, adjustments made to the program.

A review of the 100 Acres Reserve Management Plan should be carried out five years after the completion of the capital works recommended in the plan.

Refer to Figure 4, 100 Acres Reserve Recommended Fire Management Works and Figure 5, 100 Acres Reserve Recreation Use/Path Network.

TABLE 1 Summary of Recommendations and Capital Works Implications for 100 Acres Reserve

PR: Parks and Recreation Unit
HLL: Health and local Laws Unit
EEP: Economic and Environmental Planning Unit

Rec. No	Recommendation	MCC Unit	Stage 1 (\$)	Stage 2 (\$)	Stage 3 (\$)	Operational (\$)
Objective :Natural Environment						
Protect and enhance the biodiversity and conservation values of vegetation communities and flora and fauna species of The 100 Acres and enhance the habitat link with Andersons Creek habitat corridor.						
Priorities: High (H), Medium (M), and Low (L)						
	TOTAL COST (Natural Environment)		\$20,450	\$23,650	\$16,650	\$15,250
Weed Control						
1.	Weed control strategies will continue to be implemented as a high priority that protect and maintain the 'better quality vegetation in each of the Ecological Vegetation Classes (EVC's) (refer Figure 5) and include the following: <ul style="list-style-type: none"> • Grassy Dry Forest, condition A,B,C; • Grassy Forest, A,B,C,D; • Valley Grassy Forest, all of condition A, select sites of B and C; and • Creekline Herb-rich Woodland, all of condition B, C and D. 	PR				
2.	Expand weed control around the colonies of rare plants in the Creekline Herb-rich Woodland with particular attention to Creeping Buttercup (<i>Ranunculus repens</i>), Yorkshire Fog (<i>Holcus lanatus</i>), Japanese Honeysuckle (<i>Lonicera japonica</i>) and Angled Onion (<i>Allium triquetrum</i>). Follow -up weed control to extend progressively into surrounding	PR				

Rec. No	Recommendation	MCC Unit	Stage 1 (\$)	Stage 2 (\$)	Stage 3 (\$)	Operational (\$)
	<p>vegetation. (H). The relevant locations are:</p> <ul style="list-style-type: none"> • On Domeney Gully, at the intersection with Paulines Gully within a 10 metre radius of MGA coordinates 343430,5817600, where Hooker's Fescue (<i>Austrofestuca hookeriana</i>), Common Rasp-fern (<i>Doodia australis</i>), Mother Shield-fern (<i>Polystichum proliferum</i>), Rough Tree-fern (<i>Cyathea australis</i>) and Joint-leaf Rush (<i>Juncus holoschoenus</i>) grow; • On Swamp Gum Gully immediately downstream of the intersection with Domeney Gully within a 5-10 metre radius of MGA coordinates 343525,5817635, where Soft Water-fern (<i>Blechnum minus</i>), Rough tree-fern (<i>Cyathea australis</i>, Common Cudweed <i>Euchiton involucratus</i>) and Maori Bedstraw (<i>Galium propinquum</i>) grow; • Immediately below the dam wall of the Austin Seven dam, including a large patch of Common rasp-fern (<i>Doodia australis</i>); • Around the 5 known patches of Lanky Goodenia (<i>Goodenia</i>) and Cinquefoil Cransbill (<i>Geranium potentilloides</i>) including the patch on the northern edge on Berringa Gully, immediately downstream of Crathie Gully at MGA coordinates 343955, 5817423, 					

Rec. No	Recommendation	MCC Unit	Stage 1 (\$)	Stage 2 (\$)	Stage 3 (\$)	Operational (\$)
3.	<p>Continue to decrease populations of Blackberry (<i>Rubus anglocandicans</i>), Bridal Creeper (<i>Asparagus asparagoides</i>) and other woody weeds. This is to be achieved through three strategies.(H)</p> <ul style="list-style-type: none"> The distribution of Blackberry (<i>Rubus anglocandicans</i>), Bridal Creeper (<i>Asparagus anglocandicans</i>) and woody weed plants varies considerably from virtually nothing to one patch of Hawthorn (<i>Crataegus monogyna</i>), approximately 10m x 20m in extent. For most of the reserve these plants occur only sparsely. All areas of the reserve need to be systematically walked every two-five years (depending on the level of rabbit activity seen). During this systematic walk all woody weeds that can be pulled/knifed/mattock cut or ringbarked are controlled (rabbit holes are also noted, tagged and dug in), The creek flats, gully floor (which are considerably more degraded) are walked systematically each year to spray for Blackberry (<i>Rubus anglocandicans</i>) and juvenile woody weeds. If spraying cannot occur without causing off target damage this Blackberry (<i>Rubus anglocandicans</i>) or juvenile woody weeds is left unsprayed. These uncontrolled plants are then dealt with in a one off dedicated visit or picked up in the search/walk referred to in the previous point, and Individual woody weeds that require the drill and fill or frill and fill technique or more extensive stands are controlled through a dedicated visit. 	PR				

Rec. No	Recommendation	MCC Unit	Stage 1 (\$)	Stage 2 (\$)	Stage 3 (\$)	Operational (\$)
	<p>Denser stands that remain are as follows.</p> <ul style="list-style-type: none"> • Montpellier Broom (<i>Genista monspessulana</i>) around MGA coordinates 343900, 5817460. Where dense, this species is controlled by prioritising the flowering plants. This is an annual Friends Group activity. Montpellier Broom; • Gorse (<i>Ulex europaeus</i>) around Wirth Road area.(H) • Hawthorn (<i>Crataegus monogyna</i>) on Swamp Gum Gully closest to Austin Gully dam at MGA coordinates 343660, 5817790. (M) 					
4.	<p>Pull out dispersed plants of Boneseed (<i>Chrysanthemoides monilifera spp.monilifera</i>) and Montpellier Broom (<i>Genista monspessulana</i>) wherever they are encountered. Boneseed is more prevalent in the reserve's <i>northeast</i>, particularly in the vicinity of the corner of Berringa Road and Wirth Road. Spring is the ideal time for this work because flowers make the weeds conspicuous from a distance. (H)</p>	PR				
5.	<p>Prevent any White Sallow -wattle (<i>Acacia floribunda</i>) and Sallow white (<i>Acacia longifolia subsp.longifolia</i>) from setting seed anywhere in the reserve. These species are easily killed by cutting down with secateurs, without herbicide. This is a task well suited to the friends Group. Plants appear sporadically throughout the reserve, but particularly in recently burned areas. A good strategy is to take a carefully planned route through the whole reserve in September when maturing plants are easily detected and identified at a distance from their</p>	PR				

Rec. No	Recommendation	MCC Unit	Stage 1 (\$)	Stage 2 (\$)	Stage 3 (\$)	Operational (\$)
	conspicuous flowers. (H) (Urgent and annual)					
6.	Continue to reduce populations of weedy vine species. i.e. Japanese Honeysuckle (<i>Lonicera japonica</i>) .Work towards ensuring that all the fronts of honeysuckle do not expand out of the gully floor and that in the gully floor it does not extend generally into indigenous shrub species.(M)	PR				
7.	Expand control works on all rhizomatous weed species where they are invading indigenous vegetation. ie. small patches are eliminated and the fronts of all other patches are rolled back. This includes sections on the fire breaks.ie.Kikuya (<i>Pennisetum clandestinum</i>), Wandering Jew (<i>Tradescantia fluminensis</i>) and Ivy (<i>Hedera helix</i>). (M)	PR				
8.	Continue control of Sweet Vernal-grass (<i>Anthoxanthum odoratum</i>), Brown-top Bent (<i>Agrostis capillaries</i>), Cat's Ear (<i>Hypochoeris radicata</i>) in all currently treated areas. including almost all Grassy Forest, Grassy Dry Forest and most Valley Grassy Forest. As resources allow and the treated areas improve expand the area under treatment.(M)	PR				
9.	In areas where Sweet Vernal-grass (<i>Anthoxanthum odoratum</i>) control is not carried out, systematically walk the slopes at least once every two to five years to find and treat any scattered woody vine and bramble weed species and rabbit holes.(L)	PR				
10.	Develop a strategy for weed control post prescribed burns. Include guidelines to prioritise works according to available resources. 100 % weed control for several years post burning is ideal, however this will not always be feasible depending on the size of the	PR				

Rec. No	Recommendation	MCC Unit	Stage 1 (\$)	Stage 2 (\$)	Stage 3 (\$)	Operational (\$)
	burn.(M)					
11.	Whenever feasible, control Bridal Creeper (<i>Asparagus aparagoides</i>) when it is encountered during other management tasks. It is scattered mainly through the Valley Grassy Forest.(M)	PR				
12.	Continue to control the following weed species Creeping Buttercup (<i>Typha latifolia</i>), Water Couch (<i>Paspalum distichum</i>) in the dams and control Jointed Rush (<i>Juncus articulatus</i>) in the Brown dam.(L)	PR				
13.	Remove Jointed Rush (<i>Juncus articulatus</i>) from the floor of the Brown dam by hand, with herbicide follow-up if needed. (M).	PR				
14.	Continue control of Angled Onion (<i>Allium triquetrum</i>) and Bulbil Watsonia (<i>Watsonia meriana var.bulbillifera</i>) populations to ensure that they do not expand further into areas of indigenous vegetation on the slopes and into the colonies of rare plants in the Creekline Herb-rich Woodland. (M)	PR				
15.	Use the frill-cut method to kill all Hawthorn (<i>Crataegus monogyna</i>) on the Swamp Gum Gully closest to the Austin Seven dam, around MGA coordinates 343660, 5817790. (M)	PR				
16.	Continued hand-weeding of Sweet Vernal –grass (<i>Anthoxanthum odoratum</i>) in the most natural areas of Valley Grassy Forest. As resources allow and the treated areas improve, expand the area under treatment.(M)	PR				
17.	Whenever feasible, control Bridal Creeper (<i>Asparagus asparagoides</i>) when it is encountered during other management tasks.(M)	PR				

Rec. No	Recommendation	MCC Unit	Stage 1 (\$)	Stage 2 (\$)	Stage 3 (\$)	Operational (\$)
18.	Remove Jointed Rush (<i>Juncus articulatus</i>) from the floor of the Brown Dam by hand, with herbicide follow-up if needed.(M)	PR				
Conservation of Rare Plants						
19.	Protect and maintain populations of rare or threatened flora species within The 100 Acres and include all those significant species colour coded and listed in Appendix 2.(H)	PR				
20.	Early Septmeber search for Winelipped Spider-orchid plants (<i>Caladenia oenochila</i>) and Cobra Greenhood (<i>Pterostylis grandiflora</i>) around the two known locations. If two or more flowers are found, arrange hand pollination by someone familiar with this procedure, then check and record whether seeds are successfully produced. In early July each year search for Cobra Greenhood (<i>Pterostylis grandiflora</i>) plants at and around the location where it has previously been recorded. If plants reappear determine action according to numbers present and current threats. (H)	PR				
21.	Seek cooperation between Manningham City Council and Friends of Warrandyte State Park to establish a program of breeding, propagating and planting species that are listed in Appendix 4 as threatened with disappearance from the Reserve. Put highest priority on species that are rarest and easiest to propagate. (H)	PR,EEP				
Planting Eucalypts						
22.	Plant scattered Eucalypts to the area to the south of the homestead ruins(east-north-east of the brown dam) where there are presently very few eucalypts.(M)	PR				

Rec. No	Recommendation	MCC Unit	Stage 1 (\$)	Stage 2 (\$)	Stage 3 (\$)	Operational (\$)
Rabbits						
23.	Continue integrated rabbit control. Avoid using machinery to excavate holes and tunnel erosion unless absolutely unavoidable. Regular and frequent visits every two months to all closed holes to reclose any openings promptly will help to achieve this. If machinery use is unavoidable take all necessary steps to avoid impacting on vegetation. (H)	PR				
24.	Review fox control as part of the strategic management operations of the reserve.	PR				
Habitat						
25.	Ensure all removal of dead material (dead shrubs and logs) for bushfire prevention and preparedness and for the safety of path users does not go beyond what is necessary so that the environmental values of the reserve are protected and enhanced (H)	PR				
26.	Erect a nest box specially designed for Powerful Owl (<i>Ninox strenua</i>), at a location recommended by an expert on that species.(M)	PR				
27.	Monitor occupation of nest boxes and known tree hollows each September and November and when detected, evict pest species such as feral bees, European Wasps or Mynas. (H)	PR				
28.	Continue to control European Wasp nests and be particularly on the alert for wasps nesting during January to April.(H)	PR				
29.	Notify cat owners whose cats are found in the reserve of the need to contain them to their properties at all times. (M)	PR, HLL				
Wetlands and Drainage						
30.	Investigate and monitor storm water run-off from some neighbouring properties on Arundel Rd and	EEP, A&E				

Rec. No	Recommendation	MCC Unit	Stage 1 (\$)	Stage 2 (\$)	Stage 3 (\$)	Operational (\$)
	Crathie Avenue and where possible direct away from the Reserve. (M)					
31.	Monitor the extensive tunnel erosion in Domeney Gully. (M)	PR				
Monitoring						
32.	Establish a program to monitor the environmental condition of fauna and flora habitat and if necessary revise management practices to maintain and improve the environmental quality of the Reserve. (M)	PR				
Future Fauna Survey						
33.	Investigate with the Field Naturalists Club of Victoria to conduct a trapping survey of bats, ground-dwelling mammals and reptiles. (L)	PR, EEP				
Objective : Cultural Heritage and Planning						
Protect cultural heritage sites and rationalise the eastern boundary of 100 Acres						
34.	Investigate amending the Heritage Overlay in the Manningham Planning Scheme to include the 100 Acres Reserve.	EEP				
35.	Investigate formal closure of Wirth Road to include the road reserve in the park and resolve fences around Wirth Road.	EEP,SP				
36.	Investigate closure of northern section of Berringa Road.	EEP,SP				
Objective : Landscape Values						
Maintain and enhance the landscape values						
37.	Ensure footbridges, boardwalks, furniture and signage complement the natural character of the 100 Acres Reserve.	EEP				

Rec. No	Recommendation	MCC Unit	Stage 1 (\$)	Stage 2 (\$)	Stage 3 (\$)	Operational (\$)
38.	Advocate for minimising the visual impact of adjoining development on the significant landscape, environmental and cultural values of the 100 Acres Reserve.	EEP				
Objective :Fire Management						
Plan and implement effective and integrated fire management planning for 100 Acres in conjunction with other fire and land management agencies.						
The management strategies and recommended actions to limit the occurrence of unplanned fires in 100 Acres are to:-						
Regulate Fire Use						
39.	Lighting of fires and solid fuel BBQs within the reserve is prohibited with the exception of prescribed burns.	PR, H&LL				
Isolate Known Ignition Sources						
40.	Maintain car park at Domeney Reserve in a minimal fuel condition. (Item 1, Figure 4)	PR				
Discourage Arson						
41.	Request that CFA investigate all unplanned fires.	PR				
Facilitate First Attack Fire Fighting						
42.	Maintain access tracks and conduct an inspection with CFA prior to each fire season to maintain requisite vertical and horizontal clearances. (Item 2, Figure 4).	PR				
43.	Provide signage at each entrance warning against use on Total Fire Ban days. (Item 3, Figure 4).	EEP,PR, H&LL				
Facilitate Safe Evacuation or Shelter in Place						
44.	Erect directional signs at intersections of major paths.	EPP,PR, H&LL				

Rec. No	Recommendation	MCC Unit	Stage 1 (\$)	Stage 2 (\$)	Stage 3 (\$)	Operational (\$)
The management strategies and recommended actions to minimise potential damage to houses and infrastructure from fire in 100 Acres are to:						
Reduce potential for Flame and Radiant Heat Damage to Built Assets						
45.	Maintain the existing northern and southern fire breaks in accordance with The 100 Acres Reserve Wildfire Prevention and Preparedness Plan. (Item 4, Figure 4)	PR				
46.	Target adjacent private properties for annual fire hazard inspection by Municipal Fire Planning Officer (MFPO) and stipulate maintenance of appropriate Wildfire Management Overlay (WMO) inner and outer zone standard vegetation management.	H&LL				
Reduce Potential for Ember Ignition of Built Assets						
47.	Reduce bark fuel hazard on trees within the northern and southern firebreaks through burning or hand removal. (Item 4, Figure 4).	PR				
48.	Target private properties adjacent to the 100 Acres Reserve for CFA and/or Council community education programs.	H&LL, PR, EEP, CFA				
The management strategies and actions to ensure that fire management protects and enhance environmental values within 100 Acres are to:						
Implement an ecological burning program						
49.	Update and implement the Fire Management Plan (2004) by Harry and Hester, the planned burning program to achieve appropriate fire regimes for Ecological vegetation Classes. (EVCs).	PR		\$6,000		
Fire protection works to minimise environment impact where compatible with safety objectives						
50.	Continue with woody weed removal particularly within and adjacent to Fire Management Zones. (FMZs).	PR				

Rec. No	Recommendation	MCC Unit	Stage 1 (\$)	Stage 2 (\$)	Stage 3 (\$)	Operational (\$)
51.	Time mowing, slashing etc. to favour desired species and ensure that the blade height and manoeuvring of tractors and kubotas do not break the ground surface.	PR				
52.	Use existing tracks as control lines to minimise use of heavy machinery in the Reserve.	PR				
53.	Undertake post-fire monitoring and weed control.	PR				\$2,500
The strategy and recommended actions to ensure that fire management recognises and protects social and heritage values within 100 Acres are to:						
Identify heritage sites and assess vulnerability and manage accordingly						
54.	Ascertain vulnerability of Homestead site to wildfire. (Item 5, Figure 4).	PR,CFA				
55.	Protect significant heritage trees by removing fine fuels for 10 metres radius, prior to prescribed burning.	PR				
The strategies and actions to reduce the potential for the built and natural environment beyond the reserve to suffer significant damage from a fire within the reserve are to:						
Increase community resilience beyond the reserve boundary						
56.	Ensure surrounding area is covered by relevant planning and building approval controls.	EEP, SP, BS				
57.	Target surrounding area for CFA and/or Council community education re wildfire safety.	EEP, PR, H&LL				
Plan to manage fire spread beyond the Reserve						
58.	Include consideration of the 100 Acres Reserve in relevant landscape scale Bushfire Management Plan.	EEP, PR				
Objective :Visitor Experiences and Recreation						
Continue to provide sustainable nature-based recreation and educational opportunities and experiences that promote visitor appreciation of the natural environment leading to increased health and well being balanced with the need to protect the						

Rec. No	Recommendation	MCC Unit	Stage 1 (\$)	Stage 2 (\$)	Stage 3 (\$)	Operational (\$)
natural, cultural, and landscape values of 100 Acres.						
Recreational Opportunities						
59.	Manage the impact of recreational activities on the 100 Acres Reserve for the safe and enjoyable use of visitors and to minimise conflicts between users and undesirable impacts on the landscape, cultural and environmental values of the 100 Acres Reserve.	EEP, PR, H&LL				
60.	Promote link to the Yanggai Baring Linear Park.	EEP				
61.	Consider access to all members of the community, including people with all abilities, wherever feasible.	EEP, PR, H&LL				
Dog Walking						
62.	Walking dogs off lead to remain prohibited within the 100 Acres Reserve and walking dogs on lead will be permitted on all paths, including the perimeter horse trail with the exception of paths and areas as specified in Recommendation 62. .	H&LL				
63.	Prohibit dogs in high conservation areas located in the northwest part of the 100 Acres Reserve as shown in Figure 5 containing the most significant habitat and in areas where plants are most at risk of dying out.	H&LL				
64.	Prepare an amendment to the Council Order under the Domestic Animals Strategy section (2) of the Domestic feral and Nuisance Animals Act 1994 to implement the dog controls for 100 Acres.	H&LL				
65.	Promote the benefits of dog ownership and use public education, signage and enforcement to gain better compliance with dog control requirements, particularly keeping dogs on leads and on paths.	H&LL, EEP				

Rec. No	Recommendation	MCC Unit	Stage 1 (\$)	Stage 2 (\$)	Stage 3 (\$)	Operational (\$)
66.	Assess and monitor current dog controls and undertake an assessment of dog controls after a three year period as part of Council's Domestic Animals Management Plan.	PR, H&LL				
67.	Improve visibility of dogs on lead signage and pick up dog faeces signs at all entrances to the reserve.	EEP, HLL				
68.	Provide additional bins for the disposal of dog faeces at Berringa and Villanova Roads and Domeney Reserve entrances to the 100 Acres Reserve.	A&E H &LL		\$2,000		
Horse Riding						
69.	Horse riding will be confined to the horse trail on the perimeter track of the 100 Acres Reserve and along Berringa Road as shown in Figure 5.	H&LL				
70.	Provide horse riding signage at strategic locations on Berringa Road.	ETS	\$500			
Cycling						
71.	Bicycle use will only be permitted on Management Vehicular Tracks within the 100 Acres Reserve as shown in Figure 5.	H&LL				
Path Network						
72.	Improve and maintain the path network within the 100 Acres Reserve based on Manningham's Urban and Park design Guide path classification as shown in Figure 5.	EEP	\$10,000			
73.	Monitor erosion and incremental path widening and conduct erosion control measures on trails within 100 Acres.	EEP & PR				\$1,500
74.	Maintain access to the 100 Acres Reserve from surrounding residential communities, and improve access from Villanova Court.	EEP & PR	\$3,000			

Rec. No	Recommendation	MCC Unit	Stage 1 (\$)	Stage 2 (\$)	Stage 3 (\$)	Operational (\$)
75.	Monitor and remove overhanging vegetation on minor paths –vegetation and drainage, track surface.	PR				
76.	Investigate resources for ranger patrols to monitor the use of the track network to minimise the conflict between users and enforce dog controls.	EEP H&LL				
Infrastructure and Facilities						
77.	Replace existing boardwalks at Austin Seven and Tadpole Dams and on Shady trail, in a manner that minimises the flooding and environmental impacts.	ETS	\$25,000			\$500
78.	Provide and upgrade infrastructure in a manner that avoids damage to native vegetation, in particular the ground storey and note that some uncommon plants only occur on path edges and /or in the main firebreaks.	ETS,EE P & PR				
78.	Construct culvert over Swamp Gum Gully crossing on the northern fire break.	ETS	\$15,000			\$250
79.	Provide seating along the trail network at strategic points within the100 Acres Reserve, as resting opportunities for the quiet enjoyment and nature appreciation of the area.	EEP		\$5,000		\$500
80.	Re-commission toilets at Domeney Reserve near the 100 Acres Reserve major entrance point and interpretation facilities.	ETS,EE P	\$60,000			\$5,000
Signage						
81.	Update/improve park information, directional and regulatory signage including fire emergency information at major entrances and other strategic locations within the100 Acres Reserve.	EEP, HLL, PR	\$15,000			\$750
82.	Update/improve environmental interpretative signs along the designated nature trail within the100 Acres Reserve, including information on why it is important not to feed the birds.	EEP,HLL , PR	\$35,000			\$1,500

Rec. No	Recommendation	MCC Unit	Stage 1 (\$)	Stage 2 (\$)	Stage 3 (\$)	Operational (\$)
83.	Construct and maintain 'have you seen a koala?' box similar to the box on the Mullum Mullum Trail (M)	PR	\$1,550	\$750	\$750	\$750
	Fencing					
84.	Only permit rural style or maximum 1.8 m chain mesh open fencing of residential boundaries with the 100 Acres Reserve.	EEP				
85.	Provide additional or replace existing sighter wire fencing along the horse trail.	EEP	\$6,000			
Objective : Community Awareness and Involvement						
Promote community awareness of the significant natural features of 100 Acres and foster community partnerships in the ongoing management of the reserve.						
86.	Update and re-print <i>A Walking Guide to 100 Acres Flora and Fauna Reserve</i> brochure to complement the interpretation signs along the natural trail and make it available on Manningham City Council's web site.	EEP		\$5,000		
87.	Incorporate environmental information about the 100 Acres Reserve in the updated Manningham walking brochure.	EEP				
88.	Liaise with local residents and provide regular updates to improve awareness and appreciation of park values, health benefits and management actions, including in relation to weeds, management of areas adjoining residences and dog walking.	EEP & PR				
89.	Liaise with users groups and local schools to improve awareness and appreciation of park values and management leading to increased opportunities for environmental education and ongoing community involvement associated with the 100 Acres Reserve.	EEP & PR				
90.	Continue to support the 100 Acres Friends Group and encourage recruiting new members, particularly from younger generations.	EEP				

Rec. No	Recommendation	MCC Unit	Stage 1 (\$)	Stage 2 (\$)	Stage 3 (\$)	Operational (\$)
Objective: Monitor the implementation of the 100 Acres Management Plan on a regular basis.						
91	Consult with stakeholders, community groups and adjoining landowners in the ongoing development, monitoring and management of 100 Acres.	EEP				
92	Hold an annual meeting with all the responsible departments/units across Council to discuss the progress of the Management Plan implementation and identify any new issues that may have arisen over the previous 12 months.	EEP				
	TOTAL Management Plan COST		\$191,500	\$42,400	\$17,400	\$28,500

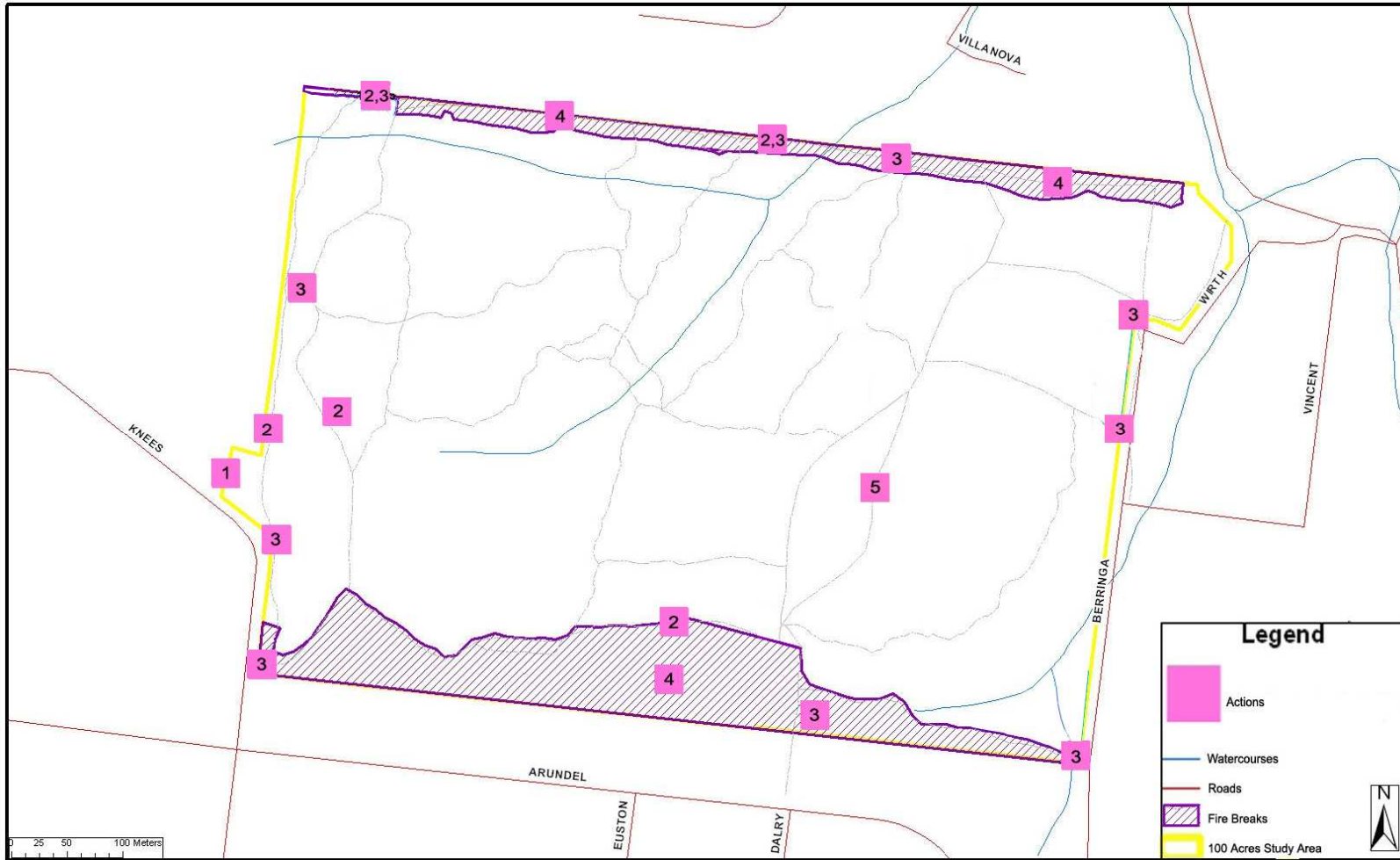


Figure 4 Recommended Fire Management Works

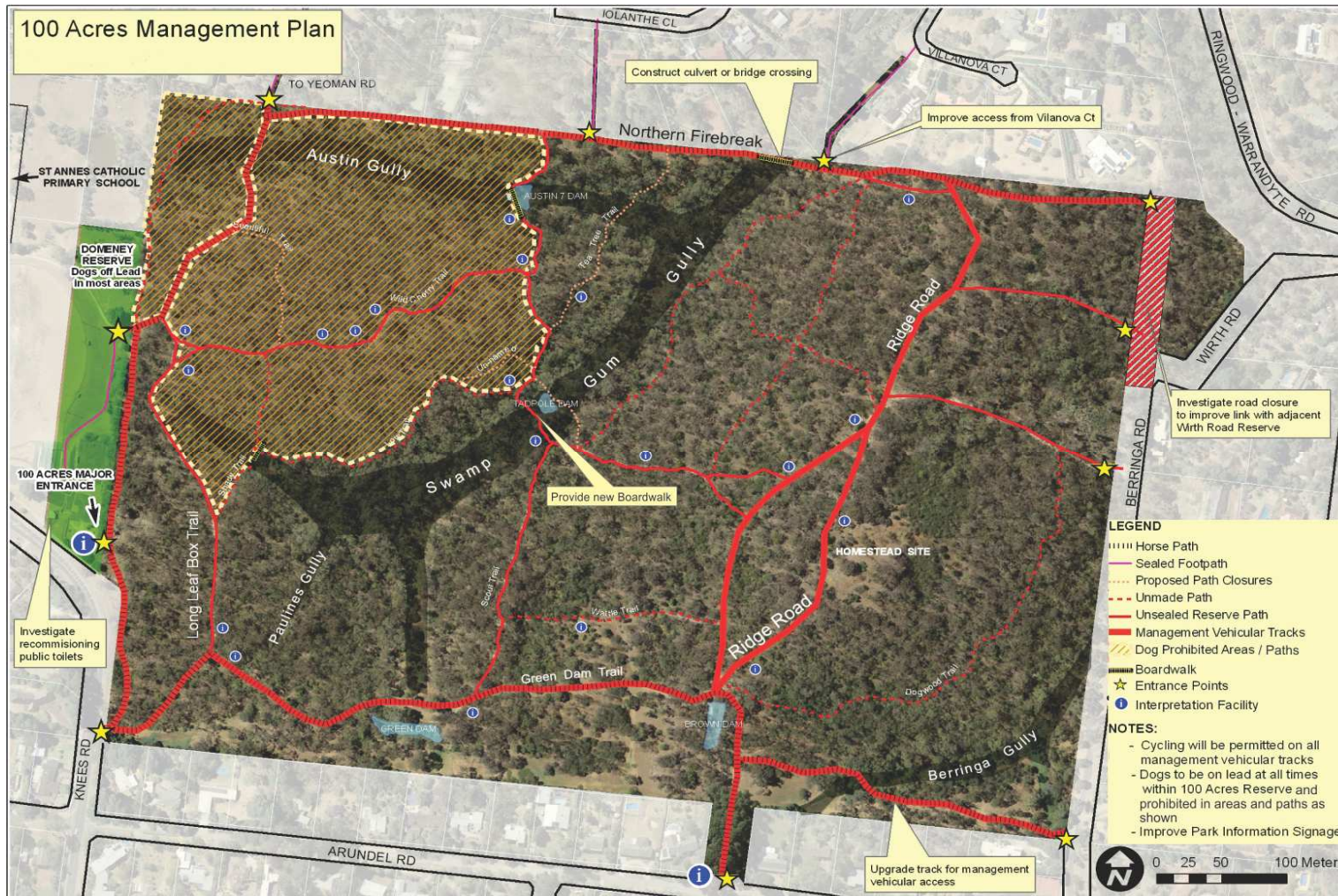


Figure 5 '100 Acres Management Plan'

**Part Two
Management Plan Report**

Existing Conditions, Analysis and Issues

5. PLANNING AND POLICY CONTEXT

The 100 Acres Reserve Management Plan has been developed in the context of State Government and Council policies and strategies.

State and Regional Policies and Studies

Aboriginal Heritage Act 2006

Under the Aboriginal Heritage Act, any works within 200 metres of a waterway an area of cultural sensitivity and high impact activities, such as the construction of a shared path, will require a Cultural Heritage Management Plan.

Melbourne 2030 (2002)

In 2002 the State Government adopted Melbourne 2030 Planning for Sustainable Growth, which provides a strategy for future development within Metropolitan Melbourne for the next 30 years. The strategy contains several policies and initiatives which are relevant to 100 Acres, which aim to improve community safety and protect open spaces for future generations.

Metropolitan Open Space Strategy (2002)

Linking People and Spaces, a Strategy for Melbourne's Open Space Network provides for the long term planning of open space and protection of areas of environmental significance within Metropolitan Melbourne.

The City of Manningham is located in the East Region of the Strategy. Open Space areas within this region have a high visitor use and high conservation value. The key focus for this region is to enhance existing facilities at a range of sites, to protect open space areas of environmental significance from increasing visitor numbers and pressure for recreation facilities and enhance vegetation links, especially along streams such as Andersons Creek.

Andersons Creek Waterway Management Activity Plan (2001)

Melbourne Water is the Authority responsible for the restoration, maintenance and management for the bed and banks of the Mullum Mullum Creek. The Andersons Creek Waterway Management Plan covers all publicly owned land within the stream corridor and some privately owned land adjacent to the waterway. It focuses mostly on the waterway, the riparian zone, factors impacting upon the stream environment and identifies opportunities for improvement of stream condition, waterway health and vegetation cover along the corridor.

Native Vegetation Management Framework (Net Gain)

The goal of the Native Vegetation Management – A Framework for Action Strategy for the protection of native vegetation and biodiversity and achieve a reversal, across the entire landscape, of the long-term decline in the extent and quality of native vegetation leading to a net gain. Net gain is the outcome for native vegetation and habitat where overall gains are greater than overall losses and individual losses are avoided, where possible.

The Framework introduces the concept of 'Net Gain' to redress the loss of Indigenous vegetation as is approved through the Victoria Planning Schemes.

5.1. Local Studies and Policies

Manningham Council Plan 2009-2013

The 2009~2013 Council Plan is a strategic plan that aims to improve Manningham for the benefit of the whole community and outlines Manningham's community vision, objectives, and strategies and a set of actions for Manningham City Council.

Manningham City Council's vision for the municipality is for:

- *A vibrant, safe and culturally diverse community that fosters participation, connectedness, harmony, social inclusion, health and wellbeing;*
- *A community with access to high quality, responsive, services, facilities and infrastructure, to meet changing needs;*
- *A Council underpinned by sound financial management, customer service, continuous improvement, strong governance and leadership, transparency, consultation, communication and advocacy;*
- *A municipality that supports sustainable development and achieves a balance between lively activity areas supporting a healthy local economy, and preserving our rural areas and abundance of open space;and*
- *A community that protects and enhances our natural environment and wildlife, and is concerned about reducing our carbon footprint in all that we do.*

Objective 9 of the Council plan aims *to adopt sustainable practices that reduce our carbon footprint on the environment, reduce waste, energy and water use and protect and enhance biodiversity.*

Strategy 9.1 of the Council Plan *aims to Protect our natural environment, biodiversity and open space and*

Action 9.1.3 relates specifically to the future management of the 100 Acres Reserve- *Finalise the Management Plan for the 100 Acres Reserve with a view to balancing the provision of recreational opportunities and experiences with protection of indigenous flora and fauna.*

Manningham Public Open Space Strategy (2004)

The Manningham Public Open Space Strategy provides a guide for the strategic planning, development, management, use and maintenance of Manningham's Open Space. The Open Space Strategy identifies 100 Acres Reserve as a Conservation Reserve of Regional Significance and provides informal recreation opportunities associated with the natural environment.

Manningham City Council's vision for public open space is:

“an open space network which provides a range of active and passive recreation opportunities in accordance with community needs, which is readily accessible, conserves and enhances the natural and cultural resources of the municipality, contributes to the local economy, and offers an amenable environment in which to live, work and visit for current and future generations”.

Manningham City Council is involved in the provision of open space recreation opportunities because it believes that there are a number of benefits that derive from participation in, or provision of, a diverse range of quality recreation opportunities including:

Social/Health

Environment is a major influence on health. By providing high quality open space networks, Council can create an environment that is supportive of health and encourages activity that reduces the likelihood and extremity of disease. Activities within open space areas such as walking have health benefits such as improved cardiovascular fitness, lower blood pressure, stronger muscles and bones (built up by walking regularly), and decreased stress. Open space areas are also socialising spaces that provide links with the broader community and encourage social connections.

Environment

Open space provides for important ecological aspects such as waterways, flora and fauna. Vegetation in open space provides habitat for wildlife, including corridor links to and along waterways.

Urban liveability

Open space brings an aesthetic value to a neighbourhood by providing a “green break” between houses and roads.

Culture

Open space can be a venue for cultural displays, festivals, programs and activities. Open space can also have pre settlement or post settlement cultural significance associated with specific sites or features.

Economic

The economic benefit of open space can be measured in the spin-off effects of tourism and the role of high quality open space in attracting residents to Manningham and enhancing property values.

Healthy Living in Manningham- Municipal Public Health Plan (2005)

Manningham's *Municipal Public Health Plan* is currently being reviewed and promotes the importance of physical activity and its link to people's health and lifestyle. Provision of path networks within reserves, such as the 100 Acres Reserve creates recreation opportunities for people to increase their health levels which are a key component of the Public Health Plan.

Disability Access Policy and Action Plan (2004)

Manningham's City Council's Disability Access Policy and Action Plan (2004) outlines Council's direction over the years 2004-2008. It identifies theme and a framework for addressing access, inclusion and participation for people with disabilities who live, work, study, and visit or otherwise has a connection to Manningham.

Manningham Recreation Needs Study (2003)

The *Recreation Needs Study (2003)* was undertaken by Council to assess the current and future culture and leisure needs of residents within Manningham.

Walking was identified as the most popular sporting or recreation activity, (28%). The community consultation process undertaken as part of this Management Plan supported this finding with 'walking' identified as being the most common reason for visiting 100 Acres.

Recreation Strategy (2010)

'Active for life' Manningham's *Recreation Strategy* has been developed in consultation with the community to inform our recreation provision up to 2020. This strategy addresses the challenge for the whole of the Manningham Community to be Active for Life! The Strategy is currently on Public exhibition.

From a State and National perspective, physical activity has been ranked second only to tobacco control in being the most important factor in health promotion and disease prevention in Australia Vic Health Website: Physical Activity 2009.

The Strategy vision is for a community that is spending more time participating in a diverse range of recreational pursuits regardless of age, gender, ability and cultural background. The community will make the most of the infrastructure, facilities, parks and programs offered and enjoy improved health and wellbeing as a result. The strategy identifies that Manningham residents have high participation rates in walking and cycling highlighting the importance for improvements in accessibility, paths, links and promotion.

Manningham Bicycle Strategy (2001) Action plan updated in (2006)

The *Manningham Bicycle Strategy (2001)* provides direction for ongoing development of on and off bicycle facilities and programs. The strategy is being reviewed in 2010/11.

Manningham Horse Riding Strategy (reprinted 2007)

The *Horse Riding Strategy* for the City of Manningham aims to improve the horse trail network and local practices towards environmental sustainability. A series of recommendations is provided which recognise the need to develop an environmentally sustainable horse trail network, to reduce road safety risks and develop further off-road riding links. The strategy seeks to ensure that there is a balance between environmental protection and responsible rider access to the network.

Manningham Domestic Animals Strategy (2004)

The *Manningham Domestic Animals Strategy (2004)* aims to promote and facilitate responsible ownership of dogs and cats, support animal welfare and promotes the benefits of animal companionship, with an emphasis on the protection and enhancement of community safety and the environment.

Dogs and their owners are significant users of public open space, however some dogs in public places can have an adverse effect on community safety and the environment. The Strategy aims to balance the needs of all users of open space through its *Dog in Public Places* policy by providing a network of on lead, off lead and prohibited areas. The principle means of control of dogs in public places is by way of the Council Order in accordance with S26 (2) of the Domestic (Feral and Nuisance) Animals Act 1994 which is the responsibility of Health and Local Laws Unit, Manningham City Council.

A *Domestic Animals Management Plan* must be submitted to the Minister for Agriculture every three years and includes the management of dogs throughout Council Reserves.

Manningham Planning Scheme

The 100 Acres Reserve study area comprises land which is Council owned and managed and is contained within two different Zones and two Overlays within the Manningham Planning Scheme.

Public Conservation and Resource Zone (PCRZ)

100 Acres and Wirth Road Reserve is contained within the Public Conservation and Resource Zone (PCRZ). The purpose of this zone is to protect and conserve the natural environment and natural processes for their historic, scientific, landscape, habitat or cultural values.

Public Park and Recreation Zone (PPRZ)

The adjacent Domeney Reserve is zoned Public Park and Recreation Zone (PPRZ). The purpose of this zone is to recognise areas for public recreation and open space and aims to conserve areas of significance, while allowing for commercial purposes where appropriate. The interpretation facility located on a small section of Domeney Reserve serves as the major entrance point to 100 Acres.

The planning Overlays include:

Environmental Significance Overlay (ESO2): This Overlay protects botanical and zoological significance and maintains ecological processes and genetic diversity. The protection and enhancement of environmentally significant sites and strengthening of connecting habitat links will assist in the maintenance of biodiversity within the municipality and surrounding areas. This Overlay applies to 100 Acres and Wirth Road Reserve and excludes Domeney Reserve.

Wildfire Management Overlay (WMO): This Overlay identifies areas where the intensity of wildfire is significant and likely to pose a threat to life and property. This Overlay applies to the whole study area except Domeney Reserve and includes adjacent properties on the north, south and eastern boundaries of 100 Acres.

Land Subject to Inundation Overlay (LSIO): This Overlay identifies land in flood storage or flood fringe area affected by the 1 in 100 year flood and ensures that any development maintains a free passage and temporary storage of floodwaters, minimises flood damage and is compatible with flood hazard. This Overlay applies to the gully on the northeast side of Wirth Road Reserve.

6. RESERVE IDENTITY AND CHARACTER

The 100 Acres Reserve is characterised by a predominant bushland setting comprising several distinct communities of native plants. Forest types include: Red Stringybark/Messmate and Pepper- mint forest on south facing slopes; Candelbark and Yellow Box Forest on low ridges and hills; Red Box/Red Stringybark/Long-leaf Box and Narrow -leaf Peppermint Forest on the tops of stony hills and ridges, extending somewhat down adjacent slopes; Swamp Gum/Candlebark Forest in narrow bands along minor creeks and gullies and sometimes extending up adjacent southern /southeastern slopes of the reserve. The indigenous aquatic species Green Rush is common in the Brown, Austin Seven and Green Dams and Water Plantain dominates most of the Brown dam and is moderately abundant in the Green Dam.

The orchards and pine plantation cleared decades ago now support regrowth of native vegetation except along the southern firebreak. The nature of the regrowth varies greatly. To the south, east and north of the homestead ruins, the regrowth comprises dense Burgan (Kunzea) and wattles with very sparse flora beneath. Northwest of the homestead ruins, gardens and excavations have regrown with less Burgan and fairly dense indigenous understorey, but with much lower diversity than where there is less sign of past excavation.

Historical clearing and land uses in 100 Acres have impacted on the reserve resulting in a scarcity of fully grown trees; abundance of weeds along gullies; prevalence of uneven ground; and a reduced presence of certain plant species which occur in pristine vegetation of the same types.

The only area with a natural density of large, old eucalypts in 100 Acres is around the homestead ruins where successive property owners and managers retained large trees around their home while the rest of the land was progressively cleared for agriculture and the firewood market. Trees were removed selectively, leaving scattered large trees. Some of these pre-European trees remain today and some have died in recent years, attributable to drought.

No old trees grow along Swamp Gum Gully because it was completely bulldozed. The edge of the bulldozer cut is visible along most of the length of the gully edges. A drainage channel was also cut along the eastern side of the gully downstream of Tadpole Dam. Similarly bulldozing probably occurred in the gully in the southeastern corner. Pipes have also been laid into the gullies to receive stormwater from adjacent residential land.

The cluster of pine trees at the Arundel Road entrance to the 100 Acres Reserve provides a unique landscape character within the reserve which is historically significant. The reserve is strongly dissected with low, moderately steep hills in which the slopes and ridges drain rapidly. Creek courses are linear in nature with narrow floodplains consisting of fine – textured alluvium of Quaternary age. Beneath are Silurian siltstones and sandstones of the Andersons Creek formation. Elsewhere there is shallow, stony, pale yellowish-grey clay duplex soil. Outcropping is common on the highest terrain and soil depth increases downhill.

High points are in the northwest, southwest and eastern parts of 100 Acres with the elevation ranging from approximately 115 metres above sea level to 137 metres in the south west corner. The higher areas are separated by Domeney Gully running east from the western boundary of the reserve that joins with Green Gully running from the south to form Main Gully that extends northwards to the reserve's boundary. Berringa Gully runs across the southeast corner of 100 Acres. Austin Gully runs from west to east from the northwest corner of the reserve parallel to the northern fire break and joins the Main Gully about halfway along the northern boundary.

The 100 Acres Reserve contains four dams which are not reliable water supplies during the year. Green Dam is at the head of Green Gully on the Southern Fire break with Brown Dam also within the southern fire break. Tadpole Dam is in the Main Gully and Austin Dam is half way along Austin Gully.

The 100 Acres Reserve has an extensive informal path network that is accessed via ten entrances to the Reserve. Horse access to the designated horse trail on the perimeter of the Reserve is via the north and south entrances on Berringa Road. A major interpretation facility is located at the major entrance to 100 Acres Reserve at the south east corner of Domenev Reserve with a smaller interpretation facility at the Arundel Road entrance. Existing infrastructure within the reserve is limited to signage, fencing and benches.

7. CULTURAL HERITAGE VALUES

The 100 Acres Reserve study area is within the traditional territory of Indigenous people from the Woi Wurrung language group. The Wurundjeri Tribe Land and Compensation Cultural Heritage Council Inc has been declared by the Victorian Aboriginal Heritage Council to be the Registered Aboriginal party for the area.

Four Aboriginal archaeological sites have been discovered within 100 Acres Reserve and it is likely to contain others.

European settlement of the general region commenced around 1850 with the discovery of gold at Andersons Creek (now Warrandyte) and the development of orchards on higher ground.

During the early 1900's and up until the 1940's, 100 Acres was largely cleared of native vegetation and used for orchards, growing berries and a pine plantation. Tom Petty's nephew, Jim Mitchell bought this 100 Acre block from Tom and built a house (since demolished). The old Homestead site has local historical value but is not listed in the Schedule to the Heritage Overlay under the Manningham City Council Planning Scheme.

The entire site was eventually grazed until 1960s or early 1970's. Timber harvesting occurred on the hills west of Swamp Gum Gully and part of the land was used for training soldiers in the Second World War, including excavation of trenches for mock warfare. Since this time, the site has regenerated and currently contains a number of significant floral and faunal communities. Some gullies were completely bulldozed and were badly churned up for many years as they were used for the National competition of the Austin Seven mud trails with the introduction of the sport to Australia in 1950. The last event occurred around 1975.

In response to widespread community campaign opposing a proposal to subdivide the land during the 1970's, 100 Acres was purchased by the City of Doncaster and Templestowe (now Manningham City Council) for \$1.2 million with assistance by the Commonwealth of Australia and the Victorian Government. 100 Acres was officially opened as a Reserve in 1980 and is managed by Council. There are few bush remnants in the western parts of the municipality. The site is listed as **State significance** as an extensive and fairly complete remnant of native woodland within the metropolitan area.

Local community interest in the reserve is a significant feature of its recent history. Over the years management of the reserve has been influenced and improved in consultation with the community including:

- 100 Acres Management Plan (1978). An Advisory Committee was established to prepare a Management Plan for the Reserve. The principal objective was to:
'Preserve and maintain a viable example of the indigenous vegetation broadly representative of Melbourne's outer eastern suburbs in natural relationship and to allow passive recreation in the area so as to encourage an appreciation thereof.'
- The 100 Acres Reserve Management Plan (1996). The main focus was to encourage natural regeneration of the indigenous vegetation; actively develop and manage the Reserve as a viable fauna habitat, food source and refuge; provide and maintain a range of recreational opportunities which do not compromise the conservation value of the area; and facilitate community involvement in the management of the Reserve with the formation of the 100 Acres Friends Group.

8. NATURAL ENVIRONMENT

Nature and the natural environment are unsurpassed among things that residents value about living in Manningham, according to a 2005 focus group survey. Council therefore places a high importance on protecting natural assets such as the 100 Acres. The Reserve provides high quality habitat for flora and fauna and valuable recreation opportunities for visitors to enjoy the peaceful bushland setting so highly valued by the community.

The significant work undertaken over the years by Council's Bushland Crew and the Friends of 100 Acres Group has ensured an uncommonly high level of ecological viability in the 100 Acres Reserve which is stable despite the effects of prolonged, severe drought. It is rare for so few indigenous plant species to die over three decades in metropolitan Melbourne and it is also uncommon for so few species to have disappeared during the current severe drought.

The western third of the 100 Acres Reserve is in an ecological condition that is rarely rivaled in the Melbourne region, even in National Parks, which provides valuable opportunities for visitors to learn about the natural environment in a setting so close to Melbourne.

The 100 Acres Ecological Assessment (2009) provides an assessment of Flora and Fauna and associated environmental values and attributes and has informed the 100 Acres Reserve Management Plan.

8.1. Flora

8.1.1 Vegetation Types

The 100 Acres Reserve is within the Highlands- Southern Fall Biogeographic Region and is within about 1 kilometre of the Gippsland Plain Biogeographic Region.

The natural vegetation of 100 Acres Reserve consists of four Ecological Vegetation Classes (EVCs) under the Department of Sustainability and Environment's vegetation classification system and several artificial wetlands which are described in Appendix 1. The EVC's and their conservation status are listed below.

EVC	Conservation Status
Creepline Herb-rich Woodland	Vulnerable
Grassy Forest	Vulnerable
Valley Grassy Forest	Vulnerable
Grassy Dry Forest	Least Concern

The ecological condition of 100 Acres Reserve within each vegetation type is mapped according to a five level scale and is shown in Figure 6. The vegetation rating scheme is explained in Appendix 4.

Wetland vegetation in 100 Acres is a result of the construction of dams within the Reserve. The artificial wetland areas include Brown and the Austin Seven Dams, Green and Tadpole Dams and the tiny southwestern wetland created to filter runoff from Knees Road. Wetland vegetation is only recognized as representing an EVC if it occurs in the topography that is substantially natural. However, this Management Plan recognizes the Reserve's artificial wetlands

as providing important habitat for indigenous flora and fauna, representing effective surrogates for natural wetlands that have become severely depleted.

8.1.2 Ecological Condition of Habitat

The 100 Acres Reserve is classified as an area of **State Significance** because it contains vulnerable EVCs including Valley Grassy Forest, Grassy Forest and Creepline-Herb-rich Woodland. The ecological condition of the vegetation in 100 Acres varies from poor to excellent; with a spatial pattern that reflects the historical use of the land. The areas around the homestead ruins, the former orchards and the gullies where the Austin Seven mud trails were run are in poor to fair condition, whereas the vegetation in the western third of the reserve which has been least disturbed is in good to excellent ecological condition.

Approximately a quarter of the vegetation is in good or excellent condition, half is in fair ecological condition and a quarter is in poor condition. Even in National Parks in the Melbourne area, only a few have a small percentage of vegetation in excellent ecological condition. For 100 Acres to have as much as four hectares in excellent condition is quite unusual. The estimated conservation significance across the whole Reserve is shown in Figure 7.

The vegetation is in markedly better ecological condition west of Swamp Gum Gully. These areas represent the highest quality of indigenous vegetation and are very rare in suburban bushland. They have probably never had their soil turned over or been completely cleared (although many eucalypts were cut).

The occurrence of Grassy Forest in the 100 Acres Reserve is unique to Manningham where no other instance of this EVC is known in municipality and the vegetation's excellent ecological condition heightens its significance within Manningham.

Grassy Dry Forest and Valley Grassy Forest are in fair condition on average but have substantial areas in the 'good' and 'excellent' categories.

Creepline Herb-rich Woodland and the artificial wetland areas are in the poorest ecological condition in 100 Acres which have suffered from many decades of cattle grazing, extensive historical excavation for dams, drainage channels, pipes and agriculture and a quarter-century of Austin Seven mud trails where the gullies were badly churned up. With the exception of a few rare plants that have survived in the gullies, these activities have destroyed most of the indigenous flora of the Creepline Herb-rich Woodland, which is a vulnerable community and is particularly susceptible to weed invasion following soil disturbance.



Figure 6 - Ecological Vegetation Classes and Categories of Ecological Condition

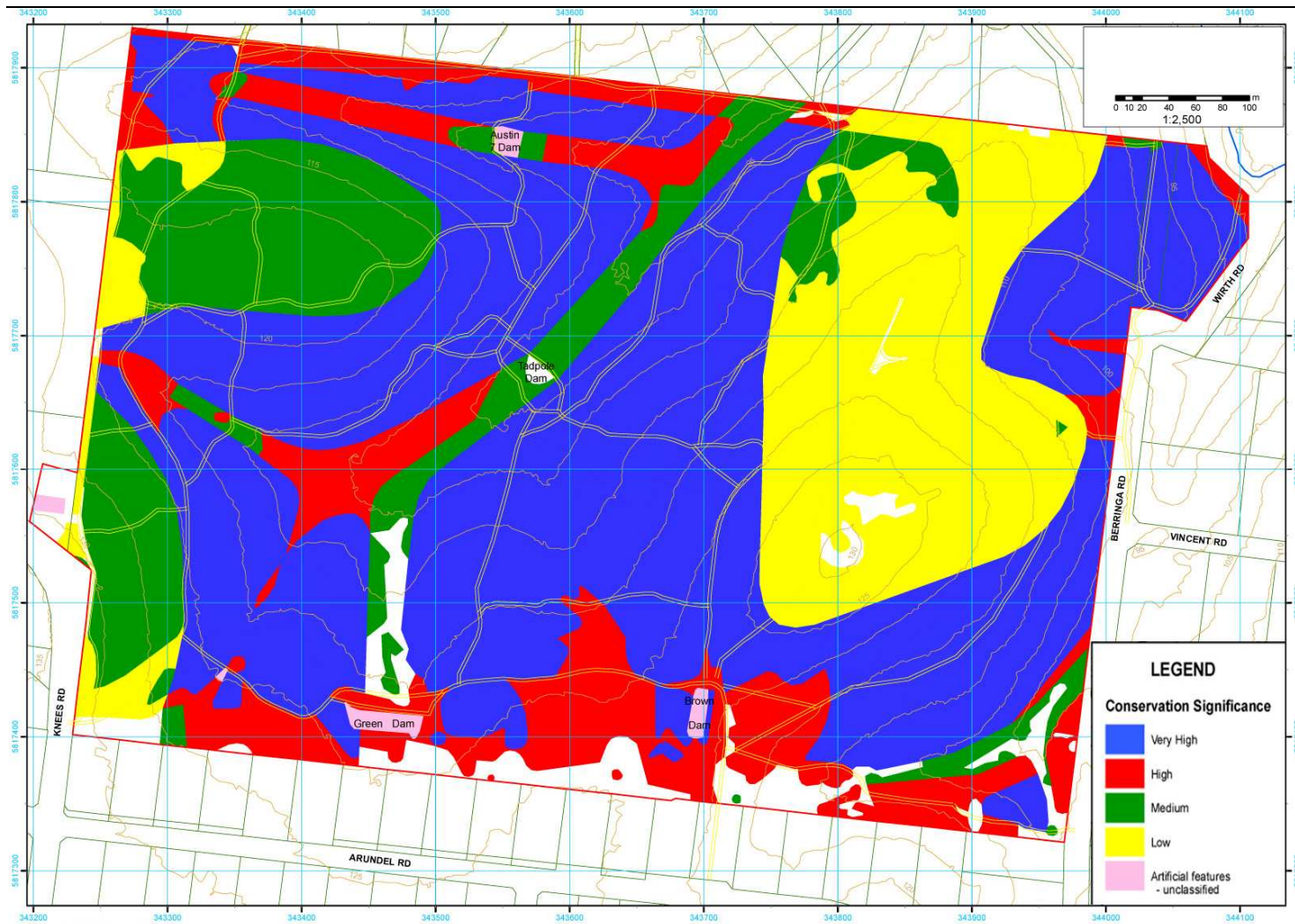


Figure 7 - Areas of Different Conservation Significance

All riparian vegetation is significant for its critical role in maintaining stream ecology, wildlife corridors and waterway protection. Environmental weeds have been rampant for decades in these areas and represent a serious threat to this 'vulnerable' EVC and a substantial proportion of the site's significant plant species.

The wetland vegetation in the former dams is all in fair ecological condition and provides worthwhile habitat for indigenous flora and fauna particularly as natural wetlands have become severely depleted over the years. The Green Dam appears to suffer from nutrient pollution (as does land to its east) and its sides are too steeply sloped to achieve good ecological condition. The Brown Dam is not polluted but its sides are too steep to provide consistently good wetland habitat. The Austin Seven Dam's ecological condition appears to be limited by its poor retention of water, which could be improved by raising the outlet drain. The Tadpole Dam is practically devoid of native vegetation.

8.1.3 Plant Species and Diversity

The variety and diversity of flora species recorded in the 100 Acres Reserve comprises at least 206 wild indigenous species of flowering plant, one hybrid orchid, one trans-generic hybrid wallaby-grass, eight species of fern, 20 species of moss and five of liverwort. These are high numbers for an area of its size in the Melbourne area. It is estimated that about 20 species of flowering plants or fern await detection under better conditions and more species of mosses or liverworts would most likely be detected in a good season.

A list of scientific and common names of plant species including significant plant species observed within each type of vegetation is presented in Appendix 2.

14 species of flowering plant and one species of fern ally have been recorded in previous years but not during the present study. 7 of these orchids have been seen in the past decade and are likely to reappear in a year not so badly affected by drought. In addition, five other orchid species, three lily species, a wattle, a yam-daisy, Tall Bluebell, Austral Carrot and Ferny Mazola have not been seen for more than a decade but still have a strong likelihood of reappearing in a good year.

The only recorded indigenous plant species that have a high probability of having died out in the 100 Acres Reserve are Prickly Starwort (*Stellar pungent*) and Showy Violet (*Viola betonicifolia*).

Of the plant species recorded in 100 Acres, a unique species of tussock-grass (*Poa*) is listed as a species that appears to be undecided and is similar in appearance to Common Tussock-grass (*Poa* sp.aff.*labillardierei*) and warrants recognition as a species new to science. If this *Poa* is found to be very rare and threatened with extinction in the long term in accordance with the Precautionary Principal adopted by the United Nations this would mean that the *Poa* should be treated as being of national significance.

The most significant plant species within 100 Acres listed as 'vulnerable' in Victoria are the orchids Wine-lipped Spider orchid (*Caladenia oenochila*), Cobra Greenwood (*Psterostylis grandiflora*) and two are listed as 'rare in

Victoria but not otherwise considered threatened' (Walsh and Stajsic 2007) and include the (Danonong Range variant) Dandenong Ranges Cinnamon Wattle (*Acacia leprosa*), and Pale-flowered Cransebill (*Geranium* sp).

Sixteen plant species recorded in 100 Acres in the past twenty years are rare in the greater Melbourne as judged by having no more than ten localities listed in the standard text, 'Flora of Melbourne' (Gray & Knight 2001), and two Brushy Needlewood (*Hakea decurrens*) and Yam Daisy (*Microseris scapigera* spp.agg) are suspected of being potentially rare or threatened in Manningham. Another 32 species not seen in the 2009 ecological assessment of 100 Acres or were in such low numbers that the species are at risk of dying out. These species low populations make all of them vulnerable to pollination factors as well as other risk factors such as drought and climate change.

The ecological well being of a bushland area diminishes as the number of indigenous plant species declines, because diversity helps bushland to:

- Provide habitat for fauna, some of which help maintain vegetation health,
- Resist weed invasion,
- Adapt to variable conditions, and
- Recover from events such as flood and fire.

A capacity to adapt to change is particularly important if climate continues to change as scientists predict. Good stewardship of the long-term viability of bushland therefore requires conservation of plant species that are scarce and at risk of disappearing, even if those species are not rare or threatened more widely.

8.2. Fauna

The vegetation communities within the 100 Acres Reserve provide habitat for an extensive variety of birds, mammals, frogs, reptiles and butterflies. Appendix 5 includes a list of all available observational records of fauna from 100 Acres and adjacent properties, supplemented with entries for fauna recorded within one kilometre that may occasionally visit the Reserve or fly over it. Introduced species are also included. Few bats were recorded in 100 Acres as no trapping surveys were undertaken and a target survey for bats is recommended.

At least 160 fauna species have been recorded in 100 Acres since the late 1970's. Of these the only fauna species that regularly occurs in the Reserve and is listed as threatened under the Fauna and Flora Guarantee Act 1988 is the Powerful Owl (*Ninox strenua*).

The scarcity of Common Ringtail Possums (*Trichosurus vulpecula*) in 100 Acres is probably due, at least in part, to harvesting by the Powerful Owl, which would have to hunt over a much wider area than the reserve to meet its needs. There is a moderate chance that the reserve has a large tree hollow that would suit breeding by a Powerful Owl. This species has been known to make use of a specially constructed nest box so it would be desirable to include a nest box specifically designed for the Powerful Owl.

The only other species that regularly occurs in the 100 Acres Reserve and is listed by the Land Conservation Council (1994) as rare in the eastern half of their

administrative 'Melbourne Area' is the Buff-banded Rail (*Gallirallus phillirallus*). This species periodically takes up temporary residence in the vicinity of the Reserve's wetlands.

The White-lipped Snake (*Drysdalia coronoides*), treated as rare but not otherwise threatened within northeastern metropolitan Melbourne, was observed in 100 Acres in 1999 and there is a reasonable chance of it persisting there, even though it was not observed in the 2009 ecological study. Subject to scientific assessment other species such as the Varied Sittella, Black Wallaby and Victorian Smooth Froglet may also be threatened with disappearance from the municipality.

Many fauna species have not been seen for more than a decade. This can be partly attributed to the prolonged, severe drought; e.g. waterbirds are not visiting as much while the wetlands are dry and many nomadic birds and butterflies may not be visiting because plants do not flower as well during drought. Some other species have not been recorded for many years because they are only vagrants or rare visitors to Park Orchards. The visitation rate of some species (e.g. Satin Bowerbird, (*Passer violaceus*)) is so low naturally that it is not surprising that they go unseen for over a decade.

There are certainly signs of a declining trend in the diversity of birds in 100 Acres since the 1970s. Indigenous species that were resident in the reserve in 1970's but have rarely been observed since then include the White-faced Heron (*Egretta novaehollandiae*), Australian Hobby (*Falco longipennis*), Painted Button-quail (*Turnix varia*), Fan-tailed Cuckoo (*Cacomantis flabelliformis*), Southern Boobook (*Ninox novaeseelandiae*), Tree Martin (*Hirundo nigricans*), Spotted Quail-thrush (*Cinclosoma punctatum*), Yellow-rumped Thornbill (*Acanthiza chrysorrhoa*), Striated Pardalote (*pardalotus striatus*), White-eared Honeyeater (*lichenostomus leucotis*), White-plumed Honeyeater (*lichenostomus penicillatus*) and Australian Raven (*Corvus coronoides*). These species have also been in decline throughout the eastern suburbs, so the causes of the decline are not necessarily related to anything that has changed in 100 Acres.

Alongside the decline of some species, there is a regional rise in the incidence of some other species, particularly parrots, the Noisy Miner and Crested Pigeon. Yellow-tailed Black-Cockatoos were once recorded as 'rarely observed' list but are now abundant in Park Orchards in some years. Noisy Miners, in particular pose a risk of becoming so abundant as to displace smaller species of bird. Little Corellas, Long-billed Corellas and Crested Pigeons are rapidly extending their range into the eastern suburbs and have become abundant within a few kilometres of 100 Acres, so they are bound to appear in the Reserve even though no records were found in the present study.

Despite the substantial changes that have occurred to 100 Acres bird fauna, they do not seem to provide impetus for any shift in management practices. They simply amplify the importance of managing the vegetation to provide optimum habitat for fauna and to minimise detrimental impacts.

8.2.1 Aquatic Habitat

The Reserve's wetlands and gullies are populated by at least four species of frog. The abundance of frogs is presently limited due to nutrient contamination of the Green Dam and by drought in the Austin Seven dam. This could be alleviated if the outlet drain of the Austin dam was raised to retain more water for longer.

The wetlands also provide habitat for many insects that have an aquatic stage in their lifecycle, which provides food for animals higher in the food chain, such as frogs, birds and bats. The Green Dam (the only surface water present in the reserve) attracted White-striped Freetail Bats (*Nyctinomus australis*) and a higher concentration of birds than other areas in the reserve because of the availability of food and water. The dense vegetation on the southwestern edge of the green dam provides important cover and perching sites for birds.

8.2.2 Tree Hollows

The scarcity of large trees means that there are unnaturally few tree hollows. Consequently, the reserve cannot fully support many animals that depend on hollows or fissures for nesting or roosting. This has reduced the number of bird and bat species that would otherwise be found in the area. However, some hollow-dependent species breed in the area, e.g. various parrots and the White-striped Freetail Bat.

Feral bees and Mynas occupy some of the Reserve's tree hollows, making them unavailable for native wildlife.

The erection of bat boxes and nest boxes could partly compensate for the shortage of natural hollows, but they should be regularly monitored each spring and summer to evict pest species. It would be desirable to include a nest box specifically designed for the Powerful Owl.

The reduced abundance of full-sized trees is a limiting factor for wildlife that relies on such trees and the hollows that they develop. The clearing that removed the original tree cover has caused much wider ecological problems, including:

- A canopy of young eucalypts that are unnaturally dense (except where orchards and the pine plantation once were), leaving less space, soil moisture and nutrients for understorey plants than in a pristine environment,
- A consequent upset in the natural balance between plant species (as well as the associated fauna), e.g. proliferation of Burgan (*Kunzea ericoides*) at the expense of other species,
- Ingress of environmental weeds, exacerbated by the introduction of livestock, and
- The likely loss of sensitive species of flora and fauna, such as Spider-orchids.

While the density of eucalypts in most of the Reserve's forest is higher than in a pristine site, the scrub of Burgan and wattles to the north, east and south of the homestead ruins contains very few eucalypts. This is a problem because the wattles and Burgan are overly dominant in the absence of eucalypt competition and the vegetation cannot make progress toward a more natural forest with better wildlife habitat. Planting of some eucalypts in these areas would help correct this problem. The ecological burns of 14 April 2007 also demonstrate that cutting and burning of Burgan can provide an opportunity for removing scrub.

The reduced abundance of tree hollows for roosting and nesting of indigenous flora can be artificially compensated by the installation of nest boxes, as long as they are regularly monitored to allow eviction of pests such as feral bees.

8.2.3 Terrestrial and Avian Habitat

The variety and ecological condition of vegetation in the 100 Acres Reserve meet the requirements for a reasonable diversity of birds and terrestrial wildlife. However, only hardy terrestrial fauna remain. The scarcity of terrestrial species such as reptiles and small mammals can probably be attributed to the reserve's modest size and the accumulated impact of dogs and cats over many years. Even when dogs and cats do not prey on terrestrial wildlife, their presence tends to displace native animals to areas where dogs and cats do not go.

The high incidence of dogs walked off lead throughout 100 Acres Reserve significantly diminishes the potential habitat value of the reserve's forest and wetlands. Even dogs on lead displace birds more than humans on their own (Banks and Bryant, 2007). This is particularly important at locations and times of year that might otherwise be used for breeding.

The drought is a likely cause of the reduced diversity of honeyeaters and butterflies in the Reserve in recent years. Their food plants have not been flowering as well as in wetter years.

The density of fallen logs and branches in the 100 Acres Reserve provides the sort of cover needed by reptiles and invertebrates. For most terrestrial fauna, cover is of similar importance to food.

8.3. Pest Plants and Animals

8.3.1 Environmental Weeds

Weeds are kept well under control in most of the 100 Acres and are an ongoing task for Council's Bushland Crew and the 100 Acres Friends Group. No weed species were rated in the highest category of severity in *The One Hundred Acres Ecological Assessment (2009)*. The scientific and common names of weed species are listed according to their approximate abundance and severity in each type of vegetation in Appendix 3.

Due to past land uses Creeping Buttercup (*Ranunculus repens*), Yorkshire Fog (*Holcus lanatus*) and Japanese Honeysuckle (*Lonicera japonica*) have caused the greatest ecological harm smothering vegetation throughout the Creekline Herb-rich Woodland. Environmental weeds have been rampant for decades in these areas and represent a serious threat to this 'vulnerable' EVC and a substantial proportion of the site's significant plant species. All riparian vegetation is significant for its critical role in maintaining stream ecology, wildlife corridors and waterway protection and an urgent effort is required to control these species and associated weeds around a few patches of rare plants including Hookers Fescue (*Austrofestuca hookeriana*), Soft water fern (*Blechnum minus*), Common Rasp-fern (*Doodia australis*) and Lanky Goodenia (*Goodenia elongata*).

Six other weed species which require urgent control within the different vegetation communities in the 100 Acres Reserve include White-sallow Wattle (*Acacia floribunda*), Sallow Wattle (*Acacia longifolia* subsp. *lonifolia*), Sweet Vernal-grass (*anthoxanthum odoratum*), Bridal Creeper (*Asparagus aparagoides*), Boneseed (*Chrysanthemoides monilifera* ssp. *Monilifera*), Montpellier Broom (*Genista monspessulana*), Hawthorn (*Crataegus monogyna*) and Jointed Rush (*Juncus articulatus*). Blackberry (*Rubus anglocandicans*) has been decimated by drought over the past decade,

amplifying the effectiveness of chemical control and the absence of the extremely serious environmental weed, Sweet Pittosporum (*Pittosporum undulatum*) in 100 Acres is due to ongoing control work.

8.3.2 Rabbits

The impact of grazing and digging by rabbits in the 100 Acres Reserve is minor, due to rabbit control measures undertaken taken by Manningham City Council. However, excavation of rabbit burrows can pose a significant risk to native vegetation, particularly rare plants in the Creekline Herb-rich Woodland and rabbit control measures should be limited to those that cause minimal risk to native vegetation.

8.4. Other Influences

8.4.1 Drought

Drought conditions in all but two years since 1997 have had several pronounced effects on vegetation including:

- The eucalypt canopy and the ground flora has thinned noticeably;
- Some previously widespread and common species' abundance reduced to about 1% or less of what they had been in 2002;
- Many other plant species had been markedly reduced over the same period; and
- Species of damp or swampy ground have been worst affected.

The impact of climate change on the 100 Acres will require ongoing monitoring of the Reserve's vegetation. The need to intervene can be identified in a developing ecological problem to assist in park management and respond better to the way the vegetation is found to change over time. 'Adaptive management' has a well recognised role in the management of natural areas.

8.4.2 Eucalypt Dieback Disease and Nutrient Pollution

Eucalypts in some areas of the 100 Acres Reserve have suffered from eucalypt dieback disease, particularly near the ceremonial stone and plaque in the reserve's west downhill from the Green Dam; and uphill from the corner of Berringa Rd and Wirth Rd. However, the tree canopy in the latter two of these areas is presently affected by drought and in some cases the effects of ecological burning conducted in April 2007, making it too difficult to determine the contribution of dieback disease to tree deaths and the unhealthy canopy.

Factors that contribute to eucalypt dieback disease include infestations of Bell Miners and excessive soil nutrients. Excessive soil nutrients near the southern boundary around the Green Dam and behind about six properties facing Arundel have promoted rampant growth of nutrient-loving weeds such as Creeping Buttercup (*Ranunculus repens*), Japanese Honeysuckle (*Lonicera japonica*) and Yorkshire Fog (*Holcus lanatus*). Nutrients pollution also smothers and displaces indigenous plants in the Creekline Herb-rich Woodland.

A colony of Noisy Miners has been reported visiting the north western corner of the Reserve. If they become resident, they pose a risk of precipitating eucalypt dieback as a result of the interaction with leaf-eating pests and other birds.

9. FIRE MANAGEMENT

The management of fire in 100 Acres Reserve is complex and involves mitigating fire risk and understanding fire behaviour to ensure human safety and asset protection and is an important factor for maintaining forest health and diversity of indigenous flora. The last wildfire in 100 Acres Reserve was in 1962. Since this time a number of controlled burns have been undertaken in the reserve for the purposes of fuel reduction, weed management and maintaining ecological health.

Fire management was highlighted as an issue in 100 Acres Community Survey (2008) and following Black Saturday, 7 February 2009 bushfires, further concern was raised by residents adjoining the Reserve of the posed fire risk by the Reserve.

The City of Manningham Wildfire Prevention and Preparedness Plans WPPP's) for Bushland Reserves, Context and Methodology (2009) and its companion document, *The 100 Acres Reserve WPPP (2009)* prepared for Manningham City Council have assessed areas of Council bushland Reserves/open space which pose a wildfire risk.

The 100 Acres Reserve BPPP recommends fire management strategies, objectives and actions for the Reserve based on environmental considerations, risk analysis modelled on fire behaviour and scientific fuel based assessment considerate of asset protection and sound management practice. *The 100 Acres Reserve WPPP* has been prepared to inform the development of the 100 Acres Reserve Management Plan.

It is important to recognise that although the bushland reserves can be managed to limit the detrimental impacts of fire within and immediately surrounding them, the fire risk of bushland reserves cannot be eliminated. Management of bushland is only one determinant of wildfire outcomes in the wider community. A number of higher level treatments support fire management in reserves, including land use planning and building approval controls, generic community education, emergency response planning and arrangements and provision of recovery services.

9.1. Relevant Legislation, Policy and Plans

The Council's wildfire prevention responsibilities derive from the Country Fire Authority Act, 1958 and are to take all practical steps (including burning) to prevent the occurrence of fires on, and minimise the danger of spread of fires on and from land under its control or management. It is CFA's role to superintend and enforce fire prevention and to report any failure by a public authority or municipal council to properly carry out their duties. The CFA may also appoint a Municipal Fire Prevention Committee (MFPC) to undertake a range of functions including advising Council on the existence and management of hazards, and making recommendations in the preparation of the Municipal Fire Prevention Plan.

The Municipal Fire Prevention Plan must:

- Identify areas, buildings and land use in the municipal district which are at particular risk of fire,
- Specify how each risk is to be treated, and
- Specify who is responsible for treating those risks.

The CFA Act also requires Council to appoint a Municipal Fire Prevention Officer (MFPO) (*CFA Act, s.96A*) and provides Council and the MFPO with certain legal protections when acting in good faith.

The Manningham *Municipal Fire Prevention Plan 2006-10* specifies the development of fire Management Plans for bushland areas.

A small area bordering the 100 Acres Reserve comes under the *Metropolitan Fire Brigades Act, 1958*. Responsibilities under this act are to take all practical steps (including burning) to prevent the occurrence of fires on, and minimise the danger of spread of fires on and from land under its control or management.

Fire Management Planning in Victoria is currently being reformed through the Integrated Fire Management Planning (IFMP) initiative. Whilst this will not alter Council's legislative responsibilities, it is likely to change the planning process and structures, with increased emphasis on cross-tenure planning, risk assessment, community engagement, performance monitoring, and consistency of terminology and plan format.

It is anticipated that the Wildfire Prevention and Preparedness Plans will eventually replace the Municipal Fire Prevention Plan 2006-10.

9.2. Current Management

The most recent Fire Management Plan for the 100 Acres Reserve was produced in 2004 (Harry and Hester). The plan considered the overall fuel hazard in the Reserve to be moderate and the threat of fire to neighbouring properties low due to the existing Fire Management Zones (FMZs) with the exception of 200 Berringa Road.

The primary fuel management treatment recommended was fuel reduction burning, and the report divided the 100 Acres Reserve into 14 burn areas and classified each as one of five fire management zones as per the Code of Practice for Fire Management on Public Lands, 1995 (DSE, 1995). In addition, other fuel management techniques were considered in the burns area including slashing, debarking and weed removal.

9.3. Fire Management Works

Vegetation management that contributes either directly or indirectly to fire management is undertaken by several sections within the Council including the bushland crew, tree felling crew and mowing crew. Any hazard management needs to be sensitive to the ecological values of the Reserve.

All of the native vegetation in 100 Acres is ecologically adapted to fire of low to extreme intensity. Some of the plant species, such as Kopata (*Pelargonium inodorum*) only appear in a few years following a fire. A number of fuel reduction burns have been conducted since the Harry and Hester (2004) report. In 2007 MCC and the CFA successfully conducted prescribed burns in two areas of 100 Acres resulting in the germination of a large range of indigenous plants.

Fuel Management Zones (FMZs) maintained by Council in the 100 Acres Reserve are shown in Figure 8. These FMZs are maintained by mechanical slashing, hand mowing and hand weeding. The maintenance of the FMZs occurs as part of the routine maintenance of the Reserve, with slashing and hand mowing occurring at least twice each year, usually once before and once during the fire season.

Some debarking of trees occurred in the northeast corner as recommended by Harry and Hester (2004) and in the southwest corner. Debarking will reduce the quantity of material available to produce embers and will therefore assist in the

control of planned burns and reduce ember attack on adjacent houses in the event of a wildfire.

Council has been undertaking significant weed management in the 100 Acres Reserve. In particular, removal and ongoing management of weeds such as Burgan (*Kunzea ericoides*), sweet vernal (*Anthoxanthum odoratum*) and blackberry (*Rubus anglocandicans*) is contributing to the reduction of the fuel hazard. It should be recognised, however, that the space vacated by these weeds is likely to be occupied by regenerating indigenous vegetation.

There is a comprehensive track network within the reserve. All vehicular tracks are suitable for small 4wd fire fighting vehicles (slip-ons). Whilst some sections of some tracks could carry larger tankers there are tight turns and unexpected constrictions in the width of tracks that could cause difficulties. It is understood that CFA have keys to all gates and that MCC and local CFA brigades undertake an annual inspection of the track network and maintain a Traffic Management Plan for the Reserve in case of wildfire.

There is good access to the reserve entrances via the public road network which also provides access to the dwellings backing onto 100 Acres. There are 48 buildings adjacent to the reserve and the surrounding residential area is reticulated.

There are a number of dams within the 100 Acres Reserve, but none are considered reliable supplies of fire fighting water. This may be due to the current long standing drought as both Green and Brown dams were considered viable fire fighting water supplies in 2004 (Harry and Hester,2004).

9.4. Risk Analysis

The fire risk analysis of the 100 Acres Reserve was modelled on fire behaviour and scientific fuel based assessment considerate of asset protection and sound management practice.



Figure 8. - Summary of Current Fire Management Work

9.4.1 Fire Hazard

The 100 Acres Reserve is set within a predominantly urban landscape. There is limited potential for an established fire to burn into the reserve and little potential for an ignition within the reserve to spread well beyond the reserve boundary.

Given the low likelihood of a major fire burning into the reserve, the most credible wildfire risk scenario is a fire that originates near the northern boundary and driven across the reserve towards the residences in Arundel Road and Berringa Road. In this scenario properties to the east and north of the reserve would be impacted upon by lower intensity backing or flanking fire.

Fire intensity was modelled across 100 Acres Reserve using the vegetation, fuel hazard and topography of the site. The weather and general fire conditions were represented by a set of scenarios defined by the credible direction of fire spread, length of fire run and forest fire danger index. The Ecological Vegetation Classes (EVCs) within the Reserve were sampled to assess the amount of fine fuel available for consumption by a wildfire.

Fuel samples were collected in accordance with the Overall Fuel Hazard guide. Comparison of the levels of surface, bark and elevated fuels to the expected steady state levels of these components for a given EVC indicated the potential for change in amount of fuel over time.

The fire behaviour modelling indicated that a fire spreading the full north-south length of the Reserve had a sufficient run to reach significant intensities particularly up slope. Flame lengths in the order of 11-12 metres were predicted.

Fire behaviour around the southern and eastern boundaries is moderated somewhat by the gentle down slopes, and will drop when the fire reaches the fuel reduced areas of the Fire Management Zone (FMZ) of the Southern Fire Break.

9.5. Exposure and Vulnerability

The values exposed to wildfire in the 100 Acres Reserve include:

9.5.1 Lives of visitors of the Reserve and immediate neighbours

The 100 Acres Reserve is used extensively by short duration visitors. The size of the reserve and complexity of the track network means there is some potential for users to be trapped by fire within the reserve.

There is less risk to people outside of the reserve due to the high survivability ratings of the adjacent homes if effectively defended and the ability to relocate into the 'urban' area.

9.5.2 Buildings within and adjacent to the reserve

There are 48 buildings adjacent to the Reserve. The threat to adjacent housing and its occupants was assessed in terms of the likely impact of the scenario test fire on buildings using two models: The Wildfire Management Overlay (WMO) and the Wilson House Survival Meter.

Setbacks required to minimise flame and radiant heat ignition of a structure setback were calculated for each EVC based on the vegetation type, fuel load and topography of 100 Acres. The setback was calculated for each fire scenario relevant to a particular EVC.

The analysis of setback distances shows that the Southern Fire Break provides adequate setback for the dwellings in Arundel Road. It is important that elevated fuel not be allowed to gradually reclaim the fire break, and attention is directed to the area behind 57-73 Arundel Road.

It is recommended that additional mowing be undertaken in the south east corner behind 175 Berringa Road which is located close to the reserve boundary and that elevated fuel is substantially thinned in front of 200 Berringa Road where there is no FMZ art present.

The western end of the Northern Fire Break could potentially be impacted upon by the most severe fire behaviour due to the run up out of the gully through Valley Grassy Forest, although the likelihood of this is low given prevailing fire wind directions. It is recommended that the Northern Fire Break be extended to the western boundary to provide additional protection to 7 and 8 Yeoman Court.

The setback rating results of the fire behaviour analysis assumes that Fire Management Zones have been maintained that are adequate to reduce fire intensity in the immediate vicinity of the house. The ratings show the impact that active defence has on house survival. It should be noted, however, that staying to defend a house during bushfire is inherently dangerous and requires comprehensive planning and preparedness.

9.5.3 Biodiversity Values

The *Valley Grassy Forest* and *Grassy Dry Forest* are fire dependent Ecological Vegetation Classes. It is considered unlikely that an unplanned fire would do significant damage to biodiversity values on site and ongoing exclusion of fire will have ecological impacts. Fire would have a greater impact on the *Creepline-Herb-rich Woodland* which is naturally damper and appears to have a greater weed infestation particularly in the eastern parts of the reserve. The main objective of a planned burning programme would be to achieve ecological outcomes.

9.5.4 Management Strategies

Bushland fire management in the City of Manningham is underpinned by a set of management principles that articulate how fire risk is managed. These principles complement those which govern fire management on adjacent Public land (DSE, 2006) and are consistent with the Manningham City Council Vision and Values, (2009-2013 Council Plan).

These principles and a common set of specific fire management objectives for bushland reserves enable a consistent approach across the various bushland reserves within Manningham.

A number of higher level treatments support fire management in reserves. These include land use planning and building approval controls, generic

community education, emergency response planning and arrangements, and provision of recovery services. Whilst these are not directly reserve fire management treatments their presence and effective implementation will be important to the outcome of a major fire involving any of Manningham's bushland reserves.

9.5.5 Fire Management Principles

Fire management principles outlined in the *City of Manningham Wildfire Prevention and Preparedness Plans for Bushland Reserves (2009)* are that:

- Fire Management Planning must address the threat of wildfire and provide for the achievement of integrated land management objectives;
- Fire Management Planning must satisfy Council's legal requirements;
- Fire management activities will be undertaken within a risk management framework;
- Fire management will be based on sound data, evidence and analysis and consultation with key stakeholders;
- Fire Management Planning and activities must be undertaken in a participative manner where the responsibility for reducing the likelihood and consequence of wildfire is appropriately shared between Council and private landholders and managers in recognition that outcomes are maximised when Council and citizens work cooperatively to solve problems;
- Council's Fire Management Planning will identify, assess and, as far as practical, mitigate potential environmental, social and economic risks associated with fire management on Council land. Fire management will aim to minimise impacts on natural and cultural values, where protection of human life and property is not compromised; and
- Council's Fire Management Planning and activities will be monitored for effectiveness and efficiency, and reported to the community through normal Council procedures.

9.5.6 Fire Management Objectives

Fire Management objectives outlined in *The 100 Acres Reserve Bushfire Prevention and Preparedness Plan (2009)* are:

- No unplanned fires within a reserve;
- No person should suffer injury or lose their life from wildfire in the reserve;
- Potential for damage to houses and infrastructure should be minimised;
- Fire management should protect and enhance environmental values within the reserve;
- Fire management should recognise and protect social and heritage values within the reserve; and
- The built and natural environment beyond the reserve should not suffer significant damage from a fire in the reserve.

10. VISITOR EXPERIENCES AND RECREATION OPPORTUNITIES

10.1. Community Survey (2008)

The 100 Acres Reserve Questionnaire 'Our Community Voice' was a self-completion questionnaire distributed to 408 households in the area surrounding 100 Acres in October 2008. The questionnaire was also distributed to the Wyena Pony Club and the Wyena Adult Riding Club and to major interest groups within Manningham including the 100 Acres Friends Group and Friends of Manningham Dogs and Cats.

'Have Your Say' signs inviting comments were placed at the entrances to the 100 Acres Reserve notifying visitors about the commencement of the review of the Management Plan. An article about the project inviting comments was also placed in the Manningham Matters and on Council's web site.

The questionnaire was designed to inform the community about the preparation of the 100 Acres Reserve Management Plan and ascertain how the 100 Acres is used by the local community, what attributes are valued by the community and ideas and issues which should be addressed in the Management Plan. Respondents were also given an opportunity to indicate if they wished to be involved in future consultation.

10.1.1 Survey Findings

The full results of the survey are shown in Appendix 6. Key findings are outlined below.

A total of 117 responses to the questionnaire were received during the six week survey period. The results highlighted the importance of the reserve's environmental and natural values to the local residents which provide a bushland experience for relaxation, walking, dog walking, nature appreciation and wildlife observation.

The 100 Acres Reserve is an extremely popular place to visit. Over three-quarters (75%) of the respondents surveyed visit on a regular basis throughout the week. Most people walked to the 100 Acres (86%) and most people visited during the daytime (64%) and almost a third (30%) of the respondents visited it in the evening.

Almost half of the respondents cited 'walking' (44%) as the main reasons for visiting the reserve, followed by dog walking (23%) and nature appreciation (18.5%). The 100 Acres Reserve is highly valued by the local community for its 'natural and environmental qualities' (39%) and is a quiet place for 'relaxing' (12%) which is 'close to home' (13%).

The majority of respondents (86%) felt safe when visiting the 100 Acres. Other respondents who indicated they did not feel safe when visiting the reserve cited the main reasons as 'dogs off lead', particularly large dogs, 'poor signage' and it 'feels lonely and isolated'.

Almost three-quarters of the respondents (72%) were satisfied with the existing dog controls. Almost an equal number of respondents owned a dog (56%) as those who do not own a dog (44%). The majority of respondents (93%) indicated that they were satisfied with the existing horse riding controls.

The survey results suggested there is a relatively high level of satisfaction in the management of the 100 Acres Reserve. The majority of respondents (79%) believe that 100 Acres is managed relatively well with almost half of the respondents (49.2%) rated management of the reserve as 'good' (41%) or 'excellent' (8.2%).

A third of the respondents indicated that they were dissatisfied with certain aspects of the reserve and cited 'signage', 'environmental management' 'pest/feral animals', 'pet management', 'fire management', and 'neighbouring land issues'.

10.2. Themes and Issues

The extent and detailed nature of the comments provided by the respondents reflected the importance of the 100 Acres Reserve to the local community and the strong affinity with the reserve. The themes and issues that emerged from the questionnaire can be broadly divided into the following groups:

- **The 100 Acres Reserve is highly valued by the local community as an important bushland reserve.**
Many respondents commented about the value of the 100 Acres Reserve such as 'I think the park is one of the best assets of the Park Orchards area. We use it almost everyday and it contributes greatly to our health and well being (both mentally and physically)', which supports the need to continue to maintain and protect the significant environmental qualities of the reserve for the enjoyment of existing and future visitors.
- **Fire Management Issues**
Several respondents were concerned about fire management within the reserve, particularly in regard to fuel reduction practices and potential fire hazard risks to adjoining properties..
- **Environmental Issues**
Rabbits were raised by some respondents as a constant major problem and there is a need for more resources for on-going weed and rabbit control.
- **Drainage Issues**
A couple of respondents indicated that there is a need to improve the dam water quality and control the septic run-off to effectively control weeds within the reserve.
- **Address existing dog issues, particularly enforce existing dog controls.**
Many respondents expressed that too many dogs are walked off lead, which impacted on sensitive bushland and caused conflict with other park users. Respondents indicated that Council's by laws are not enforced and there is a need to increase Ranger presence, provide better signage and install dog faeces bins to overcome the problem of dog droppings within the reserve particularly on paths.

Three respondents indicated that dogs should be allowed to be walked off lead, particularly on the outside perimeter track (horse trail) of the reserve. However a

mixture of horses and dogs off lead will need to be carefully considered as dogs off lead were identified as high risk in an independent risk review of the impact of horse riding along the Warrandyte River Reserve.

Almost three-quarters (74%) of the dog owners walked their dogs on the internal tracks within the reserve. The results suggest there will be a need to balance the provision of recreational opportunities and experiences appropriate to the natural environment and provide for protection of flora and fauna which the community so highly values.

- **Maintain and improve visitor facilities, particularly signage**
The community enjoys the natural character and charm of the reserve which should be maintained and protected. A number of respondents believed there should be no development with comments such as 'Leave our 100 Acres alone' and 'please don't over do it'. Whereas other people believed that minor improvements to the reserve including signage, path maintenance and more seating would enhance opportunities and encourage greater use of the reserve.

10.3. Further consultation

In October 2010 a further community survey was conducted of the same households surveyed in 2008 to gauge local opinion in relation to a proposal to allow dogs off lead on the perimeter path.

A total of 110 responses were received. 48.6% of the respondents supported relaxing the existing dog controls and cited the reason that more off lead areas would be appreciated. 51.4% of the respondents objected to the proposed dog controls and cited the existing and potential conflict with other park users and the impact of wildlife and vegetation.

10.4. Walking and Nature Appreciation Opportunities

Walking is an inexpensive exercise that can be undertaken by the majority of the population in a variety of settings. Walking is the most popular activity undertaken in Manningham. It is also the most frequently participated in and appeals to a wide range of people. Walking is an inexpensive exercise that can be undertaken by the majority of the population in a variety of settings. Many walking groups have developed within the municipality particularly over the past six years. Manningham Council hosts a nature walk in the 100 Acres Reserve as part of its Spring Festival in October each year. To foster community participation in walking Council also provides a list of walking groups and walking is further encouraged with the publication of the Walks in Manningham booklet.

The 100 Acres Reserve is a natural bushland enjoyed by the local residents for walking in association with nature appreciation and wildlife observation and is used by people with botanical and orthithological interests. The natural attributes of the reserve are highly valued by the local community and there are opportunities for interpretation and environmental education with community and school groups.

Access for people for limited abilities in some areas of the park is limited as the uneven nature of the clay surface of the existing path network is not suitable for people in wheelchairs, with prams or who are unsteady on their feet.

Continued and improved provision of sustainable nature-based recreation for the community and recognition of their attachment to the bushland area are important objectives for the future management of the Reserve. Walking, dog walking, horse riding and cycling will need to be managed to minimize the potential conflicts between different park users and adverse impacts on park values.

10.5. Dog Walking

Walking dogs within the 100 Acres Reserve is a popular community activity and dogs are permitted on lead on all the trails within the reserve. Domeney Reserve, the adjoining sporting and recreation reserve, is designated a dog off lead area (outside times required for sport and maintenance requirements) provided dogs under effective control and not within 15 metres of:

- Children's play equipment, and
- A permanent barbeque facility; or
- A sporting event.

Dog ownership provides social, physical, psychological and health benefits for pet owners and has important benefits for society as a whole. Dog ownership provides companionship and gives immense pleasure without the demand of human relationships. Research has indicated that there are links between pet ownership and better health. Dogs enhance preventative health measures in the community through companionship, exercise which contribute to better cardiovascular health. Dog ownership also helps to build social networks within the community, creating opportunities for greater social interaction.

However the need to address existing dog controls emerged as an issue from the ecological assessment of the reserve, results from the 100 Acres Reserve Community Survey (2008) and discussions with members of Manningham Dogs and Cats (FOMDAC) and is discussed below.

Feedback from 100 Acres Reserve Community Survey (2008) revealed that the majority of respondents supported the existing on lead dog controls, however many respondents indicated that the existing controls are not adhered to and not enforced. Many dogs are walked off lead, which has caused detrimental impacts on sensitive vegetation, diminished the reserve's habitat value and caused conflict with other park users. In a further survey (2010) 51% of respondents objected to relaxing dog controls to allow dogs off lead on the perimeter path.

Research into the impact of dog walking in bushland areas and the 100 Acres Ecological Assessment (2009) highlighted that:

- Dogs can displace wildlife and even dogs on lead can displace birds more than humans on their own which decreases opportunities for wildlife observation particularly birdlife. The reserve's Black Wallabies are the most vulnerable, particularly when dogs are off lead. Lizards and small birds are also affected. The dams and more secluded parts of the forest are the most critical areas to minimise the presence of dogs for the benefit of wildlife,

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- Several of the internal trails pass through vulnerable vegetation communities with high conservation value and the presence of dogs can disrupt wildlife feeding and breeding and dog faeces can introduce additional nutrients which promote weed growth,
 - Dogs presently have a detrimental effect on rare plants in parts of the 100 Acres. The main effect from dogs within the reserve is not only from scratching when urinating or defecating, but also due to trampling and the chemical effects of urine and faeces on the vegetation. The problem is greatest in areas containing the most significant vegetation within the reserve. Many of the rarest plants, such as orchids, are tiny shallow-rooted and easily destroyed by a single scratch of a dog's paw. Their reproduction is already compromised by other factors, and a single footfall on a flower stem can eliminate a whole year's reproductive opportunity for that plant. This makes a big difference to those species represented by only a few plants.
 - A significant ecological benefit would be gained by excluding dogs from the most natural high quality conservation areas and that dogs on lead should be confined to designated trails within the reserve particularly larger paths and firebreaks.

Friends of Manningham Dog and Cats (FOMDAC) and sixteen submissions on the draft Management plan requested that dogs be permitted off lead on the perimeter track where horses and bicycles are permitted. A further survey of the same households was conducted to gauge local opinion about this proposal and is outlined in section 9.2 of the Management Plan.

FOMDAC stated that there are few off leash areas of a large size in the Warrandyte/Park Orchards area and the Warrandyte River Reserve is under enormous pressure as the only long continuous dog off-lead walk. However, an independent risk review undertaken for Council in 2004 of the impact of recreational horse riding along the Warrandyte River Reserve identified horse riding and dogs off lead as high potential risk exposure and dogs off lead were considered a high risk exposure to other park users.

FOMDAC agreed that significant conservation areas of good quality should be off limits to dogs with the exception of the perimeter track. FOMDAC recommended that bins should be installed at strategic locations within the reserve and education should be carried out by Rangers, with increased patrols.

Domeney Doggies, an informal dog walking group, uses the Domeney Reserve oval to exercise their dogs off lead. Currently the oval is closed for maintenance reasons. The dog walkers were informally surveyed and provided the following comments:

- 90 per cent of the group were in favour of the perimeter path being off lead,
- Most believed only off lead for 'voice recall' dogs. i.e. dogs come when called, and
- Realisation that irresponsible dog owners in the 100 Acres Reserve are making it difficult for others and hard to police rules about voice recall.

In accordance with the Manningham Council Order under the Domestic (Feral & Nuisance) Animal Act 1996 that requires all dogs to be on lead unless within a designated off lead area.

- If a dog is off lead and in a public place, then the dog is still said to be under effective control if the following applies,
- The dog is in close proximity to the person. Allowing a dog to be a distance of greater than 50 metres from the owner may allow for the breakdown in communication with that dog. The dog may also impact on other users of that open space,
- The dog is in sight of the person, and
- The person handling the dog can demonstrate satisfactorily to an authorised person that the dog will immediately respond to their commands.

Management of dog walking in the 100 Acres Reserve is required to enable a balance between continued dog walking use in selected areas, minimising the conflict between park visitors and protection of the significant flora and fauna values of the Reserve which the community so highly values. Increased Ranger presence and signage to clarify dog controls will be required, particularly at the beginning and end of paths. Bins should be provided at the major entrances, including Berringa Road and Villanova Road entrances to the reserve to overcome the problem of dog droppings, particularly on paths.

10.6. Horse Riding Access

The designated horse trail in 100 Acres is part of Manningham's horse trail network and provides a circuit for riders. To protect significant vegetation horse riding is permitted on the perimeter track located on the north, west and southern boundaries of the reserve and along Berringa Road to the east. The track is separated from the remainder of the reserve by a sighter wire fence. Horse riding access to the reserve is at the north and south entrances on Berringa Road.

Anecdotal evidence and community survey findings indicate horse riding usage within the reserve is relatively low. However levels of use may change particularly as young families move into the eastern half of the municipality between Warrandyte and Park Orchards providing opportunities for horse ownership and participation.

The Manningham Horse Riding Strategy advocates the progressive assessment and management of identified trail links and circuits to improve the quality and safety of trails and to allow a range of environmental management techniques to be implemented. Sustainable riding links require a balance between environmental safety and access concerns based on an assessment of botanical values, existing trail alignment, rider motivations and destinations, soil types, drainage, road safety sight lines and trail surfacing.

Management practices of the perimeter trail have worked well to reduce the environmental impacts of horse riding within the reserve. The success of works such as weed control and erosion works introduced at 100 Acres since 1997 is considered to provide a model of management for implementation elsewhere throughout Manningham's horse trail network.

10.7. Cycling

The informal paths within 100 Acres are important to continue the bushland experiences valued by the local residents. The park is mainly used for walking and walking dogs; however in recent years, mountain bike activities have increased in the park, which has led to soil erosion, vegetation damage along some of the paths and conflict with other park users.

Management of mountain biking will be required, given the small size and carrying capacity of the park, the high natural values of the area and the high levels of pedestrian use. Cycling should be confined to all management vehicular tracks within the park which will allow cycling access through the park for local use.

Mountain bike opportunities for a sustainable mountain bike trail and a BMX facility are being investigated by Parks Victoria with the Mullum Mullum Park.

11. INFRASTRUCTURE AND FACILITIES PATH NETWORK

11.1. Path Network

The path network within the 100 Acres Reserve provides a unique bushland experience valued by the local residents and visitors alike. The path network ranges from three metre wide fire break tracks for fire and maintenance management purposes to narrow bushland paths in an enclosed forest setting approximately 0.5-1 metre wide.

Most of the path network within the reserve comprises unmade paths which have a predominantly natural appearance. The objective of these paths is to provide an experience that is as 'natural' as possible, while protecting fragile soils and significant flora from the effect of concentrated foot traffic.

In some situations crushed rock can be mixed into the natural soil to provide a better wearing surface which is also less slippery without going to the cost of a crushed rock path. Alternatively stabilised soil can be used.

The trail network needs to be rationalised to protect significant vulnerable vegetation communities and flora and fauna species within the reserve and minimise conflicts between users. Many vulnerable plant species grow close to the trails and a significant ecological benefit would be gained by confining dogs to designated trails on larger paths and fire breaks. The existing horse riding use on the perimeter trail should be maintained.

The proposed classification of the path network within the 100 Acres Reserve is based on Manningham's Park Design Guide classification of paths within reserves and includes:

- Management vehicular tracks;
- Horse trail (on the management vehicular track on the perimeter of the reserve);
- Unsealed paths (crushed rock or dirt paths, 1.2-1.5m wide);
- Unmade paths (located in undisturbed bushland, natural appearance, dirt surface, construction has been kept to a minimum to avoid environmental damage. maximum 1m wide); and
- Proposed path closures (unused paths to be closed for environmental reasons).

Access for people of all abilities is relatively limited within 100 Acres due to the relatively steep gradient within the reserve and the uneven surface of existing trails which are not suitable for people in wheelchairs, with prams or who are unsteady on their feet.

Organised events held within the 100 Acres Reserve are required to apply to Council and must comply with a set of conditions for the use of the reserve in relation to litter, noise and repair of damage to the reserve. The number of events should be confined to the environmental capacity of the reserve.

11.2. Future Link to Yanggai Barring Linear Park

Council's Public Open Space Strategy (2004) (currently being reviewed), identifies the 100 Acres Reserve as a future link to the Yanggai Barring Linear Park. The Linear Park extends from the City of Maroondah in Warranwood to the 100 Acres Reserve in Park Orchards.

A path system has been developed along the section managed by the City of Maroondah in consultation with the Friends of Yanggai Baring and a Management Plan is currently being prepared for the Yanggai Barring Linear Park within the City of Manningham.

11.3. Boardwalks/Crossing Points

There are 3 boardwalks within the 100 Acres Reserve which are in poor condition and will need to be replaced. The Austin Seven Dam boardwalk should be upgraded. The Swamp Gum Gully boardwalk on the northern fire break needs to be removed and replaced with either a bridge or culverts. The Tadpole Dam boardwalk should be removed and the track closed for environmental reasons. Construction of new boardwalks must comply with Australian standards and minimise environmental and cultural impacts.

11.4. Roads within the 100 Acres Reserve

The north section of Berringa Road separates the 100 Acres from the reserve extension between Berringa and Wirth Roads. Wirth Road is only accessible to emergency vehicles. The Wirth Road Reserve extends to a minor drainage line and consequently the road itself is located in the open space reserve rather than the road reserve. There is an opportunity to integrate Wirth Road and the road reserve into 100 Acres to improve management arrangements within the park. It is desirable that Council investigate the closure of the northern section of Berringa Road and inclusion of the road reserve into the 100 Acres Reserve.

11.5. Signage/Interpretation

In 2002 an interpretation facility was constructed at the Arundel Road entrance to the 100 Acres Reserve and in 2005 a major interpretation facility was constructed at the Domeney Reserve as the major entrance to 100 Acres.

The remaining signage within the reserve is very poor and needs to be updated and improved. Signs are required to provide visitor information explaining the designated dog controls and directional, regulation and prohibition information. The signage should be located at entry and strategic points within the reserve and the existing interpretive signs located along the designated nature trail should be updated to enhance visitors' enjoyment and environmental appreciation of the area's significant natural assets.

11.6. Seating

The provision of new seating within the 100 Acres Reserve is seen as an important, way of increasing recreation opportunities for users, particularly providing for nature appreciation. Seating allows people to rest and enjoy the natural and peaceful

surroundings of the reserve. Old and unusable seats should be removed and replaced.

11.7. Fencing

There is a need to repair the existing sighter wire fence along some sections of the designated horse trail and along the path of the proposed new dog prohibited area. Acceptable styles of boundary fencing include open style agricultural fencing or cyclone wire fencing for maintenance purposes and visual amenity.

11.8. Car Parking

Visitors to the main entrance to the 100 Acres Reserve use the existing car park at Domeney Reserve which was upgraded in 2006. The asphalt car park has a capacity for 25 cars and was developed as part of the implementation of the Domeney Reserve Management Plan. The Arundel Road entrance has no formal carpark, although there is space for approximately six cars.

11.9. Public Toilets

Visitors to the 100 Acres Reserve use the public toilets located in the Domeney Reserve pavilion. However there is poor signage directing visitors to these toilets as they are not visible from the Domeney car park major entrance to 100 Acres.

The stand alone public toilets located adjacent to the car park entrance to the 100 Acres Reserve were de-commissioned several years ago and are currently used to store sporting equipment for the local sporting clubs. These toilets, when operable were a continual problem with vandals damaging property, graffiti, breaking of bottles and dumping of rubbish. This was mainly due to the position and configuration of the building. i.e. the two rear brick walls of the building acted as a good screen from traffic and pedestrians.

When determining the location of public toilets good planning practices may include;

- Locating near events that generate the peak loading and frequency;
- Consider options to cater for peak demand;
- Integrate with other building, and
- Impact on users.

There is a need to improve signage to link the Domeney pavilion public toilets with Domeney car park major entrance to the 100 Acres Reserve. The unused existing public toilets should also be re-commissioned to cater for the increase in the levels of use of 100 Acres Reserve.

12. COMMUNITY AWARENESS AND INVOLVEMENT

The 100 Acres Reserve is recognised as a natural history resource used by people with botanical and ornithological interests. It also provides an important opportunity for ongoing environmental education, particularly with students attending St Anne's Catholic Primary School, which is located in close proximity to the Reserve.

The Friends of the 100 Acres Group has an interest and knowledge of the reserve. The group has contributed significantly to the ongoing management of the reserve and has worked closely with Council's Bushland Crew over many years. To foster 'community ownership' of the reserve it is important that the Friends Group continues to be supported and that younger generations and new park users are encouraged to become actively involved in the management reserve.

A Walking Guide to 100 Acres Flora and Fauna Reserve was produced in 1988, reprinted in 1992 and revised in 2005. The booklet provides environmental information at selected sites along the existing nature trail within the reserve and includes interpretation facilities constructed as the major entrance to 100 Acres from Domeney Reserve.

Unfortunately copies of the booklets were destroyed in a fire at the Council offices in 2009. There is a need to update and reprint copies of this brochure and investigate using Council Web for easy access to information about The 100 Acres Reserve to raise community awareness of the environmental significance of the reserve. The existing interpretation signage along the nature trail should be upgraded to add environmental appreciation to the visitor recreation experience. This is particularly important for children, who are generally experiencing less and less of nature from one generation to the next.

13. MANAGEMENT

13.1. Monitoring, Co-ordination and Review

The following areas within Manningham City Council are responsible for the management of the 100 Acres Reserve:

Economic and Environmental Planning

- Landscape and Leisure T- open space, recreation and strategic planning of Council's parks (including project management of the design and implementation of park management and development plans), and
- Economic and Environmental Planning Environment Team-environmental planning of conservation and environmental areas.

Parks and Recreation

- Landscape Maintenance Team-bushland maintenance, fire management, mowing and garden maintenance and horticulture and landscape maintenance,
- Tree Maintenance Team, and
- Park security.

Health and Local Laws

- Local laws Team-local laws patrols. i.e. dog 'on' and 'off' lead areas.

Civic Buildings - building maintenance for civic buildings and cleaning of public toilets/amenities/BBQ's.

Given the variety of Council service units who are responsible for the planning and management of the 100 Acres Reserve, it will be important to designate a team which is responsible for the overall co-ordination and implementation of the Management Plan. Presently the Landscape and Leisure Team within Economic and Environmental Planning has this responsibility for park Management Plans.

There is an opportunity to improve communication across all the responsible areas within Council. To facilitate this, it is recommended that as a minimum, an annual meeting is held with all responsible departments/units across Council to discuss the progress of the Management Plan, identify any new issues that may have arisen over the previous 12 months and to discuss any suggested strategies to address these.

14. REFERENCES

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APPENDICES AND SUPPORTING DOCUMENTS

APPENDIX 1

VEGETATION COMPOSITION

The vegetation composition of each of the four Ecological Vegetation Classes (EVC's) and the artificial wetlands present in the 100 Acres Reserve are described below and a list of the scientific and common names of plant species observed within each type of vegetation type are provided in Appendix 2. The descriptions of vegetation composition are ordered from the most water-dependant to the least.

Artificial Wetlands

The Brown Dam and the Austin Seven^{*} Dam held no water during spring 2008 to winter 2009, when this study was conducted. Both dams were populated mostly by indigenous wetland plants that have colonised with the aid of wind, water and waterbirds. Introduced plants represented a minority of the vegetation cover in these dams and there was no evidence of planting.

Most of the Green Dam contained shallow water and the whole dam was covered with a mixture of planted and wild wetland plants. The planted species are native to the Melbourne region but not all of them are locally indigenous. Wetland weeds made up a small proportion of the Green Dam's flora.

The Tadpole Dam was dry and covered with weeds, particularly Creeping Buttercup (*Ranunculus repens*).

The tiny southwestern wetland created in 1995 (or thereabouts) to filter runoff from Knees Rd was quite dry and the only survivors from the original planting were a few specimens of the hardy Tall Sedge (*Carex appressa*).

Wetlands are extremely dynamic environments, their vegetation composition changing dramatically as water levels rise and fall. The following descriptions of the natural vegetation in the Brown, Green and Austin Seven Dams should not be expected to remain current as water levels change.

Woody Plants: No trees, shrubs or vines grow in these wetlands.

Floating Aquatics: The fern ally, *Azolla pinnata*, was recorded in the Green Dam until the 1980s but is no longer present there, attributable to the drought. The only floating aquatic plant found during the present study was the duckweed, *Lemna disperma*, on the Green Dam.

Amphibious Species: The indigenous species, *Alisma plantago-aquatica*, *Juncus gregiflorus* and *Juncus sarophorus* are present to varying degrees in all the dams with natural vegetation. *Juncus gregiflorus* is abundant in the Brown Dam and the Austin Seven Dam, and moderately common in the Green Dam where it must compete with planted species such as the aggressive, non-indigenous *Schoenoplectus tabernaemontani* and *Bolboschoenus medianus*. *Alisma plantago-aquatica* currently dominates most of the Brown Dam, is

^{*} 'Austin Seven' is a name applied loosely to various types of car that have been popular for 'mud trial' racing since the sport was introduced to Australia at The 100 Hundred Acres in 1950, continuing there until 1975.

moderately abundant in the Green Dam and represented by only one individual in the Austin Seven dam. The following species occur naturally in two of these three dams and are likely to appear periodically in the third: *Alternanthera denticulata*, *Epilobium hirtigerum*, *Glyceria australis*, *Isolepis inundata*, *Juncus amabilis*, *Juncus holoschoenus* and *Persicaria decipiens*. Weeds represented a minority of the dam's flora in 2008-9 but a significant threat is posed by *Holcus lanatus* in all dams, as well as *Juncus articulatus* and *Paspalum distichum* in the Brown Dam.

Conservation Status: The EVC, 'Wetland Formation', is classified by the Department of Sustainability & Environment as 'Endangered', which is the highest category of threat. However, the department has advised that this rating should not be applied to wetlands in substantially man-made topography, as in the case of the dams at the 100 Acres Reserve. Nevertheless, the reserve's wetlands are providing worthwhile habitat for indigenous flora and fauna, representing effective surrogates for natural wetlands that have become severely depleted.

Creekline Herb-rich Woodland (EVC) Area: 3.1 ha

Quick Recognition: Identifiable as a corridor of *Eucalyptus ovata* and/or *Eucalyptus rubida* along a minor creek or drainage line flanked by Valley Grassy Forest, growing in alluvium which is often inundated but drains freely. Compared with the similar Swampy Riparian Complex (EVC 126) that occurs south of Park Orchards, intact examples of Creekline Herb-rich Woodland have more ferns (both species and individuals) and are more likely to contain *Acacia mearnsii*.

Position in the Landscape: This EVC occurs in narrow bands along minor creeks (often non-perennial), predominantly growing in alluvium. It sometimes extends slightly up adjacent slopes that face south or southeast (e.g. in the southeastern corner of The One Hundred Acres). It occurs in dissected terrain and is flanked by Valley Grassy Forest.

Tree Canopy: Normally dominated by *E. ovata*, but the Blackberry Gully upstream of the Austin Seven Dam is unusual in being dominated by *Eucalyptus rubida*. The heights of these trees in The One Hundred Acres reach over 20 m at maturity, which is at the upper end of the range for this EVC more generally.

Lower Trees: *Acacia melanoxyton* is abundant and *Acacia mearnsii* is scattered.

Shrubs: The more natural areas have a moderately dense shrub layer typically 3-5 m tall. Visibility is typically 10 m but quite variable. The shrub layer is dominated by *Ozothamnus ferrugineus* and has an abundance of *Coprosma quadrifida*, *Senecio minimus* and often *Acacia verticillata*. *Bursaria spinosa*, *Cassinia aculeata* and *Kunzea ericoides* are consistently present in moderate numbers and *Goodenia ovata* is dense in patches. *Leptospermum scoparium* is presently scarce but may become abundant after fire.

Vines: *Clematis aristata* is scattered through the Creekline Herb-rich Woodland. *Clematis decipiens* occurs as occasional outliers from the adjacent slopes.

Ferns: Moderately abundant in numbers of species and numbers of individuals – a characteristic feature of Creekline Herb-rich Woodland. *Pteridium esculentum* is abundant. The more natural areas include the following species: *Adiantum aethiopicum*, *Blechnum minus*, *Cyathea australis*, *Doodia australis*, *Hypolepis glandulifera* and *Polystichum proliferum*.

Ground Flora: Densely grassy and rich in herbaceous species of swampy ground. The dominant indigenous species form a patchwork of *Acaena novae-zelandiae*, *Carex appressa*, *Gahnia radula*, *Juncus gregiflorus* and *Pteridium esculentum*. Other indigenous species that are abundant (but with too little cover to be dominant) include *Dichondra repens*, *Isolepis inundata*, *Poa tenera* and *Schoenus apogon*. *Austrofestuca hookeriana*, *Blechnum minus*, *Centella cordifolia*, *Cyathea australis*, *Goodenia elongata*, *Hypolepis glandulifera*, *Polystichum proliferum* and *Ranunculus glabrifolius* are not abundant but serve as reliable indicators of Creekline Herb-rich Woodland. Weeds of damp ground, particularly *Lonicera japonica*, *Ranunculus repens* and *Holcus lanatus* are abundant in the Reserve's Creekline Herb-rich Woodland as a result of historical clearing, excavation and mud-bashing by Austin Sevens and motorcycles. Weeds have also replaced native vegetation where rabbit burrows have been recently dug up.

Conservation Status: Creekline Herb-rich Woodland in intact condition is extremely scarce in Manningham and the rest of the Melbourne region due to grazing, clearing for urban development and installation of drains and sewers. Overwhelmingly, the remaining vestiges are in poor ecological condition due to insensitive land use and the vegetation's vulnerability to environmental weeds such as those mentioned above. All riparian native vegetation is significant for its critical roles in maintaining stream ecology, wildlife corridors and waterway protection through its particular characteristics of shade, flood response, nutrient cycling and use by fauna. Without taking these factors into account, the Department of Sustainability & Environment gives the conservation status of Creekline Herb-rich Woodland as 'Vulnerable' in the Highlands Southern Fall bioregion. This is the second-highest level of threat recognised by the department.

Grassy Forest (EVC) Area: 1.7 ha

Grassy Forest has not previously been recognised to exist in Manningham because of its similarity to Valley Grassy Forest. However, the vegetation structure and plant species on the south-facing slope west of the Tadpole Dam are much closer to the vegetation widely regarded as Grassy Forest in the Dandenong Ranges than it is to Valley Grassy Forest in Manningham. Prior to the Department of Sustainability & Environment's acceptance of Grassy Forest as an EVC, this type of vegetation was classified within Herb-rich Foothill Forest.

Very shallow soil and low evapo-transpiration on a south-facing slope appear to be important factors allowing Grassy Forest to occur in the 100 Acres Reserve.

A small area of south-facing slope situated south of the homestead ruins and east-northeast of the Brown Dam may have once supported Grassy Forest. This area was partly planted with pines roughly a century ago, then cleared two or three decades ago. The regrowth following the removal of the pines is a scrub of wattles and Burgan, providing no evidence of which EVC pre-dated the pines. The area immediately north of the regrowth is too affected by dieback and historical agricultural use to allow one to be confident about whether it derives from Grassy Forest or Valley Grassy Forest adopts the conservative approach of treating this area as being Valley Grassy Forest, consistent with the middle and lower slopes of the rest of that hill.

Over one hectare of Grassy Forest in the 100 Acres Reserve is in extremely good ecological condition. Weeds are scarce except near the Reserve's western boundary.

Quick Recognition: The tree canopy comprises similar numbers of each of *Eucalyptus goniocalyx*, *Eucalyptus macrorhyncha*, *Eucalyptus obliqua* and *Eucalyptus radiata*.

Eucalyptus polyanthemos is absent (unlike Grassy Dry Forest) and so are *Eucalyptus melliodora* and *Eucalyptus rubida* (unlike Valley Grassy Forest). The shrub layer is mostly sparser than these other two EVCs, but this does not apply on the lower slope where there has been more historical disturbance of the vegetation. The ground layer is densely grassy and herbaceous (similar to Valley Grassy Forest), whereas the related Grassy Dry Forest has plenty of exposed ground. In their natural state, both Grassy Dry Forest and Valley Heathy Forest have more orchids than Grassy Forest.

Position in the Landscape: Downhill from Grassy Dry Forest (EVC 22). In the 100 Acres Reserve, Grassy Forest is located on a south-facing slope, but in cooler, higher rainfall areas it often occurs on slopes with other aspects.

Tree Canopy: Crowns just touch each other or overlap slightly, typically 17 m tall. The species are described two paragraphs up.

Lower Trees: Sparse, dominated by *Exocarpos cupressiformis*. Stunted *Acacia melanoxylon* are scattered and *Acacia pycnantha* is scarce.

Shrubs: Mostly sparse, but with *Kunzea* becoming dense on the lower slope where there has been greater historical disturbance. *Epacris impressa* is abundant but provides little cover overall. Species in moderate abundance include *Bursaria spinosa*, *Cassinia* species, *Correa reflexa*, *Daviesia leptophylla*, *Dillwynia cinerascens*, *Olearia myrsinoides* and *Platylobium obtusangulum*. *Tetradlea ciliata* is a characteristic species but is scarce.

Vines: Light twiners are fairly abundant and the more vigorous vine, *Clematis aristata*, is scarce. The light twiners include *Billardiera mutabilis* (ex *B. scandens*), *Comesperma volubile* and the parasite, *Cassytha pubescens*.

Ferns: *Pteridium esculentum* forms scattered patches, becoming denser on the lower slope. No other ferns were observed.

Creepers and Scramblers: Scattered. The most abundant species is *Hardenbergia violacea*, followed by *Veronica plebeia* and *Oxalis exilis/perennans*.

Ground Flora: Densely grassy in a layer typically 20 cm deep. *Joycea pallida*, *Poa morrisii* and *Poa sieberiana* dominate, interspersed with many other grass species (not all identifiable at the time of year when surveyed for this study) and a high abundance of *Lomandra filiformis* subsp. *coriacea*. *Xanthorrhoea minor* is characteristically present in moderate numbers. *Themeda triandra* is less abundant than in the Valley Grassy Forest. Interspersed among the grass tussocks is a fairly rich array of small herbaceous species (forbs) and the sub-shrubs *Acrotriche serrulata*, *Acacia aculeatissima*, *Gonocarpus tetragynus* and *Pimelea humilis*. The most abundant forbs are *Arthropodium strictum*, *Burchardia umbellata*, *Dianella admixta* and *Poranthera microphylla*. Other forbs in substantial numbers include *Brunonia australis*, *Helichrysum scorpioides*, *Hypericum gramineum*, *Lagenophora gracilis* and *Opercularia varia*. *Drosera whittakeri* is not very abundant, unlike Valley Grassy Forest. The orchids found in this study (in autumn) were *Glossodia major*, *Pterostylis melagramma*, *Pterostylis nutans* and *Pterostylis pedunculata*. Other orchids such as *Diuris* species are likely to be visible in spring. Moss and lichen is fairly abundant.

Conservation Status: The occurrence of Grassy Forest at the 100 Acres Reserve is apparently unique in Manningham, and the vegetation's extremely good ecological condition heightens its significance within the municipality. More widely, Grassy Forest's grassy, productive understorey has led to widespread degradation and clearing associated with

grazing by livestock. The bioregional conservation status is 'Vulnerable', according to the Department of Sustainability & Environment.

Valley Grassy Forest (EVC) Area: 23.ha

The boundaries between Valley Grassy Forest and Grassy Dry Forest in the 100 Acres Reserve were probably always indistinct and have been further obscured by the depletion of indigenous plants through drought, recent fires, historical clearing and dieback.

Quick Recognition: *Eucalyptus rubida* and *Eucalyptus melliodora* are conspicuous in the tree canopy (unlike Grassy Forest) and the other eucalypts present usually include *Eucalyptus obliqua*, *Eucalyptus radiata* or both (unlike Grassy Dry Forest). The ground layer is densely grassy and herbaceous whereas the related Grassy Dry Forest has a substantial proportion of exposed ground.

Position in the Landscape: In the Reserve, Valley Grassy Forest occurs downhill from Grassy Dry Forest (EVC 22). Elsewhere, it sometimes occurs downhill from Valley Heathy Forest (EVC 127), or on low ridges and hills where soil conditions are too mesic (conducive to plant growth) for Grassy Dry Forest to establish.

Tree Canopy: Crowns are separated slightly or just touching each other, typically 15-20 m tall. *Eucalyptus melliodora* and/or *Eucalyptus rubida* are always present, often mixed with *Eucalyptus macrorhyncha*, *Eucalyptus radiata* or *Eucalyptus obliqua*. *Eucalyptus goniocalyx* or *Eucalyptus polyanthemus* are often present near a transition toward Grassy Dry Forest.

Lower Trees: The sub-canopy tree layer is moderately dense. It is dominated by *Exocarpos cupressiformis* and has fairly abundant *Acacia melanoxylon*. *Acacia mearnsii* is the next most abundant species, followed by *Acacia pycnantha*, *Allocasuarina littoralis* and finally *Acacia implexa*.

Shrubs: Moderately dense in the least modified areas, with *Kunzea* becoming dense in areas where there has been greater historical disturbance. *Bursaria spinosa* is abundant. *Cassinia aculeata*, *Cassinia arcuata*, *Dillwynia cinerascens*, *Epacris impressa* and *Platylobium obtusangulum* are present in moderate density throughout. Shrubs that are conspicuous in some areas but not others include *Acacia verticillata*, *Cassinia longifolia*, *Coprosma quadrifida*, *Hovea heterophylla*, *Olearia myrsinoides* and *Prostanthera lasianthos*.

Vines: *Rubus parvifolius* is a good indicator of this EVC but it is scarce in the 100 Acres. As in much of the region over recent years, *Pandorea pandorana* has colonised the Reserve and *Clematis decipiens* has become abundant. *Clematis aristata* remains at naturally low abundance. The light twiners, *Billardiera mutabilis* (ex *B. scandens*) and *Comesperma volubile* are common. The vigorous parasitic vine, *Cassytha melantha*, is dense in two small areas.

Ferns: Patches of *Pteridium esculentum* are fairly abundant. *Adiantum aethiopicum* is also common on the lower slopes. No other ferns were observed.

Creepers: Moderately dense, the most abundant species being *Dichondra repens*, *Hardenbergia violacea*, *Bossiaea prostrata*, *Hydrocotyle laxiflora*, *Veronica plebeia* and (following fire) *Viola hederacea*.

Ground Flora: The ground flora of the more natural areas of Valley Grassy Forest in the Reserve is dense, grassy and rich in species, with many lilies and orchids. *Lomandra longifolia* is the dominant ground flora species on the lower slopes, while *Themeda triandra*

and *Gahnia radula* tend to dominate elsewhere. Other abundant grass species include *Austrodanthonia racemosa*, *Austrodanthonia tenuior*, *Austrostipa rudis*, *Joycea pallida*, *Microlaena stipoides*, *Poa morrisii* and *Poa sieberiana*. The grass-like *Lomandra filiformis* subsp. *coriacea* and *Lomandra filiformis* subsp. *filiformis* are also abundant.

As in the case of Grassy Forest, interspersed among the grass tussocks is a fairly rich array of small herbaceous species (forbs), *Senecio* species (particularly *Senecio hispidulus*) and the sub-shrubs *Acrotriche serrulata*, *Acacia aculeatissima*, *Gonocarpus tetragynus* and *Pimelea humilis*. The lilies *Arthropodium strictum*, *Burchardia umbellata*, *Dianella admixta* and *Tricoryne elatior* are abundant, as are *Drosera whittakeri*, *Lagenophora gracilis* and *Poranthra microphylla*. Other forbs in substantial numbers include *Brunonia australis*, *Dianella longifolia*, *Helichrysum scorpioides*, *Hypericum gramineum*, *Opercularia varia*, *Ranunculus lappaceus* and *Thysanotus patersonii*. The orchids found in this study were *Pterostylis melagramma*, *Pterostylis nutans* and *Pterostylis pedunculata*. Other orchids have been recorded in the Valley Grassy Forest and Grassy Dry Forest at The One Hundred Acres in previous years but the locations are not recalled well enough to determine in which EVC.

Mosses vary from being dense (in the case of *Dicranoloma billarderi* south of the homestead ruins) to sparse. *Hypnum cupressiforme* and *Thuidiopsis furfurosa/sparsa* are consistently present.

Conservation Status: Valley Grassy Forest is one of the best conserved EVCs in Manningham, but more widely, its grassy, productive understorey has led to widespread degradation and clearing associated with grazing by stock. The bioregional conservation status is 'Vulnerable', according to the Department of Sustainability & Environment.

Grassy Dry Forest (EVC 22) Area: 11.4ha

Quick Recognition: On high ground with sparse ground flora (other than moss). The tree canopy contains abundant *Eucalyptus polyanthemos*, often mixed with *Eucalyptus macrorhyncha* and *Eucalyptus goniocalyx* and sometimes with *Eucalyptus rubida*, but not *Eucalyptus obliqua* or *Eucalyptus radiata*.

Position in the Landscape: On the tops of stony hills and ridges, extending somewhat down the adjacent slopes (except for aspects in the southern quadrant).

Tree Canopy: Crowns are slightly separated or just touch. Eucalypts are typically 15 m tall at maturity. Species composition is as described above.

Lower Trees: Sparse, strongly dominated by *Exocarpos cupressiformis* and with *Acacia mearnsii* conspicuous at some locations. *Acacia implexa*, *Acacia melanoxylon* and *Acacia pycnantha* are scattered thinly.

Shrubs: Areas of regrowth following soil disturbance contain dense *Kunzea*, e.g. on the former orchard rows near the homestead ruins. Otherwise, patches of shrubs typically 2 m tall interrupt broad open areas. *Kunzea* and *Bursaria spinosa* are the dominant larger shrubs, accompanied by smaller numbers of *Acacia genistifolia*, *Acacia leprosa*, *Acacia paradoxa*, *Cassinia aculeata*, *Cassinia arcuata*, *Cassinia longifolia* and *Leptospermum continentale*. The post-fire coloniser, *Acacia myrtifolia*, is abundant in the southwestern area burned on 14th April 2007 and can be expected to dwindle to very few plants by 2012. A cluster of three *Hakea decurrens* from two generations is an unusual feature, perhaps associated with numerous planted specimens on a neighbouring property.

There is also a layer of lower shrubs, principally comprising *Correa reflexa*, *Daviesia leptophylla*, *Dillwynia cinerascens*, *Epacris impressa*, *Hibbertia obtusifolia* (a characteristic species) and the shrubby herb, *Senecio hispidulus*. *Tetratheca ciliata* is scattered and was probably more abundant prior to the past decade of drought.

Vines: *Clematis decipiens* is fairly common, having increased its abundance in recent years. The light twiner, *Billardiera mutabilis* (ex *B. scandens*) and the parasitic twiner, *Cassytha pubescens*, are fairly abundant. The vigorous vine, *Pandorea pandorana*, has invaded the vegetation from its former range in the high-rainfall forests of the hills to the east.

Creepers: Moderately dense, the most abundant species being *Hydrocotyle laxiflora*. Other abundant species are *Bossiæa prostrata*, *Dichondra repens*, *Geranium* sp.2, *Hardenbergia violacea*, *Veronica plebeia* and (following fire) *Kennedia prostrata* and *Viola hederacea*. The characteristic species, *Astroloma humifusum*, is present but scarce.

Ferns: No ferns were observed, a natural condition for this form of Grassy Dry Forest.

Ground Flora: Sparse apart from moss; grassy with abundant forbs. *Hypnum cupressiforme* is the most abundant of many moss species. Other than mosses, *Joycea pallida* dominates the ground flora. Other abundant grass species include *Austrodanthonia racemosa*, *Austrodanthonia tenuior*, *Austrostipa rudis*, *Lomandra filiformis* subsp. *coriacea*, *Lomandra filiformis* subsp. *filiformis*, *Microlaena stipoides*, *Poa sieberiana* (not *Poa morrisii*) and *Themeda triandra*. *Xanthorrhoea minor* and the sedges, *Lepidosperma laterale* and *Lepidosperma gunnii*, are patchy in distribution but fairly abundant overall.

Most of the forbs and sub-shrubs are in common with Grassy Forest and Valley Grassy Forest. The sub-shrubs are *Acrotriche serrulata*, *Acacia aculeatissima*, *Gonocarpus tetragynus* and *Pimelea humilis*. The lilies *Arthropodium strictum* and *Dianella admixta* are abundant, but other lily species are noticeably less conspicuous than in Valley Grassy Forest. The other abundant ground flora species are *Drosera whittakeri*, *Gonocarpus tetragynus*, *Lagenophora gracilis* and *Poranthera microphylla*. Other forbs in substantial numbers include *Brunonia australis*, *Crassula decumbens*, *Helichrysum scorpioides*, *Hypericum gramineum*, *Opercularia varia*, *Stackhousia monogyna* and *Thysanotus patersonii*. Scattered through the more natural areas of Grassy Dry Forest is a range of orchids in the genera *Caladenia*, *Calochilus*, *Diuris*, *Eriochilus*, *Genoplesium*, *Pterostylis* and *Thelymitra* (although many of these were not detected during the present study due to drought).

Conservation Status: Grassy Dry Forest is better conserved than most EVCs in Manningham. The bioregional conservation status is 'Least Concern', according to the Department of Sustainability & Environment.






APPENDIX 2

INVENTORY OF INDIGENOUS PLANTS

The table below indicates the presence of wild indigenous species of flowering plants, ferns, mosses and liverworts in the various vegetation types within the 100 Acres Reserve, condensed from all available historical data and thirteen lists compiled in this study. At the end of that table is a list of planted species.

Species are ordered alphabetically by their scientific names, using the same nomenclature as the Census of Vascular Plants of Victoria (Walsh and Stajsic 2007).

Colour-coding indicates significant species as follows:

	A species that appears to be undescribed (<i>Poa</i> sp. aff. <i>labillardierei</i>);
	Species listed by Walsh and Stajsic (2007) as rare or threatened in Victoria;
	Species that have no more than ten localities listed in the standard text, ' <i>Flora of Melbourne</i> ' (Gray & Knight 2001);
	Species that are regarded as potentially rare or threatened in Manningham.
	Population details of plant species that are seriously scarce in the reserve but not widely

The columns beneath the heading, 'Vegetation Type', represent:

Grassy Dry Forest: EVC 22;
Valley Grassy Forest: EVC 47;
Grassy Forest: EVC 128;
Creekline H.W'land: EVC 164, Creekline Herb-rich Woodland;
Wetland: The former farm dams.

Within those columns, the symbols have the following meanings:

- D Dominant (or sharing dominance) within the relevant vegetation stratum, at least in part of the EVC;
- M Many individuals within the EVC but with too little foliage cover to be dominant;
- ✓ Present in moderate numbers, not dominant within a vegetation stratum;
- Scarce.

Where a species occurs in a particular EVC only as an occasional outlier of a main population in an adjacent EVC, the outliers are given no entry in the table.

The column headed 'Historical Records' indicates the year of the most recent record of species that were not detected during the 2008-9 fieldwork. Often, the location of a historical find is not known accurately enough to determine the associated vegetation type(s) and the abundance of the species is unknown.

Wild Species

Scientific Name	Common Name	Vegetation Type					Historical Records
		Grassy Dry Forest	Valley Grassy Forest	Grassy Forest	Creekline H. W/land	Wetland	
Ferns and Fern Allies							
<i>Adiantum aethiopicum</i>	Common Maidenhair		✓		✓		
<i>Azolla pinnata</i>	Ferny Azolla					✓	1983
<i>Blechnum minus</i>	Soft Water-fern				-		
<i>Cyathea australis</i>	Rough Tree-fern				✓		
<i>Doodia australis</i>	Common Rasp-fern				-		
<i>Hypolepis glandulifera</i>	Downy Ground-fern				-		
<i>Polystichum proliferum</i>	Mother Shield-fern				✓		
<i>Pteridium esculentum</i>	Austral Bracken		✓	✓	M		
Flowering Plants							
<i>Acacia aculeatissima</i>	Thin-leaf Wattle	✓	✓	✓			
<i>Acacia genistifolia</i>	Spreading Wattle	✓		-			
<i>Acacia implexa</i>	Lightwood	-	-				
<i>Acacia leprosa</i> (Dandenong Range variant)	Dandenong Range Cinnamon Wattle	✓	-				
<i>Acacia mearnsii</i>	Black Wattle	M	✓		-		
<i>Acacia melanoxylon</i>	Blackwood	✓	M	✓	D		
<i>Acacia myrtifolia</i>	Myrtle Wattle	✓					
<i>Acacia paradoxa</i>	Hedge Wattle	✓	✓				
<i>Acacia pycnantha</i>	Golden Wattle	✓	✓	-			
<i>Acacia verticillata</i>	Prickly Moses	-	✓	-	D		
<i>Acaena echinata/ovina</i>	Sheep's Burr	-	✓				
<i>Acaena novae-zelandiae</i>	Bidgee-widgee		✓		D	✓	
<i>Acrotriche serrulata</i>	Honey-pots	M	M	✓			
<i>Alisma plantago-aquatica</i>	Water Plantain				-	D	
<i>Allocasuarina littoralis</i>	Black Sheoak		✓				
<i>Alternanthera denticulata</i>	Lesser Joyweed				-	D ¹	
<i>Arthropodium milleflorum</i>	Pale Vanilla-lily		✓	-			
<i>Arthropodium strictum</i>	Chocolate Lily	M	M	M			
<i>Asperula conferta</i>	Common Woodruff		-				
<i>Astroloma humifusum</i>	Cranberry Heath		-				
<i>Austrodanthonia caespitosa</i>	Common Wallaby-grass		✓				
<i>Austrodanthonia eriantha</i>	Hill Wallaby-grass	-	✓				
<i>Austrodanthonia fulva</i>	Leafy Wallaby-grass		✓				
<i>Austrodanthonia penicillata</i>	Slender Wallaby-grass		-				
<i>Austrodanthonia racemosa</i>	Clustered Wallaby-grass	D	M				
<i>Austrodanthonia setacea</i>	Bristly Wallaby-grass	✓	✓				
<i>Austrodanthonia tenuior</i>	Purplish Wallaby-grass	✓	M	-			
? <i>Austrodanthonia tenuior</i> × <i>Joycea pallida</i>	Hybrid grass	-					
<i>Austrofestuca hookeriana</i>	Hooker Fescue				✓		

¹ At least some of the *Alternanthera denticulata* in the Green Dam are probably planted.

Scientific Name	Common Name	Vegetation Type					Historical Records
		Grassy Dry Forest	Valley Grassy Forest	Grassy Forest	Creekline H. W/land	Wetland	
<i>Austrostipa pubinodis</i>	Tall Spear-grass	✓	✓				
<i>Austrostipa rudis</i> subsp. <i>rudis</i> ²	Veined Spear-grass	M	M	✓	-		
<i>Billardiera mutabilis</i>	Common Apple-berry	✓	✓	✓			
<i>Bossiaea prostrata</i>	Creeping Bossiaea	✓	✓				
<i>Brunonia australis</i>	Blue Pincushion	✓	✓	✓			
<i>Bulbine bulbosa</i>	Yellow Bulbine-lily	✓	✓				
<i>Burchardia umbellata</i>	Milkmaids	✓	M	M			
<i>Bursaria spinosa</i>	Sweet Bursaria	D	D	✓	✓		
<i>Caesia parviflora</i>	Pale Grass-lily	✓	✓	✓			
<i>Caladenia carnea</i>	Pink Fingers	-	-	-			
<i>Caladenia gracilis</i>	Musky Caladenia			-			2007
<i>Caladenia oenochila</i>	Wine-lipped Spider-orchid		-				
<i>Caladenia praecox</i>	Early Caladenia						
<i>Caladenia transitoria</i>	Eastern Bronze Caladenia			-			
<i>Calochilus robertsonii</i>	Purplish Beard-orchid	-					2005
<i>Carex appressa</i>	Tall Sedge				✓	D ³	
<i>Carex breviculmis</i>	Short-stem Sedge	-	✓		-		
<i>Cassinia aculeata</i>	Common Cassinia	✓	✓	-	✓		
<i>Cassinia arcuata</i>	Drooping Cassinia	✓	✓	-			
<i>Cassinia longifolia</i>	Shiny Cassinia	✓	✓	✓			
<i>Cassytha melantha</i>	Coarse Dodder-laurel		-				
<i>Cassytha pubescens</i>	Downy Dodder-laurel	✓	✓	M			
<i>Centella cordifolia</i>	Centella		-		-	✓	
<i>Chamaescilla corymbosa</i>	Blue Stars			-			
<i>Clematis aristata</i>	Mountain Clematis		✓	-	✓		
<i>Clematis decipiens</i>	Small-leafed Clematis	✓	M		-		
<i>Comesperma volubile</i>	Love Creeper		✓	✓			
<i>Coprosma quadrifida</i>	Prickly Currant-bush		✓		D		
<i>Correa reflexa</i>	Common Correa	✓		✓			
<i>Corunastylis despectans</i>	Sharp Midge-orchid						2001
<i>Cotula australis</i>	Common Cotula	✓	✓				
<i>Craspedia variabilis</i>	Variable Billy-buttons	-					
<i>Crassula decumbens</i>	Spreading Crassula	✓	✓				
<i>Crassula sieberiana</i> s.l.	Sieber Crassula	-					
<i>Danthonia</i> – see <i>Austrodanthonia</i>							
<i>Daucus glochidiatus</i>	Austral Carrot						1983
<i>Daviesia leptophylla</i>	Narrow-leaf Bitter-pea	✓	✓	✓			
<i>Deyeuxia quadriseta</i>	Reed Bent-grass	✓	✓	-			
<i>Dianella admixta</i>	Black-anther Flax-lily	M	M	M			
<i>Dianella longifolia</i> s.l.	Pale Flax-lily		✓		-		
<i>Dichelachne rara</i>	Common Plume-grass	✓	-	✓			
<i>Dichondra repens</i>	Kidney-weed	✓	M	-	M		
<i>Dillwynia cinerascens</i>	Grey Parrot-pea	M	M	✓			
<i>Diuris chryseopsis</i>	Golden Moths	-		-			
<i>Diuris pardina</i>	Leopard Orchid	-					

² A past record of *Austrostipa rudis* subsp. *nervosa* is regarded here as unreliable because the same list did not include the abundant *Austrostipa rudis* subsp. *rudis*.

³ At least some of the *Carex appressa* in the Green Dam is probably planted.

Scientific Name	Common Name	Vegetation Type					Historical Records
		Grassy Dry Forest	Valley Grassy Forest	Grassy Forest	Creekline H. W/land	Wetland	
<i>Diuris pardina</i> x <i>sulphurea</i>	a hybrid Diuris	-					
<i>Drosera peltata</i> subsp. <i>auriculata</i>	Tall Sundew	-	✓	✓			
<i>Drosera whittakeri</i>	Scented Sundew	M	M	✓			
<i>Elymus scaber</i>	Common Wheat-grass		✓				
<i>Epacris impressa</i>	Common Heath	M	✓	M			
<i>Epilobium billardierianum</i> subsp. <i>cinereum</i>	Variable Willow-herb					-	
<i>Epilobium hirtigerum</i>	Hairy Willow-herb					M	
<i>Eriochilus cucullatus</i>	Parson's Bands	-					
<i>Eryngium vesiculosum</i>	Prickfoot				-		
<i>Eucalyptus goniocalyx</i>	Bundy, Long-leaf Box	D	D	D			
<i>Eucalyptus macrorhyncha</i>	Red Stringybark	D	D	D			
<i>Eucalyptus melliodora</i>	Yellow Box	-	D				
<i>Eucalyptus obliqua</i>	Messmate Stringybark		D	D			
<i>Eucalyptus ovata</i>	Swamp Gum		-		D		
<i>Eucalyptus polyanthemos</i>	Red Box	D	D				
<i>Eucalyptus radiata</i>	Narrow-leaf Peppermint	-	M	D			
<i>Eucalyptus rubida</i>	Candlebark	✓	D		M		
<i>Euchiton collinus</i>	Creeping Cudweed	-	M	-			
<i>Euchiton involucratus</i>	Common Cudweed				✓		
<i>Exocarpos cupressiformis</i>	Cherry Ballart	D	D	D			
<i>Exocarpos strictus</i>	Pale-fruit Ballart		-				
<i>Gahnia radula</i>	Thatch Saw-sedge	D	D		D		
<i>Galium propinquum</i>	Maori Bedstraw		-				
<i>Genoplesium</i> – see <i>Corunastylis</i>							
<i>Geranium gardneri</i>	Rough Cranesbill				✓		
<i>Geranium potentilloides</i>	Cinquefoil Cranesbill				✓		
<i>Geranium</i> sp. 2	Variable Cranesbill	✓	✓		✓		
<i>Geranium retrorsum</i> / sp. 3 ⁴	a Cranesbill		✓				
<i>Glossodia major</i>	Wax-lip Orchid	✓	-	✓			
<i>Glyceria australis</i>	Australian Sweet-grass					D	
<i>Gnaphalium indutum</i>	Tiny Cudweed	✓					
<i>Gompholobium huegelii</i>	Common Wedge-pea		-				
<i>Gonocarpus tetragynus</i>	Common Raspwort	M	M	M	✓		
<i>Goodenia elongata</i>	Lanky Goodenia		-				
<i>Goodenia ovata</i>	Hop Goodenia				✓		
<i>Hakea decurrens</i>	Bushy Needlewood	-	- ⁵				
<i>Hardenbergia violacea</i>	Purple Coral-pea	✓	✓	✓			
<i>Helichrysum luteoalbum</i>	Jersey cudweed	-					
<i>Helichrysum scorpioides</i>	Button Everlasting	✓	✓	✓			
<i>Hibbertia obtusifolia</i>	Grey Guinea-flower	✓					
<i>Hovea heterophylla</i>	Common Hovea	M	M	✓			
<i>Hydrocotyle foveolata</i>	Yellow Pennywort		✓		✓		
<i>Hydrocotyle laxiflora</i>	Stinking Pennywort	M	M		✓		

⁴ It is unclear whether *Geranium retrorsum* or *G. sp. 3* is the correct identity for plants in The 100 Acres. The latter is globally rare whereas the former is uncommon in Manningham but not throughout Victoria.

⁵ The cluster of *Hakea decurrens* in the reserve's northwestern corner is apparently associated with the many planted specimens just over the neighbour's fence.

Scientific Name	Common Name	Vegetation Type					Historical Records
		Grassy Dry Forest	Valley Grassy Forest	Grassy Forest	Creekline H. W/land	Wetland	
<i>Hypericum gramineum</i>	Small St John's Wort	✓	✓	✓	-		
<i>Hypoxis vaginata</i>	Sheath Star	✓	✓				
<i>Indigofera australis</i>	Austral Indigo		-				
<i>Isolepis hookeriana</i>	Grassy Club-rush		-		✓		
<i>Isolepis inundata</i>	Swamp Club-rush				✓	M	
<i>Isolepis marginata</i>	Little Club-rush	✓					
<i>Joycea pallida</i>	Silvertop Wallaby-grass	D	✓	D			
<i>Juncus amabilis</i>	Hollow Rush		-		✓	✓	
<i>Juncus bufonius</i>	Toad Rush		-				
<i>Juncus gregiflorus</i>	Green Rush				M	D	
<i>Juncus holoschoenus</i>	Joint-leaf Rush				-	✓	
<i>Juncus pallidus</i>	Pale Rush	-	-		-		
<i>Juncus sarophorus</i>	Broom Rush				✓	✓	
<i>Juncus subsecundus</i>	Finger Rush	✓	✓				
<i>Kennedia prostrata</i>	Running Postman	✓					
<i>Kunzea ericoides</i> spp. agg.	Burgan	D	D	D	✓		
<i>Lagenophora gracilis</i>	Slender Lagenophora	M	M	✓			
<i>Lagenophora stipitata</i>	Common Lagenophora		-				
<i>Lemna ?disperma</i>	Common Duckweed					✓	
<i>Lepidosperma gunnii</i>	Slender Sword-sedge	✓		-			
<i>Lepidosperma laterale</i>	Variable Sword-sedge	✓	✓	-			
<i>Leptospermum continentale</i>	Prickly Tea-tree	✓	✓				
<i>Leptospermum scoparium</i>	Manuka		-				
<i>Leucopogon virgatus</i>	Common Beard-heath	✓	✓	✓			
<i>Levenhookia sonderi</i>	Slender Stylewort	-					
<i>Linum marginale</i>	Native Flax		-				
<i>Lomandra filiformis</i> subsp. <i>coriacea</i>	Wattle Mat-rush	M	M	M			
<i>Lomandra filiformis</i> subsp. <i>filiformis</i>	Wattle Mat-rush	M	M	✓			
<i>Lomandra longifolia</i>	Spiny-headed Mat-rush		D		✓		
<i>Luzula meridionalis</i> var. <i>densiflora</i>	Common Woodrush	-					
<i>Luzula meridionalis</i> var. <i>flaccida</i>	Common Woodrush		✓				
<i>Lyperanthus suaveolens</i>	Brown Beaks						2001
<i>Lythrum hyssopifolia</i>	Small Loosestrife					-	
<i>Microlaena stipoides</i>	Weeping Grass	M	M	✓	✓		
<i>Microseris scapigera</i> spp. agg.	Yam-daisy	-					
<i>Olearia myrsinoides</i>	Silky Daisy-bush	✓	✓	✓			
<i>Opercularia ovata</i>	Broad-leaf Stinkweed		✓	✓			
<i>Opercularia varia</i>	Variable Stinkweed	✓	✓	✓			
<i>Oxalis exilis/perennans</i>	Wood-sorrel	✓	M	✓	M		
<i>Ozothamnus ferrugineus</i>	Tree Everlasting		✓				
<i>Pandorea pandorana</i> ⁶	Wonga Vine	✓	✓				
<i>Pelargonium ? inodorum</i>	Kopata		✓		D		
<i>Persicaria decipiens</i>	Slender Knotweed					✓	
<i>Pimelea linifolia</i>	Slender Rice-flower	✓	✓	✓			
<i>Pimelea humilis</i>	Common Rice-flower	M	✓	✓			

⁶ *Pandorea pandorana* only arrived in the eastern suburbs in recent years and is upsetting the ecology of many sites that it has colonised. It is questionable whether it should be regarded as indigenous in The One Hundred Acres.

Scientific Name	Common Name	Vegetation Type					Historical Records
		Grassy Dry Forest	Valley Grassy Forest	Grassy Forest	Creekline H. W/land	Wetland	
<i>Plantago varia</i>	Variable Plantain	✓	✓				
<i>Platylobium obtusangulum</i>	Common Flat-pea	✓	✓	✓			
<i>Poa ensiformis</i>	Purple-sheathed Tussock-grass		✓		✓		
<i>Poa labillardierei</i>	Common Tussock-grass		✓				
<i>Poa morrisii</i>	Soft Tussock-grass	-	✓	✓			
<i>Poa sieberiana</i> var. <i>sieberiana</i>	Grey Tussock-grass	M	✓	✓			
<i>Poa</i> sp. aff. <i>labillardierei</i> an	undescribed tussock-grass	✓					
<i>Poa tenera</i>	Slender Tussock-grass		-		✓		
<i>Poranthera microphylla</i>	Small Poranthera	M	D	✓	M		
<i>Prostanthera lasianthos</i>	Victorian Christmas-bush		✓				
<i>Pseudognaphalium</i>	- see <i>Helichrysum</i>						
<i>Pterostylis alpina</i>	Mountain Greenhood						2005
<i>Pterostylis concinna</i>	Trim Greenhood		-				
<i>Pterostylis grandiflora</i>	Cobra Greenhood		-				2007
<i>Pterostylis melagramma</i>	Tall Greenhood	✓	✓	✓			
<i>Pterostylis nana</i>	Dwarf Greenhood	-					1985
<i>Pterostylis nutans</i>	Nodding Greenhood	✓	✓	-			
<i>Pterostylis pedunculata</i>	Maroon-hood	-	-	-			
<i>Ranunculus glabrifolius</i>	Shining Buttercup				✓		
<i>Ranunculus lappaceus</i>	Australian Buttercup		✓				
<i>Rubus parvifolius</i>	Small-leaf Bramble	-	-				
<i>Schoenus apogon</i>	Common Bog-rush	M	M		M		
<i>Senecio glomeratus</i>	Annual Fireweed		-		-		
<i>Senecio hispidulus</i>	Rough Fireweed	M	M		✓		
<i>Senecio minimus</i>	Shrubby Fireweed		✓		D	-	
<i>Senecio prenanthoides</i>	Beaked Fireweed	✓	✓	✓			
<i>Senecio quadridentatus</i>	Cotton Fireweed	-	-				
<i>Solanum laciniatum</i>	Large Kangaroo Apple	-	✓		✓		
<i>Solenogyne dominii</i>	Solenogyne		✓	-			
<i>Solenogyne gunnii</i> ⁷	Solenogyne						?
<i>Spyridium parvifolium</i>	Australian Dusty Miller		✓				
<i>Stackhousia monogyna</i>	Candles	✓	✓	-			
<i>Stellaria pungens</i>	Prickly Starwort						1991
<i>Stipa</i>	- see <i>Auistrostipa</i>						
<i>Stylidium armeria/graminifolium</i>	Grass Trigger-plant	-		-			
<i>Tetralochea ciliata</i>	Pink-bells	-	-	-			
<i>Thelymitra arenaria</i>	Forest Sun-orchid	-					
<i>Thelymitra juncifolia</i>	Rush Sun-orchid						1974
<i>Thelymitra peniculata</i>	Trim Sun-orchid	-					
<i>Themeda triandra</i>	Kangaroo Grass	M	D	✓			
<i>Thysanotus patersonii</i>	Twining Fringe-lily	✓	✓	✓			
<i>Tricoryne elatior</i>	Yellow Rush-lily	✓	✓	✓			
<i>Veronica plebeia</i>	Trailing Speedwell	✓	✓	-			
<i>Viola betonicifolia</i>	Showy Violet						1983
<i>Viola ?cleistogamoides</i>	Hidden Violet						1991
<i>Viola hederacea</i>	Ivy-leaf Violet	✓	D	-	-		
<i>Wahlenbergia gracilis</i>	Sprawling Bluebell		✓				

⁷ Reported by council officer, Jane Pammer, without date or location.

Scientific Name	Common Name	Vegetation Type					Historical Records
		Grassy Dry Forest	Valley Grassy Forest	Grassy Forest	Creekline H. W/land	Wetland	
<i>Wahlenbergia stricta</i>	Tall Bluebell	✓	✓	✓			
<i>Wurmbea dioica</i>	Common Early Nancy	✓	✓	-			
<i>Xanthorrhoea minor</i>	Small Grass-tree	✓		✓			
<i>Xanthosia dissecta</i>	Cut-leaf Xanthosia	-	-	-			
Mosses and Liverworts							
<i>Barbula calycina</i>	Moss						1983
<i>Barbula crinita</i>	Moss						1983
<i>Breutelia affinis</i>	Common Breutelia		✓				
<i>Campylopus clavatus</i>	Broody Swan-neck Moss		✓	✓			
<i>Campylopus introflexus</i>	Heath Star Moss	✓	✓				
<i>Ceratodon purpureus</i>	Moss						1983
<i>Chiloscyphus semiteres</i>	Green Worms	-	✓	-	✓		
<i>Dicranoloma billarderi</i>	Moss		D	-			
<i>Fissidens taylorii</i>	Moss						1983
<i>Fossombronina pusilla</i>	Liverwort						1983
<i>Fossombronina sp.</i>	Liverwort						1983
<i>Frullania probosciphora</i>	Liverwort						1983
<i>Funaria hygrometrica</i>	Common Fire-moss	✓	✓				
<i>Gemmabryum crassum</i>	Thread Moss						1983
<i>Gemmabryum dichotomum</i>	Broody Bryum						1983
<i>Hypnum cupressiforme</i>	Common Hypnum	M	✓	✓			
<i>Lunularia cruciata</i>	Moonwort		-		✓		
<i>Orthodontium lineare</i>	Cape Thread-moss						1983
<i>Orthotrichum tasmanicum</i>	Moss						1983
<i>Polytrichum juniperinum</i>	Common Juniper-moss	✓	✓				
<i>Ptychomnion aciculare</i>	Paper Moss		-		-		
<i>Rosulabryum billarderi</i>	Common Thread-moss						1983
<i>Thuidium furfurosa/sparsa</i>	Weft Moss	✓	✓	✓			
<i>Tortula muralis</i>	Common Wall-moss						1983
<i>Triquetrella papillata</i>	Moss	-					

Planted Species





The following list has the same format as the one above. All species except the *Lythrum* were observed by the author in 2009. While all of the species are indigenous to the Melbourne area, most are not indigenous to Park Orchards.

Scientific Name	Common Name	Vegetation Type				
		Grassy Dry Forest	Valley Grassy Forest	Grassy Forest	Creekline H. Wetland	Wetland
<i>Austrofestuca hookeriana</i>	Hooker's Fescue				-	
<i>Bolboschoenus medianus</i>	Marsh Club-rush					M
<i>Crassula helmsii</i>	Swamp Crassula					M
<i>Lythrum salicaria</i>	Purple Loosestrife					-
<i>Myriophyllum crispatum</i>	Upright Milfoil					-
<i>Myoporum</i> sp.	Myoporum					-
<i>Poa labillardierei</i>	Common Tussock-grass		-		-	
<i>Schoenoplectus tabernaemontani</i>	River Club-rush					✓
<i>Viminaria juncea</i>	Golden Spray		-			

APPENDIX 3

INVENTORY OF ENVIRONMENTAL WEEDS

The table below shows the distribution, abundance and severity of all species of environmental weeds in bushland within the 100 Acres Reserve, in a similar manner to for indigenous species. The abundance of each species is indicated by the symbols in the grid cells as explained on page, and the severity is colour-coded as indicated below. However, no species was given the highest (red) rating.

-  Currently becoming denser and/or more widespread, to the extent that the vegetation's current value for indigenous flora or fauna is expected to suffer a very serious reduction within the next few years if new measures are not introduced to control this species. This excludes weeds that have already done such damage but are no longer actively and very seriously replacing the remaining indigenous flora and fauna.
-  Seriously diminishing the vegetation's value for habitat or protection of land and water by either causing active deterioration or preventing ecological recovery, or else likely to have such an effect within five years if preventative action is not taken.
-  Not as serious as above, but still causing (or likely to cause in future) significant diminution of the vegetation's value for habitat or protection of land and water, either by causing active deterioration or preventing ecological recovery.
-  Not representing any significant threat for the foreseeable future, e.g. weeds that are expected not to spread beyond the edges of paths and tracks.

Scientific Name	Common Name	Vegetation Type				
		Grassy Dry Forest	Valley Grassy Forest	Grassy Forest	Creekline H. W/land	Wetland
<i>Acacia baileyana</i>	Cootamundra Wattle	✓	✓			
<i>Acacia elata</i>	Cedar Wattle				–	
<i>Acacia floribunda</i>	White Sallow-wattle	✓	✓			
<i>Acacia leprosa</i> hybrid	a hybrid wattle	–	–			
<i>Acacia longifolia</i> subsp. <i>longifolia</i>	Sallow Wattle	✓	✓	–		
<i>Agapanthus praecox</i> subsp. <i>orientalis</i>	Agapanthus	–	–			
<i>Agrostis capillaris</i>	Brown-top Bent	–	–			
<i>Aira caryophyllaea</i>	Silvery Hair-grass	✓	✓			
<i>Aira elegantissima</i>	Elegant Hair-grass	✓	✓			
<i>Allium triquetrum</i>	Angled Onion		✓		✓	–
<i>Anagallis arvensis</i>	Pimpernel		✓			
<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass	D	M	–	M	
<i>Arbutus unedo</i>	Irish Strawberry Tree		–			
<i>Arctotheca calendula</i>	Cape Weed	–				
<i>Asparagus asparagoides</i>	Bridal Creeper	–	✓		–	
<i>Aster subulatus</i>	Aster-weed					–
<i>Billardiera heterophylla</i>	Bluebell Creeper	–				

<i>Briza maxima</i>	Large Quaking-grass	✓	✓	✓	✓
<i>Briza minor</i>	Lesser Quaking-grass	-	-		
<i>Bromus diandrus</i>	Great Brome	-	-		
<i>Bromus hordeaceus</i>	Soft Brome	-	-		
<i>Cardamine flexuosa/hirsuta</i>	Bitter-cress		-		
<i>Centaureum erythraea</i>	Common Centaury	✓	-		-
<i>Cerastium glomeratum</i>	Common Mouse-ear	✓	✓		✓
Chickweed					
<i>Chrysanthemoides monilifera</i> ssp. <i>monilifera</i>			-		
	Boneseed				
<i>Cirsium vulgare</i>	Spear Thistle		-		M
<i>Conyza</i> sp.	Fleabane				✓
<i>Conyza sumatrensis</i>	Fleabane		-		
<i>Cordyline australis</i>	New Zealand Cabbage Tree				-
<i>Cortaderia selloana</i>	Pampas Grass				-
<i>Cotoneaster glaucophyllus</i>	Cotoneaster	-	-		
<i>Cotoneaster pannosus</i>	Cotoneaster		-		
<i>Crataegus monogyna</i>	Hawthorn				✓
<i>Cyperus eragrostis</i>	Drain Flat-sedge				✓
<i>Cytisus scoparius</i>	English Broom	-	-		
<i>Dactylis glomerata</i>	Cocksfoot				✓
<i>Ehrharta erecta</i>	Panic Veldt-grass	✓	✓		✓
<i>Ehrharta longiflora</i>	Annual Veldt-grass	✓	-		
<i>Erica lusitanica</i>	Spanish Heath		-		
<i>Fraxinus angustifolia</i>	Desert Ash				-
<i>Freesia alba</i> x <i>leichtlinii</i>	Freesia	-			
<i>Fumaria bastardii</i>	Bastards Fumitory		-		
<i>Galium aparine</i>	Cleavers	-	✓		M
<i>Genista monspessulana</i>	Montpellier Broom	M	✓		
<i>Gladiolus undulatus</i>	Wild Gladiolus				-
<i>Grevillea</i>	Grevillea hybrids and cultivars		-		
<i>Hakea salicifolia</i>	Willow-leaf Hakea		-		
<i>Hedera helix</i>	Ivy				✓
<i>Helminthotheca echioides</i>	Ox-tongue				✓
<i>Holcus lanatus</i>	Yorkshire Fog		-		D
<i>Hypochoeris glabra</i>	Smooth Cat's Ear				✓
<i>Hypochoeris radicata</i>	Cat's Ear	-	✓	-	-
<i>Isolepis levynsiana</i>	Tiny Flat-sedge		✓		-
<i>Juncus articulatus</i>	Jointed Rush				✓
<i>Leontodon taraxacoides</i>	Hairy Hawkbit	-			
<i>Ligustrum lucidum</i>	Large-leaved Privet				✓
<i>Lolium perenne</i>	Perennial Rye-grass	-			
<i>Lonicera japonica</i>	Japanese Honeysuckle		✓		D
<i>Lotus uliginosus</i>	Greater Bird's-foot Trefoil				✓
<i>Melissa officinalis</i>	Common Balm				-
<i>Mentha spicata</i>	Spearmint				-
<i>Mentha</i> x <i>rotundifolia</i>	Apple Mint				-
<i>Oxalis incarnata/pes-caprae</i>	Soursob	✓	✓		-
<i>Paspalum dilatatum</i>	Paspalum				-
<i>Paspalum distichum</i>	Water Couch				✓
<i>Pennisetum clandestinum</i>	Kikuyu				-
<i>Phalaris aquatica</i>	Toowoomba Canary-grass				✓
<i>Pinus radiata</i>	Monterey Pine		✓	-	
<i>Pittosporum undulatum</i>	Sweet Pittosporum		✓	-	-
<i>Plantago lanceolata</i>	Ribwort	-	-		
<i>Potentilla indica</i>	Indian Strawberry				✓
<i>Prunella vulgaris</i>	Self-heal				✓
<i>Prunus cerasifera</i>	Cherry-plum	-	-		

<i>Pseudoscleropodium purum</i>	Golden Weft-moss	-	-		
<i>Ranunculus repens</i>	Creeping Buttercup			D	✓
<i>Rosa rubiginosa</i>	Sweet Briar	-	✓	-	
<i>Rubus anglocandicans</i>	Blackberry		-	✓	
<i>Rumex conglomeratus</i>	Clustered Dock		-	✓	-
<i>Rumex obtusifolius</i>	Broad-leaf Dock			✓	
<i>Solanum americanum</i>	Glossy Nightshade		-	✓	-
<i>Solanum nigrum.</i>	Black Nightshade		-	-	
<i>Solanum pseudocapsicum</i>	Madeira Winter-cherry			✓	
<i>Soliva sessilis</i>	Jo Jo	-	-		
<i>Sonchus oleraceus</i>	Sow-thistle	-	✓	✓	-
<i>Torilis arvensis</i>	Knotted Parsley			-	
<i>Tradescantia fluminensis</i>	Wandering Jew			✓	
<i>Trifolium campestre</i>	Hop Clover		-		
<i>Trifolium dubium</i>	Suckling Clover			-	
<i>Ulex europaeus</i>	Gorse (Furze)		-		
<i>Vicia tetrasperma</i>	Slender Vetch		-		
<i>Viola odorata</i>	Fragrant Violet		-	-	
<i>Vulpia bromoides</i>	Squirrel-tail Fescue	M	✓		
<i>Vulpia myuros</i>	Rat's-tail Fescue	M			
<i>Zantedeschia aethiopica</i>	White Arum Lily		-	✓	

APPENDIX 4

VEGETATION CONDITION RATING SCHEME

The ecological condition of native vegetation is mapped as shown in Figure 6 and described using an adaptation of the A-to-D scale of Lorimer (1997). This method measures the ecological condition of vegetation, but does not directly take into account other aspects of the Department of Sustainability & Environment's (2004) 'habitat hectare' method, namely logs, large old trees, the extent of contiguous native vegetation and connectivity to other areas of native vegetation.

This method relies on the observation that human modification of a natural environment generally causes a reduction in biodiversity (i.e. species and genetic variability) and a shift from native to introduced species. Plants are very good indicators of this process; indigenous plants tend to be replaced by weeds, and the total number of plant species declines.

This process goes through several stages. First, a few indigenous plant species that are sensitive to disturbance disappear, while most other species survive and reproduce. With greater disturbance, the number of lost indigenous species increases and some of the remaining ones struggle to reproduce, typically because their seedlings are out-competed by weeds. A stage may then arise where half or more of the indigenous species die out, leaving only hardy species that can survive against weed invasion and loss of the native fauna that provide pollination and pest control. If earthworks or similar activities are conducted, only the hardiest plants are likely to survive (such as isolated remnant trees in gardens), and these generally gradually decline because they cannot reproduce effectively (e.g. tree seedlings being mowed and pollen being too scarce).

This led the author to devise a scale from A to E based on the position of vegetation in the stages of degradation just described. The ratings are designed to be easily determined in the field, using criteria based on two factors:

- The number of indigenous plant species remaining compared with expectations of a pristine site of the same size and habitat type; and
- The ability of the indigenous species present to survive and reproduce.

The categories are:

Rating A: Contains almost all of the indigenous plant species that one could expect to occur in that type of vegetation (taking into account the size of the area). At least 80% of plant species are able to reproduce adequately to maintain their numbers. Very rare in suburban bushland.

Rating B: Contains at least half of the indigenous plant species that could be expected, but not reaching rating A due to loss of species or reproductive failure. Active management and some revegetation can usually raise the rating to A.

Rating C: Contains less than half of the indigenous plant species that could be expected, but more than about 20% (unless the vegetation structure is fairly natural). A range of indigenous life forms or vegetation strata are present, e.g. canopy trees, sub-canopy trees, shrubs and ground flora. Most of the indigenous plants are likely to be able to reproduce successfully.

Rating D: Contains less than half of the indigenous plant species that could be expected, frequently less than 20%, but the vegetation still conforms to the Department of Sustainability & Environment's criteria for a 'remnant patch', i.e. there is either a full tree canopy or else indigenous plants represent at least quarter of the understorey cover. Reproduction of most of the indigenous plants is usually seriously impeded. The complexity of vegetation structure is usually substantially reduced. These areas usually have value only for landscape and hardier wildlife.

Rating E: Not conforming to the Department of Sustainability & Environment's criteria for a 'remnant patch', i.e. the tree canopy cover is depleted or absent and indigenous plants represent less than quarter of the understorey cover.

In cases on the margin between two categories, attention is focused on the plant species that are expected to play the most important ecological role, such as the naturally dominant species in the overstorey and understorey. If the loss of biodiversity is particularly evident among the most ecologically important species, the lower ranking is assigned.

While this method for assessing ecological condition is based solely on plants, it can be expected to provide a reasonable indication of fauna habitat (and consequently fauna species), and overall genetic diversity.

The author also believes that the ecological condition scale above is a good workable indicator of the value of a site for conservation of biodiversity. Note that it differs from most indicators of vegetation 'quality' published elsewhere, in that it does not downgrade a site solely for the presence of weeds. For example, many Victorian wetlands have a relatively high density of weeds in a stable coexistence with high numbers of indigenous species. The ecological condition rating may be 'B' in such a case despite the weediness, because the indigenous plants are secure. A typical 'vegetation quality' indicator would rate such a site as being of poor quality because of the significant proportion of weeds.

The ecological condition scale above places value on conservation of biodiversity, not on naturalness. A site such as the one quoted above may disappoint people who value naturalness very highly, but that is a secondary consideration for the objectives of this report.

APPENDIX 5

FAUNA LIST

The following list includes all available observational records of fauna from the 100 Acres Reserve and adjacent private properties, supplemented with entries for fauna recorded within one kilometre that may occasionally visit the reserve or fly over it. The supplementary records appear in blue type. Butterfly records are only from Dr Lorimer, Mrs Falkingham and local naturalist, Dr David Hewitt, because the state fauna database does not include butterflies (other than species listed under the Flora and Fauna Guarantee Act 1988).

The column headed 'CAVS No.' lists the species' identification numbers in the Census of Australian Vertebrate Species.

Species whose names are preceded by an asterisk are introduced. Within each major fauna group (e.g. Birds), species are ordered according to the taxonomic sequence presently used by the Department of Sustainability & Environment, except that butterflies are ordered alphabetically.

The column headed 'No. Observers' indicates how many observers have reported each species. This gives a rough guide to how conspicuous the species has been. The column headed 'Historical Records' indicates the year of the most recent record of species that were not detected during the 2008-9 fieldwork. Records dated 1978 are from a list prepared by Mr Murray Bouchier from his eighteen prior years of birdwatching in the reserve, so some of them may be considerably older than 1978.

CAVS No.	Common Name	Scientific Name	No. Observers	Historical Records
Birds				
217	Musk Duck*	<i>Biziura lobata</i>	1	1997
202	Australian Wood Duck	<i>Chenonetta jubata</i>	5	
948	*Mallard	<i>Anas platyrhynchos</i>	1	2001
208	Pacific Black Duck	<i>Anas superciliosa</i>	5	
211	Grey Teal	<i>Anas gracilis</i>	1	1999
215	Hardhead*	<i>Aythya australis</i>	1	2001
61	Australasian Grebe	<i>Tachybaptus novaehollandiae</i>	2	2001
100	Little Pied Cormorant	<i>Phalacrocorax melanoleucos</i>	1	2001
97	Little Black Cormorant	<i>Phalacrocorax sulcirostris</i>	1	2001
106	Australian Pelican*	<i>Pelecanus conspicillatus</i>	1	1996
188	White-faced Heron	<i>Egretta novaehollandiae</i>	5	
189	White-necked Heron	<i>Ardea pacifica</i>	2	1988
	Unidentified Egret		1	1978
192	Nankeen Night Heron	<i>Nycticorax caledonicus</i>	3	1986
179	Australian White Ibis	<i>Threskiornis molucca</i>	3	
180	Straw-necked Ibis	<i>Threskiornis spinicollis</i>	3	1990
182	Yellow-billed Spoonbill	<i>Platalea flavipes</i>	2	1978
232	Black-shouldered Kite	<i>Elanus axillaris</i>	1	1978
228	Whistling Kite*	<i>Haliastur sphenurus</i>	1	1977
221	Brown Goshawk	<i>Accipiter fasciatus</i>	4	
222	Collared Sparrowhawk	<i>Accipiter cirrhocephalus</i>	1	1977
224	Wedge-tailed Eagle	<i>Aquila audax</i>	3	2000
225	Little Eagle	<i>Hieraaetus morphnoides</i>	3	1991

* If this record truly relates to The One Hundred Acres, it must have been only a fly-over or brief stop.

CAVS No.	Common Name	Scientific Name	No. Observers	Historical Records
239	Brown Falcon	<i>Falco berigora</i>	1	1991
235	Australian Hobby	<i>Falco longipennis</i>	1	1978
240	Nankeen Kestrel	<i>Falco cenchroides</i>	2	1999
46	Buff-banded Rail	<i>Gallirallus philippensis</i>	1	
56	Dusky Moorhen	<i>Gallinula tenebrosa</i>	1	2001
14	Painted Button-quail	<i>Turnix varia</i>	2	1978
174	Bush Stone-curlew	<i>Burhinus grallarius</i>	1	1978
133	Masked Lapwing	<i>Vanellus miles</i>	2	
125	Silver Gull	<i>Larus novaehollandiae</i>	1	2001
957	*Rock Dove	<i>Columba livia</i>	1	2001
989	*Spotted Turtle-Dove	<i>Streptopelia chinensis</i>	8	
34	Common Bronzewing	<i>Phaps chalcoptera</i>	5	
35	Brush Bronzewing	<i>Phaps elegans</i>	1	1978
267	Yellow-tailed Black-Cockatoo	<i>Calyptorhynchus funereus</i>	5	
268	Gang-gang Cockatoo	<i>Callocephalon fimbriatum</i>	5	
273	Galah	<i>Cacatua roseicapilla</i>	6	
269	Sulphur-crested Cockatoo	<i>Cacatua galerita</i>	8	
254	Rainbow Lorikeet	<i>Trichoglossus haematodus</i>	6	
258	Musk Lorikeet	<i>Glossopsitta concinna</i>	2	2001
281	Australian King-Parrot	<i>Alisterus scapularis</i>	4	
282	Crimson Rosella	<i>Platycercus elegans</i>	7	
288	Eastern Rosella	<i>Platycercus eximius</i>	8	
309	Swift Parrot	<i>Lathamus discolor</i>	2	1978
306	Blue-winged Parrot	<i>Neophema chrysostoma</i>	1	1978
337	Pallid Cuckoo	<i>Cuculus pallidus</i>	4	1988
338	Fan-tailed Cuckoo	<i>Cacomantis flabelliformis</i>	5	2000
342	Horsfield's Bronze-Cuckoo	<i>Chrysococcyx basalis</i>	3	
344	Shining Bronze-Cuckoo	<i>Chrysococcyx lucidus</i>	4	
248	Powerful Owl	<i>Ninox strenua</i>	3	2007
242	Southern Boobook	<i>Ninox novaeseelandiae</i>	5	1994
313	Tawny Frogmouth	<i>Podargus strigoides</i>	6	
330	White-throated Nightjar	<i>Eurostopodus mystacalis</i>	1	1992
317	Australian Owlet-nightjar	<i>Aegotheles cristatus</i>	2	1992
334	White-throated Needletail	<i>Hirundapus caudacutus</i>	5	1997
335	Fork-tailed Swift	<i>Apus pacificus</i>	1	1980
322	Laughing Kookaburra	<i>Dacelo novaeguineae</i>	9	
326	Sacred Kingfisher	<i>Todiramphus sanctus</i>	3	1992
558	White-throated Treecreeper	<i>Cormobates leucophaeus</i>	10	
529	Superb Fairy-wren	<i>Malurus cyaneus</i>	9	
565	Spotted Pardalote	<i>Pardalotus punctatus</i>	9	
976	Striated Pardalote	<i>Pardalotus striatus</i>	6	2006
488	White-browed Scrubwren	<i>Sericornis frontalis</i>	5	
465	Weebill	<i>Smicornis brevirostris</i>	4	
453	White-throated Gerygone	<i>Gerygone olivacea</i>	1	1977
475	Brown Thornbill	<i>Acanthiza pusilla</i>	8	
484	Buff-rumped Thornbill	<i>Acanthiza reguloides</i>	1	1992
486	Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>	3	1991
471	Yellow Thornbill	<i>Acanthiza nana</i>	4	2000
470	Striated Thornbill	<i>Acanthiza lineata</i>	6	
638	Red Wattlebird	<i>Anthochaera carunculata</i>	9	
633	Bell Miner	<i>Manorina melanophrys</i>	8	
634	Noisy Miner	<i>Manorina melanocephala</i>	6	
614	Yellow-faced Honeyeater	<i>Lichenostomus chrysops</i>	5	
617	White-eared Honeyeater	<i>Lichenostomus leucotis</i>	5	2000
625	White-plumed Honeyeater	<i>Lichenostomus penicillatus</i>	3	1999

CAVS No.	Common Name	Scientific Name	No. Observers	Historical Records
583	Brown-headed Honeyeater	<i>Melithreptus brevirostris</i>	4	1992
578	White-naped Honeyeater	<i>Melithreptus lunatus</i>	7	
631	New Holland Honeyeater	<i>Phylidonyris novaehollandiae</i>	2	
591	Eastern Spinebill	<i>Acanthorhynchus tenuirostris</i>	7	
586	Scarlet Honeyeater	<i>Myzomela sanguinolenta</i>	5	
377	Jacky Winter	<i>Microeca fascinans</i>	1	1978
380	Scarlet Robin	<i>Petroica multicolor</i>	5	2000
382	Flame Robin	<i>Petroica phoenicea</i>	2	1991
383	Pink Robin	<i>Petroica rodinogaster</i>	2	1987
385	Hooded Robin	<i>Melanodryas cucullata</i>	1	1978
392	Eastern Yellow Robin	<i>Eopsaltria australis</i>	6	
421	Eastern Whipbird	<i>Psophodes olivaceus</i>	1	1978
436	Spotted Quail-thrush	<i>Cinclosoma punctatum</i>	2	1978
549	Varied Sittella	<i>Daphoenositta chrysoptera</i>	5	
416	Crested Shrike-tit	<i>Falcunculus frontatus</i>	5	
405	Olive Whistler	<i>Pachycephala olivacea</i>	1	1978
398	Golden Whistler	<i>Pachycephala pectoralis</i>	6	
401	Rufous Whistler	<i>Pachycephala rufiventris</i>	7	
408	Grey Shrike-thrush	<i>Colluricincla harmonica</i>	9	
365	Leadend Flycatcher	<i>Myiagra rubecula</i>	1	1978
366	Satin Flycatcher	<i>Myiagra cyanoleuca</i>	5	2006
369	Restless Flycatcher	<i>Myiagra inquieta</i>	2	1978
415	Magpie-lark	<i>Grallina cyanoleuca</i>	7	
362	Rufous Fantail	<i>Rhipidura rufifrons</i>	2	1978
361	Grey Fantail	<i>Rhipidura fuliginosa</i>	9	
364	Willie Wagtail	<i>Rhipidura leucophrys</i>	5	2001
424	Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>	7	
430	White-winged Triller	<i>Lalage sueurii</i>	3	
671	Olive-backed Oriole	<i>Oriolus sagittatus</i>	8	
547	Dusky Woodswallow	<i>Artamus cyanopterus</i>	5	1992
702	Grey Butcherbird	<i>Cracticus torquatus</i>	6	
705	Australian Magpie	<i>Gymnorhina tibicen</i>	8	
694	Pied Currawong	<i>Strepera graculina</i>	6	
697	Grey Currawong	<i>Strepera versicolor</i>	7	2001
930	Australian Raven	<i>Corvus coronoides</i>	4	1998
954	Little Raven	<i>Corvus mellori</i>	5	
693	White-winged Chough	<i>Corcorax melanorhamphos</i>	4	1992
679	Satin Bowerbird	<i>Ptilonorhynchus violaceus</i>	1	1999
995	*House Sparrow	<i>Passer domesticus</i>	2	2000
662	Red-browed Finch	<i>Neochmia temporalis</i>	7	
997	*European Greenfinch	<i>Carduelis chloris</i>	1	1978
996	*European Goldfinch	<i>Carduelis carduelis</i>	1	1978
564	Mistletoebird	<i>Dicaeum hirundinaceum</i>	2	1992
357	Welcome Swallow	<i>Hirundo neoxena</i>	4	
359	Tree Martin	<i>Hirundo nigricans</i>	2	1978
360	Fairy Martin	<i>Hirundo ariel</i>	1	1978
509	Rufous Songlark	<i>Cincloramphus mathewsi</i>	2	1978
574	Silvereye	<i>Zosterops lateralis</i>	7	
779	Bassian Thrush	<i>Zoothera lunulata</i>	2	1978
991	*Common Blackbird	<i>Turdus merula</i>	8	
992	*Song Thrush	<i>Turdus philomelos</i>	3	1998
999	*Common Starling	<i>Sturnus vulgaris</i>	5	2001
998	*Common Myna	<i>Acridotheres tristis</i>	6	
Mammals				
1003	Short-beaked Echidna	<i>Tachyglossus aculeatus</i>	2	2006

CAVS No.	Common Name	Scientific Name	No. Observers	Historical Records
1162	Koala	<i>Phascolarctos cinereus</i>	3	1999
1113	Common Brushtail Possum	<i>Trichosurus vulpecula</i>	5	
1138	Sugar Glider	<i>Petaurus breviceps</i>	6	1998
1129	Common Ringtail Possum	<i>Pseudocheirus peregrinus</i>	8	
1147	Feathertail Glider	<i>Acrobates pygmaeus</i>	1	1992
1242	Black Wallaby	<i>Wallabia bicolor</i>	3	
1324	White-striped Freetail Bat	<i>Nyctinomus australis</i>	3	
1349	Gould's Wattle Bat	<i>Chalinolobus gouldii</i>	1	1961
1351	Chocolate Wattle Bat	<i>Chalinolobus morio</i>	1	1992
1335	Lesser Long-eared Bat	<i>Nyctophilus geoffroyi</i>	1	1992
1379	Little Forest Bat	<i>Vespadelus vulturnus</i>	1	1992
1412	*House Mouse	<i>Mus musculus</i>	3	1998
1409	*Brown Rat	<i>Rattus norvegicus</i>	1	1998
1408	*Black Rat	<i>Rattus rattus</i>	3	1997
1532	*Red Fox	<i>Canis vulpes</i>	4	
1510	*European Rabbit	<i>Oryctolagus cuniculus</i>	6	
Frogs				
3134	Common Froglet	<i>Crinia signifera</i>	6	
3033	Victorian Smooth Froglet	<i>Geocrinia victoriana</i>	4	
3058	Southern Bullfrog	<i>Limnodynastes dumerilii</i>	4	
3061	Striped Marsh Frog	<i>Limnodynastes peronii</i>	2	1999
3182	Southern Brown Tree Frog	<i>Litoria ewingii</i>	7	
3906	Verreaux's Tree Frog	<i>Litoria verreauxii verreauxii</i>	1	1992
Reptiles				
2450	Delicate Skink	<i>Lampropholis delicata</i>	1	1986
2451	Garden Skink	<i>Lampropholis guichenoti</i>	3	2000
2452	Weasel Skink	<i>Saproscincus mustelinus</i>	3	1999
2578	Blotched Blue-tongued Lizard	<i>Tiliqua nigrolutea</i>	4	
2580	Common Blue-tongued Lizard	<i>Tiliqua scincoides</i>	3	
2973	Lowland Copperhead	<i>Austrelaps superbus</i>	2	2007
2665	White-lipped Snake	<i>Drysdalia coronoides</i>	6	2006
2681	Tiger Snake	<i>Notechis scutatus</i>	1	2007
Butterflies				
	Spotted Sedge-skipper	<i>Hesperilla ornata ornata</i>	2	
	Splendid Ochre, Symmomus Skipper	<i>Trapezites symmomus</i>	2	
	White-banded Grass-dart	<i>Taractrocera papyria</i>	1	
	Australian Painted Lady	<i>Vanessa kershawi</i>	2	
	Common Brown	<i>Heteronympha merope merope</i>	2	
	Eastern Ringed Xenica	<i>Geitoneura acantha</i>	2	
	Klug's Xenica	<i>Geitoneura klugii</i>	1	1986
	Common Grass-blue	<i>Zizina labradus labradus</i>	2	
	Meadow Argus	<i>Junonia villida calybe</i>	1	
	Shouldered Brown	<i>Heteronympha penelope</i>	1	
	Dingy Swallowtail	<i>Papilio anactus</i>	2	
	Varied Sedge-skipper	<i>Hesperilla donnysa</i>	2	

APPENDIX 6

'OUR COMMUNITY VOICE' 100 ACRES RESERVE QUESTIONNAIRE

The 'Our Community Voice' survey was a self-completion questionnaire, which was mailed on 14 October 2008 to 408 households in the area surrounding the 100 Acres Reserve in Park Orchards. The questionnaire was also distributed to the Wyena Pony Club, Adult Riding Club and to major interest groups within Manningham, including 100 Acres Friends Group and Friends of Manningham Dogs and Cats.

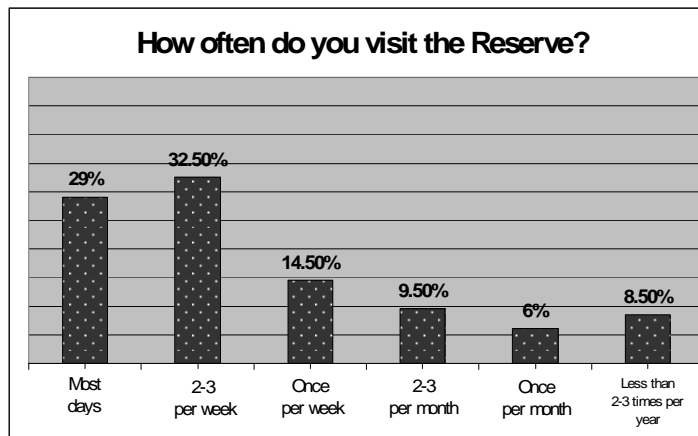
The questionnaire was designed to inform the community about preparation of the 100 Acres Management Plan and ascertain how the 100 Acres Reserve is used by the local community. They were asked what attributes, ideas and issues should be addressed in the Management Plan.

The questionnaire was a mixture of tick boxes (yes, no, neutral), and space for individual written comments. Respondents were given an opportunity to indicate if they wished to be involved in future consultation. The respondents had until 14 November to complete the questionnaire and return it via a reply paid envelope for data processing and analysis.

The results of the survey provide a number of insights into how the 100 Acres Reserve is used, the reasons why it is so highly valued by the community and identifies the community's concerns with its future development and management.

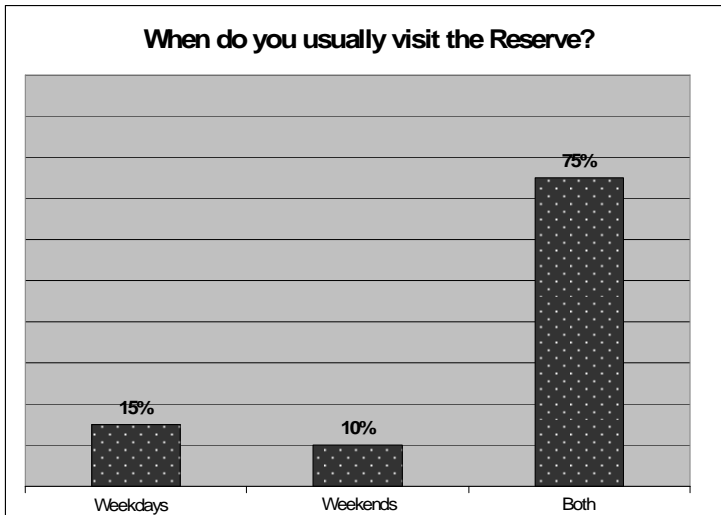
117 completed questionnaires were received and the results are outlined below. In response to the open ended questions in the survey, a detailed list of comments is provided in Appendix B.

1. How often do you visit 100 Acres reserve?



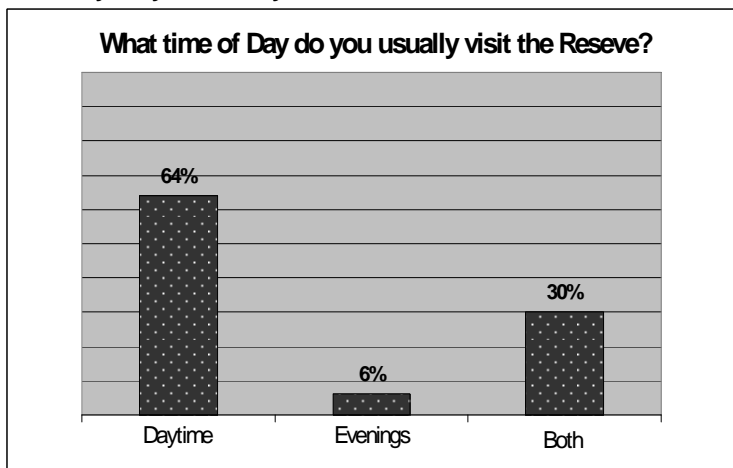
The 100 Acres Reserve is an extremely popular place to visit by the local residents. Over three-quarters (76%) of the respondents surveyed indicated that they visit the 100 Acres on a regular basis. 29% of respondents visit it 'most days', 32.5% visit '2-3 per week' and 14.5% visit 'once per week'.

2. When do you usually visit the Reserve



The results of the survey reveal that three-quarters of the respondents visit the 100 Acres Reserve on a constant basis throughout the week, which suggests there is no peak time of visitation between weekday and weekend use.

3. What time of day do you usually visit?



More than half of the respondents usually visit the reserve during the 'daytime' with almost a third (30%) visit the reserve 'both' in the evening and during the daytime.

4. How do you usually get to this Reserve?

Walk/Run	Horse	Cycle	Car	Bus	Other
86%	3%	5%	6%	-	-

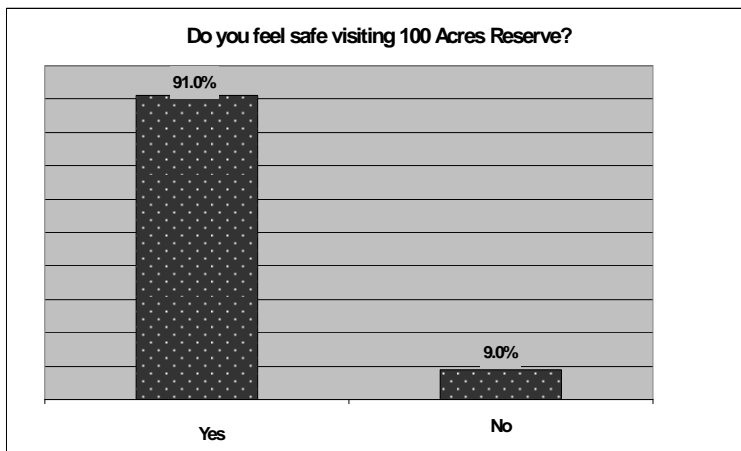
The survey findings indicate that the majority of the respondents (86%) walk to the reserve. However it should be noted that the questionnaire was biased towards the surrounding local community, as it is often more difficult to obtain information from casual park users or those from other suburbs or municipalities.

From information gained from a local naturalist, Cecily Falkingham, walking and environmental groups such as the Koonung Walkers and the Field Naturalists Bird Observers also visit the reserve, because of the significant flora and fauna. These groups travel to the reserve by car or bus. There is also further opportunity to promote the reserve for environmental education with school and community groups, particularly with the completion of the interpretation facility, including parking, at the entrance to the 100 Acres Reserve on the adjoining Domeney Reserve.

A very low proportion of respondents ride a horse (3%) to the 100 Acres Reserve , most likely due to poor trail access as busy roads are unsafe and dangerous for horse riders.

5. Do you feel safe when visiting the 100 Acres Reserve?

6. If no, why do you say that?

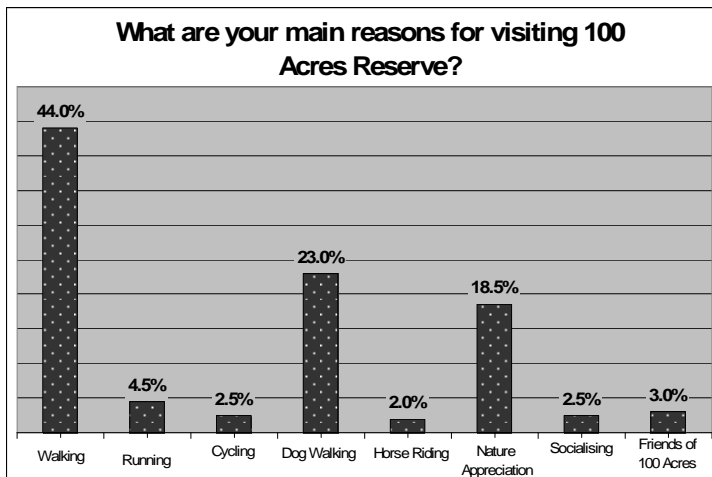


The vast majority of residents surveyed believe that the 100 Acres Reserve is a safe place to visit with 91% indicating that they feel safe when visiting the reserve.

Where the response was 'No' respondents were asked to provide their reasons. , 9% of respondents indicated they did not feel safe when visiting the reserve and cited 'dogs off lead', particularly large dogs, 'poor signage' and 'it feels lonely and isolated'.

Some respondents answered this question even though they felt safe using the reserve, but stated that they visit the reserve 'only with company', 'it appears very isolated' and the problem 'dogs are off lead'.

7. What are your main reasons for visiting the 100 Acres Reserve?

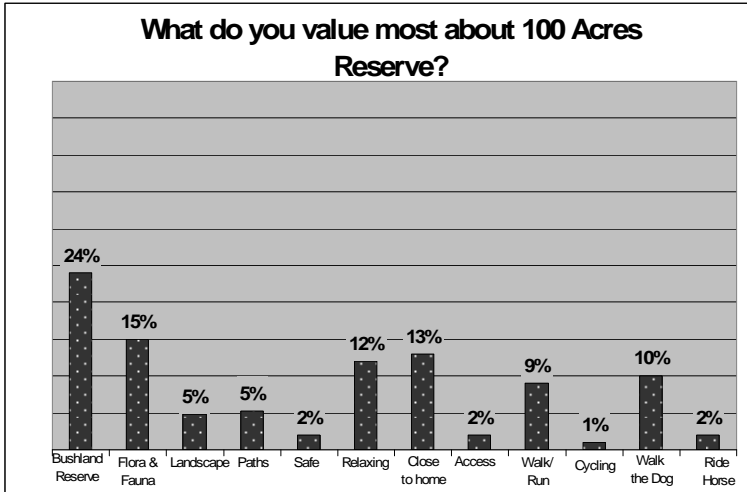


Respondents were asked to indicate up to two reasons for visiting the reserve. Almost half of the respondents cited 'walking' (44%) as the main reason they visit 100 Acres Reserve followed by 'dog walking' (23%) and 'nature appreciation' (18.5%).

'Cycling' use is very low in the reserve (2.5%) as there is limited cycling opportunity owing to no sealed tracks within the reserve. However, there is anecdotal evidence that mountain bike riding is increasing within the reserve, most likely due to the narrow bushland tracks which are popular with mountain bikers. The management plan will need to address the mountain bike use within the reserve to ensure that the environmental impacts and potential conflict with other park visitors are minimised.

Comments made from people who ticked the 'other' reasons for visiting the reserve and commented in the space provided, included 'looking for orchids', 'introducing grandchildren to the bush', 'quiet time/drawing', 'bird watching' and 'on the way to and from school'.

8. What do you value most about the 100 Acres Reserve?

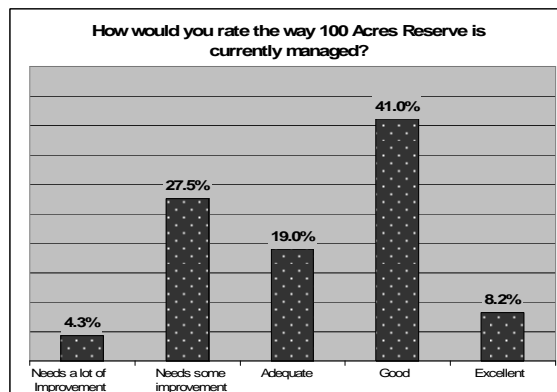


Respondents were asked to indicate up to 3 attributes that they most value about the 100 Acres Reserve.

The survey findings suggest that the 100 Acres Reserve is highly valued by the local residents for its natural and environmental qualities (39%) and is a quiet place for 'relaxing' (12%) which is 'close to home' (13%). The reserve is also valued by a number of residents as a place to 'walk the dog' (10%). The results support the need to continue to maintain and protect the significant environmental values of the reserve for the enjoyment of existing and future visitors to the 100 Acres Reserve.

9. How would you rate the way 100 Acres Reserve is currently managed?

10. If you indicated 'needs some improvement' or needs a lot of improvement' Why?



The results of the survey suggest there is a relatively high level of satisfaction in the management of the 100 Acres Reserve. The majority of respondents (79%) believe that

reserve is managed relatively well with almost half of the respondents (49.2%) rating management of the reserve as 'good' (41%) or excellent (8.2%).

Where the response was 'Needs some improvement' or 'Needs a lot of improvement', respondents were asked to provide their reasons. In response to this open ended question 31.8% of respondents provided detailed comments. The issues identified can be broadly divided into six groups and include:

- Environmental management/weed control rabbit control.
- Poor or lack of signage.
- Improve dam quality.
- Fire management/too much dead timber in reserve, fire hazard.
- Path maintenance/management issues, maintenance not frequent enough.
- Dog control issues.

11. Are you satisfied with the following aspects of the reserve?

12. If No, why do you say that?

	YES	NO	NEUTRAL		YES	NO	NEUTRAL
Park Access	86%	8%	6%	Environmental Management	43%	36%	21%
Path network	78%	5%	17%	Pest/feral animals	35%	35%	30%
Parking	44%	23%	33%	Pet management	44%	35%	21%
Seating	43%	31%	26%	Fire management	44%	35%	21%
Interpretation Signage	31%	32%	37%	Neighbouring land issues	32%	34%	34%
Horse trail	30%	27%	43%				

Respondents were asked to rate their satisfaction level in regard to the different aspects of the 100 Acres Reserve. The majority of respondents were satisfied with the 'park access points' and 'path network' with almost a half of the respondents satisfied with 'parking', 'seating', 'environmental management' 'pet management', 'pest /feral management' and 'fire management'. Approximately a third of the respondents were satisfied with the 'interpretation signage' and 'horse trail'.

A third of respondents indicated they were dissatisfied with certain aspects of the park, and cited 'signage', 'environmental management', 'pest/feral animals', 'pet management', 'fire management' and 'neighbouring land issues' as the main areas of concern.

It is interesting to note that the comments generally reinforce the issues highlighted in Question 10 and can be broadly divided into seven groups and are outlined below:

- Environmental management/need for weed and rabbit control.
- Signage is inadequate, poor and needs upgrading.
- Provide more seating.
- Fire management /undergrowth and dead wood are a fire hazard.
- Trails and paths need regular maintenance.
- Dog control issues, existing dog on lead controls are not adhered to and not enforced, many dogs are off lead, problems with dog faeces.
- Drainage issues and the need to improve dam quality.

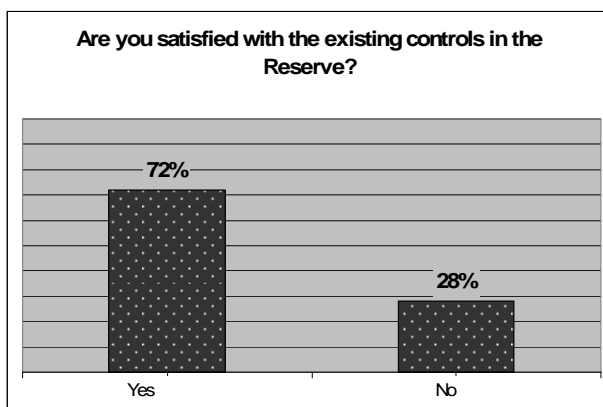
13 Is there anything else Council could do to encourage you to make greater use of the reserve than you currently do?

The respondents' detailed comments reveal that the community enjoys the natural character and charm of the reserve, which should be maintained and protected. Some respondents believed there should be limited or no development of the reserve with some signage improvements, path maintenance and more seating. The existing dog controls should be enforced with more ranger presence and inappropriate uses should be addressed. The comments can be grouped into the following:

- No action required, happy with reserve as is.
- Enforce existing dog controls.
- Improve park facilities.
- Improve environment and habitat.
- Other.

14. Dogs are required to be on lead within the boundary of the 100 Acres Reserve. Are you satisfied with the existing dog controls in the Reserve?

15. If No, why do you say that?



The survey findings indicate that almost three-quarters of the respondents were satisfied with the dog on lead controls in 100 Acres Reserve. It appears that this question was answered by both respondents who were satisfied and dissatisfied with the dog controls. Nevertheless the comments provide useful information regarding community attitudes for future dog control regulations of the reserve.

The following reasons given by the respondents were divided into two main groups and include:

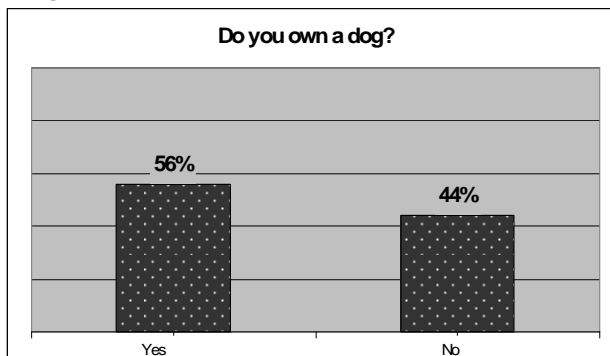
Problems with existing dog controls

Although satisfied with the existing dog on lead controls, many respondents expressed that too many dogs are off lead which impacted on sensitive bushland and caused conflict with other park users. There was a need for increased Ranger presence, better signage and installation of dog faeces bins to overcome the problem dog droppings within the reserve particularly on the paths.

Change dog on lead controls to dog off lead

A small number of respondents indicated that the dogs should be allowed to be off lead, particularly on the outside perimeter track (horse trail) of the reserve. However the mixture of horses and dogs off lead will need to be carefully considered as dogs off lead were identified has a high risk in the independent risk review of the impact of horse riding along the river reserve at Warrandyte.

16 Do you own a dog?



17. If you walk your dog in 100 Acres Reserve do you use the internal tracks?

Yes	No
74%	26%

The survey findings reveal that there are almost an equal number of respondents who own a dog (56%) as those who do not have a dog (44%). The internal tracks within 100 Acres Reserve are very popular for dog walking and are used by almost three-quarters of the respondents (74%) who own a dog. The results suggest that there will be a need to balance the provision of recreational opportunities and experiences appropriate to the natural environment and provide for the protection of flora and fauna which the community so highly values.

18. Horse riding is confined to the track around the perimeter of the reserve and along Berringa Road. Are you satisfied with the existing horse controls in the Reserve?

19. If No, why do you say that?

Yes	No
93%	7%

The survey results indicate that the majority of the respondents were satisfied with the existing horse riding controls in the reserve. Where the response was 'No', respondents were asked to provide their reasons why they were dissatisfied. 7% of respondents cited that 'more tracks should be available to riders' and the 'white wire along the trail is down in many places and needs to be repaired.' 'Vehicle traffic is too busy around the reserve'.

Other respondents believe horse riding is a problem in the 100 Acres Reserve and cited reasons such as 'as long as they stick to the track', 'if they stopped to pick up after their horse (or at least move it)' and 'I hate horses

20. Do either you or a member of your family belong to a Pony Club or Adult Riding Club?

YES	NO
5%	95%

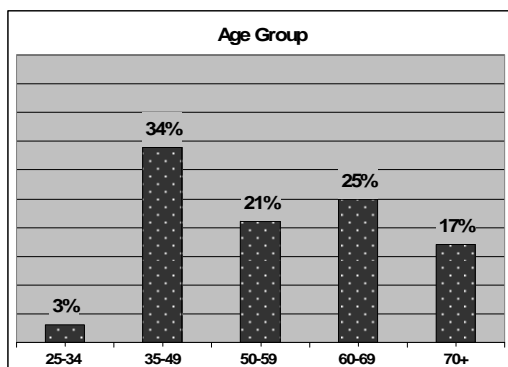
The survey results reveal that an extremely small proportion of the respondents represent members of the Wyena Pony Club or Adult Riding Club, which may suggest that there is poor trail access to 100 Acres Reserve, because of the busy and dangerous roads.

21. Do you have any further comments?

The extent and detailed nature of the comments reflect how important the 100 Acres Reserve is to the local community. There appears to be a very strong sense of community ownership. The results generally reflect similar themes or issues which have been previously highlighted in this survey and can be broadly divided into the following groups:

- The 100 Acres is highly valued by the local community as an important bushland reserve.
- Fire management issues.
- Environmental management issues, particularly weed control.
- Address drainage issues and improve dam quality.
- Address existing dog issues, particularly enforce dog controls.
- Maintain and improve visitor facilities, particularly signage.
- Other (items outside the scope of the project).

22. Age



The survey results revealed that 80% of the respondents are between 35-69 years old and 42% are over 60 years old. Walking is the most popular activity undertaken in the 100 Acres Reserve on a regular basis by the local community. To foster wider community participation of the 100 Acres Reserve it is also listed in the 'Popular Parks in Manningham' booklet. It is important that 100 Acres Reserve Management Plan ensures that the reserve continues to provide and improve opportunities for walking in association with nature appreciation to enable people of all ages to engage in physical activity leading to increased health and well being.

23. Gender

FEMALE	MALE
34%	66%

The survey findings indicate two-thirds of the respondents were male.

24. Which of the following best describes your household composition?

Adults only	Adults with school preschool aged children	Adults with primary school aged children	Adults with secondary school aged children	Adults with adult children
44%	8%	15%	13%	20%

The survey findings reveal that the majority of respondents represented a 'mature' household composition (64%) with 'adults only' (44%) or 'adults with adults with adult children' (20%). Almost a third of the respondents represented 'adults with primary school aged children' (15%) and adults with secondary school aged children (13%).