SIGNIFICANT AREAS - Bushland

Plans of Management & Action Plans

Prepared by:

Water Catchments Team
Environment Division
Hornsby Shire Council

April 2000

TABLE OF CONTENTS

SECTION **PAGE NO.**

FOREWORD

A series of Significant Area Plans of Management have been developed by Hornsby Shire Council to comply with the Local Government Amendment (Community Land Management) Act (1998), which requires Plans of Management to be reviewed and adopted by Councils for all 'community' land by January, 2000.

The Significant Area Plans contained within this document have been prepared for special sites such as those with significant populations of threatened species or endangered ecological communities. Although these significant areas will also continue to be managed in accordance with the Bushland (Natural Areas) Plan of Management, the individual significant area Plan of Management, will supersede the generic Plan for that particular site.

Significant Area Plans of Management are required to be prepared for "areas of community land, all or part of which are directly affected by a recovery plan or threat abatement plan" according to the Local Government (Community Land Management) Act (1998). Though Recovery Plans for these areas are not yet produced, the intention of these plans are that these significant areas will also be managed in accordance with any future Recovery Plan.

A Bushland (Natural Areas) Plan of Management has been prepared by Hornsby Shire Council to comply with the Local Government Amendment (Community Land Management) Act 1998. This Plan covers all community land-bushland not covered by this Significant Area Plan of Management.

Community land can be defined as 'land in the ownership of Council which should be retained for use by the general public' as opposed to operational land which can be defined as 'land which need not be retained'.

Although Plans of Management are only required for Council owned 'community' lands, Crown reserves devolved to Council under the Local Government Amendment (Community Land Management) Act (1998), i.e. under Council's care, control and management, have also been included to ensure a uniform plan for management of open space within Hornsby Shire. Further, some of the bushland management strategies operate under legislation that relates to privately owned land, and thus this plan also has application to privately owned bushland. The relevant legislation includes the Threatened Species Conservation Act (1995), Environmental Planning and Assessment Act (1979), National Parks and Wildlife Act (1974) and the Noxious Weeds Act (1993).

Hornsby Shire contains over 35,000 hectares of bushland which represents 69% of the Shire. Of this, approximately 5,500 hectares is managed by Council and is made up of:-

Berowra Valley Regional Park .....3,880 hectares
jointly managed with NPWS under the Berowra Valley Regional Park Trust
other reserves ..... 1,879 hectares

Berowra Valley Regional Park

A Significant Area Plan of Management, Berowra Valley Bushland Park Plan of Management Stage 2 was adopted in January 1996. On March 27 1998 the park was gazetted by the Minister for the Environment as Berowra Valley Regional Park under the National Parks and Wildlife Act (1979). The new regional park is jointly managed by Hornsby Council and the National Parks and Wildlife Service. The management decisions and consent authority for the park will rest with the Berowra Valley Regional Park Trust. The Trust board is made up of three Hornsby Shire Councillors, two community representatives, Council's Bushland Manager, and NPWS's District Manager. The Trust board will review the existing Plan of Management and produce a new Plan of Management to reflect that the Park is now managed under the National Parks and Wildlife Act (1974).

All Council Plans of Management for bushland reserves adjacent to Berowra Valley Regional Park will be consistent with the Berowra Valley Regional Park Plan of Management.

SEPP 19

The objectives of the Significant Area Plans of Management contained within this document, are consistent with State Environmental Planning Policy No. 19 - Bushland in Urban Areas, the aims of which are:

"to protect and preserve bushland within the urban areas specified because of it's value to the community as part of the natural heritage, it's aesthetic value and it's value as a recreational, educational and scientific resource"

RECENT AMENDMENTS TO THE LOCAL GOVERNMENT ACT (1993)

The Local Government Amendment (Community Land Management) Regulation 1998 contains regulations regarding plans of management. The object of this Regulation is to prescribe guidelines for the categorisation of land under section 36 (4) and (5) of the Act. The Regulation also sets out the core objectives of each particular category. The significance of the prescribed core objectives is that a lease, license or other estate cannot be granted in respect of the land if it would defeat those objectives.

Categories set out in the Local Government Amendment (Community Land Management) Act 1998 are as follows:

(a) a natural area;
(b) a sportsground;
(c) a park;
(d) general community use;
(e) an area of cultural significance.

Land categorised as natural area can be further categorised as follows:

(a) bushland;
(b) wetland;
(c) escarpment;
(d) watercourse;
(e) foreshore;
(f) a category prescribed by the regulations.

The lands covered by these Plans of Management are categorised as natural areas, and are further categorised mostly as bushland or bushland and watercourse.

The core objectives for management of community land categorised as a natural area are:

a) to conserve biodiversity and maintain ecosystem function in respect of the land, or the feature or habitat in respect of which the land is categorised as a natural area and,

b) to maintain the land, or that feature or habitat, in its natural state and setting, and

c) to provide for the restoration and regeneration of the land, and

d) to provide for community use of and access to the land in such a manner as will minimise and mitigate any disturbance caused by human intrusion, and

e) to assist in and facilitate the implementation of any provisions restricting the use and management of the land that are set out in a recovery plan or threat abatement plan prepared under the Threatened Species Conservation Act 1995 or the Fisheries Management Act 1994.

The core objectives for management of community land categorised as bushland are:

a) to ensure the ongoing ecological viability of the land by protecting the ecological biodiversity and habitat values of the land, the flora and fauna (including invertebrates, fungi and micro-organisms) of the land and other ecological values of the land, and

b) to protect the aesthetic, heritage, recreational, educational and scientific values of the land, and

c) to promote the management of the land in a manner that protects and enhances the values and quality of the land and facilitates public enjoyment of the land, and to implement measures directed to minimising or mitigating any disturbance caused by human intrusion, and

d) to restore degraded bushland, and

e) to protect existing landforms such as natural drainage lines, watercourses and foreshores, and

f) to retain bushland in parcels of a size and configuration that will enable the existing plant and animal communities to survive in the long term, and

g) to protect bushland as a natural stabiliser of the soil surface.

The core objectives for management of community land categorised as wetland are:

a) to protect the biodiversity and ecological values of wetlands, with particular reference to their hydrological environment (including water quality and water flow), and to the flora, fauna and habitat values of the wetlands, and

b) to restore and regenerate degraded wetlands, and

c) to facilitate community education in relation to wetlands, and the community use of wetlands, without compromising the ecological values of wetlands.

The core objectives of community land categorised as escarpment are

a) to protect any important geological, geomorphological or scenic features of the escarpment, and

b) to facilitate safe community use and enjoyment of the escarpment.

The core objectives for management of community land categorised as a watercourse are:

a) to manage watercourses so as to protect the biodiversity and ecological values of the instream environment, particularly in relation to water quality and water flows, and

b) to manage watercourses so as to protect the riparian environment, particularly in relation to riparian vegetation and habitats and bank stability, and

c) to restore degraded watercourses, and

d) to promote community education, and community access to and use of the watercourse, without compromising the other core objectives of the category.

The core objectives for management of community land categorised as foreshore are:

a) to maintain the foreshore as a transition area between the aquatic and the terrestrial environment, and to protect and enhance all functions associated with the foreshore's role as a transition area, and

b) to facilitate the ecologically sustainable use of the foreshore, and to mitigate impact on the foreshore by community use.

The core objectives for land categorised as an area of cultural significance:

1) The core objectives of community land categorised as an area of cultural significance are to retain and enhance the cultural significance of the area (namely its Aboriginal, aesthetic, archaeological, historical, technical or research or social significance) for past, present and future generations by the active use of conservation methods.

2) Those conservation methods may include any or all of the following methods:

a) the continuous protective care and maintenance of the physical material of the land or of the context and setting of the area of cultural significance,

b) the restoration of the land, that is, the returning of the existing physical material of the land to a known earlier state by removing accretions or by reassembling existing components without the introduction of new material,

c) the reconstruction of the land, that is, the returning of the land as nearly as possible to a known earlier sate,

d) the adaptive reuse of the land, that is, the enhancement or reinforcement of the cultural significance of the land by the introduction of sympathetic alterations or additions to allow compatible uses (that is, uses that involve no changes to the cultural significance of the physical material of the area, or uses that involve changes that are substantially reversible or changes that require a minimum impact),

e) the preservation of the land, that is, the maintenance of the physical material of the land in its existing state and the retardation of deterioration of the land.

3) A reference in subsection (2) to land includes a reference to any buildings erected on the land.

CROWN LANDS ACT LAND MANAGEMENT PRINCIPLES

As stated previously, the Hornsby Shire Council Plans of Management, also cover areas of Crown land under Council's care, control and management. As such, this document takes into account the principles of Crown land management, as set out in the Crown Lands Act, 1989.

These principles are as follows:

- To observe environmental protection principles in relation to the management and administration of Crown Land;
- To conserve wherever possible, the natural resources of Crown Land (including water, soil, flora, fauna and scenic quality);
- To encourage appropriate public use and enjoyment of Crown Land;
- To encourage multiple use of Crown Land where appropriate;
- To use and manage Crown Land in such a way that both the land and its resources are sustained in perpetuity, where appropriate;
- To deal with Crown Land in the best interests of the State consistent with the above principles.

COMMUNITY INPUT INTO THE PLANS OF MANAGEMENT

Public Comment and Amendment to Plans of Management

A requirement of the Local Government Amendment (Community Land Management) Act (1998) is that all Plans of Management be placed on public display for a minimum period of 28 days with an additional 14 days allowed for submissions to be received. By writing a submission, members of the community are given an opportunity to participate in the future direction of management of the Shire's Open Space.

Submissions allow the community (including residents, interest groups, sporting groups and government agencies) to express opinions, provide information and suggest alternatives to the proposed Management Strategies for community open space within the Shire. On closure of the period for public comment, all submissions are considered and amendments made to the Plans of Management as required.

A public hearing will be held in respect of a proposed plan of management if the proposed plan would have the effect of categorising or recategorising of community land.

This draft plan of management will be exhibited in accordance with these requirements. Amendments may be made, where appropriate, at the suggestion of members of the community, and these plans may then be adopted with the included amendments after a further exhibition period. In addition to advertising this Plan of Management and making it available at Council's Administration building and Council libraries, the document will be advertised on Council's Web site

MANAGEMENT STRATEGY

1.0 INTRODUCTION

1.1 What is a Plan of Management?

A Plan of Management is a document which provides a means to manage the future use, development and maintenance issues of land within the Shire, in accordance with the requirements of Section 36 and other relevant sections of the Local Government Amendment (Community Land Management) Act (1998). This process is a necessary requirement for all community classified land owned by Council. In addition land under Council's care, control and management will be managed in accordance with these Plans of Management.

Plans of Management identify major issues which affect community land within the Shire of Hornsby. They establish Council's objectives for the future of these lands in terms of planning, management and maintenance.

The Plans also establish a programme for implementation and performance of the above objectives, determining priorities for their achievement.

1.2 What Activities are allowable under the Plan of Management?

Community land is required to be used and managed in accordance with the Plan of Management and any change to the use or management of that land requires the adoption of a new Plan of Management. This section therefore, defines activities allowable under these Plans.

The Plan approves any activity that is consistent with the core objectives for that land as well as being permissible under the Hornsby Shire Local Environment Plan (HSLEP) (1999).

Zoning

The majority of Natural Areas in the Shire are covered under the zoning Open Space A, Open Space B, Environment Protection A and Environment Protection B, and some areas are also listed as heritage items, pursuant to the Hornsby Shire Local Environment Plan (HSLEP), 1999. As discussed in the Foreword, some management issues also relate to land under other zoning's such as Residential and Rural.

Hornsby Shire Local Environment Plan is interpreted to allow the following activities under this Plan.

wc = without consent
c = development consent required
p = prohibited

OSA = Open Space A
OSB = Open Space B
EPA = Environmental Protection A
EPB = Environmental Protection B

Landuse	OS A	OS B	EP A	EP B
Agriculture or aquaculture which involves clearing of native vegetation	c	c	c	c
Agriculture or aquaculture which does not involve clearing of native vegetation	c	c	c	wc
Buildings ancillary or incidental to public reserves	c	c	p	c
Buildings or agricultural structures	c	c	p	c
Bushfire Hazard Reduction activities and ecological burns	wc	wc	wc	wc
Bushland regeneration and restoration (inc. wetlands and riparian areas)	wc	wc	wc	wc
Dams	p	p	p	c
Fire Trail Maintenance				
Installation of water quality remediation works	wc	wc	wc	wc
Landscaping and gardening	wc	wc	c	c
Maintenance and upgrades of walking tracks	wc	wc	c	wc
Major earthworks or public drainage works	c	c	c	c
Major facilities: major construction of bridges, extensive boardwalks or viewing platforms or new walking tracks	c	c	c	c
Minor rock or soil stabilisation works and earth works	wc	wc	c	wc
Minor track construction and upgrades	wc	wc	c	wc
Recreational facilities	c	c	p	c

Redirection of watercourses	c	c	p	c
Research and educational activities as approved by Council's Water Catchments Team	wc	wc	c	wc
Educational, scientific, and compliance reserve signage (not commercial)	wc	wc	wc	wc
Temporary activities or developments under a granted lease or license under the Local Government Act 1993	wc	wc	p	wc
Water quality remediation works	wc	wc	c	wc
Weed control	wc	wc	wc	wc
Works that promote the scientific or educational value of bushland	wc	wc	na	wc
Works that promote the scientific or educational value of wetlands	na	na	wc	na

On areas of Crown Land covered by this Plan of Management, the consent of both Council and the Department of Land and Water Conservation as land owner, is required for activities requiring Development Consent.

Environmental Assessment of Activities

Activities such as weed control, bushland regeneration and restoration, wetland regeneration and restoration, maintenance and upgrade of walking tracks, works that promote the scientific or educational value of bushland and minor rock and soil stabilisation works are considered beneficial activities consistent with the aims and objectives of this plan of management.

These activities are allowable under this plan of management in significant bushland areas providing full environmental assessment including threatened species assessment is undertaken.

Where these activities are proposed in an area covered by the Threatened Species Conservation Act (1995) and a Part 5 Assessment is not undertaken, a Section 91 licence is required under the Act, and can be obtained through the National Parks and Wildlife Service.

Any other activities such as major environmental projects or significant track works will require a Part 5 assessment or Review of Environmental Factors (REF) under the EP&A Act (1979).

2.0 BASIS FOR MANAGEMENT

2.1 Environmental Values of Bushland in Hornsby Shire

Open space, whether it be bushland, sportsfields, neighbourhood parks or other classifications, plays a range of roles in the Shire and is valued in different ways by the community.

Bushland provides a range of functions to the community, and is a large contributing factor to landscape character and a repository for natural heritage.

Environmental and Social values of bushland in Hornsby Shire include:

- Scenic amenity
- Catchment protection
- Biodiversity conservation
- Recreation
- Environmental education

2.2 Council's Strategic Intent

Hornsby Council's strategic intent is **"Creating a Living Environment".**

This will be achieved for Hornsby Shire through the following strategic direction and actions:

1. *Engaging the community in the future of the Shire*
2. *Protecting the Natural Environment*
3. *Conserving Resources*
4. *Facilitate increased social well being*
5. *Aligning service provision to meet changing needs*
6. *Integrated land use & transport planning*
7. *Facilitate a diverse local economy*
8. *Achieving financial sustainability*

2.3 Council's specific bushland management aims

In addition to the core objectives as set out in the Local Government Amendment (Community Land Management) Act (1998), the following specific aims have been developed for bushland management.

General aim

To conserve Hornsby Shire's bushland for public recreation and education whilst protecting it's natural, cultural and aesthetic values. Bushland management will be undertaken on a total catchment basis with a regional perspective.

Specific aims

- Protect conserve and enhance the Shire's unique natural flora and fauna;
- Protect and conserve biodiversity within the Shire including threatened animal and plant species and vegetation communities;
- Ameliorate threatening processes;
- Preserve our natural and cultural heritage including Aboriginal sites and historic features;
- Protect, conserve and enhance the aesthetic and scenic qualities of the bushland environment;
- Provide the community with well maintained bushland for recreational activities;
- Promote scientific and educational inquiry into the bushland environment;
- Manage and protect bushland on a total catchment basis.

2.3.1 Council's Bushland management aims in relation to Significant Areas comprising endangered ecological communities:

The recently completed *Threatened Biota Conservation Plan (ESP Ecological Surveys and Planning P/L, 1999)* adopted by Council at its July 1999 ordinary meeting, outlines management recommendations for threatened species, populations and ecological communities occurring within the Shire.

Recommendations for the following Endangered Ecological Communities are relevant to the Plans of Management contained within this document.

Blue Gum High Forest:

Publicly owned remnants must be conserved as fully as possible and linked to other remnants. Wherever feasible, remnants should be conserved and enhanced:-

- Cease mowing parks where there is opportunity to rehabilitate this endangered community;
- Undertake professional bush regeneration works in sites affected by weed invasion;
- Curtail excessive recreational use in areas that could be rehabilitated;
- Prevent further substantial losses of this community;
- Map this community on private land and apply protective zoning;
- Undertake a project to link remnants using appropriate species to be planted along road reserves, other open space and in gardens.

Sydney Turpentine Ironbark Forest

Wherever feasible, remnants should be conserved and enhanced through long-term protection involving expansion and linking of remnants:-

- Cease mowing in parks where there is opportunity to rehabilitate this endangered community;
- Undertake professional bush regeneration works in sites affected by weed invasion;
- Curtail excessive recreational use in areas that could be rehabilitated;
- Prevent further substantial losses of this community;
- Map this community on private land and apply protective zoning;
- Undertake a project to link remnants using appropriate species to be planted along road reserves, other open space and in gardens.

Shale Sandstone Transition Forest

Wherever feasible, remnants should be conserved and enhanced:-

- Undertake professional bush regeneration works in sites affected by weed invasion;
- Curtail excessive recreational use in areas that could be rehabilitated;

- Prevent further losses of this community.

Sydney Coastal Riverflat Forest

All remnants should be expanded to the greatest extent feasible in an endeavour to buffer them against threats and to improve their ecological resilience:-

- All remnants should be protected from weed invasion and too frequent fire;
- Stock should be fenced out of remnants;
- Voluntary Conservation Agreements with the NPWS should be facilitated for all potentially viable remnants outside conservation estate;
- Further detailed survey is required to locate and map Sydney Coastal Riverflat Forest remnants.

2.4 Leases and Licences

Leases and licences formalise the use of community land by groups such as sporting clubs and schools, or by commercial organisations and individuals providing facilities or services for public use.

The Local Government Amendment (Community Land Management) Act (1998) requires that granting of a lease, licence or other estate be in accordance with an express authorisation in the Plan of Management (s.46):

- for a purpose prescribed by subsection (4), or for a purpose prescribed by any of sections 36E to 36N as a core objective of the land concerned, or
- for a purpose prescribed by the regulations, if the plan of management applies to several areas of community land, or
- for a short-term, casual purpose prescribed by the regulations, or
- for a residential purpose in relation to housing owned by the Council, or
- for the purpose of providing pipes, conduits or other connections under the surface of the ground for the connection of premises adjoining the community land to a facility of the council or other public utility provider that is situated on the community land

A licence may be needed where intermittent or short term use of the community open space is proposed. Leases, licences and other estates may be granted in accordance with this Plan of Management, for a period not exceeding 5 years (s.46) on a daily, weekly, seasonal or yearly basis.

The Local Government Amendment (Community Land Management) Act (1998) requires that any leases other than those prescribed by the regulation (in accordance with the core objectives for bushland) must be publicly notified.

Buildings in bushland are used by community groups such as scouts, girl guides, sporting clubs etc. The leasing of buildings in bushland in community open space are to be considered on individual merits and may be granted by Council for a period not exceeding 21 years in accordance with the Local Government Amendment (Community Land Management) Act (1998) (ss. 46, 47). Public notice will be given if the Council proposes to grant a lease or licence for a period exceeding five years (s47).i. The Local Government Amendment (Community Land Management) Act (1998) (s.46 and 47) prescribes the kind of buildings or structures that may be erected under a lease, and the purposes for which the building or structure may be used under a lease. This applies to community land classified as 'natural areas'. These uses as described in the legislation are consistent with the aims and objectives of this plan of management.

Leasing and Licensing in relation to areas of community open space other than sportsgrounds will be authorised within the Plans of Management.

This document also permits Council to grant easements for authorities/organisations/individuals over lands identified in this document providing the Council is satisfied there is no reasonable alternative and that the community land obtains appropriate benefits. The holder of the easement is responsible for the costs incurred in the repair of any adverse impacts on the bushland caused by the easement and for the repair of any installations the holder of the easement has caused to be placed in the easement.

3.0 ABOUT THIS PLAN OF MANAGEMENT

This document applies to 13 individual Significant Areas.

The reserves covered within this plan of management and categorisations as per the Local Government Amendment (Community Land Management Act (1998) are:

BUSHLAND
- Lamorna Ave Reserve
- Netherby Street Reserve
- Tekopa Rd Reserve
- Tim Brownescombe Reserve

BUSHLAND & PARK
- Cairnes Rd Reserve
- Fearnley Reserve
- Lakes of Cherrybrook
- Laurence St Reserve
- Walumeda Reserve

BUSHLAND, PARK & GENERAL COMMUNITY USE
- Appletree Dr Reserve
- McKinley Pl Reserve
- Normanhurst Park including Waitara Creek and Dog Pound Creek bushland
- Ray Park, Carlingford

The Significant Area Plans apply only to the natural area contained within each reserve. Lands categorised as park or general community use (scout halls) contained within the reserve are clearly indicated on the maps attached to each significant area plan. The generic plan of management for these land categorisations will apply to the areas indicated on the map as park or general community use (scout halls).

Separate, individual plans of management affecting bushland reserves, which are not covered in this document are:
- Dence Park – Terry's Creek Reserve, Epping
- Erlestoke Park – Pyes Creek Reserve, Castle Hill
- Greenway Park, Cherrybrook
- James Henty Park – Georges Creek Reserve, Dural

Each reserve plan comprises:

Part 1: Introduction and Reserve Description
Part 2: Management Issues and Strategies
Part 3: Action Plan

A map of each reserve is included which clearly indicates the categorisation of land as per the Local Government Amendment (Community Land Management) Act (1998).

3.1 Part 1 – Introduction and reserve description

Part 1 of the Plans of Management entitled Introduction and Reserve Description includes an overall outline of the location of the reserve and its significance.

Each reserve is given an overall rating describing the vegetation condition as per Smith and Smith (1990). The different ratings are:

Rating	% Weeds
Good	<10%
Fair	11% - 30%
Poor	31% - 60%
Very Poor	>60%

3.2 Part 2 – Management Issues and Strategies

Part 2 entitled Management Issues and Strategies includes specific land management goals and strategies and community values and issues for that reserve. Objectives for the plan are developed as management strategies.

Community Issues
Information from a past survey, and through the Water Catchment Team's interaction with the general public in the day to day running of this section of Council, the following list shows the most commonly raised issues in relation to the management of bushland within the Shire.

- Hazard reduction burning;
- Bush regeneration and weed control;
- Rubbish dumping/litter;
- Improve signage for walking tracks;
- Walking track maintenance;
- Increase number of walking tracks;
- Bushland conservation;
- Combating water pollution;
- Access;
- Increase picnic areas;
- Increase toilet facilities;
- Provide more information on walking tracks, flora and fauna.

Management Strategies and statements
Council has recognised the main issues of importance to the general public and has utilised them, in conjunction with Council based issues, to assist with development of management strategies for the Shire's bushland to satisfy the various issues.

Council recognises that these issues will change as the demographics of the various communities change. The Plan of Management have been prepared with the realisation that changes to the management statements will occur as there are changes to the demographics of the community.

Management statements have been developed in response to the various issues that have been raised. The management statements determined by this process are used in **Part 3 - Action Plan**, to determine actions necessary to fulfil Council's management statements or objectives.

3.3 Part 3 – Action Plan

Part 3 entitled Action Plan outlines the actions necessary to fulfil the management strategies and community issues as identified in Part 2, and establishes a time frame for implementation of the strategies.

Implementation and Performance
As required by the Local Government Amendment (Community Land Management) Act (1998), this part of the Plan of Management outlines the means by which Council proposes to achieve the objectives and performance targets and the manner in which Council proposes to assess its performance.

The Action Plans are the working section of the document and will require amendment as objectives are achieved. This part of the Plan will be subject to periodic review, approximately every five years, in response to changing community needs and aspirations and to ensure it is an effective working document. During the reviews, quantitative and qualitative assessment of performance targets will be undertaken. Monitoring on an annual basis will also occur. A Plan will be publicly exhibited if major changes are made, to allow comments from the community.

The Action Plan will provide a framework for management consistent with anticipated availability of resources and anticipated community needs. The priority ratings determined are subject to the availability of funds and staff, and will require revision if circumstances alter.

Relationship of reserves to other identiftying numbers used by different Divisions within Council:

Reserve name	Asset ID #	IPI #	Lands register #	
Lamorna Ave	PL 2970	44464 21606 44461 44465 44466 12653 12654	134	
Netherby St	1251	1	133	
Tekopa Rd	1522 1523 1524 1525		82	
Tim Brownescombe	nil		Nil	
Cairnes Rd	PL 1420		311	
Fearnley	PL 3930		163	
Lakes of Cherrybrook	PL 7950-4 1209		285	
Laurence St	PL 5250	4869 44353 44894	229	
Appletree	1118 1510 1511 1206		270	
McKinley	PL 5365 FL 7950		52	
Waitara Creek	FL 9108 PL 3990 1195 1124 1257 PL 6630 PL 8565 1157 PL 2120 PL 7530-2 PL 5110-1 1198		185 121 140?	
Ray Park	PL 7270 1226 1225 PL 5600 1202		333	
Walumeda Reserve	1203 1223 PL 6530		218	

HORNSBY SHIRE COUNCIL

Individual Plans of Management & Action Plans

Prepared by:

Water Catchments Team
Environment Division
Hornsby Shire Council

April 2000

Lamorna Ave Reserve
Draft Bushland Plan of Management

1.0 INTRODUCTION

This Draft Plan of Management for Lamorna Ave Reserve has been developed by Hornsby Shire Council to comply with the Local Government Act (1993), which required Plans of Management to be adopted by Councils for all 'community' land by July, 1996. Lamorna Ave Reserve is recognised as a significant area and this individual Plan of Management has been developed specifically for this reserve.

Hornsby Shire Council Local Environment Plan (LEP)
The current Hornsby Shire Local Environment Plan 1999 zones Lamorna Ave Reserve as Open Space A (Public Recreation - Local).

SIGNIFICANCE OF THE RESERVE

Hornsby Shire's bushland reserves are an important feature of the Shire's natural character and beauty. Urban bushland areas throughout Hornsby Shire and the northern Sydney region contribute significantly to the scenic amenity and beauty of this area.

Urban bushland areas are important for the following reasons:

- They provide a 'green space' in the built environment, contributing to the scenic amenity of urban areas
- They provide important habitat for native fauna species which would otherwise move away from urban areas. Urban bushland can form part of important wildlife corridors which provide shelter, food and habitat for migratory and nomadic species
- They are an important scientific resource, providing a record of the original vegetation of the district.
- They are an important educational resource, and often the first point of contact with nature for many urban residents as well as a venue for formal education. They provide nearby schools and other educational institutions with natural areas which can be visited without the need for a formal excursion, and where it is feasible to carry out studies requiring repeat investigations.
- Urban bushland provide recreational opportunities, enabling urban residents to undertake recreational pursuits in a bushland setting.

In addition to these general features, Lamorna Ave Reserve has particular significance for the following reasons:

- The bushland remnant present within Lamorna Ave Reserve has been identified as Blue Gum High Forest, an Endangered Ecological Community protected under the Threatened Species Conservation Act (1995).
- The reserve is surrounded by residential development, providing local residents with an easily accessible bushland setting for passive recreational pursuits.
- The reserve is situated along a tributary of Devlins Creek and forms part of an important bushland corridor along Devlins Creek.

**NB: Under Section 56 of the Threatened Species Conservation Act (1995), the Director-General of the National Parks and Wildlife Service, is required to "prepare a recovery plan for each endangered or vulnerable species, population and ecological community, as soon as practicable after it is listed in Schedule 1 of the Act, to promote the recovery of the species, population or ecological community to a position of viability in nature".

Once a Recovery Plan has been prepared for Blue Gum High Forest, this Plan of Management will be reviewed to ensure it is consistent with the Recovery Plan.

RESERVE DESCRIPTION

Lamorna Ave Reserve is located along Lamorna and Edwards Ave, Beecroft, at the headwaters of a tributary of Devlins Creek. It occupies an area of approximately 1.93 hectares. It is located in an established urban area adjacent residential properties.

The reserve is linear in shape and isolated, not directly connected to any other bushland areas. The small size of the reserve means that it has a high edge to area ratio, making it vulnerable to external influences especially weed propagules.

Land Tenure

Lamorna Ave Reserve is identified as a Public Reserve, Lot 27 DP 207587, Lot 16 DP 31832, Lot 75 DP 50696, Lot 2 & Lot 46 DP 217863, Lot 72 DP 503715, Lot 66 DP 218185, owned and managed by Hornsby Shire Council. No leases or licenses currently affect the land. Given the nature of the reserve it is unlikely that any leases or licenses will arise, however any proposals should be considered on their merit and in consideration of how they meet the objectives of this plan.

Topography

The reserve is located on a gentle slope to the east of the Pennant Hills Road which follows a ridgetop through much of the south-west of Hornsby Shire. Within the reserve, the landscape is flat to gently sloping east from Lamorna Ave to Edwards Ave.

Geology and soils

The soils present within Lamorna Ave Reserve are primarily clay soils derived from Wianamatta Shale. "Naturally vegetated shale landscapes are now very rare due to their preferential settlement through forestry, agriculture and later urbanisation" (*EPS Ecological Surveys and Planning, 1999*).

Hydrology

The watercourse present within the reserve is an ephemeral tributary of Devlins Creek. The creek traverses close to the full length of the reserve. This tributary flows through Carlingford residential area joining Devlins Creek in Beecroft Reserve where it flows through community bushland and eventually joins the Lane Cove River in Lane Cove National Park.

The present hydrological regime in the reserve is a result of the surrounding urban development as well as the development higher in the catchment.

Generally, the stormwater flows during rains events are increased by development which increases the amount of impervious surfaces within a catchment. Water runs off these surfaces more rapidly leading to increased peak flows and lower dry weather flows.

Water Quality

There is no data recorded for water quality within this reserve. Catchments such as the Devlins Creek Catchment with significant urban or industrial development can generate significant pollution including nutrients, suspended solids, metals, bacteria and chemical pollution, seriously affecting the quality of receiving waters.

Flora

Vegetation

Lamorna Ave Reserve was surveyed during November 1999 to determine the nature and distribution of plant communities, it's habitat value and the nature and intensity of weed invasion. The plant community present in Lamorna Ave Reserve can be described as Community K: *Eucalyptus pilularis - E.saligna - E.paniculata* Tall Open-forest as described in the *Hornsby Shire Bushland Survey* (Smith & Smith 1990). This vegetation community was described then as under-represented in the Shire.

Significant flora

The vegetation of Lamorna Ave Reserve has been previously documented in the *Hornsby Shire Threatened Biota Conservation Plan* (ESP Ecological Surveys & Planning 1999) and has been identified as Blue Gum High Forest, an endangered ecological community listed under Schedule 1 of the Threatened Species Conservation Act (1995).

There has been no comprehensive flora list compiled for this reserve and although the understorey has been considerably modified, the species present are consistent with the species listed as comprising the characteristic assemblage for Blue Gum High Forest in Schedule 1 of the Threatened Species Conservation Act (1995).

Vegetation condition

Although much of the canopy is intact, the understorey has been considerably modified and cleared in parts. The vegetation in the bushland area suffers from varying degrees of degradation and can be described as having an overall rating of very poor as per Smith & Smith (1990).

Fauna

Common species such as possums, lizards and snakes are likely to visit the reserve. The avifauna and of the reserve is likely to be typical of Shale and open forest habitats, though diversity may have declined due to surrounding residential development, domestic pet predation and lack of understorey vegetation.

Fauna activity may have also declined due to the fact that it is an isolated parcel of bushland, not forming part of a continuous bushland corridor, this high edge to area ratio increases the susceptibility of resident native fauna to impacts such as predation. Further investigation would be required to ascertain whether the reserve is still important for certain native fauna species.

There has been no fauna surveys undertaken within this reserve.

Significant fauna

There are no significant fauna species recorded as being present in this reserve.

Aboriginal and European Heritage Sites

It is likely that the Aboriginal people of the Dharug group were the original inhabitants of the reserve and surrounding area. There are no records of heritage items of Aboriginal significance in the reserve, (*Koettig 1996*) and due to the nature and disturbance of the reserve, none would be expected.

There are no records of heritage items of European significance in the reserve (*Hornsby Shire Council LEP, 1999*). A survey of the reserve could be undertaken as part of any review of the heritage study.

2.0 MANAGEMENT ISSUES AND STRATEGIES

Weed invasion, Bush regeneration and Vegetation Management

Lamorna Ave Reserve is affected by moderate to severe weed invasion. These weeds compete with the native species leading to simplification of the bushland's ecology and loss of biodiversity.

The majority of the canopy is intact but much of the understorey has been previously cleared and is currently suffering competition from a range of weed species. Due to the presence of some healthy canopy trees and native groundcovers, resilience is likely to be medium currently, but will decline in the future as weeds become more established modifying the vegetation structure. The weeds present are a result of impacts of the adjoining landuses including formalised parks and gardens and residential development.

The main weed species include Wandering Jew (*Tradescantia albiflora*), Privet (*Ligustrum lucidum* and *Ligustrum sinense*), Turkey Rhubarb (*Acetosa sagittata*), Bamboo (*Bambusa sp.*), Broom (*Genista monspessulana*), Crofton Weed (*Ageratina adenophora*), Kikuyu (*Pennisetum clandestinum*) and Ehrharta (*Ehrharta erecta*). Other weed species present include Monstera (*Monstera deliciosa*), Fleabane (*Conyza bonariensis*), Plantain (*Plantago lanceolata*), Busy Lizzy (*Impatiens balsamina*), Fishbone Fern (*Nephrolepis cordifolia*), Acer (*Acer sp.*), Liquidambar (*Liquidambar styraciflua*), Cassia (*Senna pendula*) and Sea-side Daisy (*Erigeron karvinskianus*). A number of large exotic trees have also been planted along the riparian zone in the past, and there is evidence of dumping of grass clippings and garden waste intermittently along the creekline, both a source of weed propagules.

Weed invasion has been identified as a significant threat to the survival of Blue Gum High Forest (*ESP Ecological Surveys & Planning, 1999*). This weed invasion should be addressed as part of the overall management of the reserve.

An integrated program of herbicide use as well as manual weed removal is needed and should be done so in co-ordination with any park maintenance or future upgrading of the site as resources become available for the Reserve.

Hydrology/Water quality

In urbanised catchments such as the Devlins Creek catchment, nutrient levels are expected to be elevated. The presence of high nutrient concentrations provide ideal conditions for weed growth, giving these exotic plants a competitive advantage over native species. This can have significant impacts, inhibiting regeneration of the native plant community, thus threatening its long-term survival.

This tributary of Devlins Creek receives stormwater from the surrounding urban area. It

is an ephemeral creek, only flowing following rain events. During periods of high rainfall, flows are generally increased with a higher velocity contributing to erosion along weaker sections of the creekbank. At present, weed species growing in the riparian zone are providing some bank stabilisation. Potential erosion will need to be addressed as part of any weed removal and restoration program.

A number of large deciduous, exotic trees are present along the creekline. The large amount of leaf drop each year is likely to also contribute to low oxygen levels in the water during flow periods.

Native and Introduced Fauna

Although there has been no formal fauna survey of Lamorna Ave Reserve, it is still likely that native fauna species frequent the reserve and some may even reside there. Even the degraded, weedy areas can still provide some habitat and protection for native fauna species. Any restoration works undertaken in this reserve should consider that thickets of weeds can be temporary homes for native fauna until their natural habitat can be restored. Any primary clearing of weeds should be carried out gradually, so as refuge areas remain for native animals to utilise.

The high edge to area ratio of the reserve and the presence of cats and dogs in the surrounding residential area constitutes a significant threat to native wildlife. Public education on the protection of native fauna in the area would be useful to make surrounding landholders aware of possible faunal activity in the reserve and their protection under the National Parks and Wildlife Act (1974) and the Threatened Species Conservation Act (1995).

Fire Regime

Urban bushland fire management needs to consider the ecological needs of the bushland as well as the risk posed by wildfires to life and property. Fire management in urban bushland reserves should aim to minimise hazard to life and property whilst conserving ecological values of the reserve.

Due to the narrow area of this riparian reserve, and the lack of undergrowth, it is unlikely that any hazard reduction work would be required. Any proposals for hazard reduction burns should be carried out in conjunction with regeneration of the bushland for the benefit of native vegetation management.

Recreation and Access

There are no problems with access in this reserve due to the lack of understorey vegetation.

Due to the presence of the endangered ecological community, limited access considerations are needed to prevent the damage caused by informal tracks and trails. Access needs to be restricted to uses which will have minimal impact on the ecology of the bushland area.

Boundaries and Neighbours

Lamorna Ave Reserve has a high edge to area ratio increasing its susceptibility to adverse external influences from the boundaries. Co-operation between Council and local residents is necessary for effective management of the reserve boundaries.

The boundary of the reserve with the residential properties is mostly well-defined by fencing with only a few areas of likely encroachment. Although mowing of an adjacent grassed area is contributing to weed propagules entering the reserve, letting the area regenerate unchecked would perhaps contribute more significantly to the spread of weeds.

Neighbours of the reserve will be encouraged to work with Council to assist in the regeneration and maintenance of the reserve and to inform Council of any illegal dumping of garden refuse or acts of vandalism which may occur.

References:

Smith & Smith (1990) *Hornsby Shire Bushland Survey*

ESP Ecological Surveys & Planning (1999) *Hornsby Shire Threatened Biota Conservation Plan*

Hornsby Shire Council (1999) *Hornsby Shire Local Environment Plan*

3.0 ACTION PLAN

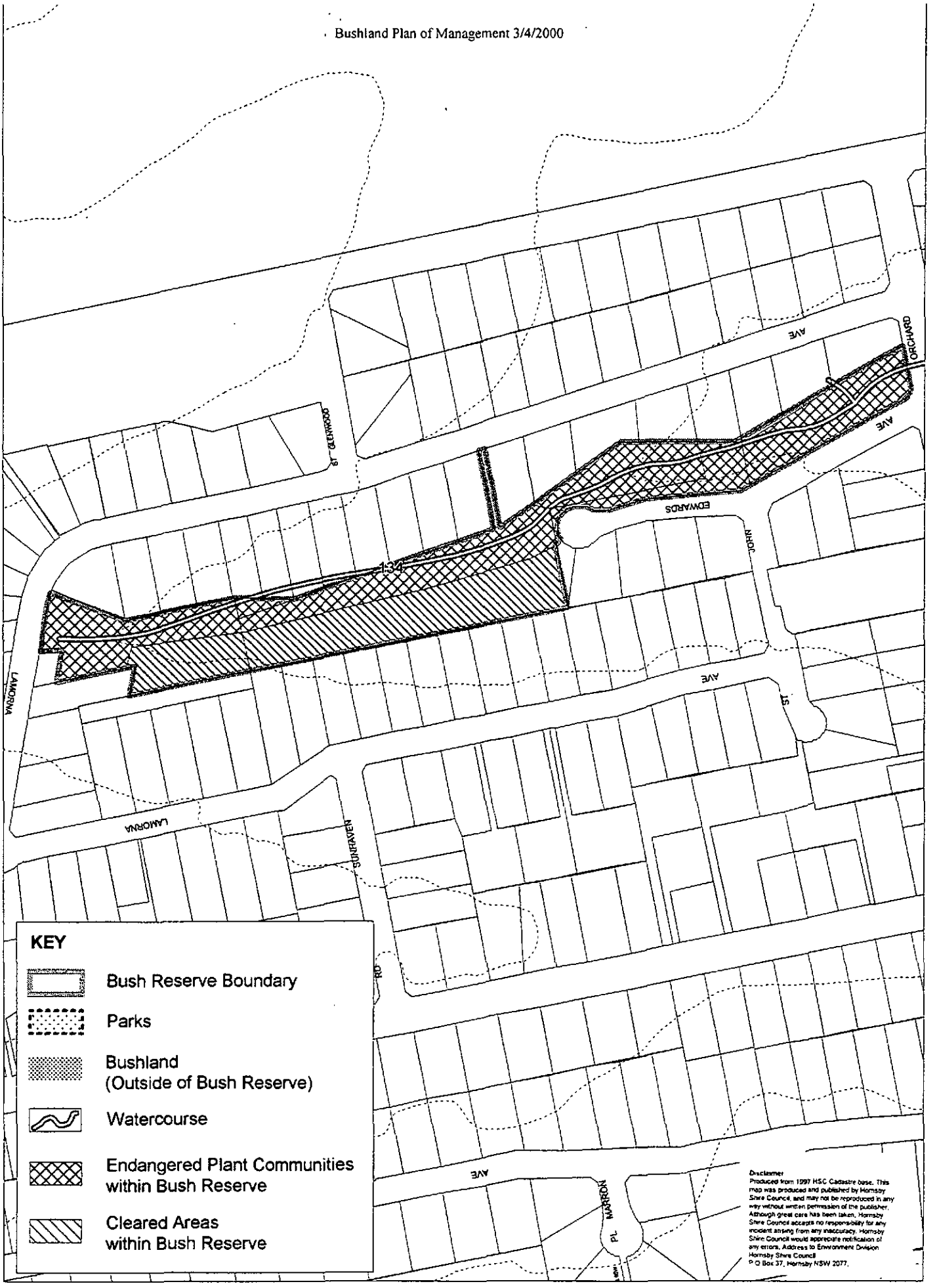
MANAGEMENT STATEMENT	ACTION	RESPONSIBILITY	TIMEFRAME	PERFORMANCE MEASURE
Weed Invasion, Bush Regeneration and Vegetation Management Formalised activities within the natural area will require a lease or licence agreement with Council.	Any granting of leases, licences or other estates must be consistent with the core objectives for bushland as set out in the Local Government Amendment (Community Land Management) Regulation 1998.	HSC / proponents	as required O	Any granting of a lease, licence or other estate for activities within the natural area are consistent with the Local Government Amendment (Community Land Management) Regulation 1998. Activities allowable in the bushland do not impact on the conservation of bushland.
Consideration is given to regeneration of bushland for any activity proposed for Lamorna Ave Reserve to mitigate the degrading influences on the Reserve.	Ensure that all activities are carried out with consideration of bushland protection and regeneration.	HSC/proponents	as required O	Protection of bushland
The Blue Gum High Forest remnant is to be managed for nature conservation to protect this endangered ecological community.	Restrict activities in this area to bushland restoration and low impact scientific and educational use following full environmental assessment.	Bushland Manager	O	Activities in this area do not adversely impact the bushland.
Areas affected by weed invasion within Lamorna Ave Reserve are to be rehabilitated using appropriate regeneration techniques.	Restoration and regeneration to be undertaken in areas affected by weed invasion.	Bushland Manager	as funding permits	Bushland condition is improved and maintained.
	Primary bush regeneration works should only be undertaken where sufficient follow up weed control and bush regeneration can be guaranteed.	Bushland Manager	as funding permits	Bushland condition is improved and maintained

	Encourage and support community involvement in restoration of the bushland within Lamorna Ave Reserve as part of Council's volunteer Bushcare Program.	Bushland Management Supervisor	O	Bushcare Group established in Lamorna Ave Reserve.
Indigenous species should be used wherever possible to rehabilitate degraded areas.	Any revegetation works within the Lamorna Ave Reserve site should be composed of locally occurring indigenous plants.	Bushland Management Supervisor	O	Locally indigenous plant material is utilised in rehabilitation and landscaping works.
Adequate funding for bushland restoration will assist in the conservation of Blue Gum High Forest in Lamorna Ave Reserve.	Seek additional funding from State and Federal Government sources for restoration of the area.	Bushland Manager	O as funding permits	Council receives financial grants
Hydrology / Water Quality Adequate control of stormwater and drainage from surrounding areas will assist in reducing negative impacts upon the bushland and contribute to the long-term conservation of Lamorna Ave Reserve.	Investigate and implement any remediation strategies which will reduce the negative impacts of stormwater and urban runoff into Lamorna Ave Reserve bushland area. Ensure that full environmental assessment of the impacts including threatened species assessment, is carried out prior to any proposed stormwater and drainage mitigation activity	Manager - Water Catchments Manager - Water Catchments	O O	Reduction in impacts from stormwater and drainage.
Water quality in Devlins Creek should meet ANZECC water quality guidelines for Aquatic Ecosystem health.	Investigate and implement measures necessary to improve water quality within a total catchment management program.	Manager - Water Catchments	LT	Acceptable water quality in Devlins Creek.

It is important for local landholders to be aware of activities that can impact the water quality in Devlins Creek catchment.	Encourage local landholders to minimise activities which may have a detrimental impact on the water quality of Devlins Creek	HSC/landholders	O	Acceptable water quality in Devlins Creek.
Native and Introduced Fauna Native fauna habitat should be conserved and enhanced wherever feasible.	Maintain habitat and vegetation through a well-planned bush regeneration and habitat enhancement program. Maintain habitat by preventing removal of logs for firewood and the removal of bushrock.	Bushland Manager Bushland Manager	LT/O O	Protection and enhancement of native fauna habitat.
Consideration is given to native fauna and its habitat for any activity proposed for Lamorna Ave Reserve.	Ensure fauna habitat needs are included in any proposal for restoration works within Lamorna Ave Reserve.	Bushland Manager	O	Protection of fauna habitat
Control of domestic animals.	Encourage pet owners to control domestic cats and dogs through a public education campaign and by impoundment of free roaming dogs.	Bushland Manager /Environmental Surveillance Officer	LT/O	Responsible pet ownership.
Fire Management Any fire management within Lamorna Ave Reserve should be carried out in conjunction with bush regeneration works.	Any proposals for fire management in Lamorna Ave Reserve are to be assessed by the Water Catchments Team	Bushland Manager / Manager - Fire Control	O	Fire regime is maintained for the health of the bushland.

Recreation and Access				
Access should be restricted to uses which will have minimal impact on the reserve's ecology.	Limit recreational activities in this area to passive recreational pursuits such as bushwalking, following full environmental assessment.	Bushland Manager	O as required	Recreational activities in this area do not adversely impact the bushland.
	Monitor recreational and educational uses of the reserve and their impact.	Bushland Manager	LT	
Use of informal trails through the natural area is to be discouraged wherever possible.	Unnecessary informal trails through the natural areas are to be closed, stabilised and revegetated using locally indigenous plant material.	Bushland Manager	LT	Any informal trails through the natural area are rehabilitated to an acceptable standard
	Council will actively discourage public passage to privately owned property through the reserve.	Bushland Manager	O	Reserve is not used for public access to private property.
Any proposal for track use, works or construction in the natural area will need to consider impacts on bushland.	Any proposal for use and works regarding existing trails or construction of new trails in the natural area will be subject to full environmental assessment.	Bushland Manager	as required	Proposals for track works or construction in the natural area are subject to stringent environmental assessment.

Boundaries and Neighbours The mitigation of negative impacts from neighbouring properties is essential to the long-term conservation of Lamorna Ave Reserve.	Encourage adjoining landholders to reduce any impacts such as illegal vegetation dumping and predation by domestic animals, and encourage involvement in Council's volunteer Bushcare Program.	Bushland Management Supervisor	O	Landscaped areas are maintained. Protection of natural bushland areas.
	Encourage neighbours to create or maintain buffer zones of indigenous vegetation on private land adjoining the reserve.	Bushland Manager	O	Creation and maintenance of buffer zones which assist in protecting the reserve.
	Council will pursue the removal of private encroachments onto the reserve and require the restoration and regeneration of these areas.	Bushland Manager Environment Surveillance Officer	As required LT	Reduction in encroachments.
The reserve boundaries should be well-defined and maintained to minimise the impact of any negative external influences.	Ensure that the boundary of the reserve is well-maintained.	Bushland Manager /Private property owners	LT	Natural area is well-defined. Boundaries maintained.



Hornsby Shire Council

Edwards Rd. & Lamorna Av. Beecroft

Bush Reserve

February 23, 2000

0 50 100m

N

Netherby Street Reserve
Draft Bushland Plan of Management

1.0 INTRODUCTION

This Draft Plan of Management for Netherby St Reserve has been developed by Hornsby Shire Council to comply with the Local Government Act (1993), which requires Plans of Management to be adopted by Councils for all 'community' land. Netherby St Reserve is recognised as a significant area thus an individual Plan of Management has been developed for the reserve.

Hornsby Shire Council Local Government Plan (LEP)
The current Hornsby Shire Local Environment Plan 1997 zones Netherby St Reserve as Open Space A (Public Recreation - Local).

SIGNIFICANCE OF THE RESERVE

Hornsby Shire's bushland reserves are an important feature of the Shire's natural character and beauty. Urban bushland areas throughout Hornsby Shire and the northern Sydney region contribute significantly to the scenic amenity and beauty of this area.

Urban bushland areas are important for the following reasons:

- They provide a 'green space' in the built environment, contributing to the scenic amenity of urban areas
- They provide important habitat for native fauna species which would otherwise move away from urban areas. Urban bushland can form part of important wildlife corridors which provide shelter, food and habitat for migratory and nomadic species
- They are an important scientific resource, providing a record of the original vegetation of the district.
- They are an important educational resource, and often the first point of contact with nature for many urban residents as well as a venue for formal education. They provide nearby schools and other educational institutions with natural areas which can be visited without the need for a formal excursion, and where it is feasible to carry out studies requiring repeat investigations.
- Urban bushland provide recreational opportunities, enabling urban residents to undertake recreational pursuits in a bushland setting.

In addition to these general features, Netherby Street Reserve has particular significance for the following reasons:

- The bushland remnant present within Netherby Street Reserve has been identified as Blue Gum High Forest, an Endangered Ecological Community protected under the Threatened Species Conservation Act (1995).
- The reserve adjoins St.Leos College, providing an ideal opportunity for open air classes.
- The reserve contains the headwaters of Waitara Creek, part of the larger Berowra Creek Catchment.

**NB: Under Section 56 of the Threatened Species Conservation Act (1995), the Director-General of the National Parks and Wildlife Service, is required to "prepare a recovery plan for each endangered or vulnerable species, population and ecological community, as soon as practicable after it is listed in Schedule 1 of the Act, to promote the recovery of the species, population or ecological community to a position of viability in nature".

Once a Recovery Plan has been prepared for Blue Gum High Forest, this Plan of Management will be reviewed to ensure it is consistent with the Recovery Plan.

RESERVE DESCRIPTION

Netherby Street Reserve is located at the end of Netherby Street, Wahroonga, at the headwaters of Waitara Creek. It occupies an area of approximately 1.05ha. It is located between the Mercy Family Life Centre, St.Leos College and residential properties off Netherby Street and Woolcott Ave.

The fill embankment adjacent the Mercy Family Life Centre carpark and residential properties forms the north-eastern boundary, whilst cleared, grassed areas and a school sporting oval forms the southern and western boundaries.

The reserve is rectangular in shape and isolated, not directly connected to any other bushland areas. The small size of the reserve means that it has a high edge to area ratio,

making it vulnerable to external influences especially weed propagules and pest animal predation.

Land Tenure

Netherby Street Reserve is identified as a Public Reserve, Lot 51 DP 619671, owned and managed by Hornsby Shire Council. No leases or licenses currently affect the land. Given the nature of the reserve it is unlikely that any leases or licenses will arise, however any proposals should be considered on their merit and in consideration of how they meet the objectives of this plan.

Topography

The reserve is located on a gentle slope to the west of the Pacific Highway which follows the main ridgetop through much of Hornsby Shire. Within the reserve, the landscape is gently sloping to the west from the end of Netherby Street.

Geology and soils

The soils present within Netherby St Reserve are primarily clay soils derived from Wianamatta Shale. "Naturally vegetated shale landscapes are now very rare due to their preferential settlement through forestry, agriculture and later urbanisation" (EPS Ecological Surveys and Planning, 1999).

Hydrology

The watercourse present within the reserve is Waitara Creek. The creek traverses close to the full length of the reserve and is in fact the headwaters of Waitara Creek. This Creek flows through Waitara residential area to Normanhurst Park where it flows through community bushland and eventually adjoins Berowra Creek in the Berowra Valley Regional Park.

The present hydrological regime in the reserve is a result of the surrounding urban development as well as the development higher in the catchment.

Generally, the stormwater flows during rain events are increased by development which increases the amount of impervious surfaces within a catchment. Water runs off these surfaces more rapidly leading to increased peak flows and lower dry weather flows.

Water Quality

There is no data recorded for water quality within this reserve. Catchments such as the Waitara Creek Catchment with significant urban, industrial or agricultural development can generate significant pollution including nutrients, suspended solids, metals, bacteria and chemical pollution, seriously affecting the quality of receiving waters.

Flora

Vegetation

Netherby St Reserve was surveyed during November 1999 to determine the nature and distribution of plant communities, it's habitat value and the nature and intensity of weed invasion. The plant community present in Netherby St Reserve can be described as Community K: *Eucalyptus pilularis - E.saligna - E.paniculata* Tall Open-forest as described in the *Hornsby Shire Bushland Survey* (Smith & Smith 1990). This vegetation community was described then as under-represented in the Shire.

Significant flora

The vegetation of Netherby St Reserve has been previously documented in the *Hornsby Shire Threatened Biota Conservation Plan* (ESP Ecological Surveys & Planning 1999) and has been identified as Blue Gum High Forest, an endangered ecological community listed under Schedule 1 of the Threatened Species Conservation Act (1995).

There has been no comprehensive flora list compiled for this reserve, however the species present are consistent with the species listed as comprising the characteristic assemblage for Blue Gum High Forest in Schedule 1 of the Threatened Species Conservation Act (1995).

Tetratheca glandulosa, an endangered species as per Schedule 1 of the Threatened Species Conservation Act (1995) and *Epacris purpurascens*, a vulnerable species as per Schedule 2 of the threatened Species Conservation Act (1995), have been recorded further down in the catchment on private property in the vicinty of the reserve (*ESP Ecological Surveys & Planning, 1999*)

Vegetation condition

The vegetation in the bushland area suffers from varying degrees of degradation and can be described as having an overall rating of poor as per Smith & Smith (1990) (Appendix).

Fauna

Common species such as possums, lizards and snakes are likely to visit the reserve. The avifauna of the reserve is likely to be typical of Shale and open forest habitats, though diversity may have declined due to surrounding residential development and domestic pet and feral animal predation.

Fauna activity may have also declined due to the fact that it is an isolated parcel of bushland, not forming part of a continuous bushland corridor, this high edge to area ratio increases the susceptibility of resident native fauna to impacts such as predation. Further investigation would be required to ascertain whether the reserve is still important for certain native fauna species.

There have been no fauna surveys undertaken within this reserve.

Significant fauna
There are no significant fauna species recorded as being present in this reserve.

Aboriginal and European Heritage Sites

It is likely that the Aboriginal people of the Guringai group were the original inhabitants of the reserve and surrounding area. There are no records of heritage items of Aboriginal significance in the reserve, (*Koettig 1996*) and due to the nature and disturbance of the reserve, none would be expected.

There are no records of heritage items of European significance in the reserve (*Hornsby Shire Council LEP, 1997*). A survey of the reserve could be undertaken as part of any review of the heritage study.

2.0 MANAGEMENT ISSUES AND STRATEGIES

Weed invasion, Bush regeneration and Vegetation Management

Netherby St Reserve is affected by moderate to severe weed invasion. These weeds compete with the native species leading to simplification of the bushland's ecology and loss of biodiversity.

The majority of the canopy is intact but weed infestation is severe in patches through the understorey. Resilience is likely to be medium to high currently but will decline in the future as weeds become more established modifying the vegetation structure. The weeds present are a result of impacts of the adjoining landuses including formalised parks and gardens, medium and low density residential development and school grounds and sporting ovals.

The main weed species include Balloon Vine (*Cardiospermum grandiflorum*), Sweet Pittosporum (*Pittosporum undulatum*), Broom (*Genista sp*), Coral Tree (*Erythrina sp.*), Camphor Laurel (*Cinnamomum camphora*) and Honeysuckle (*Lonicera japonica*).

Weed invasion has been identified as a significant threat to the survival of Blue Gum High Forest (*ESP Ecological Surveys & Planning, 1999*). This weed invasion should be addressed as part of the overall management of the reserve.
An integrated program of herbicide use as well as manual weed removal is needed and should be done so in co-ordination with any park maintenance or future upgrading of the site as resources become available for the Reserve.

St. Leo's College formed a Bushcare Group to work in Netherby St Reserve in 1995 and worked through until 1996. There was no bush regeneration work carried from 1996 until 2000 when school students commenced work again at the beginning of the year.

Hydrology / Water Quality

In urbanised catchments such as the Waitara Creek catchment, nutrient levels are expected to be elevated. The presence of high nutrient concentrations provide ideal conditions for weed growth, giving these exotic plants a competitive advantage over native species. This can have significant impacts, inhibiting regeneration of the native plant community, thus threatening its long-term survival.

Native and Introduced Fauna

Although there has been no formal fauna survey of Netherby Street Reserve, it is still likely that native fauna species frequent the reserve and some may even reside there. Even the degraded, weedy areas can still provide some habitat and protection for native fauna species. Any restoration works undertaken in this reserve should consider that thickets of weeds can be temporary homes for native fauna until their natural habitat can be restored. Any primary clearing of weeds should be carried out gradually, so as refuge areas remain for native animals to utilise.

The high edge to area ratio of the reserve and the presence of cats and dogs in the surrounding residential area constitutes a significant threat to native wildlife. Public education on the protection of native fauna in the area would be useful to make surrounding landholders aware of possible faunal activity in the reserve and their protection under the National Parks and Wildlife Act (1974) and the Threatened Species Conservation Act (1995).

Fire Regime

Urban bushland fire management needs to consider the ecological needs of the bushland as well as the risk posed by wildfires to life and property. Fire management in urban bushland

reserves should aim to minimise hazard to life and property whilst conserving ecological values of the reserve.

Due to the narrow area of this riparian reserve it is unlikely that any hazard reduction work would be required. Any proposals for hazard reduction burns should be carried out in conjunction with regeneration of the bushland for the benefit of native vegetation management.

Recreation and Access

There are problems associated with public access in this reserve, as the surrounding lands are essentially private property. Council cannot encourage the use of trails which direct people to private property. There is currently an informal but well-used track through the reserve between the highschool and the Mercy Family Life Centre as well as other smaller informal trails. A paved footpath provides access to the reserve from the end of Netherby Street.

Due to the presence of the endangered ecological community, limited access considerations are needed to prevent the damage caused by informal tracks and trails. Access needs to be restricted to uses which will have minimal impact on the ecology of the bushland area.

Boundaries and Neighbours

Netherby Street Reserve has a high edge to area ratio increasing its susceptibility to adverse external influences from the boundaries. Co-operation between Council, residents, the school and Mercy Family Life Centre is necessary for effective management of the reserve boundaries.

The boundary of the reserve with the Mercy Family Life Centre and residential properties is well-defined by fencing and the carpark verge, however, it is evident that some clearing of groundcovers and understorey and possibly some planting of the buffer area between the Mercy Family Life Centre and the reserve has taken place. The boundary with St Leo's College is less well-defined but can be assumed to be approximately where the cleared, grassed area begins. Although mowing of this grassed area is contributing to weed propagules entering the reserve, letting the area regenerate unchecked would perhaps contribute more significantly to the spread of weed propagules.

Neighbours of the reserve will be encouraged to work with Council to assist in the regeneration and maintenance of the reserve and to inform Council of any illegal dumping of garden refuse or acts of vandalism which may occur.

References

Smith & Smith (1990) *Hornsby Shire Bushland Survey*

ESP Ecological Surveys & Planning (1999) *Hornsby Shire Threatened Biota Conservation Plan*

Hornsby Shire Council (1999) *Hornsby Shire Local Environment Plan*

Margrit Koettig Archaeological Services (1996) *Hornsby Shire Aboriginal Heritage Study*

3.0 ACTION PLAN

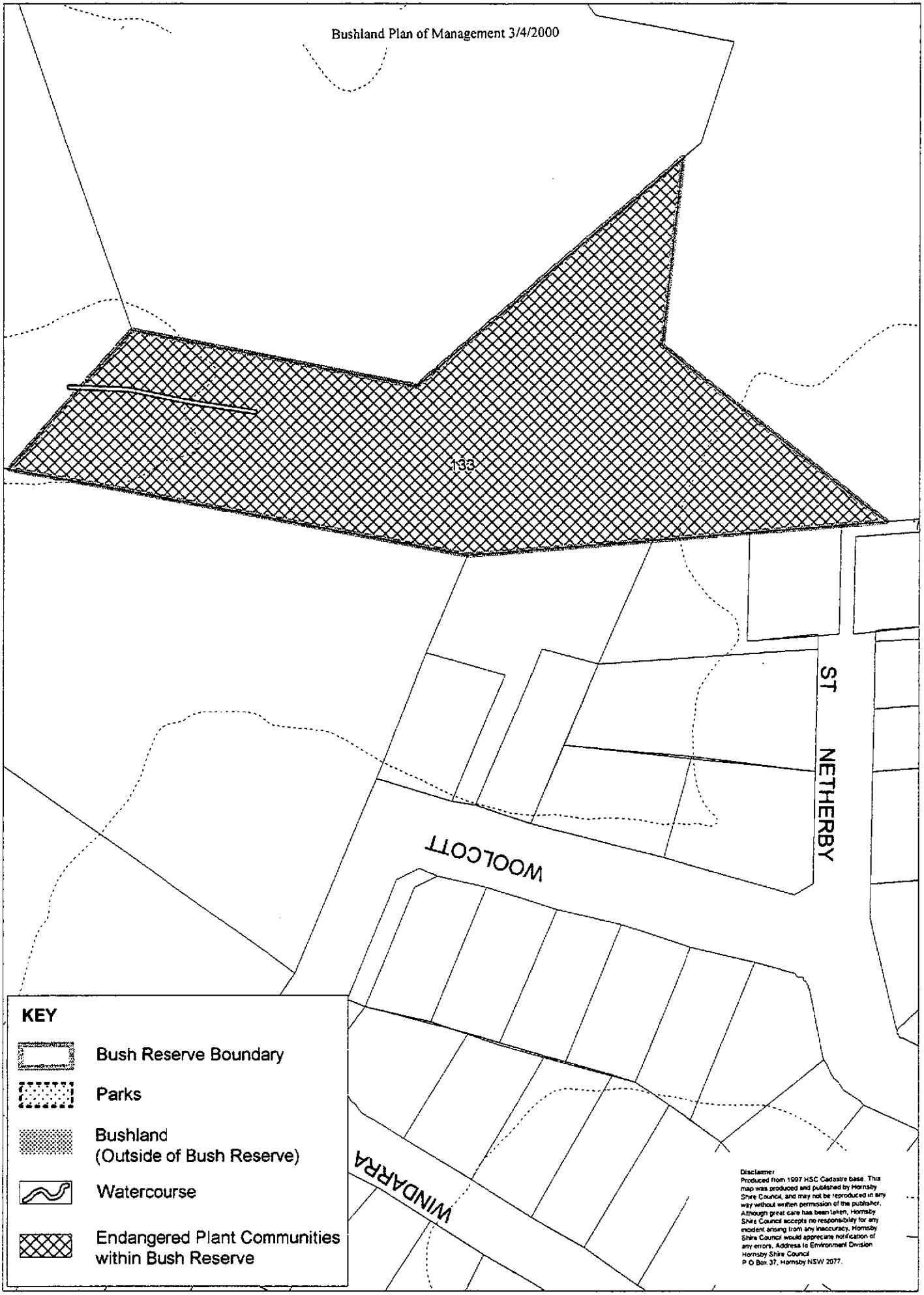
MANAGEMENT STATEMENT	ACTION	RESPONSIBILITY	TIMEFRAME	PERFORMANCE MEASURE
Weed Invasion, Bush Regeneration and Vegetation Management Formalised activities within the natural area will require a lease or licence agreement with Council.	Any granting of leases, licences or other estates must be consistent with the core objectives for bushland as set out in the Local Government Amendment (Community Land Management) Regulation (1998).	HSC / proponents	as required O	Any granting of a lease, licence or other estate for activities within the natural area are consistent with the Local Government Amendment (Community Land Management) Regulation (1998). Activities allowable in the bushland do not impact on the conservation of bushland.
Consideration is given to regeneration of bushland for any activity proposed for Netherby St Reserve to mitigate the degrading influences on the Reserve.	Ensure that all activities are carried out with consideration of bushland protection and regeneration.	HSC/proponents	as required O	Protection of bushland
The Blue Gum High Forest remnant is to be managed for nature conservation to protect this endangered ecological community.	Restrict activities in this area to bushland restoration and low impact scientific and educational use following full environmental assessment.	Bushland Manager	O	Activities in this area do not adversely impact the bushland.
Areas affected by weed invasion within Netherby St Reserve are to be rehabilitated using appropriate regeneration techniques.	Restoration and regeneration to be undertaken in areas affected by weed invasion.	Bushland Manager	as funding permits	Bushland condition is improved and maintained.
	Primary bush regeneration works should only be undertaken where sufficient follow up weed control and bush regeneration can be guaranteed.	Bushland Manager	as funding permits	Bushland condition is improved and maintained

	Continue to support the Bushcare Group currently working in Netherby St Reserve and encourage further community involvement in restoration of the bushland as part of Council volunteer Bushcare Program.	Bushland Management Supervisor	O	Support for Bushcare Group in Netherby St Reserve and further recruitment.
Indigenous species should be used wherever possible to rehabilitate degraded areas.	Any revegetation works within the Netherby St Reserve site should be composed of locally occurring indigenous plants.	Bushland Management Supervisor	O	Locally indigenous plant material is utilised in rehabilitation and landscaping works.
Adequate funding for bushland restoration will assist in the conservation of Blue Gum High Forest in Netherby Street Reserve.	Seek additional funding from State and Federal Government sources for restoration of the area.	Bushland Manager	Ongoing as funding permits	Council receives financial grants
Hydrology / Water Quality Adequate control of stormwater and drainage from surrounding areas will assist in reducing negative impacts upon the bushland and contribute to the long-term conservation of Netherby Street Reserve.	Investigate and implement any remediation strategies which will reduce the negative impacts of stormwater and urban runoff into Netherby St Reserve. Ensure that full environmental assessment of the impacts including threatened species assessment, is carried prior to any proposed stormwater and drainage mitigation activity	Manager - Water Catchments Manager - Water Catchments	O/MT As required	Reduction in impacts from stormwater and drainage.
Water quality in Waitara Creek should meet ANZECC water quality guidelines for Aquatic Ecosystem health.	Investigate and implement measures necessary to improve water quality within a total catchment management program.	Manager - Water Catchments	LT	Acceptable water quality in Waitara Creek.

It is important for local landholders to be aware of activities that can impact the water quality in Waitara Creek catchment.	Encourage local landholders to minimise activities which may have a detrimental impact on the water quality of Waitara Creek	HSC/landholders	O	Acceptable water quality in Waitara Creek.
Native and Introduced Fauna Native fauna habitat should be conserved and enhanced wherever feasible.	Maintain habitat and vegetation through a well-planned bush regeneration and habitat enhancement program. Maintain habitat by preventing removal of logs for firewood and the removal of bushrock.	Bushland Manager Bushland Manager	O/LT O	Protection and enhancement of native fauna habitat.
Consideration is given to native fauna and its habitat for any activity proposed for Netherby St Reserve.	Ensure fauna habitat needs are included in any proposal for restoration works within Netherby St Reserve.	Bushland Manager	O	Protection of fauna habitat
Control of domestic animals.	Encourage pet owners to control domestic cats and dogs through a public education campaign and by impoundment of free roaming dogs.	Bushland Manager /Environmental Surveillance Officer	O	Responsible pet ownership.
Fire Management Any fire management within Netherby St Reserve should be carried out in conjunction with bush regeneration works.	Any proposals for fire management in Netherby St Reserve are to be assessed by the Water Catchments Team	Bushland Manager / Manager - Fire Control	O	Fire regime is maintained for the health of the bushland.

Recreation and Access Access should be restricted to uses which will have minimal impact on the reserve's ecology.	Limit recreational activities in this area to passive recreational pursuits such as bushwalking, following full environmental assessment. Monitor recreational and educational uses of the reserve and their impact.	Bushland Manager Bushland Manager	O LT	Recreational activities in this area do not adversely impact the bushland.
Use of informal trails through the natural area is to be discouraged wherever possible.	Unnecessary informal trails through the natural areas are to be closed, stabilised and revegetated using locally indigenous plant material Council will actively discourage public passage to privately owned property through the reserve.	Bushland Manager Bushland Manager	MT MT	Any informal trails through the natural area are rehabilitated to an acceptable standard Reserve is not used for public access to private property.
Any proposal for track use, works or construction in the natural area will need to consider impacts on bushland.	Any proposal for use and works regarding existing trails or construction of new trails in the natural area will be subject to full environmental assessment.	Bushland Manager	as required	Proposals for track works or construction in the natural area are subject to stringent environmental assessment.

Boundaries and Neighbours The mitigation of negative impacts from neighbouring properties is essential to the long-term conservation of Netherby Street Reserve.	Encourage adjoining landholders to reduce any impacts such as illegal vegetation dumping and predation by domestic animals, and encourage involvement in Council's volunteer Bushcare Program.	Bushland Management Supervisor /neighbouring landholders	O	Landscaped areas maintained. Protection of natural bushland areas.
	Encourage neighbours to create or maintain buffer zones of indigenous vegetation on private land adjoining the reserve.	Bushland Manager /neighbouring landholders	O	Creation and maintenance of buffer zones which assist in protecting the reserve.
	Council will pursue the removal of private encroachments onto the reserve and require the restoration and regeneration of these areas.	Bushland Manager Environmental Surveillence Officer	As required LT	Reduction in encroachments.
The reserve boundaries should be well-defined and maintained to minimise the impact of any negative external influences.	Ensure that the boundary of the reserve, particularly with the school is well-maintained.	Bushland Manager /neighbouring landholders	As funding permit	Natural area is well-defined. Boundaries maintained.



HORNSBY SHIRE COUNCIL

Hornsby Shire Council

Netherby Street, Wahroonga

Bush Reserve

March 1, 2000

0 25 50m

N

Tekopa Road Reserve
Draft Bushland Plan of Management

1.0 INTRODUCTION

This Draft Plan of Management for Tekopa Rd Reserve has been developed by Hornsby Shire Council to comply with the Local Government Act (1993), which required Plans of Management to be adopted by Councils for all 'community' land by July, 1996. Tekopa Rd Reserve is recognised as a significant area and this individual Plan of Management has been developed specifically for this reserve.

Hornsby Shire Council Local Environment Plan (LEP)
The current Hornsby Shire Local Environment Plan 1999 zones Tekopa Rd Reserve as Open Space A (Public Recreation - Local).

SIGNIFICANCE OF THE RESERVE

Hornsby Shire's bushland reserves are an important feature of the Shire's natural character and beauty. Bushland areas throughout Hornsby Shire and the northern Sydney region contribute significantly to the scenic amenity and beauty of this area.

Urban bushland areas are important for the following reasons:

- They provide a 'green space' in the built environment, contributing to the scenic amenity of urban areas
- They provide important habitat for native fauna species which would otherwise move away from urban areas. Urban bushland can form part of important wildlife corridors which provide shelter, food and habitat for migratory and nomadic species
- They are an important scientific resource, providing a record of the original vegetation of the district.
- They are an important educational resource, and often the first point of contact with nature for many urban residents as well as a venue for formal education. They provide nearby schools and other educational institutions with natural areas which can be visited without the need for a formal excursion, and where it is feasible to carry out studies requiring repeat investigations.
- Urban bushland provide recreational opportunities, enabling urban residents to undertake recreational pursuits in a bushland setting.

In addition to these general features, Tekopa Road Reserve has particular significance for the following reasons:

- The bushland remnant present within Tekopa Road Reserve has been identified as Sydney Turpentine Ironbark Forest, an Endangered Ecological Community protected under the Threatened Species Conservation Act (1995).
- The reserve adjoins Glenorie Creek bushland corridor which is part of a contiguous bushland area linking with Marramarra National Park further downstream.
- The reserve contains the headwaters of Glenorie Creek, which flows into Marramarra Creek, part of the larger Berowra Creek Catchment.
- The reserve is adjacent a residential area providing local residents with an easily accessible bushland setting for passive recreational pursuits.
- The reserve contains a Catchment Remediation Rate device which prevents gross pollutants from entering the reserve.

**NB: Under Section 56 of the Threatened Species Conservation Act (1995), the Director-General of the National Parks and Wildlife Service, is required to "prepare a recovery plan for each endangered or vulnerable species, population and ecological community, as soon as practicable after it is listed in Schedule 1 of the Act, to promote the recovery of the species, population or ecological community to a position of viability in nature".

Once a Recovery Plan has been prepared for Sydney Turpentine Ironbark Forest, this Plan of Management will be reviewed to ensure it is consistent with the Recovery Plan.

RESERVE DESCRIPTION

Tekopa Road Reserve is located off Tekopa Road, Glenorie, at the headwaters of Glenorie Creek. It occupies an area of approximately 1.3ha. It is located between Tekopa Road and Crown bushland. Tekopa Road forms the southern boundary, private rural properties form the eastern boundary and residential properties and Glenorie Creek form the western boundary. This is part of the Glenorie Creek bushland corridor heading north through

Crown bushland eventually adjoining Marramarra National Park.

The reserve is rectangular in shape, initially narrow with a high edge to area ratio, making it vulnerable to external influences especially weed propagules and pest animal predation. Further downstream where the reserve adjoins a larger bushland area, impacts from external influences are likely to be significantly reduced.

Land Tenure

Tekopa Road Reserve is identified as a Public Reserve, Lots 66-68 DP 258001 and Lot 88 DP 585835, owned and managed by Hornsby Shire Council. No leases or licenses currently affect the land. Given the nature of the reserve it is unlikely that any leases or licenses will arise, however any proposals should be considered on their merit and in consideration of how they meet the objectives of this plan.

Topography

The reserve is located on a gentle south facing slope to the east of the Old Northern Road which follows the main ridgetop along the western boundary of Hornsby Shire. Within the reserve, the landscape is gently sloping to the south-west from the Tekopa Road verge.

Geology and soils

The soils present within Tekopa Road Reserve are primarily clay soils derived from Wianamatta Shale. "Naturally vegetated shale landscapes are now very rare due to their preferential settlement through forestry, agriculture and later urbanisation" (EPS Ecological Surveys and Planning, 1999).

Hydrology

The watercourse present within the reserve is Glenorie Creek. The creek traverses the full length of the reserve and is in fact the headwaters of Glenorie Creek. This Creek flows through a small residential and rural residential area in Glenorie then into Crown bushland and eventually adjoins Colah Creek and then Marramarra Creek in Marramarra National Park. This is part of the larger Berowra Creek Catchment.

The present hydrological regime in the reserve is a result of the surrounding residential and agricultural development as well as the development higher in the catchment.

Generally, the stormwater flows during rains events are increased by development which increases the amount of impervious surfaces within a catchment. Water runs off these surfaces more rapidly leading to increased peak flows and lower dry weather flows.

Water Quality

Water quality sampling has recently begun in this reserve. Catchments such as the Glenorie Creek Catchment with significant agricultural development as well as industrial and residential development can generate significant pollution including nutrients, suspended solids, bacteria and chemical pollution, seriously affecting the quality of receiving waters. High nutrient levels have been recorded in this creek most likely as a result of onsite sewage disposal in the catchment.

A Catchment Remediation Rate device is present in the reserve. This is a gross pollutant trap which collects litter, leaf litter and coarse sediments. The device is cleaned out on a regular basis.

Flora

Vegetation

Tekopa Road Reserve was surveyed during November 1999 to determine the nature and distribution of plant communities, it's habitat value and the nature and intensity of weed invasion. The plant community present in Tekopa Reserve can be described as Community M: *Syncarpia glomulifera - Eucalyptus paniculata - Angophora costata* Open Forest and a small portion of Community D: *Eucalyptus punctata – Corymbia gummifera – E.haemastoma* Woodland as described in the *Hornsby Shire Bushland Survey* (Smith & Smith 1990).

The Community M vegetation was described then as under-represented in the Shire and has now been listed as an endangered ecological community under Schedule 1 of the Threatened Species Conservation Act (1995).

Significant Flora

The vegetation of Tekopa Road Reserve has been previously documented in the *Hornsby Shire Threatened Biota Conservation Plan* (ESP Ecological Surveys & Planning 1999) and has been identified as Sydney Turpentine Ironbark Forest, an endangered ecological community listed under Schedule 1 of the Threatened Species Conservation Act (1995).

There has been no comprehensive flora list compiled for this reserve, however the species present are consistent with the species listed as comprising the characteristic assemblage for Sydney Turpentine Ironbark Forest in Schedule 1 of the Threatened Species Conservation Act (1995).

Acacia gordonii, an endangered species as per Schedule 1 of the Threatened Species

Conservation Act (1995), has been recorded in bushland to the north-east of Cairnes Road Reserve (*ESP Ecological Surveys & Planning, 1999*).

Vegetation condition

The vegetation in the bushland area suffers from varying degrees of degradation and can be described as having an overall rating of fair as per Smith & Smith (1990).

Fauna

Common species such as possums, lizards and snakes are likely to visit the reserve. The avifauna of the reserve is likely to be typical of Shale and open forest habitats and the permanent creekline is likely to attract various frog species, small fish and insects, though diversity may have declined due to surrounding residential and rural development and domestic pet and feral animal predation. Further investigation would be required to ascertain the importance of this reserve for certain native fauna species.

Fauna activity is still likely to be significant due to the fact that the reserve forms part of a continuous bushland corridor, ensuring a better chance of withstanding external influences such as predation.

There has been no fauna surveys undertaken within this reserve.

Significant fauna

There are no significant fauna species recorded as being present in this reserve.

Aboriginal and European Heritage Sites

It is likely that the Aboriginal people of the Dharug group were the original inhabitants of the reserve and surrounding area. There are no records of heritage items of Aboriginal significance in the reserve, (*Koettig 1996*) and due to the nature and disturbance of the reserve, none would be expected.

There are no records of heritage items of European significance in the reserve (*Hornsby Shire Council LEP, 1999*). A survey of the reserve could be undertaken as part of any review of the heritage study.

2.0 MANAGEMENT ISSUES AND STRATEGIES

Weed invasion, Bush regeneration and Vegetation Management

Tekopa Road Reserve is affected by moderate to severe weed invasion. These weeds compete with the native species leading to simplification of the bushland's ecology and loss of biodiversity.

The majority of the canopy is intact but weed infestation is severe in patches through the understorey and is concentrated along the creekline as well as boundaries with adjoining properties. Resilience is likely to be medium to high currently but will decline in the future as weeds become more established, modifying the vegetation structure. The weeds present are a result of impacts of the adjoining landuses including low density residential development, rural properties and road verge.

The main weed species include Honeysuckle, Pittosporum, Jasmine, Privet, Wandering Jew, Willow, Ehrharta, Fishbone Fern and Camphor Laurel.

Weed invasion has been identified as a significant threat to the survival of Sydney Turpentine Ironbark Forest (*ESP Ecological Surveys & Planning, 1999*). This weed invasion should be addressed as part of the overall management of the reserve.

An integrated program of herbicide use as well as manual weed removal is needed and should be done so in co-ordination with any park maintenance or future upgrading of the site as resources become available for the reserve.

Hydrology / Water Quality

In rural residential catchments such as the Glenorie Creek catchment, nutrient levels are expected to be elevated. Initial water quality sampling has detected high nutrient levels which can mainly be attributed to onsite sewage systems in the catchment. The presence of high nutrient concentrations provide ideal conditions for weed growth, giving these exotic plants a competitive advantage over native species. This can have significant impacts, inhibiting regeneration of the native plant community, thus threatening its long-term survival.

A gross pollutant trap has been installed in the reserve to catch litter, leaf litter and coarse sediments which would otherwise have been deposited in the creek. Although the device is not designed to filter out nutrients, the trapping of coarse sediments would remove a proportion of the nutrients which are attached to the sediment particles.

Native and Introduced Fauna

Although there has been no formal fauna survey of Tekopa Road Reserve, it is still likely that native fauna species frequent the reserve and some may even reside there. Even the degraded, weedy areas can still provide some habitat and protection for native fauna species. Any restoration works undertaken in this reserve should consider that thickets of weeds can be temporary homes for native fauna until

their natural habitat can be restored. Any primary clearing of weeds should be carried out gradually, so as refuge areas remain for native animals to utilise.

The high edge to area ratio of the reserve and the presence of cats and dogs in the surrounding rural residential area constitutes a significant threat to native wildlife as does the possibility of the presence of other pest species such as foxes. Public education on the protection of native fauna in the area would be useful to make surrounding landholders aware of possible faunal activity in the reserve and their protection under the National Parks and Wildlife Act (1974) and the Threatened Species Conservation Act (1995).

Fire Regime

Urban bushland fire management needs to consider the ecological needs of the bushland as well as the risk posed by wildfires to life and property. Fire management in urban bushland reserves should aim to minimise hazard to life and property whilst conserving ecological values of the reserve.

Any proposals for hazard reduction burns should be carried out in conjunction with regeneration of the bushland for the benefit of native vegetation management.

Recreation and Access

There is currently no formal public access through this reserve, as the surrounding lands are essentially private property. Council cannot encourage the use of trails which direct people to private property. Although there are no formalised tracks or trails, the lack of dense undergrowth means that access is still possible from the Tekopa Road verge.

Due to the presence of the endangered ecological community, limited access considerations are needed to prevent the damage caused by informal tracks and trails. Access needs to be restricted to uses which will have minimal impact on the ecology of the bushland area.

Boundaries and Neighbours

Tekopa Road Reserve has a high edge to area ratio increasing its susceptibility to adverse external influences from the boundaries. Co-operation between Council and adjoining landholders is necessary for effective management of the reserve boundaries.

The boundary of the reserve with the adjoining residential and rural residential properties is well-defined by fencing. The boundary with adjoining Crown bushland is less clear, however this is not important as both the Council owned and Crown bushland are managed by Council with consistency of conservation objectives.

Neighbours of the reserve will be encouraged to work with Council to assist in the regeneration and maintenance of the reserve and to inform Council of any illegal dumping of garden refuse or acts of vandalism which may occur.

References

Smith & Smith (1990) *Hornsby Shire Bushland Survey*

ESP Ecological Surveys & Planning (1999) *Hornsby Shire Threatened Biota Conservation Plan*

Hornsby Shire Council (1999) *Hornsby Shire Local Environment Plan*

Margrit Koettig Archaeological Services (1996) *Hornsby Shire Aboriginal Heritage Study.*

3.0 ACTION PLAN

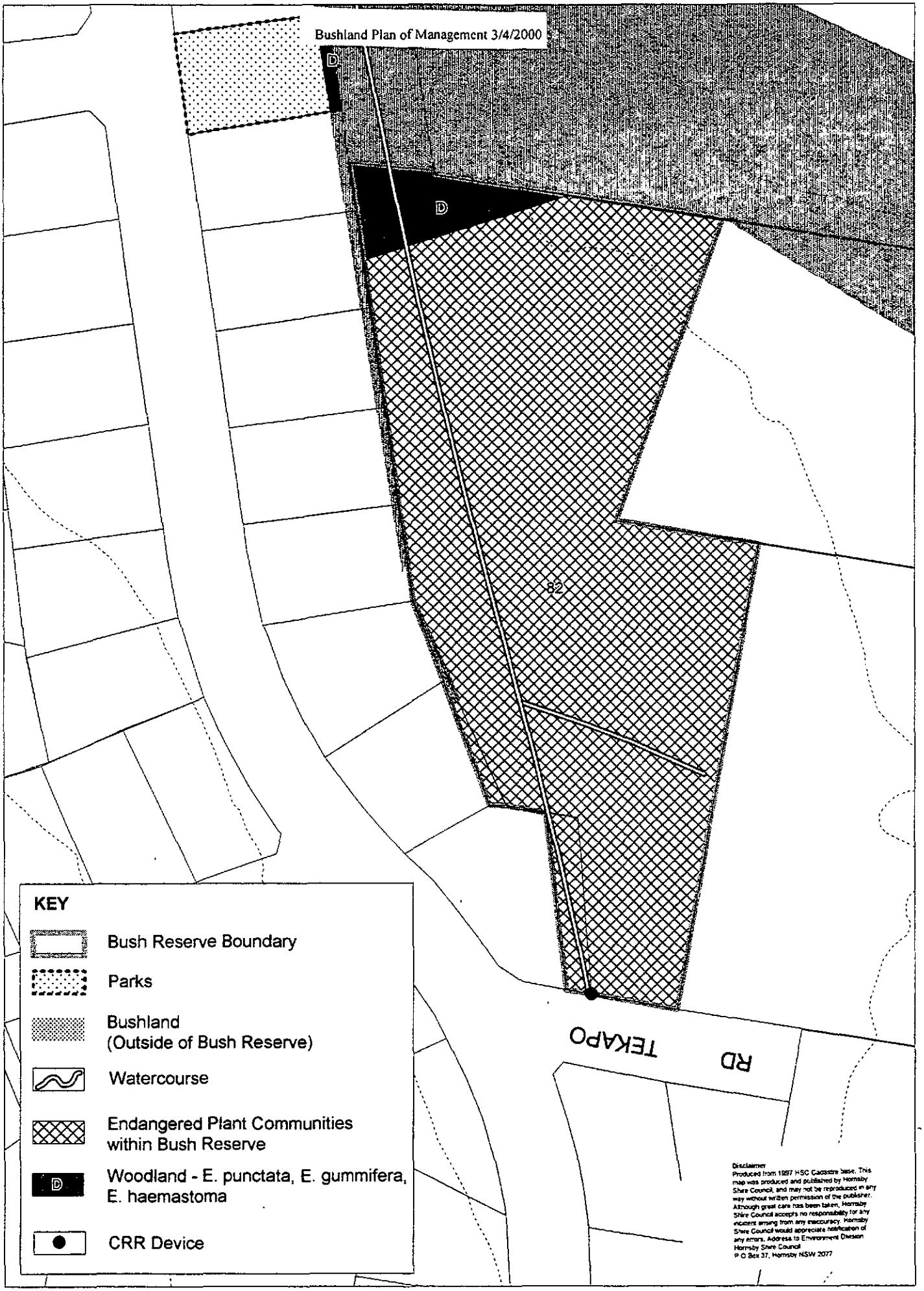
MANAGEMENT STATEMENT	ACTION	RESPONSIBILITY	TIMEFRAME	PERFORMANCE MEASURE
Weed Invasion, Bush Regeneration and Vegetation Management Formalised activities within the natural area will require a lease or licence agreement with Council.	Any granting of leases, licences or other estates must be consistent with the core objectives for bushland as set out in the Local Government Amendment (Community Land Management) Regulation 1998.	HSC / proponents	as required O	Any granting of a lease, licence or other estate for activities within the natural area are consistent with the Local Government Amendment (Community Land Management) Regulation 1998. Activities allowable in the bushland do not impact on the conservation of bushland.
Consideration is given to regeneration of bushland for any activity proposed for Tekopa Road Reserve to mitigate the degrading influences on the Reserve.	Ensure that all activities are carried out with consideration of bushland protection and regeneration.	HSC/proponents	as required O	Protection of bushland
The Sydney Turpentine Ironbark Forest remnant is to be managed for nature conservation to protect this endangered ecological community.	Restrict activities in this area to bushland restoration and low impact scientific and educational use following full environmental assessment.	Bushland Manager	O	Activities in this area do not adversely impact the bushland.
Areas affected by weed invasion within Tekopa Rd Reserve are to be rehabilitated using appropriate regeneration techniques.	Restoration and regeneration to be undertaken in areas affected by weed invasion.	Bushland Manager	as funding permits	Bushland condition is improved and maintained.
	Primary bush regeneration works should only be undertaken where sufficient follow up weed control and bush regeneration can be guaranteed.	Bushland Manager	as funding permits	Bushland condition is improved and maintained

	Encourage and support community involvement in restoration of the bushland within Tekopa Rd Reserve as part of Council's volunteer Bushcare Program.	Bushland Management Supervisor	O	Bushcare Group established in Tekopa Road Reserve.
Indigenous species should be used wherever possible to rehabilitate degraded areas.	Any revegetation works within the Tekopa Rd Reserve site should be composed of locally occurring indigenous plants.	Bushland Management Supervisor	O	Locally indigenous plant material is utilised in rehabilitation and landscaping works.
Adequate funding for bushland restoration will assist in the conservation of Sydney Turpentine Ironbark Forest in Tekopa Rd Reserve.	Seek additional funding from State and Federal Government sources for restoration of the area.	Bushland Manager	O as funding permits	Council receives financial grants
Hydrology / Water Quality				
Adequate control of stormwater and drainage from surrounding areas will assist in reducing negative impacts upon the bushland and contribute to the long-term conservation of Tekopa Rd Reserve.	Investigate and implement any remediation strategies which will reduce the negative impacts of stormwater and urban runoff into Tekopa Rd Reserve bushland area. Ensure that full environmental assessment of the impacts including threatened species assessment, is carried prior to any proposed stormwater and drainage mitigation activity.	Manager – Water Catchments Manager – Water Catchments	O/MT As required	Reduction in impacts from stormwater and drainage.
Water quality in Glenorie Creek should meet ANZECC water quality guidelines for Aquatic Ecosystem health.	Investigate and implement measures necessary to improve water quality within a total catchment management program.	Manager – Water Catchments	LT	Acceptable water quality in Glenorie Creek.

The CRR device should be regularly monitored and maintained to ensure it is operating effectively.	Ensure the gross pollutant trap is inspected and cleaned out on a regular basis as part of Council's maintenance program for all CRR devices.	Manager – Water Catchments	O	CRR device is well-maintained
It is important for local landholders to be aware of activities that can impact the water quality in Glenorie Creek catchment.	Encourage local landholders to minimise activities which may have a detrimental impact on the water quality of Glenorie Creek	HSC/landholders	O	Acceptable water quality in Glenorie Creek.
Native and Introduced Fauna Native fauna habitat should be conserved and enhanced wherever feasible.	Maintain habitat and vegetation through a well-planned bush regeneration and habitat enhancement program. Maintain habitat by preventing removal of logs for firewood and the removal of bushrock.	Bushland Manager Bushland Manager	O/LT O	Protection and enhancement of native fauna habitat.
Consideration is given to native fauna and its habitat for any activity proposed for Tekopa Rd Reserve.	Ensure fauna habitat needs are included in any proposal for restoration works within Tekopa Rd Reserve.	Bushland Manager	O	Protection of fauna habitat
Control of domestic animals.	Encourage pet owners to control domestic cats and dogs through a public education campaign and by impoundment of free roaming dogs.	Bushland Manager /Environmental Surveillance Officer	O	Responsible pet ownership.
Fire Management Any fire management within Tekopa Rd Reserve should be carried out in conjunction with bush regeneration works.	Any proposals for fire management in Tekopa Rd Reserve are to be assessed by the Water Catchments Team	Bushland Manager / Manager - Fire Control	O	Fire regime is maintained for the health of the bushland.

Recreation and Access Access should be restricted to uses which will have minimal impact on the reserve's ecology.	Limit recreational activities in this area to passive recreational pursuits such as bushwalking, following full environmental assessment. Monitor recreational and educational uses of the reserve and their impact.	Bushland Manager Bushland Manager	O LT	Recreational activities in this area do not adversely impact the bushland.
Use of informal trails through the natural area is to be discouraged wherever possible.	Unnecessary informal trails through the natural areas are to be closed, stabilised and revegetated using locally indigenous plant material Council will actively discourage public passage to privately owned property through the reserve.	Bushland Manager Bushland Manager	LT O	Any informal trails through the natural area are rehabilitated to an acceptable standard Reserve is not used for public access to private property.
Any proposal for track use, works or construction in the natural area will need to consider impacts on bushland.	Any proposal for use and works regarding existing trails or construction of new trails in the natural area will be subject to full environmental assessment.	Bushland Manager	as required	Proposals for track works or construction in the natural area are subject to stringent environmental assessment.

Boundaries and Neighbours				
The mitigation of negative impacts from neighbouring properties is essential to the long-term conservation of Tekopa Rd Reserve.	Encourage adjoining landholders to reduce any impacts such as illegal vegetation dumping and predation by domestic animals, and encourage involvement in Council's volunteer Bushcare Program.	Bushland Management Supervisor	O	Landscaped areas maintained. Protection of natural bushland areas.
	Encourage neighbours to create or maintain buffer zones of indigenous vegetation on private land adjoining the reserve.	Bushland Manager	O	Creation and maintenance of buffer zones which assist in protecting the reserve.
	Council will pursue the removal of private encroachments onto the reserve and require the restoration and regeneration of these areas.	Bushland Manager Environmental Surveillence Officer	as required LT	Reduction in encroachments.



HORNSBY SHIRE COUNCIL

Hornsby Shire Council

Tecoma & Tekapo Rds, Glenorie

Bush Reserve

March 6, 2000

0 25 50m

N

Tim Brownescombe Reserve
Draft Bushland Plan of Management

1.0 INTRODUCTION

This Draft Plan of Management for Tim Brownescombe Reserve has been developed by Hornsby Shire Council to comply with the Local Government Act (1993), which requires Plans of Management to be adopted by Councils for all 'community' land by July, 1996. Tim Brownescombe Reserve is recognised as a significant area and this individual Plan of Management has been developed specifically for this reserve.

Hornsby Shire Council Local Environment Plan (LEP)
The current Hornsby Shire Local Environment Plan 1999 zones Tim Brownescombe Reserve as Open Space A (Public Recreation - Local).

SIGNIFICANCE OF THE RESERVE

Hornsby Shire's bushland reserves are an important feature of the Shire's natural character and beauty. Urban bushland areas throughout Hornsby Shire and the northern Sydney region contribute significantly to the scenic amenity and beauty of this area.

Urban bushland areas are important for the following reasons:

- They provide a 'green space' in the built environment, contributing to the scenic amenity of urban areas
- They provide important habitat for native fauna species which would otherwise move away from urban areas. Urban bushland can form part of important wildlife corridors which provide shelter, food and habitat for migratory and nomadic species
- They are an important scientific resource, providing a record of the original vegetation of the district.
- They are an important educational resource, and often the first point of contact with nature for many urban residents as well as a venue for formal education. They provide nearby schools and other educational institutions with natural areas which can be visited without the need for a formal excursion, and where it is feasible to carry out studies requiring repeat investigations.
- Urban bushland provide recreational opportunities, enabling urban residents to undertake recreational pursuits in a bushland setting.

In addition to these general features, Tim Brownescombe Reserve has particular significance for the following reasons:

- The bushland remnant present within Tim Brownescombe Reserve has been identified as containing Blue Gum High Forest and Sydney Turpentine-Ironbark Forest, Endangered Ecological Communities protected under the Threatened Species Conservation Act (1995).
- The reserve contains the headwaters of Galston Creek, part of the larger Berowra Creek Catchment.

**NB: Under Section 56 of the Threatened Species Conservation Act (1995), the Director-General of the National Parks and Wildlife Service, is required to "prepare a recovery plan for each endangered or vulnerable species, population and ecological community, as soon as practicable after it is listed in Schedule 1 of the Act, to promote the recovery of the species, population or ecological community to a position of viability in nature".

Once a Recovery Plan has been prepared for Blue Gum High Forest, this Plan of Management will be reviewed to ensure it is consistent with the Recovery Plan.

RESERVE DESCRIPTION

Tim Brownescombe Reserve is located on Fishburn Road, Galston, and contains a tributary of Galston Creek. It occupies an area of approximately 0.52 hectares. It is located between Fishburn and Crosslands Roads, Galston, bordered on each side by rural-residential properties. The area was previously used as horse paddock.

The reserve was donated to Council in 1999, by the Brownescombe Family in memory of their son Tim.

The reserve is rectangular in shape and isolated, not directly connected to any other bushland areas. The small size of the reserve means that it has a high edge to area ratio, making it vulnerable to external influences especially weed propagules and pest animal predation.

Land Tenure

Tim Brownescombe Reserve is identified as a Public Reserve, Lot 2 DP 870158, owned and managed by Hornsby Shire Council. No leases or licenses currently affect the land. Given the nature of the reserve it is unlikely that any leases or licenses will arise, however any proposals should be considered on their merit and in consideration of how they meet the objectives of this plan.

Topography

The reserve is located on gently sloping terrain at the headwaters of Galston Creek catchment. Within the reserve, the landscape is gently to moderately sloping to the south-west from Crosslands Road.

Geology and soils

The soils present within Tim Brownescombe Reserve are primarily clay soils derived from Wianamatta Shale. "Naturally vegetated shale landscapes are now very rare due to their preferential settlement through forestry, agriculture and later urbanisation" (*EPS Ecological Surveys and Planning, 1999*).

Hydrology

The watercourse present within the reserve is a tributary of Galston Creek. The creek is ephemeral and traverses close to the full length of the reserve and is part of the headwaters of the Galston Creek Catchment. This tributary flows through the local rural-residential area to Galston Creek which flows into Berowra Valley Regional Park, to its junction with Berowra Creek.

The present hydrological regime in the reserve is a result of the surrounding agricultural and rural-residential development as well as the development higher in the catchment.

Generally, the stormwater flows during rains events are increased by development which increases the amount of impervious surfaces within a catchment. Water runs off these surfaces more rapidly leading to increased peak flows and lower dry weather flows.

A culvert diverts stormwater from Fishburn Road into the reserve where it flows through a pipe under Fishburn Road.

Water Quality

There is no current data for water quality in this reserve. Catchments such as Galston Creek catchment with significant rural-residential and agricultural development can generate significant pollution, particularly nutrients but also suspended solids, metals, bacteria and chemical pollution, having the potential to seriously affect the quality of receiving waters.

Flora

Vegetation

Tim Brownescombe Reserve was surveyed during November 1999 to determine the nature and distribution of plant communities, it's habitat value and the nature and intensity of weed invasion. The plant community present in Tim Brownescombe Reserve can be described as Community J: *Eucalyptus saligna* Tall Open Forest and Community M: *Syncarpia glomulifera – Eucalyptus paniculata – Angophora costata* Open-forest as described in the *Hornsby Shire Bushland Survey* (Smith & Smith 1990). These vegetation communities were described then as under-represented in the Shire.

Significant flora

The vegetation of Tim Brownescombe Reserve has been previously documented in the *Hornsby Shire Threatened Biota Conservation Plan* (*ESP Ecological Surveys & Planning 1999*) and has been identified as Blue Gum High Forest and Sydney Turpentine-Ironbark Forest, endangered ecological communities listed under Schedule 1 of the Threatened Species Conservation Act (1995).

There has been no comprehensive flora list compiled for this reserve, however the species present are consistent with the species listed as comprising the characteristic assemblages for Blue Gum High Forest and Sydney Turpentine-Ironbark Forest in Schedule 1 of the Threatened Species Conservation Act (1995).

Platysace clelandii, listed as a Rare or Threatened Australian Plant (ROTAP) as per Briggs and Leigh, has been recorded in the vicinity of the reserve as has *Persoonia hirsuta*, an endangered species as per Schedule 1 of the Threatened Species Conservation Act (1995) (*ESP Ecological Surveys & Planning, 1999*). Neither species has been recorded within the reserve to date.

Persoonia mollis ssp. maxima, an endangered species as per Schedule 1 of the Threatened Species Conservation Act (1995), has been recorded in bushland further downstream in the Galston Creek catchment (*ESP Ecological Surveys & Planning, 1999*).

Vegetation condition

The vegetation in the bushland area suffers from varying degrees of degradation and can be described as having an overall rating of poor as per Smith & Smith (1990).

Fauna

Common species such as possums, lizards and snakes are likely to visit the reserve. The avifauna of the reserve is likely to be typical of Shale and open forest habitats, though diversity may have declined due to surrounding rural-residential development and domestic pet and feral animal predation.

Rabbits are a particular problem in the rural areas of the Shire and one was observed in Tim Brownescombe Reserve during the site inspection.

Fauna activity may have also declined due to the fact that it is an isolated parcel of bushland, not forming part of a continuous bushland corridor, this high edge to area ratio increases the susceptibility of resident native fauna to impacts such as predation. Further investigation would be required to ascertain whether the reserve is still important for certain native fauna species.

There have been no fauna surveys undertaken within this reserve.

Significant fauna
There are no significant fauna species recorded as being present in this reserve.

Aboriginal and European Heritage Sites

It is likely that the Aboriginal people of the Dharug group were the original inhabitants of the reserve and surrounding area. There are no records of heritage items of Aboriginal significance in the reserve, (*Koettig 1996*) and due to the nature and disturbance of the reserve, none would be expected.

There are no records of heritage items of European significance in the reserve (*Hornsby Shire Council LEP, 1997*). A survey of the reserve could be undertaken as part of any review of the heritage study.

2.0 MANAGEMENT ISSUES AND STRATEGIES

Weed invasion, Bush regeneration and Vegetation Management

Tim Brownescombe Reserve is affected by moderate to severe understorey weed invasion. These weeds compete with the native species leading to simplification of the bushland's ecology and loss of biodiversity.

The majority of the canopy is intact but weed infestation is severe in patches through the understorey. *Tradescantia* in particular is widespread and established as a groundcover. Resilience is likely to be moderate currently but will decline in the future as weeds become more established, modifying the vegetation structure. The weeds present are a result of impacts of the adjoining landuses including agriculture, pasture and rural-residential development.

The main weed species include Wandering Jew (*Tradescantia albiflora*), Black-eyed Susan (*Thunbergia alata*), Mickey Mouse Plant (*Ochna serrulata*), Bridal Creeper (*Myrsiphyllum asparagoides*), Blackberry (*Rubus sp*), Ginger (*Hedychium gardneranum*), Jasmine (*Jasminum polyanthum*), Privet (*Ligustrum lucidum* and *Ligustrum sinense*), Honeysuckle (*Lonicera japonica*), Fleabane (*Conyza bonariensis*), Paddy's Lucerne (*Sida rhombifolia*), Passionfruit (*Passiflora alato-caerulea*) and Illawarra Flame Tree (*Brachychiton acerifolium*).

Weed invasion has been identified as a significant threat to the survival of Blue Gum High Forest and Sydney Turpentine-Ironbark Forest (*ESP Ecological Surveys & Planning, 1999*). This weed invasion should be addressed as part of the overall management of the reserve.

An integrated program of herbicide use as well as manual weed removal is needed and should be done so in co-ordination with any park maintenance or future upgrading of the site as resources become available for the Reserve.

The newly formed Tim Brownescombe Reserve Bushcare Group has recently started bush regeneration works in the reserve as part of Council's volunteer Bushcare Program. Appropriate regeneration techniques will be used in order to assist natural regeneration and restoration of the native plant community.

Hydrology / Water Quality

In rural catchments such as the Galston Creek catchment, nutrient levels are expected to be elevated. The presence of high nutrient concentrations provide ideal conditions for weed growth, giving these exotic plants a competitive advantage over native species. This can have significant impacts, inhibiting regeneration of the native plant community, thus threatening its long-term survival.

It is likely that some pesticide residues are present in the runoff due to surrounding orchards and market gardens.

There are some scour areas resulting from erosion during high flow times. These should be addressed as part of any future restoration works within the reserve.

Native and Introduced Fauna

Although there has been no formal fauna survey of Tim Brownescombe Reserve, it is still likely that native fauna species frequent the reserve and some may even reside there. Even the degraded, weedy areas can still provide some habitat and protection for native fauna species. Any restoration works undertaken in this reserve should consider that thickets of weeds can be temporary homes for native fauna until their natural habitat can be restored. Any primary clearing of weeds should be carried out gradually, so as refuge areas remain for native animals to utilise.

The high edge to area ratio of the reserve and the presence of cats and dogs in the surrounding rural-residential area constitutes a significant threat to native wildlife. Public education on the protection of native fauna in the area would be useful to make surrounding landholders aware of possible faunal activity in the reserve and their protection under the National Parks and Wildlife Act (1974) and the Threatened Species Conservation Act (1995).

Fire Regime

Urban bushland fire management needs to consider the ecological needs of the bushland as well as the risk posed by wildfires to life and property. Fire management in urban bushland reserves should aim to minimise hazard to life and property whilst conserving ecological values of the reserve.

Due to the narrow area of this riparian reserve it is unlikely that any hazard reduction work would be required. Any proposals for hazard reduction burns should be carried out in conjunction with regeneration of the bushland for the benefit of native vegetation management.

Recreation and Access

As the surrounding lands are essentially private property, access to this reserve should be limited. Council cannot encourage the use of trails which direct people to private property. There is currently an informal but well-used track through the reserve from the entrance at Fishburn Road through the reserve to the back fence of private property No.16 -18 Crosslands Road. There is currently no thoroughfare through to Crosslands Road from the reserve. Other informal trails are also present within the reserve.

Due to the presence of the endangered ecological community, limited access considerations are needed to prevent the damage caused by informal tracks and trails. Access needs to be restricted to uses which will have minimal impact on the ecology of the bushland area.

Boundaries and Neighbours

Tim Brownescombe Reserve has a high edge to area ratio increasing its susceptibility to adverse external influences from the boundaries. Co-operation between Council and surrounding residents is necessary for effective management of the reserve boundaries.

The boundary of the reserve with adjoining properties is well-defined by fencing to the north, east and west, with Fishburn Road forming the southern boundary.

Neighbours of the reserve will be encouraged to work with Council to assist in the regeneration and maintenance of the reserve and to inform Council of any illegal dumping of garden refuse or acts of vandalism which may occur.

References:

Smith & Smith (1990) *Hornsby Shire Bushland Survey*

ESP Ecological Surveys & Planning (1999) *Hornsby Shire Threatened Biota Conservation Plan*

Hornsby Shire Council (1999) *Hornsby Shire Local Environment Plan*

Margrit Koettig Archaeological Services (1996) *Hornsby Shire Aboriginal Heritage Study.*

3.0 ACTION PLAN

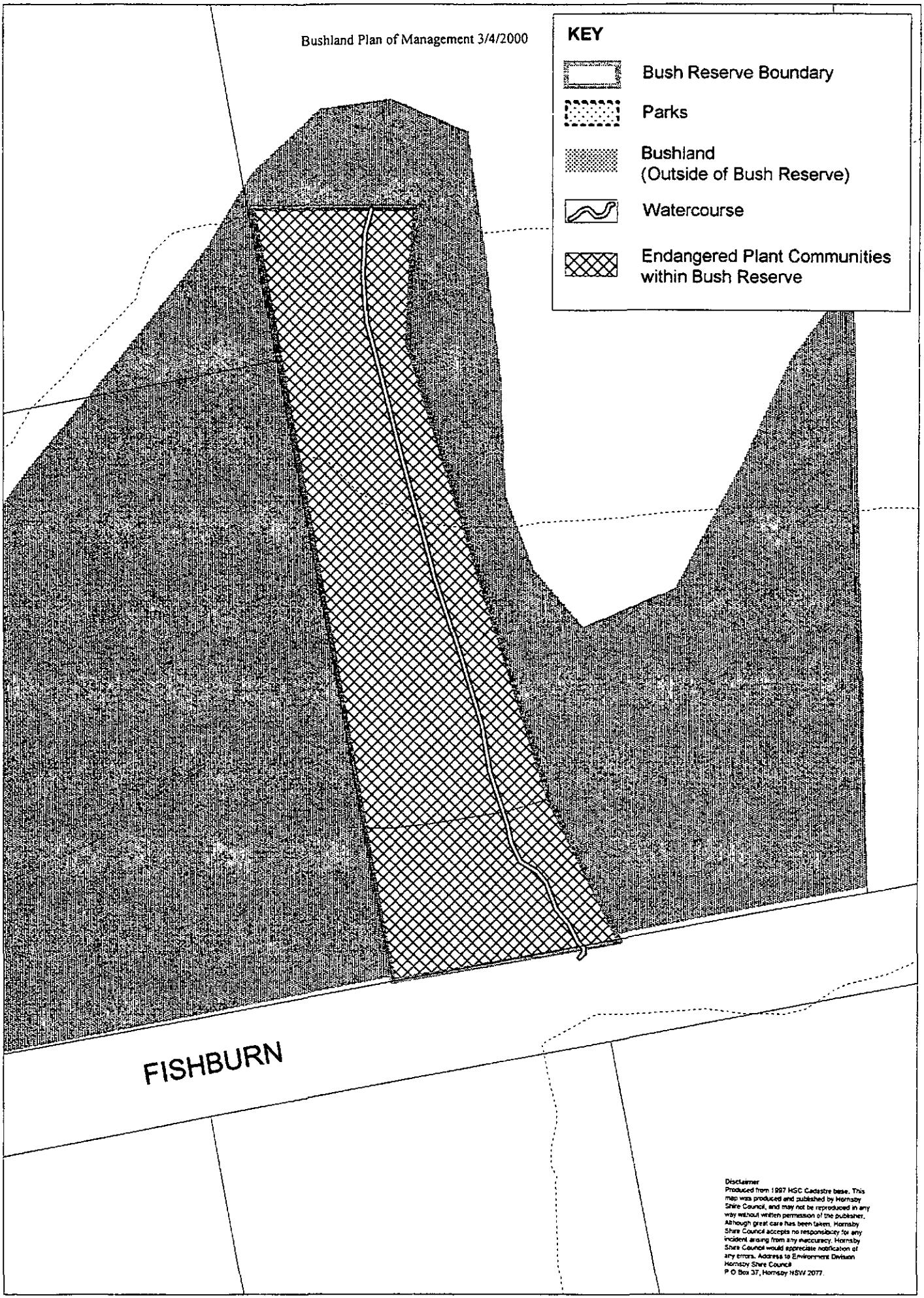
MANAGEMENT STATEMENT	ACTION	RESPONSIBILITY	TIMEFRAME	PERFORMANCE MEASURE
Weed Invasion, Bush Regeneration and Vegetation Management Formalised activities within the natural area will require a lease or licence agreement with Council.	Any granting of leases, licences or other estates must be consistent with the core objectives for bushland as set out in the Local Government Amendment (Community Land Management) Regulation 1998.	HSC / proponents	as required O	Any granting of a lease, licence or other estate for activities within the natural area are consistent with the Local Government Amendment (Community Land Management) Regulation 1998. Activities allowable in the bushland do not impact on the conservation of bushland.
Consideration is given to regeneration of bushland for any activity proposed for Tim Brownescombe Reserve to mitigate the degrading influences on the Reserve.	Ensure that all activities are carried out with consideration of bushland protection and regeneration.	HSC/proponents	as required O	Protection of bushland
The Blue Gum High Forest and Sydney Turpentine-Ironbark Forest remnant is to be managed for nature conservation to protect this endangered ecological community.	Restrict activities in this area to bushland restoration and low impact scientific and educational use following full environmental assessment.	Bushland Manager	O	Activities in this area do not adversely impact the bushland.
Areas affected by weed invasion within Tim Brownescombe Reserve are to be rehabilitated using appropriate regeneration techniques.	Restoration and regeneration to be undertaken in areas affected by weed invasion.	Bushland Manager	as funding permits	Bushland condition is improved and maintained.
	Primary bush regeneration works should only be undertaken where sufficient follow up weed control and bush regeneration can be guaranteed.	Bushland Manager	as funding permits	Bushland condition is improved and maintained

	Continue to support and provide training to the Bushcare Group currently working in within Tim Brownescombe Reserve and encourage further community involvement as part of Council's volunteer Bushcare Program.	Bushland Management Supervisor	O	Support for Bushcare Group in Tim Brownescombe Reserve and further recruitment.
Indigenous species should be used wherever possible to rehabilitate degraded areas.	Any revegetation works within Tim Brownescombe Reserve should be composed of locally occurring indigenous plants.	Bushland Management Supervisor	O	Locally indigenous plant material is utilised in rehabilitation and landscaping works.
Adequate funding for bushland restoration will assist in the conservation of Blue Gum High Forest and Sydney Turpentine-Ironbark Forest in Tim Brownescombe Reserve.	Seek additional funding from State and Federal Government sources for restoration of the area.	Bushland Manager	O as funding permits	Council receives financial grants
Hydrology / Water Quality Adequate control of stormwater and drainage from surrounding areas will assist in reducing negative impacts upon the bushland and contribute to the long-term conservation of Tim Brownescombe Reserve.	Investigate and implement any remediation strategies which will reduce the negative impacts of stormwater and rural runoff into Tim Brownescombe Reserve. Ensure that full environmental assessment of the impacts including threatened species assessment, is carried out prior to any proposed stormwater and drainage mitigation activity	Manager - Water Catchments Manager - Water Catchments	O/LT as required	Reduction in impacts from stormwater and drainage.

Water quality in Galston Creek should meet ANZECC water quality guidelines for Aquatic Ecosystem health.	Investigate and implement measures necessary to improve water quality within a total catchment management program.	Manager - Water Catchments	LT	Acceptable water quality in Galston Creek.
It is important for local landholders to be aware of activities that can impact the water quality in Galston Creek catchment.	Encourage local landholders to minimise activities which may have a detrimental impact on the water quality of Galston Creek	HSC/landholders	O	Acceptable water quality in Galston Creek.
Native and Introduced Fauna Native fauna habitat should be conserved and enhanced wherever feasible.	Maintain habitat and vegetation through a well-planned bush regeneration and habitat enhancement program. Maintain habitat by preventing removal of logs for firewood and the removal of bushrock.	Bushland Manager Bushland Manager	O/LT O	Protection and enhancement of native fauna habitat.
Consideration is given to native fauna and its habitat for any activity proposed for Tim Brownescombe Reserve.	Ensure fauna habitat needs are included in any proposal for restoration works within Tim Brownescombe Reserve.	Bushland Manager	O	Protection of fauna habitat
Control of domestic animals.	Encourage pet owners to control domestic cats and dogs through a public education campaign and by impoundment of free roaming dogs.	Bushland Manager /Environmental Surveillance Officer	O	Responsible pet ownership.
Fire Management Any fire management within Tim Brownescombe Reserve should be carried out in conjunction with bush regeneration works.	Any proposals for fire management in Tim Brownescombe Reserve are to be assessed by the Water Catchments Team.	Bushland Manager /Manager - Fire Control	O	Fire regime is maintained for the health of the bushland.

Recreation and Access Access should be restricted to uses which will have minimal impact on the reserve's ecology.	Limit recreational activities in this area to passive recreational pursuits such as bushwalking, following full environmental assessment. Monitor recreational and educational uses of the reserve and their impact.	Bushland Manager Bushland Manager	O LT	Recreational activities in this area do not adversely impact the bushland.
Use of informal trails through the natural area is to be discouraged wherever possible.	Unnecessary informal trails through the natural areas are to be closed, stabilised and revegetated using locally indigenous plant material. Council will actively discourage public passage to privately owned property through the reserve.	Bushland Manager Bushland Manager	LT O	Any informal trails through the natural area are rehabilitated to an acceptable standard Reserve is not used for public access to private property.
Any proposal for track use, works or construction in the natural area will need to consider impacts on bushland.	Any proposal for use and works regarding existing trails or construction of new trails in the natural area will be subject to full environmental assessment.	Bushland Manager	as required	Proposals for track works or construction in the natural area are subject to stringent environmental assessment.

Boundaries and Neighbours The mitigation of negative impacts from neighbouring properties is essential to the long-term conservation of Tim Brownescombe Reserve.	Encourage adjoining landholders to reduce any impacts such as illegal vegetation dumping, encroachment and predation by domestic animals, and encourage involvement in Council's volunteer Bushcare Program. Encourage neighbours to create or maintain buffer zones of indigenous vegetation on private land adjoining the reserve.	Bushland Management Supervisor /private property owners Bushland Manager/private property owners	O O	Protection of natural bushland areas. Creation and maintenance of buffer zones which assist in protecting the reserve.
The reserve boundaries should be well-defined and maintained to minimise the impact of any negative external influences.	Ensure that the boundary of the reserve is well-maintained.	Bushland Manager /Private property owners	O	Natural area is well-defined. Boundaries maintained.



HORNSBY SHIRE COUNCIL

Hornsby Shire Council

Tim Brownescombe Reserve

March 15, 2000

0 20 40m

N

Cairnes Road Reserve
Draft Bushland Plan of Management

INTRODUCTION

This Draft Plan of Management for Cairnes Rd Reserve has been developed by Hornsby Shire Council to comply with the Local Government Act (1993), which requires Plans of Management to be adopted by Councils for all 'community' land by July, 1996. Cairnes Rd Reserve is recognised as a significant area and this individual Plan of Management has been developed specifically for this reserve.

Hornsby Shire Council Local Environment Plan (LEP)
The current Hornsby Shire Local Environment Plan 1999 zones Cairnes Rd Reserve as Open Space A (Public Recreation - Local).

SIGNIFICANCE OF THE RESERVE

Hornsby Shire's bushland reserves are an important feature of the Shire's natural character and beauty. Urban bushland areas throughout Hornsby Shire and the northern Sydney region contribute significantly to the scenic amenity and beauty of this area.

Urban bushland areas are important for the following reasons:

- They provide a 'green space' in the built environment, contributing to the scenic amenity of urban areas
- They provide important habitat for native fauna species which would otherwise move away from urban areas. Urban bushland can form part of important wildlife corridors which provide shelter, food and habitat for migratory and nomadic species
- They are an important scientific resource, providing a record of the original vegetation of the district.
- They are an important educational resource, and often the first point of contact with nature for many urban residents as well as a venue for formal education. They provide nearby schools and other educational institutions with natural areas which can be visited without the need for a formal excursion, and where it is feasible to carry out studies requiring repeat investigations.
- Urban bushland provide recreational opportunities, enabling residents to undertake recreational pursuits in a bushland setting.

In addition to these general features, Cairnes Rd Reserve has particular significance for the following reasons:

- The bushland remnant present within Cairnes Rd Reserve has been identified as Sydney Turpentine Ironbark Forest, an Endangered Ecological Community protected under the Threatened Species Conservation Act (1995).
- The reserve contains the headwaters of Glenorie Creek, which flows into Marramarra Creek, part of the larger Berowra Creek Catchment.
- The reserve is adjacent a residential area providing local residents with an easily accessible bushland setting for passive recreational pursuits.

**NB: Under Section 56 of the Threatened Species Conservation Act (1995), the Director-General of the National Parks and Wildlife Service, is required to "prepare a recovery plan for each endangered or vulnerable species, population and ecological community, as soon as practicable after it is listed in Schedule 1 of the Act, to promote the recovery of the species, population or ecological community to a position of viability in nature".

Once a Recovery Plan has been prepared for Sydney Turpentine Ironbark Forest, this Plan of Management will be reviewed to ensure it is consistent with the Recovery Plan.

RESERVE DESCRIPTION

Cairnes Rd Reserve is located on Cairnes Road in the Glenorie residential area. It occupies an area of approximately 0.47 hectares with the natural area comprising approximately 0.24 hectares. It is surrounded by residential properties and is consists of a park / playground and natural area.

The reserve is surrounded by residential and rural-residential properties in Cairnes Road, Wirra Place and Tecoma Drive, Glenorie.

The reserve is small and triangular in shape with a high edge to area ratio and isolated, not directly connected to any other bushland areas. The small size of the reserve means that it has a high edge to area ratio, making it

vulnerable to external influences especially weed propagules and pest animal predation.

Tekopa Road Reserve is approximately 600 metres downstream from Cairnes Rd Reserve and forms part of a contiguous riparian bushland corridor along Glenorie Creek downstream to its junction with Berowra Creek in Berowra Valley Regional Park.

Land Tenure

Cairnes Rd Reserve is identified as a Public Reserve, Lot 41 DP 253532, owned and managed by Hornsby Shire Council. The natural area runs along the northern and south-western boundaries of the park. No leases or licenses currently affect the land. Given the nature of the reserve it is unlikely that any leases or licenses will arise, however any proposals should be considered on their merit and in consideration of how they meet the objectives of this plan.

Topography

The reserve is located on a gentle to moderate slope to the east of Old Northern Road which follows the main ridgetop and forms the majority of the boundary of the western and south-western parts of the Shire. Within the reserve, the landscape is relatively flat.

Geology and soils

The soils present within Cairnes Rd Reserve are primarily clay soils derived from Wianamatta Shale. "Naturally vegetated shale landscapes are now very rare due to their preferential settlement through forestry, agriculture and later urbanisation" (EPS Ecological Surveys and Planning, 1999).

Hydrology

The watercourse present within the reserve is Glenorie Creek and a small tributary entering the reserve from the east. The creek traverses the full length of the reserve and is in fact the headwaters of Glenorie Creek. This Creek flows through a small residential and rural residential area in Glenorie and through Tekopa Rd Reserve just downstream then into Crown bushland and eventually adjoins Colah Creek and then Marramarra Creek in Marramarra National Park. This is part of the larger Berowra Creek Catchment.

The present hydrological regime in the reserve is a result of the surrounding residential and agricultural development as well as the development higher in the catchment.

Generally, the stormwater flows during rains events are increased by development which increases the amount of impervious surfaces within a catchment. Water runs off these surfaces more rapidly leading to increased peak flows and lower dry weather flows.

Water Quality

There is no data recorded for water quality within this reserve. Catchments such as the Glenorie Creek Catchment with significant urban, industrial or agricultural development can generate significant pollution including nutrients, suspended solids, metals, bacteria and chemical pollution, seriously affecting the quality of receiving waters.

Flora

Vegetation

Cairnes Rd Reserve was surveyed during November 1999 to determine the nature and distribution of plant communities, it's habitat value and the nature and intensity of weed invasion. The plant community present in Cairnes Rd Reserve can be described as Community M: *Syncarpia glomulifera – Eucalyptus paniculata – Angophora costata* Open-forest as described in the *Hornsby Shire Bushland Survey* (Smith & Smith 1990). This vegetation community was described then as under-represented in the Shire.

Significant flora

The vegetation of Cairnes Rd Reserve has been previously documented in the *Hornsby Shire Threatened Biota Conservation Plan* (ESP Ecological Surveys & Planning 1999) and has been identified as Sydney Turpentine Ironbark Forest, an endangered ecological community listed under Schedule 1 of the Threatened Species Conservation Act (1995).

There has been no comprehensive flora list compiled for this reserve, however the species present are consistent with the species listed as comprising the characteristic assemblage for Sydney Turpentine Ironbark Forest in Schedule 1 of the Threatened Species Conservation Act (1995).

Acacia gordonii, an endangered species as per Schedule 1 of the Threatened Species Conservation Act (1995), has been recorded in bushland to the north-east of Cairnes Road Reserve (*ESP Ecological Surveys & Planning, 1999*).

Vegetation condition

The vegetation in the bushland area suffers from varying degrees of degradation and can be described as having an overall rating of poor as per Smith & Smith (1990).

Fauna

Common species such as possums, lizards and snakes are likely to visit the reserve. The avifauna of the reserve is likely to be typical of Shale and open forest habitats, though diversity may have declined due to surrounding residential development and domestic pet and feral animal predation.

The remnant contains stands of tall, mature eucalypts, favouring habitation by larger predatory birds, however there are some areas where exotic vines such as Honeysuckle, are thick in the understorey providing suitable habitat for smaller birds. The permanent creekline is likely to attract various frog species, small fish and insects. The bushland forms an important habitat type and forms part of the Glenorie Creek corridor.

Further investigation would be required to ascertain whether the reserve is still important for certain native fauna species.

There have been no fauna surveys undertaken within this reserve.

Significant fauna
There are no significant fauna species recorded as being present in this reserve.

Aboriginal and European Heritage Sites

It is likely that the Aboriginal people of the Dharug group were the original inhabitants of the reserve and surrounding area. There are no records of heritage items of Aboriginal significance in the reserve, (*Koettig 1996*) and due to the nature and disturbance of the reserve, none would be expected.

There are no records of heritage items of European significance in the reserve (*Hornsby Shire Council LEP, 1999*). A survey of the reserve could be undertaken as part of any review of the heritage study.

2.0 MANAGEMENT ISSUES AND STRATEGIES

Weed invasion, Bush regeneration and Vegetation Management

Cairnes Rd Reserve is affected by moderate to severe weed invasion. These weeds compete with the native species leading to simplification of the bushland's ecology and loss of biodiversity.

The majority of the canopy is intact but weed infestation is severe in patches through the understorey particularly along the creekline. Resilience is likely to be medium currently but will decline in the future as weeds become more established modifying the vegetation structure. The weeds present are a result of impacts of the adjoining landuses including formalised parks and gardens and rural-residential development.

The main weed species include Small-leaved Privet (*Ligustrum sinense*), Honeysuckle (*Lonicera japonica*), Wild Tobacco (*Solanum mauritianum*), Wandering Jew (*Tradescantia albiflora*), Crofton Weed (*Ageratina adenophora*), Kikuyu (*Pennisetum clandestinum*), Barnyard Grass (*Echinochloa crus-galli*), Ehrharta (*Ehrharta erecta*), Paspalum (*Paspalum dilatatum*), Paddy's Lucerne (*Sida rhombifolia*) and Purple Top (*Verbena sp.*).

Other weed species present include Acer (*Acer negundo*), Willow (*Salix sp*), Blackberry (*Rubus sp.*), Blackberry Nightshade (*Solanum nigrum*), Fleabane (*Conyza bonariensis*), Scotch Thistle (*Onopordum acanthium*) and Flatweed (*Hypochoeris radicata*).

Weed invasion has been identified as a significant threat to the survival of Sydney Turpentine Ironbark Forest (*ESP Ecological Surveys & Planning, 1999*). This weed invasion should be addressed as part of the overall management of the reserve.

An integrated program of herbicide use as well as manual weed removal is needed and should be done so in co-ordination with any park maintenance or future upgrading of the site as resources become available for the Reserve.

Hydrology / Water Quality

In rural catchments such as the Glenorie Creek catchment, nutrient levels are expected to be elevated as a result of impacts such as primary production, stormwater and sewer leaks. The presence of high nutrient concentrations provide ideal conditions for weed growth, giving these exotic plants a competitive advantage over native species. This can have significant impacts, inhibiting regeneration of the native plant community, thus threatening its long-term survival.

The creekline is suffering moderate erosion in some sections with little diversity of instream habitat types mainly as a result of the presence of only one or two exotic riparian species.

Native and Introduced Fauna

Although there has been no formal fauna survey of Cairnes Rd Reserve, it is still likely that native fauna species frequent the reserve and some may even reside there. Even the degraded, weedy areas can still provide some habitat and protection for native fauna species. Any restoration works undertaken in this reserve should consider that thickets of weeds can be temporary homes for native fauna until

their natural habitat can be restored. Any primary clearing of weeds should be carried out gradually, so as refuge areas remain for native animals to utilise.

The high edge to area ratio of the reserve and the presence of cats, dogs and other introduced fauna in the surrounding area constitutes a significant threat to native wildlife. Public education on the protection of native fauna in the area would be useful to make surrounding landholders aware of possible faunal activity in the reserve and their protection under the National Parks and Wildlife Act (1974) and the Threatened Species Conservation Act (1995).

Fire Regime

Urban bushland fire management needs to consider the ecological needs of the bushland as well as the risk posed by wildfires to life and property. Fire management in urban bushland reserves should aim to minimise hazard to life and property whilst conserving ecological values of the reserve.

Due to the small size and nature of this reserve it is unlikely that any hazard reduction work would be required. Any proposals for hazard reduction burns should be carried out in conjunction with regeneration of the bushland for the benefit of native vegetation management.

Recreation and Access

Access is essential to a recreational reserve such as Cairnes Rd Reserve. There are access ways from both Cairnes Road and Wirra Place. The access way via Wirra Place consists of a bridge crossing over Glenorie Creek. There is also access over the creek close to the junction of the tributary and main creekline leading to residences on the north-western side of the reserve.

Due to the presence of the endangered ecological community, limited access considerations are needed to prevent the damage caused by informal tracks and trails. Access needs to be restricted to uses which will have minimal impact on the ecology of the bushland area.

Boundaries and Neighbours

Cairnes Rd Reserve has a high edge to area ratio increasing its susceptibility to adverse external influences from the boundaries. There is evidence of garden escapes entering the reserves from adjoining properties. Co-operation between Council and residents is necessary for effective management of the reserve boundaries.

The boundary of the reserve is mostly well-defined by fencing. The boundary of the natural area and park is reasonably well-defined by mowing of the cleared area, however, more clearly defining the boundary would assist maintenance staff and ensure that any clearing of the natural area is prevented.

Neighbours of the reserve will be encouraged to work with Council to assist in the regeneration and maintenance of the reserve and to inform Council of any illegal dumping of garden refuse or acts of vandalism which may occur.

References

Smith & Smith (1990) *Hornsby Shire Bushland Survey*

ESP Ecological Surveys & Planning (1999) *Hornsby Shire Threatened Biota Conservation Plan*

Hornsby Shire Council (1999) *Hornsby Shire Local Environment Plan*

Margrit Koettig Archaeological Services (1996) *Hornsby Shire Aboriginal Heritage Study.*

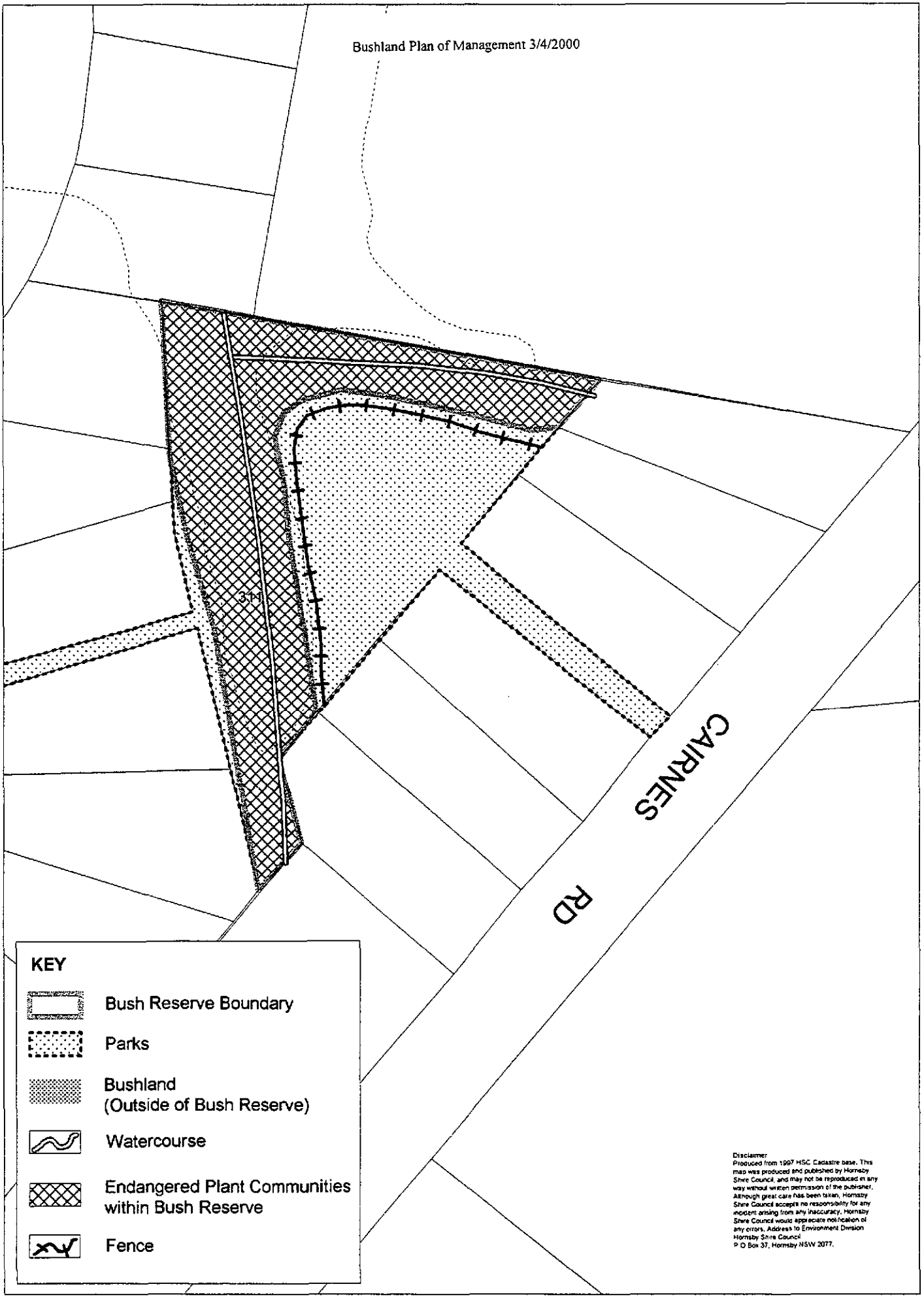
ACTION PLAN

MANAGEMENT STATEMENT	ACTION	RESPONSIBILITY	TIMEFRAME	PERFORMANCE MEASURE
Weed Invasion, Bush Regeneration and Vegetation Management Formalised activities within the natural area will require a lease or licence agreement with Council.	Any granting of leases, licences or other estates must be consistent with the core objectives for bushland as set out in the Local Government Amendment (Community Land Management) Regulation (1998).	HSC / proponents	as required O	Any granting of a lease, licence or other estate for activities within the natural area are consistent with the Local Government Amendment (Community Land Management) Regulation (1998). Activities allowable in the bushland do not impact on the conservation of bushland.
Consideration is given to regeneration of bushland for any activity proposed for Cairnes Rd Reserve to mitigate the degrading influences on the reserve.	Ensure that all activities are carried out with consideration of bushland protection and regeneration.	HSC/proponents	As required O	Protection of bushland
The Sydney Turpentine Ironbark Forest remnant is to be managed for nature conservation to protect this endangered ecological community.	Restrict activities in this area to bushland restoration and low impact scientific and educational use following full environmental assessment.	Bushland Manager	O	Activities in this area do not adversely affect bushland.
Areas affected by weed invasion within Cairnes Rd Reserve are to be rehabilitated using appropriate regeneration techniques.	Restoration and regeneration to be undertaken where sufficient follow up weed control and bush regeneration can be guaranteed.	Bushland Manager	As funding permits	Bushland condition is improved and maintained.
	Encourage and support community involvement in restoration of the bushland within Cairnes Rd Reserve as part of Council's volunteer Bushcare Program.	Bushland Management Supervisor	O	Bushcare Group established in Cairnes Rd Reserve.

Indigenous species should be used wherever possible to rehabilitate degraded areas.	Any revegetation works within the Cairnes Rd Reserve bushland site should be composed of locally occurring indigenous plants.	Bushland Management Supervisor	O	Locally indigenous plant material is utilised in rehabilitation and landscaping works.
Adequate funding for bushland restoration will assist in the conservation of Sydney Turpentine Ironbark Forest in Cairnes Rd Reserve.	Seek additional funding from State and Federal Government sources for restoration of the area.	Bushland Manager	O As funding permits	Council receives financial grants
<u>Hydrology / Water Quality</u> Adequate control of stormwater and drainage from surrounding areas will assist in reducing negative impacts upon the bushland and contribute to the long-term conservation of Cairnes Rd Reserve.	Investigate and implement any remediation strategies which will reduce the negative impacts of stormwater and rural runoff into Cairnes Rd Reserve bushland area. Ensure that full environmental assessment of the impacts including threatened species assessment, is carried prior to any proposed stormwater and drainage mitigation activity	Manager - Water Catchments Manager - Water Catchments	O/MT As required	Reduction in impacts from stormwater and drainage.
Water quality in Glenorie Creek should meet ANZECC water quality guidelines for Aquatic Ecosystem health.	Investigate and implement measures necessary to improve water quality within a total catchment management program.	Manager - Water Catchments	LT	Acceptable water quality in Glenorie Creek.
It is important for local landholders to be aware of activities that can impact the water quality in Glenorie Creek catchment.	Encourage local landholders to minimise activities which may have a detrimental impact on the water quality of Glenorie Creek	HSC/landholders	O	Acceptable water quality in Glenorie Creek.

Native and Introduced Fauna Native fauna habitat should be conserved and enhanced wherever feasible.	Maintain habitat and vegetation through a well-planned bush regeneration and habitat enhancement program. Maintain habitat by preventing removal of logs for firewood and the removal of bushrock.	Bushland Manager Bushland Manager	O/LT O	Protection and enhancement of native fauna habitat.
Consideration is given to native fauna and its habitat for any activity proposed for Cairnes Rd Reserve.	Ensure fauna habitat needs are included in any proposal for restoration works within Cairnes Rd Reserve.	Bushland Manager	O	Protection of fauna habitat
Control of domestic animals.	Encourage pet owners to control domestic cats and dogs through a public education campaign and by impoundment of free roaming dogs.	Bushland Manager /Environmental Surveillance Officer	O	Responsible pet ownership.
Fire Management Any fire management within Cairnes Rd Reserve should be carried out in conjunction with bush regeneration works.	Any proposals for fire management in Cairnes Rd Reserve are to be assessed by the Water Catchments Team	Bushland Manager / Manager - Fire Control	O	Fire regime is maintained for the health of the bushland.
Recreation and Access Access to the natural area should be restricted to uses which will have minimal impact on the reserve's ecology.	Limit recreational activities in this area to passive recreational pursuits such as bushwalking, following full environmental assessment. Monitor recreational and educational uses of the reserve and their impact.	Bushland Manager Bushland Manager	O LT	Recreational activities in this area do not adversely impact the bushland.

Use of informal trails through the natural area is to be discouraged wherever possible.	Unnecessary informal trails through the natural areas are to be closed, stabilised and revegetated using locally indigenous plant material	Bushland Manager	LT	Any informal trails through the natural area are rehabilitated to an acceptable standard
	Council will actively discourage public passage to privately owned property through the reserve.	Bushland Manager	O	Reserve is not used for public access to private property.
Any proposal for track use, works or construction in the natural area will need to consider impacts on bushland.	Any proposal for use and works regarding existing trails or construction of new trails in the natural area will be subject to full environmental assessment.	Bushland Manager	as required	Proposals for track works or construction in the natural area are subject to stringent environmental assessment.
Boundaries and Neighbours The mitigation of negative impacts from neighbouring properties is essential to the long-term conservation of Cairnes Rd Reserve.	Encourage adjoining landholders to reduce any impacts such as illegal vegetation dumping and predation by domestic animals, and encourage involvement in Council's volunteer Bushcare Program.	Bushland Management Supervisor	O	Landscaped areas maintained. Protection of natural bushland areas.
	Encourage neighbours to create or maintain buffer zones of indigenous vegetation on private land adjoining the reserve.	Bushland Manager	O	Creation and maintenance of buffer zones which assist in protecting the reserve.
	Council will pursue the removal of private encroachments onto the reserve and require the restoration and regeneration of these areas.	Bushland Manager Environmental Surveillance Officer	As required O	Reduction in encroachments.
The boundary of the natural area should be well-defined to minimise the impact of any negative external influences.	Investigate methods for clearly defining the natural area such as signage, log barriers or fencing.	Bushland Manager /neighbouring landholders	LT	Natural area is well-defined



HORNSBY SHIRE COUNCIL

Hornsby Shire Council

Cairnes Road, Glenorie

Bush Reserve

March 6, 2000

0 25 50m

N

Fearnley Reserve
Draft Bushland Plan of Management

1.0 INTRODUCTION

This Draft Plan of Management for Fearnley Reserve has been developed by Hornsby Shire Council to comply with the Local Government Act (1993), which required Plans of Management to be adopted by Councils for all 'community' land by July, 1996. Fearnley Reserve is recognised as a significant area this individual Plan of Management has been developed specifically for this reserve.

Hornsby Shire Council Local Environment Plan (LEP)
The current Hornsby Shire Local Environment Plan 1999 zones Fearnley Reserve as Open Space A (Public Recreation - Local).

SIGNIFICANCE OF THE RESERVE

Hornsby Shire's bushland reserves are an important feature of the Shire's natural character and beauty. Urban bushland areas throughout Hornsby Shire and the northern Sydney region contribute significantly to the scenic amenity and beauty of this area.

Urban bushland areas are important for the following reasons:

- They provide a 'green space' in the built environment, contributing to the scenic amenity of urban areas
- They provide important habitat for native fauna species which would otherwise move away from urban areas. Urban bushland can form part of important wildlife corridors which provide shelter, food and habitat for migratory and nomadic species
- They are an important scientific resource, providing a record of the original vegetation of the district.
- They are an important educational resource, and often the first point of contact with nature for many urban residents as well as a venue for formal education. They provide nearby schools and other educational institutions with natural areas which can be visited without the need for a formal excursion, and where it is feasible to carry out studies requiring repeat investigations.
- Urban bushland provide recreational opportunities, enabling urban residents to undertake recreational pursuits in a bushland setting.

In addition to these general features, Fearnley Reserve has particular significance for the following reasons:

- The bushland remnant present within Fearnley Reserve has been identified as Blue Gum High Forest, an Endangered Ecological Community protected under the Threatened Species Conservation Act (1995).
- The reserve contains an upstream portion of Devlins Creek, part of the larger Lane Cove River Catchment.
- The reserve is a popular recreational area well-used by local residents.

**NB: Under Section 56 of the Threatened Species Conservation Act (1995), the Director-General of the National Parks and Wildlife Service, is required to "prepare a recovery plan for each endangered or vulnerable species, population and ecological community, as soon as practicable after it is listed in Schedule 1 of the Act, to promote the recovery of the species, population or ecological community to a position of viability in nature".

Once a Recovery Plan has been prepared for Blue Gum High Forest, this Plan of Management will be reviewed to ensure it is consistent with the Recovery Plan.

RESERVE DESCRIPTION

Fearnley Reserve is located between Hannah Street and Chapman Ave, Beecroft, with Devlins Creek and a tributary of Devlins Creek running through the length of the reserve joining just upstream of Hannah Street. The entire reserve occupies an area of approximately 1.94 hectares with natural area comprising approximately 1.02 hectares. It is surrounded on all sides by residential properties in the Beecroft residential area. The main access to the reserve is the Hannah Street entrance.

The bushland area is small, irregular in shape and isolated, not directly connected to any other bushland areas. The small size of the reserve means that it has a high edge to area ratio, making it vulnerable to external influences especially weed propagules and pest animal predation.

Land Tenure

Fearnley Reserve is identified as a Public Reserve, Lot 28 DP 23858, owned and managed by Hornsby Shire Council. No leases or licenses currently affect the land. Given the nature of the reserve it is unlikely that any leases or licenses will arise, however any proposals should be considered on their merit and in consideration of how they meet the objectives of this plan.

Topography

The reserve is located on a gentle slope to the south-east of Pennant Hills Road, which follows the main ridgetop through the south-west of Hornsby Shire. Within the reserve, the landscape is gently sloping to the south from Chapman Ave.

Geology and soils

The soils present within Fearnley Reserve are primarily clay soils derived from Wianamatta Shale. "Naturally vegetated shale landscapes are now very rare due to their preferential settlement through forestry, agriculture and later urbanisation" (EPS Ecological Surveys and Planning, 1999).

Hydrology

The watercourse present within the reserve is Devlins Creek and a tributary traversing close to the full length of the reserve and joining just downstream of Hannah Street. This Creek flows through Beecroft residential area to Chilworth Reserve where it flows through community bushland and eventually adjoins the Lane Cove River in Lane Cove National Park.

The present hydrological regime in the reserve is a result of the surrounding urban development as well as the development higher in the catchment.

Generally, the stormwater flows during rains events are increased by development which increases the amount of impervious surfaces within a catchment. Water runs off these surfaces more rapidly leading to increased peak flows and lower dry weather flows.

Water Quality

Fearnley Park is located approximately 500 metres upstream of Councils regular water quality monitoring site (Site 7). Sampling has been occurring at this site since 1994. An overview of the water quality at this site is presented below.

Sampling occurs in the upper reaches of Devlins Creek in a section of creek that has been eroded from flooding events. The banks of the creek in the vicinity of this site and just upstream are dominated by riparian weeds. The water quality monitoring results at this site have been averaged and will be described below and will also be compared to the ANZECC (1992) guidelines for the protection of aquatic ecosystems.

The mean values of the physical variables pH, conductivity, dissolved oxygen concentration and salinity were within the ANZECC (1992) guidelines for the protection of aquatic ecosystems. The mean concentration of oxidised nitrogen, total nitrogen and total phosphorus were within the guidelines.

The mean level of faecal coliforms was 2000 org/100ml with a range of 2 – 36000 org/100ml. The higher levels are indicative of sewage pollution which is common in areas where older sewage infrastructure occurs. The mean concentration of suspended solids was above the recommended 10 mg/L. The turbidity level was also higher than the recommended guideline. Higher turbidity levels and suspended solids concentrations indicate inadequate soil management in the catchment (either from construction sites or from broken water mains).

High concentrations of all pollutants have occurred in this creek, mostly during wet weather events but the main concerns for this site remain sewage pollution and sediment transport in the creek.

Flora

Vegetation

Fearnley Reserve was surveyed during November 1999 to determine the nature and distribution of plant communities, it's habitat value and the nature and intensity of weed invasion. The plant community present in Fearnley Reserve can be described as Community K: *Eucalyptus pilularis - E.saligna - E.paniculata* Tall Open-forest as described in the *Hornsby Shire Bushland Survey* (Smith & Smith 1990). This vegetation community was described then as under-represented in the Shire.

Significant flora

The vegetation of Fearnley Reserve has been previously documented in the *Hornsby Shire Threatened Biota Conservation Plan* (ESP Ecological Surveys & Planning 1999) and has been identified as Blue Gum High Forest, an endangered ecological community listed under Schedule 1 of the Threatened Species Conservation Act (1995).

There has been no comprehensive flora list compiled for this reserve, however the species

present are consistent with the species listed as comprising the characteristic assemblage for Blue Gum High Forest in Schedule 1 of the Threatened Species Conservation Act (1995).

Vegetation condition
The vegetation in the bushland area suffers from varying degrees of degradation and can be described as having an overall rating of poor as per Smith & Smith (1990).

Fauna

Common species such as possums, lizards and snakes are likely to visit the reserve. The avifauna of the reserve is likely to be typical of Shale and open forest habitats, though diversity may have declined due to surrounding residential development and domestic pet and feral animal predation.

The remnant contains stands of tall, mature eucalypts, favouring habitation by larger predatory birds, however there are some areas where exotic scramblers such as Blackberry, are thick in the understorey providing suitable habitat for smaller birds. The permanent creekline is likely to attract various frog species, small fish and insects.

Fauna activity may have also declined due to the fact that it is an isolated parcel of bushland, not forming part of a continuous bushland corridor, this high edge to area ratio increases the susceptibility of resident native fauna to impacts such as predation. Further investigation would be required to ascertain whether the reserve is still important for certain native fauna species.

There have been no fauna surveys undertaken within this reserve.

Significant fauna
There are no significant fauna species recorded as being present in this reserve.

Aboriginal and European Heritage Sites

It is likely that the Aboriginal people of the Guringai or Dharug group were the original inhabitants of the reserve and surrounding area. There are no records of heritage items of Aboriginal significance in the reserve, (*Koettig 1996*) and due to the nature and disturbance of the reserve, none would be expected.

There are no records of heritage items of European significance in the reserve (*Hornsby Shire Council LEP, 1999*). A survey of the reserve could be undertaken as part of any review of the heritage study.

2.0 MANAGEMENT ISSUES AND STRATEGIES

Weed invasion, Bush regeneration and Vegetation Management

Fearnley Reserve is affected by moderate to severe weed invasion. These weeds compete with the native species leading to simplification of the bushland's ecology and loss of biodiversity.

The majority of the canopy is intact but weed infestation is severe in patches through the understorey. Resilience is likely to be medium to high currently but will decline in the future as weeds become more established modifying the vegetation structure. The weeds present are a result of impacts of the adjoining landuses including formalised parks and gardens and medium and low density residential development.

The main weed species include Wandering Jew (*Tradescantia albiflora*), Balloon Vine (*Cardiospermum grandiflorum*), Privet (*Ligustrum lucidum* and *Ligustrum sinense*), Camphor Laurel (*Cinnamomum camphora*), Moth Vine (*Araujia hortorum*), Palm Grass (*Setaria palmifolia*), English Ivy (*Hedera helix*), Creeping Buttercup (*Ranunculus repens*), Wild Tobacco (*Solanum mauritianum*), Ginger (*Hedychium gardneranum*), Cape Ivy (*Senecio mikaniodes*), Acer (*Acer negundo*) and Elephants Ears (*Alocasia macrorhiza*) with Sweet Pittosporum (*Pittosporum undulatum*) becoming dense in parts of the understorey.

Weed invasion has been identified as a significant threat to the survival of Blue Gum High Forest (*ESP Ecological Surveys & Planning, 1999*). This weed invasion should be addressed as part of the overall management of the reserve.

An integrated program of herbicide use as well as manual weed removal is needed and should be done so in co-ordination with any park maintenance or future upgrading of the site as resources become available for the Reserve. Some dead Privet was observed along the creekline indicating past weed control activity which was part of bush regeneration program operating in 1997/98 through the Parks and Landscape Team of council.

Hydrology / Water Quality

In urbanised catchments such as the Devlins Creek catchment, nutrient levels are expected to be elevated often as a result of impacts such as stormwater, sewer leaks and road runoff. The presence of high nutrient concentrations provide ideal conditions for weed growth, giving these exotic plants a

competitive advantage over native species. This can have significant impacts, inhibiting regeneration of the native plant community, thus threatening its long-term survival.

Moderate erosion occurs along parts of the creekbanks most likely a result of the impacts over many years of increased volumes and velocities of stormwater entering the reserve following significant rain events in this established, urban catchment.

Native and Introduced Fauna

Although there has been no formal fauna survey of Fearnley Reserve, it is still likely that native fauna species frequent the reserve and some may even reside there. Even the degraded, weedy areas can still provide some habitat and protection for native fauna species. Any restoration works undertaken in this reserve should consider that thickets of weeds can be temporary homes for native fauna until their natural habitat can be restored. Any primary clearing of weeds should be carried out gradually, so as refuge areas remain for native animals to utilise.

The high edge to area ratio of the reserve and the presence of cats and dogs in the surrounding residential area constitutes a significant threat to native wildlife. Public education on the protection of native fauna in the area would be useful to make surrounding landholders aware of possible faunal activity in the reserve and their protection under the National Parks and Wildlife Act (1974) and the Threatened Species Conservation Act (1995).

Fire Regime

Urban bushland fire management needs to consider the ecological needs of the bushland as well as the risk posed by wildfires to life and property. Fire management in urban bushland reserves should aim to minimise hazard to life and property whilst conserving ecological values of the reserve.

Due to the narrow area of this riparian reserve it is unlikely that any hazard reduction work would be required. Any proposals for hazard reduction burns should be carried out in conjunction with regeneration of the bushland for the benefit of native vegetation management.

Recreation and Access

There is currently a formalised access trail from the sign-posted entrance at Hannah Street. The trail passes through part of the natural area to a playground in the cleared, parkland area of the reserve.

Due to the presence of the endangered ecological community and the small size of the reserve, limited access considerations are needed to prevent the damage caused by informal tracks and trails. Access needs to be restricted to uses which will have minimal impact on the ecology of the bushland area.

Boundaries and Neighbours

Fearnley Reserve has a high edge to area ratio increasing its susceptibility to adverse external influences from the boundaries. Co-operation between Council's Water Catchments and Parks & Landscapes Team and local residents, is necessary for effective management of the reserve boundaries.

The boundary of the reserve is mostly well-defined by fencing and roadside verge. The boundary of the natural area and park is reasonably well-defined by mowing of the cleared area, however, more clearly defining the boundary would assist maintenance staff and ensure that any clearing of the natural area is prevented.

Neighbours of the reserve will be encouraged to work with Council to assist in the regeneration and maintenance of the reserve and to inform Council of any illegal dumping of garden refuse or acts of vandalism which may occur.

References:

Smith & Smith (1990) *Hornsby Shire Bushland Survey*

ESP Ecological Surveys & Planning (1999) *Hornsby Shire Threatened Biota Conservation Plan*

Hornsby Shire Council (1999) *Hornsby Shire Local Environment Plan*

Margrit Koettig Archaeological Services (1996) *Hornsby Shire Aboriginal Heritage Study.*

3.0 ACTION PLAN

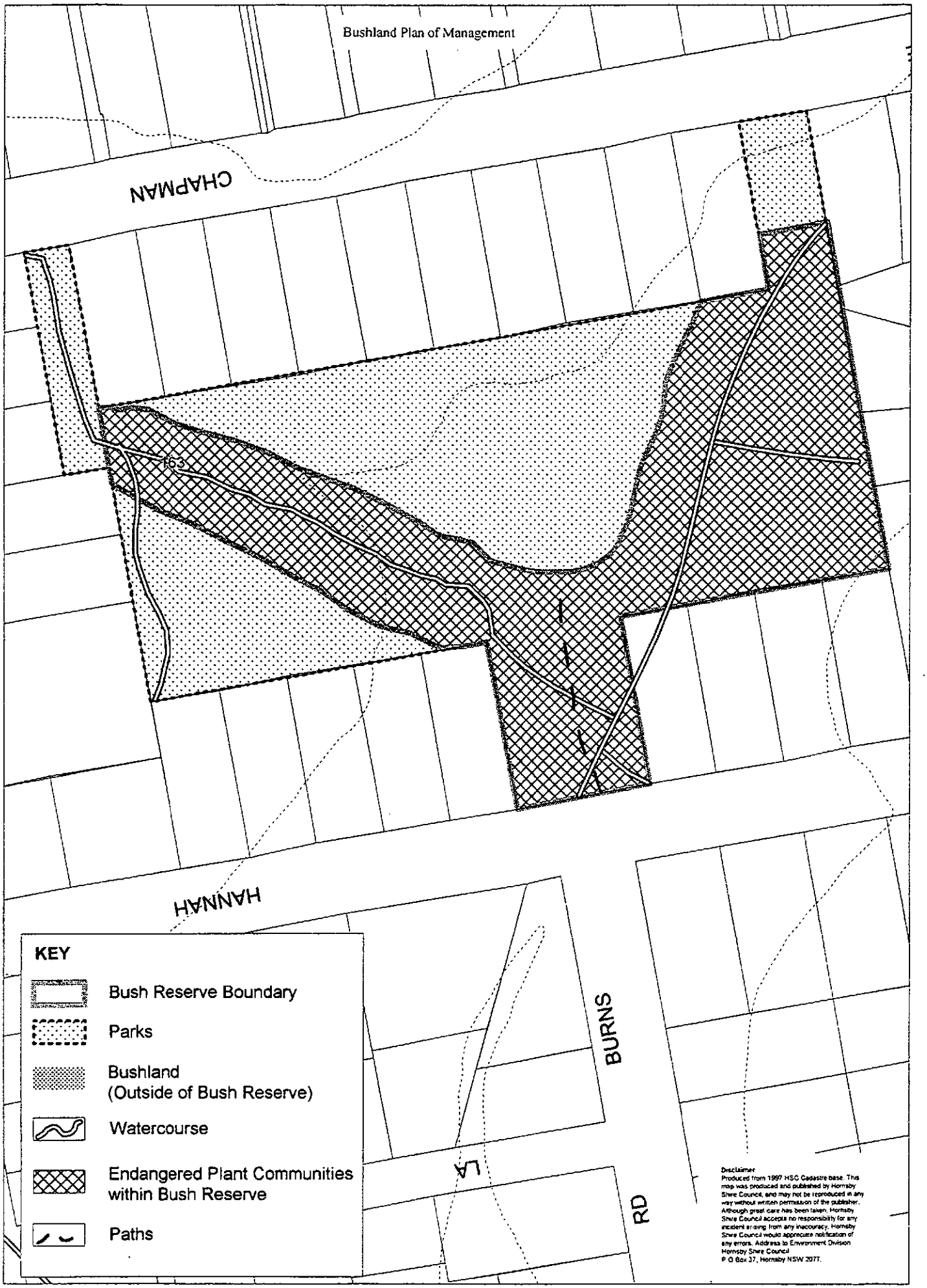
MANAGEMENT STATEMENT	ACTION	RESPONSIBILITY	TIMEFRAME	PERFORMANCE MEASURE
Weed Invasion, Bush Regeneration and Vegetation Management Formalised activities within the natural area will require a lease or licence agreement with Council.	Any granting of leases, licences or other estates must be consistent with the core objectives for bushland as set out in the Local Government Amendment (Community Land Management) Regulation (1998).	HSC / proponents	As required O	Any granting of a lease, licence or other estate for activities within the natural area are consistent with the Local Government Amendment (Community Land Management) Regulation (1998). Activities allowable in the bushland do not impact on the conservation of bushland.
Consideration is given to regeneration of bushland for any activity proposed for Fearnley Reserve to mitigate the degrading influences on the Reserve.	Ensure that all activities are carried out with consideration of bushland protection and regeneration.	HSC/proponents	As required O	Protection of bushland
The Blue Gum High Forest remnant is to be managed for nature conservation to protect this endangered ecological community.	Restrict activities in this area to bushland restoration and low impact scientific and educational use following full environmental assessment.	Bushland Manager	O	Activities in this area do not adversely impact the bushland.
Areas affected by weed invasion within Fearnley Reserve are to be rehabilitated using appropriate regeneration techniques.	Restoration and regeneration to be undertaken in areas affected by weed invasion.	Bushland Manager	as funding permits	Bushland condition is improved and maintained.
	Primary bush regeneration works should only be undertaken where sufficient follow up weed control and bush regeneration can be guaranteed.	Bushland Manager	as funding permits	Bushland condition is improved and maintained

	Encourage and support community involvement in restoration of the bushland within Fearnley Reserve as part of Council's volunteer Bushcare Program.	Bushland Management Supervisor	O	Bushcare Group established in Fearnley Reserve.
Indigenous species should be used wherever possible to rehabilitate degraded areas.	Any revegetation works within the Fearnley Reserve site should be composed of locally occurring indigenous plants.	Bushland Management Supervisor	O	Locally indigenous plant material is utilised in rehabilitation and landscaping works.
Adequate funding for bushland restoration will assist in the conservation of Blue Gum High Forest in Fearnley Reserve.	Seek additional funding from State and Federal Government sources for restoration of the area.	Bushland Manager	O As funding permits	Council receives financial grants
Hydrology / Water Quality				
Adequate control of stormwater and drainage from surrounding areas will assist in reducing negative impacts upon the bushland and contribute to the long-term conservation of Fearnley Reserve.	Investigate and implement any remediation strategies which will reduce the negative impacts of stormwater and urban runoff into Fearnley Reserve bushland area.	Manager - Water Catchments	O/LT	Reduction in impacts from stormwater and drainage.
	Ensure that full environmental assessment of the impacts including threatened species assessment, is carried prior to any proposed stormwater and drainage mitigation activity	Manager - Water Catchments	As required	
Water quality in Devlins Creek should meet ANZECC water quality guidelines for Aquatic Ecosystem health.	Investigate and implement measures necessary to improve water quality within a total catchment management program.	Manager - Water Catchments	LT	Acceptable water quality in Devlins Creek.

It is important for local landholders to be aware of activities that can impact the water quality in Devlins Creek catchment.	Encourage local landholders to minimise activities which may have a detrimental impact on the water quality of Devlins Creek	HSC/landholders	O	Acceptable water quality in Glenorie Creek.
Native and Introduced Fauna Native fauna habitat should be conserved and enhanced wherever feasible.	Maintain habitat and vegetation through a well-planned bush regeneration and habitat enhancement program. Maintain habitat by preventing removal of logs for firewood and the removal of bushrock.	Bushland Manager Bushland Manager	O/LT O	Protection and enhancement of native fauna habitat.
Consideration is given to native fauna and its habitat for any activity proposed for Fearnley Reserve.	Ensure fauna habitat needs are included in any proposal for restoration works within Fearnley Reserve.	Bushland Manager	O	Protection of fauna habitat
Control of domestic animals.	Encourage pet owners to control domestic cats and dogs through a public education campaign and by impoundment of free roaming dogs.	Bushland Manager /Environmental Surveillance Officer	O	Responsible pet ownership.
Fire Management Any fire management within Fearnley Reserve should be carried out in conjunction with bush regeneration works.	Any proposals for fire management in Fearnley Reserve are to be assessed by the Water Catchments Team	Bushland Manager / Manager – Fire Control	O	Fire regime is maintained for the health of the bushland.

Recreation and Access Access should be restricted to uses which will have minimal impact on the reserve's ecology.	Limit recreational activities in this area to passive recreational pursuits such as bushwalking, following full environmental assessment. Monitor recreational and educational uses of the reserve and their impact.	Bushland Manager Bushland Manager	O LT	Recreational activities in this area do not adversely impact the bushland.
Existing formalised tracks should be well-constructed and maintained within best management practices.	Ensure the existing track from Hannah Street through to the playground is maintained to an acceptable standard.	Manager – Parks & Landscapes	O	Formalised tracks are well-constructed and maintained.
Use of informal trails through the natural area is to be discouraged wherever possible.	Unnecessary informal trails through the natural areas are to be closed, stabilised and revegetated using locally indigenous plant material	Bushland Manager	MT	Any informal trails through the natural area are rehabilitated to an acceptable standard
Any proposal for track use, works or construction in the natural area will need to consider impacts on bushland.	Any proposal for use and works regarding existing trails or construction of new trails in the natural area will be subject to full environmental assessment.	Bushland Manager	as required	Proposals for track works or construction in the natural area are subject to stringent environmental assessment.

Boundaries and Neighbours The mitigation of negative impacts from neighbouring properties is essential to the long-term conservation of Fearnley Reserve.	Encourage adjoining landholders to reduce any impacts such as illegal vegetation dumping, encroachments and predation by domestic animals, and encourage involvement in Council's volunteer Bushcare Program. Encourage neighbours to create or maintain buffer zones of indigenous vegetation on private land adjoining the reserve.	Bushland Management Supervisor Bushland Manager	O O	Landscaped areas maintained. Protection of natural bushland areas. Creation and maintenance of buffer zones which assist in protecting the reserve.
The boundary of the natural area should be well-defined to minimise the impact of any negative external influences.	Investigate methods for clearly defining the boundary of the natural area with the parkland and neighbouring residential properties such as signage, log barriers or fencing.	Bushland Manager /neighbouring landholders	LT	Natural area is well-defined



HORNSBY SHIRE COUNCIL

Hornsby Shire Council

Fearnley Reserve

Bush Reserve

March 6, 2000

0 25 50m

N

The Lakes of Cherrybrook
Draft Bushland Plan of Management

1.0 INTRODUCTION

This Draft Plan of Management for the Lakes of Cherrybrook has been developed by Hornsby Shire Council to comply with the Local Government Act (1993), which required Plans of Management to be adopted by Councils for all 'community' land by July, 1996. The Lakes of Cherrybrook is recognised as a significant area this individual Plan of Management has been developed specifically for this reserve.

Hornsby Shire Council Local Environment Plan (LEP)
The current Hornsby Shire Local Environment Plan 1999 zones the Lakes of Cherrybrook as Open Space A (Public Recreation - Local).

SIGNIFICANCE OF THE RESERVE

Hornsby Shire's bushland reserves are an important feature of the Shire's natural character and beauty. Bushland areas throughout Hornsby Shire and the northern Sydney region contribute significantly to the scenic amenity and beauty of this area.

Urban bushland areas are important for the following reasons:

- They provide a 'green space' in the built environment, contributing to the scenic amenity of urban areas
- They provide important habitat for native fauna species which would otherwise move away from urban areas. Urban bushland can form part of important wildlife corridors which provide shelter, food and habitat for migratory and nomadic species
- They are an important scientific resource, providing a record of the original vegetation of the district.
- They are an important educational resource, and often the first point of contact with nature for many urban residents as well as a venue for formal education. They provide nearby schools and other educational institutions with natural areas which can be visited without the need for a formal excursion, and where it is feasible to carry out studies requiring repeat investigations.
- Urban bushland provide recreational opportunities, enabling urban residents to undertake recreational pursuits in a bushland setting.

In addition to these general features, the Lakes of Cherrybrook has particular significance for the following reasons:

- The bushland remnant present within the Lakes of Cherrybrook has been identified as Blue Gum High Forest, an Endangered Ecological Community protected under the Threatened Species Conservation Act (1995).
- The reserve is within a residential area providing local residents with an easily accessible bushland and lakeside setting for passive recreational pursuits.

**NB: Under Section 56 of the Threatened Species Conservation Act (1995), the Director-General of the National Parks and Wildlife Service, is required to "prepare a recovery plan for each endangered or vulnerable species, population and ecological community, as soon as practicable after it is listed in Schedule 1 of the Act, to promote the recovery of the species, population or ecological community to a position of viability in nature".

Once a Recovery Plan has been prepared for Blue Gum High Forest, this Plan of Management will be reviewed to ensure it is consistent with the Recovery Plan.

RESERVE DESCRIPTION

The Lakes of Cherrybrook is popular recreational area located on the corner of Macquarie and Shepherds Drive, Cherrybrook. It occupies an area of approximately 0.23 hectares and contains a tributary of Berowra Creek. The natural area comprises approximately 0.18 hectares with the remainder being formalised parkland and a children's playground. It is surrounded by residential development including a retirement village to the south-east of the reserve.

The bushland area is primarily located on the eastern shores of the lakes. The reserve is rectangular in shape and isolated, not directly connected to any other bushland areas. This high edge to area ratio, makes it vulnerable to external influences especially weed propagules and pest animal predation. It is bounded in the south and west by residential development, to the north by a formalised park area and to the east by Macquarie Drive.

Land Tenure

The Lakes of Cherrybrook is identified as a Public Reserve, Lot 242 DP 702794 and Lot 4205 DP 706256 owned and managed by Hornsby Shire Council.

The bushland area is mostly contained within Lot 4205 DP 706256.

There are no leases or licences currently affecting the area. Given the nature of the reserve it is unlikely that any further leases or licenses will arise, however any proposals should be considered on their merit and in consideration of how they meet the objectives of this plan.

Topography

The reserve is located at the base of a gently sloping valley along a tributary of Berowra Creek to the west of Berowra Valley Regional Park. Within the reserve, the landscape is gently sloping to the north from Kenburn Ave.

Geology and soils

The soils present within the Lakes of Cherrybrook are primarily clay soils derived from Wianamatta Shale. "Naturally vegetated shale landscapes are now very rare due to their preferential settlement through forestry, agriculture and later urbanisation" (*EPS Ecological Surveys and Planning, 1999*).

Hydrology

The watercourse present within the reserve is a tributary of Berowra Creek, which traverses the full length of the reserve. This Creek flows through Cherrybrook residential area and community bushland in McKinley Pl Reserve, to the east of Macquarie Drive and eventually adjoins Berowra Creek in the Berowra Valley Regional Park.

The present hydrological regime in the reserve is largely a result of a Hornsby Shire Council project to design a lake system aimed at providing local residents with a unique recreational setting as well as contributing to the improvement of water quality at the top of this sub-catchment of Berowra Creek. The surrounding urban development as well as the development higher in the catchment also contributes to the present hydrological regime.

The 2-pond lake system acts as a large sedimentation basin receiving runoff from the surrounding urban catchment. The possibility exists for the lake to overfill with sediment but this is an unlikely event.

Generally, the stormwater flows during rain events are increased by development which increases the amount of impervious surfaces within a catchment. Water runs off these surfaces more rapidly leading to increased peak flows and lower dry weather flows.

Water Quality

There is no data recorded for water quality within this reserve. Catchments such as this tributary of the Berowra Creek Catchment with significant urban development can generate significant pollution including nutrients, suspended solids, metals, bacteria and chemical pollution, seriously affecting the quality of receiving waters.

Flora

Vegetation

The Lakes of Cherrybrook was surveyed during November 1999 to determine the nature and distribution of plant communities, it's habitat value and the nature and intensity of weed invasion. The plant community present in the bushland area of the Lakes of Cherrybrook can be described as Community K: *E.pilularis – E.saligna – E.paniculata* Tall Open-forest as described in the *Hornsby Shire Bushland Survey* (Smith & Smith 1990).

The lake area itself is bordered by a mixture of native and exotic macrophytes. There are also some submergent macrophytes, which are not flourishing probably as a result of high turbidity levels.

Significant Flora

The Community K vegetation was described then as under-represented in the Shire and has now been listed as an endangered ecological community under Schedule 1 of the Threatened Species Conservation Act (1995).

There has been no comprehensive flora list compiled for this reserve, however the species present are consistent with the species listed as comprising the characteristic assemblage for Blue Gum High Forest in Schedule 1 of the Threatened Species Conservation Act (1995).

Vegetation condition

The vegetation in the bushland area suffers mild degradation and can be described as having an overall rating of fair as per Smith & Smith (1990). The lakeside areas are moderately degraded and can be described as having an overall rating of poor as per Smith & Smith (1990).

Fauna

The lake area acts as a feeding and resting area for local water bird species as well as

other avifauna of the region. The main species of native waterfowl recorded as being present in the reserve include the Black Duck (*Anas superciliosa*), Wood Duck (*Chenonetta jubata*), Dusky Moorhen (*Gallinula tenebrosa*) and Coot (*Fulica atra*) (River to Sea Environmental Consultants, *Lakes of Cherrybrook Management Report*, 1992). The lake area also provides habitat for fish and amphibian species.

Common species such as possums and other small mammals, lizards and snakes are likely to visit the reserve from larger bushland areas downstream. The avifauna of the reserve is likely to be typical of Shale and open forest habitats, though diversity may have declined due to surrounding residential and rural development and domestic pet and feral animal predation.

The remnant contains stands of tall, mature eucalypts, favouring habitation by larger predatory birds, however there are some areas of reasonably thick undergrowth providing suitable habitat for smaller birds and mammal species. The permanent creeklines and lake system are likely to attract various frog species, small fish and insects. The bushland forms an important habitat type and is an important part of the vegetation corridor along the length of this tributary of Berowra Creek.

There has been no comprehensive fauna surveys undertaken within this reserve.

Significant fauna

There are no significant fauna species recorded as being present in this reserve. The Powerful Owl (*Ninox strenua*), a vulnerable species as per the Threatened Species Conservation Act (1995), has been recorded on private property in the vicinity of the reserve. It is possible that Cherrybrook Lakes is within the foraging range of the species. (*ESP Ecological Surveys & Planning, 1999*).

Aboriginal and European Heritage Sites

It is likely that the Aboriginal people of the Dharug group were the original inhabitants of the reserve and surrounding area of Cherrybrook. There are no records of heritage items of Aboriginal significance in the reserve, (*Koettig 1996*) and due to the nature and disturbance of the reserve, none would be expected.

There are no records of heritage items of European significance in the reserve (*Hornsby Shire Council LEP, 1997*). A survey of the reserve could be undertaken as part of any review of the heritage study.

2.0 MANAGEMENT ISSUES AND STRATEGIES

Weed invasion, Bush regeneration and Vegetation Management

The Lakes of Cherrybrook is affected by varying levels of weed invasion. These weeds compete with the native species and if left unchecked, have the potential to cause simplification of the bushland's ecology and loss of biodiversity.

The majority of the bushland is in a healthy condition, with weed infestation predominantly restricted to the interface with developed areas including the formalised park area and lake shores. Resilience is likely to be medium to high currently with a diversity of groundcovers and shrubs still remaining, but will decline in the future as weeds become more established, modifying the vegetation structure. The weeds present are a result of impacts of the adjoining landuses including low density residential development, formalised parkland and road verge.

The main weed species include Privet (*Ligustrum lucidum* and *Ligustrum sinense*), Blackberry (*Rubus sp.*), Kikuyu (*Pennisetum clandestinum*), Moth Vine (*Araujia hortorum*), Parramatta Grass (*Sporobolus africanus*), English Ivy (*Hedera helix*), Fishbone Fern (*Nephrolepis cordifolia*), Willow (*Salix sp.*), Crofton Weed (*Ageratina adenophora*), Ehrharta (*Ehrharta erecta*), Paddy's Lucerne (*Sida rhombifolia*), Daisy (*Dimorphotheca sp.*), Wandering Jew (*Tradescantia albiflora*), Wild Tobacco (*Solanum mauritianum*) and Prairie Grass (*Bromus catharticus*).

Other weed species present include Fleabane (*Conyza bonariensis*), Busy Lizzy (*Impatiens balsamina*), Farmers Friend (*Bidens pilosa*) and Ornamental Lantana (*Lantana sp.*) with Sweet Pittosporum (*Pittosporum undulatum*) thick in parts of the understorey.

Within the lake system the main weed species present include *Typha orientalis* and *Cyperus papyrus*. Although these macrophytes are not native to the area, they are currently contributing to filtering of impurities and oxygenation of the water as well as providing aquatic habitat on the southern shores of the downstream pond. Any removal of these species should be co-ordinated with replacement by appropriate native macrophyte species.

Weed invasion has been identified as a significant threat to the survival of Blue Gum High Forest (*ESP Ecological Surveys & Planning, 1999*). This weed invasion should be

addressed as part of the overall management of the reserve.
An integrated program of herbicide use as well as manual weed removal is needed and should be done so in co-ordination with any park maintenance or future upgrading of the site as resources become available for the Reserve.

Hydrology / Water Quality

In urbanised catchments such as the Berowra Creek catchment, nutrient levels are expected to be elevated. The presence of high nutrient concentrations provide ideal conditions for weed growth, giving these exotic plants a competitive advantage over native species. This can have significant impacts, inhibiting regeneration of the native plant community, thus threatening its long-term survival.

The presence of two particular fauna species also affects the water quality in this reserve. The European Carp is an introduced fish species present in the lake system. The Carp is well-known for the impacts it can have on aquatic ecosystems. Being primarily a bottom-feeder, it stirs up sediments contributing significantly to turbidity thus decreasing the amount of light penetrating the water. This can have serious impacts on the growth of aquatic plant life which provides food and habitat for native aquatic fauna.

A number of species of native ducks inhabit the reserve. They are attracted to the lake environment and are popular with local residents and picnickers. Their numbers have increased in recent years and the likely impacts of this increase in faeces in the lake system is a rise in levels of faecal coliforms, nitrogen and phosphorus.

This lake system drains the local urban catchment including the Cherrybrook Shopping Centre and a service station on the opposite side of Shepherds Drive. A litter basket has been installed at the stormwater outlet which drains the shopping centre and service station area, as part of Council's Catchment Remediation Rate Program. The litter basket catches rubbish such as plastic bottles and food wrapping as well as leaf litter, preventing them from being spread further down the catchment. The litter basket is emptied once full.

The feeder creeks are suffering from moderate erosion as is the northern shore of the downstream pond. The lack of vegetation on the northern shore is partly a result of recreational usage and has contributed to this erosion, providing little habitat value in this part of the lake.

Native and Introduced Fauna

Although there has been no formal fauna survey of the Lakes of Cherrybrook, it is still likely that a variety of native fauna species frequent the reserve and some may even reside there. Even the degraded, weedy areas can still provide some habitat and protection for native fauna species. Any restoration works undertaken in this reserve should consider that thickets of weeds can be temporary homes for native fauna until their natural habitat can be restored. Any primary clearing of weeds should be carried out gradually, so as refuge areas remain for native animals to utilise.

The high edge to area ratio of the reserve and the presence of cats and dogs in the surrounding residential area constitutes a significant threat to native wildlife. Public education on the protection of native fauna in the area would be useful to make surrounding landholders aware of possible faunal activity in the reserve and their protection under the National Parks and Wildlife Act (1974) and the Threatened Species Conservation Act (1995).

Fire Regime

Urban bushland fire management needs to consider the ecological needs of the bushland as well as the risk posed by wildfires to life and property. Fire management in urban bushland reserves should aim to minimise hazard to life and property whilst conserving ecological values of the reserve.

Due to the small size of this reserve it is unlikely that any hazard reduction work would be required. Any proposals for hazard reduction burns should be carried out in conjunction with regeneration of the bushland for the benefit of native vegetation management.

Recreation and Access

Adequate access is essential in a recreational reserve such as the Lakes of Cherrybrook. There is currently a network of tracks linking the formalised park area with the bushland site. A section of the popular Council bushwalk, the Callicoma Walk, passes through the reserve and is indicated on the accompanying map. A number of informal trails are also present. The boundary of the bushland area needs to well-defined to prevent further impacts from adjoining landuses.

Due to the presence of the endangered ecological community, limited access to the bushland area needs to be considered to prevent the damage caused by informal tracks and trails. Access needs to be restricted to uses which will have minimal impact on the ecology of the bushland area.

Boundaries and Neighbours

The Lakes of Cherrybrook has a high edge to area ratio increasing its susceptibility to adverse external influences from the boundaries. Co-operation between Council and adjoining landholders is necessary for effective management of the reserve boundaries.

The boundary of the reserve with the adjoining residential properties is mostly well-defined by fencing. Where fencing does not exist, such as between formalised park and bushland areas, these boundaries need to be clearly defined. Neighbours of the reserve will be encouraged to work with Council to assist in the regeneration and maintenance of the reserve and to inform Council of any illegal dumping of garden refuse or acts of vandalism which may occur.

References:

Smith & Smith (1990) *Hornsby Shire Bushland Survey*
ESP Ecological Surveys & Planning (1999) *Hornsby Shire Threatened Biota Conservation Plan*
Hornsby Shire Council (1999) *Hornsby Shire Local Environment Plan*
Margrit Koettig Archaeological Services (1996) *Hornsby Shire Aboriginal Heritage Study.*

3.0 ACTION PLAN

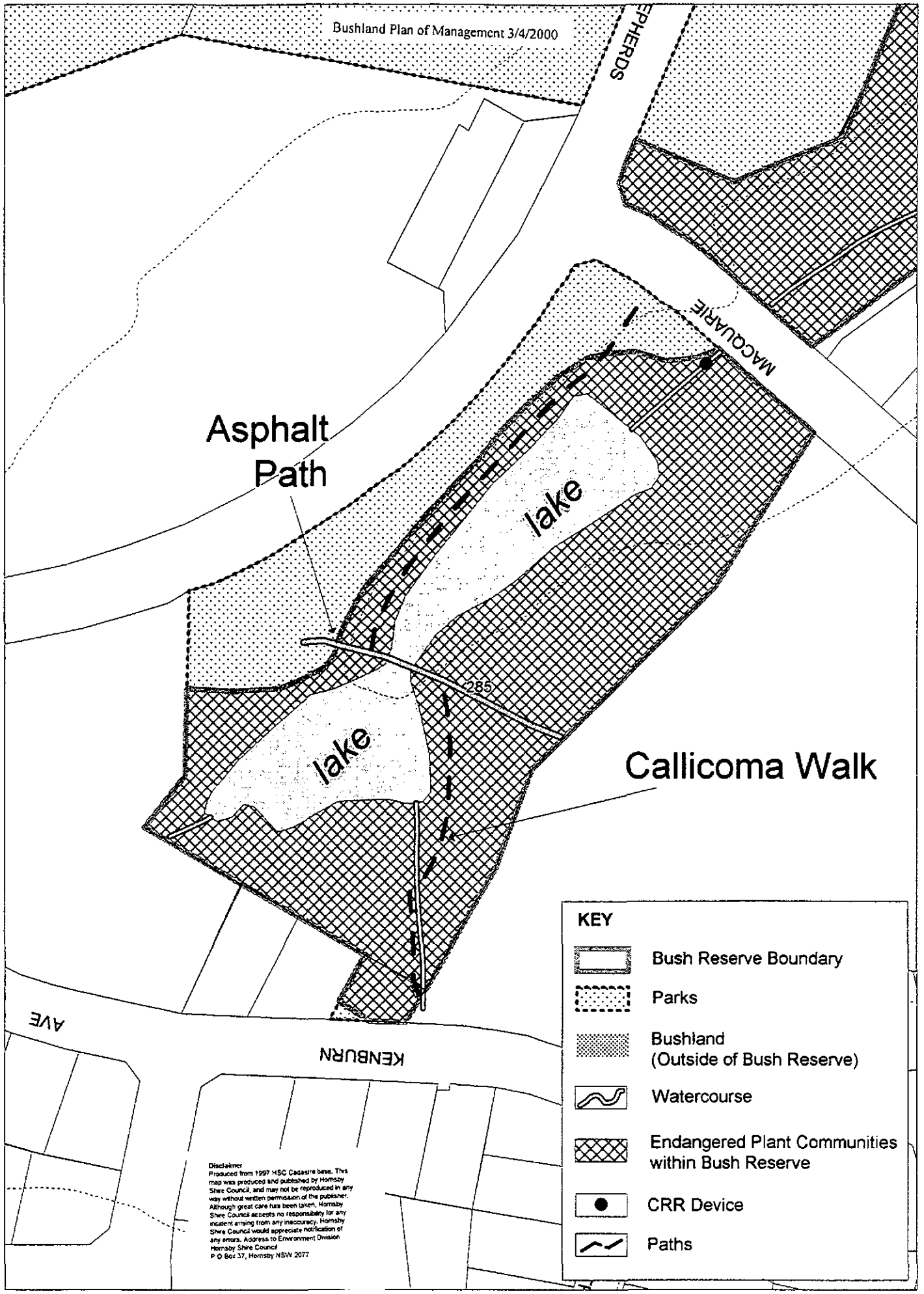
MANAGEMENT STATEMENT	ACTION	RESPONSIBILITY	TIMEFRAME	PERFORMANCE MEASURE
Weed Invasion, Bush Regeneration and Vegetation Management Formalised activities within the natural area will require a lease or licence agreement with Council.	Any granting of leases, licences or other estates must be consistent with the core objectives for bushland as set out in the Local Government Amendment (Community Land Management) Regulation (1998).	HSC / proponents	As required O	Any granting of a lease, licence or other estate for activities within the natural area are consistent with the Local Government Amendment (Community Land Management) Regulation (1998). Activities allowable in the bushland do not impact on the conservation of bushland.
Consideration is given to regeneration of bushland for any activity proposed for the Lakes of Cherrybrook to mitigate the degrading influences on the bushland.	Ensure that all activities are carried out with consideration of bushland protection and regeneration.	HSC/proponents	As required O	Protection of bushland
The Blue Gum High Forest remnant is to be managed for nature conservation to protect this endangered ecological community.	Restrict activities in this area to bushland restoration and low impact scientific and educational use following full environmental assessment.	Bushland Manager	O	Activities in this area do not adversely impact the bushland.
Areas affected by weed invasion within the Lakes of Cherrybrook are to be rehabilitated using appropriate regeneration techniques.	Restoration and regeneration to be undertaken in areas affected by weed invasion.	Bushland Manager	as funding permits	Bushland condition is improved and maintained.
	Primary bush regeneration works should only be undertaken where sufficient follow up weed control and bush	Bushland Manager	as funding permits	Bushland condition is improved and maintained

	Encourage and support community involvement in restoration of the bushland within the Lakes of Cherrybrook as part of Council volunteer Bushcare Program.	Bushland Management Supervisor	O	Continued support for Lakes of Cherrybrook Bushcare Group.
Indigenous species should be used wherever possible to rehabilitate degraded areas.	Any revegetation works within the Lakes of Cherrybrook site should be composed of locally occurring indigenous plants.	Bushland Management Supervisor	O	Locally indigenous plant material is utilised in rehabilitation and landscaping works.
Adequate funding for bushland restoration will assist in the conservation of Blue Gum High Forest in the Lakes of Cherrybrook.	Seek additional funding from State and Federal Government sources for restoration of the area.	Bushland Manager	O As funding permits	Council receives financial grants
Hydrology / Water Quality				
Stormwater and drainage from the surrounding area should be mitigated to prevent negative impacts on bushland in the Lakes of Cherrybrook.	Investigate and implement any remediation strategies which will reduce the negative impacts of stormwater and urban runoff into the Lakes of Cherrybrook bushland area.	Manager – Water Catchments	O/MT	Reduction in impacts from stormwater and drainage.
	Ensure full environmental assessment of the impacts including an 8-part test prior to commencement of any drainage control activities.	Manager – Water Catchments	As required	
Ensure that water quality in Berowra Creek meets ANZECC water quality guidelines for Aquatic Ecosystem health.	Investigate and implement measures necessary to improve water quality within a total catchment management program.	Manager – Water Catchments	LT	Acceptable water quality in Berowra Creek.

It is important for local landholders to be aware of activities that can impact the water quality in Glenorie Creek catchment.	Encourage local landholders to minimise activities which may have a detrimental impact on the water quality of Glenorie Creek	HSC/landholders	O	Acceptable water quality in Glenorie Creek.
The CRR device should be regularly monitored and maintained to ensure it is operating effectively.	Ensure the litter basket is cleaned out on a regular basis as part of Council's maintenance program for all CRR devices.	Manager – Water Catchments	O	CRR device is well-maintained
Native and Introduced Fauna				
Native fauna habitat should be conserved and enhanced wherever feasible.	Maintain habitat and vegetation through a well-planned bush regeneration and habitat enhancement program.	Bushland Manager	O	Protection and enhancement of native fauna habitat.
	Maintain habitat by preventing removal of logs for firewood and the removal of bushrock.	Bushland Manager	O	
Consideration is given to native fauna and its habitat for any activity proposed for the Lakes of Cherrybrook.	Ensure fauna habitat needs are included in any proposal for restoration works within the Lakes of Cherrybrook.	Bushland Manager	O	Protection of fauna habitat
Control of domestic animals.	Encourage pet owners to control domestic cats and dogs through a public education campaign and by impoundment of free roaming dogs.	Bushland Manager /Environmental Surveillance Officer	LT/O	Responsible pet ownership.
Fire Management				
Any fire management within the Lakes of Cherrybrook should be carried out in conjunction with bush regeneration works.	Any proposals for fire management in the Lakes of Cherrybrook are to be assessed by the Water Catchments Team	Bushland Manager / Manager - Fire Control	O	Fire regime is maintained for the health of the bushland.

Recreation and Access Access should be restricted to uses which will have minimal impact on the reserve's ecology.	Limit recreational activities in this area to passive recreational pursuits such as bushwalking, following full environmental assessment. Monitor recreational and educational uses of the reserve and their impact.	Bushland Manager Bushland Manager	O LT	Recreational activities in this area do not adversely impact the bushland.
Use of informal trails through the natural area is to be discouraged wherever possible.	Unnecessary informal trails through the natural areas are to be closed, stabilised and revegetated using locally indigenous plant material	Bushland Manager	MT	Any informal trails through the natural area are rehabilitated to an acceptable standard
Any proposal for track use, works or construction in the natural area will need to consider impacts on bushland.	Any proposal for use and works regarding existing trails or construction of new trails in the natural area will be subject to full environmental assessment.	Bushland Manager	as required	Proposals for track works or construction in the natural area are subject to stringent environmental assessment.

Boundaries and Neighbours The mitigation of negative impacts from neighbouring properties is essential to the long-term conservation of the Lakes of Cherrybrook.	Encourage adjoining landholders to reduce any impacts such as illegal vegetation and rubbish dumping and predation by domestic animals, and encourage involvement in Council's volunteer Bushcare Program.	Bushland Management Supervisor	O	Landscaped areas maintained. Protection of natural bushland areas.
	Encourage neighbours to create or maintain buffer zones of indigenous vegetation on private land adjoining the reserve.	Bushland Manager	O	Creation and maintenance of buffer zones which assist in protecting the reserve.
	Council will pursue the removal of private encroachments onto the reserve and require the restoration and regeneration of these areas.	Bushland Manager Environmental Surveillance Officer	As required LT	Reduction in encroachments.
The boundary of the natural area should be well-defined to minimise the impact of any negative external influences.	Investigate methods for clearly defining the natural area such as signage, log barriers or fencing.	Bushland Manager /neighbouring landholders	LT	Natural area is well-defined



HORNSBY SHIRE COUNCIL

Hornsby Shire Council

The Lakes of Cherrybrook

Bush Reserve

March 1, 2000

0 50 100m

N

Laurence (or Briddon) Street Reserve
Draft Bushland Plan of Management

1.0 INTRODUCTION

This Draft Plan of Management for Laurence St Reserve has been developed by Hornsby Shire Council to comply with the Local Government Act (1993), which requires Plans of Management to be adopted by Councils for all 'community' land by July, 1996. The bushland component of Laurence St Reserve is recognised as a significant area this individual Plan of Management has been developed specifically for this reserve.
The playground /park area is covered by the Parks Generic Plan of Management (*Hornsby Shire Council, 1996).*

Hornsby Shire Council Local Environment Plan (LEP)
The current Hornsby Shire Local Environment Plan 1999 zones Laurence St Reserve as Open Space A (Public Recreation - Local).

SIGNIFICANCE OF THE RESERVE

Hornsby Shire's bushland reserves are an important feature of the Shire's natural character and beauty. Bushland areas throughout Hornsby Shire and the northern Sydney region contribute significantly to the scenic amenity and beauty of this area.

Urban bushland areas are important for the following reasons:

- They provide a 'green space' in the built environment, contributing to the scenic amenity of urban areas
- They provide important habitat for native fauna species which would otherwise move away from urban areas. Urban bushland can form part of important wildlife corridors which provide shelter, food and habitat for migratory and nomadic species
- They are an important scientific resource, providing a record of the original vegetation of the district.
- They are an important educational resource, and often the first point of contact with nature for many urban residents as well as a venue for formal education. They provide nearby schools and other educational institutions with natural areas which can be visited without the need for a formal excursion, and where it is feasible to carry out studies requiring repeat investigations.
- Urban bushland provide recreational opportunities, enabling urban residents to undertake recreational pursuits in a bushland setting.

In addition to these general features, Laurence St Reserve has particular significance for the following reasons:

- The bushland remnant present within Laurence St Reserve has been identified as Sydney Turpentine Ironbark Forest, an Endangered Ecological Community protected under the Threatened Species Conservation Act (1995).
- The reserve is adjacent a residential area providing local residents with an easily accessible bushland setting for passive recreational pursuits.
- The reserve is across the road from Pennant Hills High School, providing an ideal opportunity for open air classes.
- The reserve contains children's play equipment and is an important local recreational resource. The remnant forest provides shade and contributes to the scenic amenity of the surrounding built up environment.

**NB: Under Section 56 of the Threatened Species Conservation Act (1995), the Director-General of the National Parks and Wildlife Service, is required to "prepare a recovery plan for each endangered or vulnerable species, population and ecological community, as soon as practicable after it is listed in Schedule 1 of the Act, to promote the recovery of the species, population or ecological community to a position of viability in nature".

Once a Recovery Plan has been prepared for Sydney Turpentine Ironbark Forest, this Plan of Management will be reviewed to ensure it is consistent with the Recovery Plan.

RESERVE DESCRIPTION

Laurence St Reserve is a small reserve, well-used by local residents. It contains a small playground and remnant bushland.

The Reserve is located on the corner of Laurence St and Briddon Rd, Pennant Hills. It occupies an area of approximately 0.27ha most of which comprises the natural area. It is located between Laurence St and Briddon Rd and residential development. Laurence St and Briddon Rd form the southern and eastern boundaries whilst the rest of the perimeter adjoins, private residential properties.

The reserve is small, rectangular in shape and isolated, not directly connected to any other bushland areas. The small size of the reserve means that it has a high edge to area ratio, making it vulnerable to external influences especially weed propagules and pest animal predation.

Land Tenure

Laurence St Reserve is identified as a Public Reserve, Lots 12-14 DP 216312, owned and managed by Hornsby Shire Council. No leases or licenses currently affect the land. Given the nature of the reserve it is unlikely that any leases or licenses will arise, however any proposals should be considered on their merit and in consideration of how they meet the objectives of this plan.

Topography

The reserve is located in a residential area on a ridgetop to the east of the Berowra Valley. Within the reserve, the landscape is flat.

Geology and soils

The soils present within Laurence St Reserve are primarily clay soils derived from Wianamatta Shale. "Naturally vegetated shale landscapes are now very rare due to their preferential settlement through forestry, agriculture and later urbanisation" (*EPS Ecological Surveys and Planning, (1999)*).

Hydrology / Water Quality

There are no watercourses present in the bushland area, however the reserve is contained within the Tedbury Creek catchment, part of the larger Berowra Creek Catchment.

Flora

Vegetation

Laurence St Reserve was surveyed during November 1999 to determine the nature and distribution of plant communities, it's habitat value and the nature and intensity of weed invasion. The plant community present in Laurence St Reserve can be described as Community M: *Syncarpia glomulifera - Eucalyptus paniculata - Angophora costata* Open Forest as described in the *Hornsby Shire Bushland Survey* (Smith & Smith 1990).

Significant Flora

The Community M vegetation was described then as under-represented in the Shire and has now been listed as an endangered ecological community under Schedule 1 of the Threatened Species Conservation Act (1995).

The vegetation of Laurence St Reserve has also been previously documented in the *Hornsby Shire Threatened Biota Conservation Plan* (ESP Ecological Surveys & Planning 1999) and has been identified as Sydney Turpentine Ironbark Forest, an endangered ecological community listed under Schedule 1 of the Threatened Species Conservation Act (1995).

There has been no comprehensive flora list compiled for this reserve, however the species present are consistent with the species listed as comprising the characteristic assemblage for Sydney Turpentine Ironbark Forest in Schedule 1 of the Threatened Species Conservation Act (1995).

Persoonia hirsuta, an endangered species as per Schedule of the Threatened Species Conservation Act (1995), is located in bushland in the vicinty of the reserve but has not been located in Laurence St Reserve to date.

Vegetation condition

The vegetation in the bushland area suffers from varying degrees of degradation, with part of the understorey being regularly mown, and can be described as having an overall rating of poor as per Smith & Smith (1990).

Fauna

Common species such as possums, lizards and snakes are likely to visit the reserve. There is unlikely to be significant numbers of resident fauna due the small size of the reserve and the lack of structure in the vegetation community present. The avifauna of the reserve is likely to be typical of Shale and open forest habitats, though diversity may have declined due to surrounding residential and rural development and domestic pet and feral animal predation.

Fauna activity may have also declined due to the fact that it is an isolated parcel of bushland, not forming part of a continuous bushland corridor, this high edge to area ratio increases the susceptibility of resident native fauna to impacts such as predation. Further investigation would be required to ascertain whether the reserve is still important for certain native fauna species.

There has been no fauna surveys undertaken within this reserve.

Significant fauna

There are no significant fauna species recorded as being present in this reserve. The Grey Falcon (*Falco hypoleucus*), an endangered species as per Schedule 1 of the Threatened Species Conservation Act (1995) has been recorded on private property in the vicinity of the reserve.

Aboriginal and European Heritage Sites

It is likely that the Aboriginal people of the Dharug group were the original inhabitants of the reserve and surrounding area. There are no records of heritage items of Aboriginal significance in the reserve, (*Koettig 1996*) and due to the nature and disturbance of the reserve, none would be expected.

The entire reserve is listed as a heritage item of local significance in the *Hornsby Shire Council LEP, 1999.*

2.0 MANAGEMENT ISSUES AND STRATEGIES

Weed invasion, Bush regeneration and Vegetation Management

Laurence St Reserve is affected by minor to moderate weed invasion. These weeds compete with the native species leading to simplification of the bushland's ecology and loss of biodiversity.

The majority of the canopy is intact, with part of the understorey being regularly mown. There are patches of native groundcovers and grasses throughout the reserve, indicating good regeneration potential should funding exist to allow the entire area to regenerate. Weed infestation is mainly concentrated along the boundary with residential properties. Resilience is likely to be medium to high currently but will decline in the future as weeds become more established, modifying the vegetation structure. The weeds present are a result of impacts of current management practices such as mowing and impacts of the adjoining landuses including low density residential development, playground and road verge.

The main weed species throughout the core of the reserve are herbaceous weeds and grasses including Plantain (*Plantago lanceolata*), Flatweed (*Hypochoeris radicata*), Summer Grass (*Digitaria sanguinalis*), Ehrharta (*Ehrharta erecta*), Paspalum (*Paspalum dilatatum*), Parramatta Grass (*Sporobolus africanus*) and Formosan Lily (*Lilium formosanum*). The residential boundary is moderately degraded containing Green Spider Plant (*Chlorophytum comosum*), Honeysuckle (*Lonicera japonica*), Privet (*Ligustrum lucidum* and *Ligustrum sinense*), Cassia (*Senna pendula*), Monstera (*Monstera deliciosa*) and Wandering Jew (*Tradescantia albiflora*).

Weed invasion has been identified as a significant threat to the survival of Sydney Turpentine Ironbark Forest (*ESP Ecological Surveys & Planning, 1999*). This weed invasion should be addressed as part of the overall management of the reserve.
An integrated program of herbicide use as well as manual weed removal is needed and should be done so in co-ordination with any park maintenance or future upgrading of the site as resources become available for the Reserve.

Native and Introduced Fauna

Although there has been no formal fauna survey of Laurence St Reserve, it is still likely that native fauna species frequent the reserve and some may even reside there. Even the degraded, weedy areas can still provide some habitat and protection for native fauna species. As this reserve is small in size with minimal available habitat, any restoration works undertaken in this reserve should consider that thickets of weeds can be temporary homes for native fauna until their natural habitat can be restored. Any primary clearing of weeds should be carried out gradually, so as refuge areas remain for native animals to utilise.

The high edge to area ratio of the reserve and the presence of cats and dogs in the surrounding residential area constitutes a significant threat to native wildlife. Public education on the protection of native fauna in the area would be useful to make surrounding landholders aware of possible faunal activity in the reserve and their protection under the National Parks and Wildlife Act (1974) and the Threatened Species Conservation Act (1995).

Fire Regime

Urban bushland fire management needs to consider the ecological needs of the bushland as well as the risk posed by wildfires to life and property. Fire management in urban bushland reserves should aim to minimise hazard to life and property whilst conserving ecological values of the reserve.

Any proposals for hazard reduction burns should be carried out in conjunction with regeneration of the bushland for the benefit of native vegetation management.

Recreation and Access

Access is essential in a reserve such as Laurence St Reserve where there is a public playground. The lack of understorey vegetation in the reserve encourages informal access. Areas where there is little to no vegetation cover, but rather bare dirt, indicate the most well used access paths.

Due to the presence of the endangered ecological community, limited access considerations are needed to prevent the damage caused by informal tracks and trails.

Access ways need to be defined and restricted to uses which will have minimal impact on the ecology of the bushland area.

Boundaries and Neighbours

Laurence St Reserve has a high edge to area ratio increasing its susceptibility to adverse external influences from the boundaries. Co-operation between Council and adjoining landholders is necessary for effective management of the reserve boundaries.

The boundary of the reserve with the adjoining residential properties is well-defined by fencing. Neighbours of the reserve will be encouraged to work with Council to assist in the regeneration and maintenance of the reserve and to inform Council of any illegal dumping of garden refuse or acts of vandalism which may occur.

The boundary of the park and the natural area is currently not well-defined. Clearly defining this boundary would assist in future maintenance of the park and appropriate management of the Sydney Turpentine Ironbark Forest remnant.

References:

Smith & Smith (1990) *Hornsby Shire Bushland Survey*

ESP Ecological Surveys & Planning (1999) *Hornsby Shire Threatened Biota Conservation Plan*

Hornsby Shire Council (1999) *Hornsby Shire Local Environment Plan*

Margrit Koettig Archaeological Services (1996) *Hornsby Shire Aboriginal Heritage Study.*

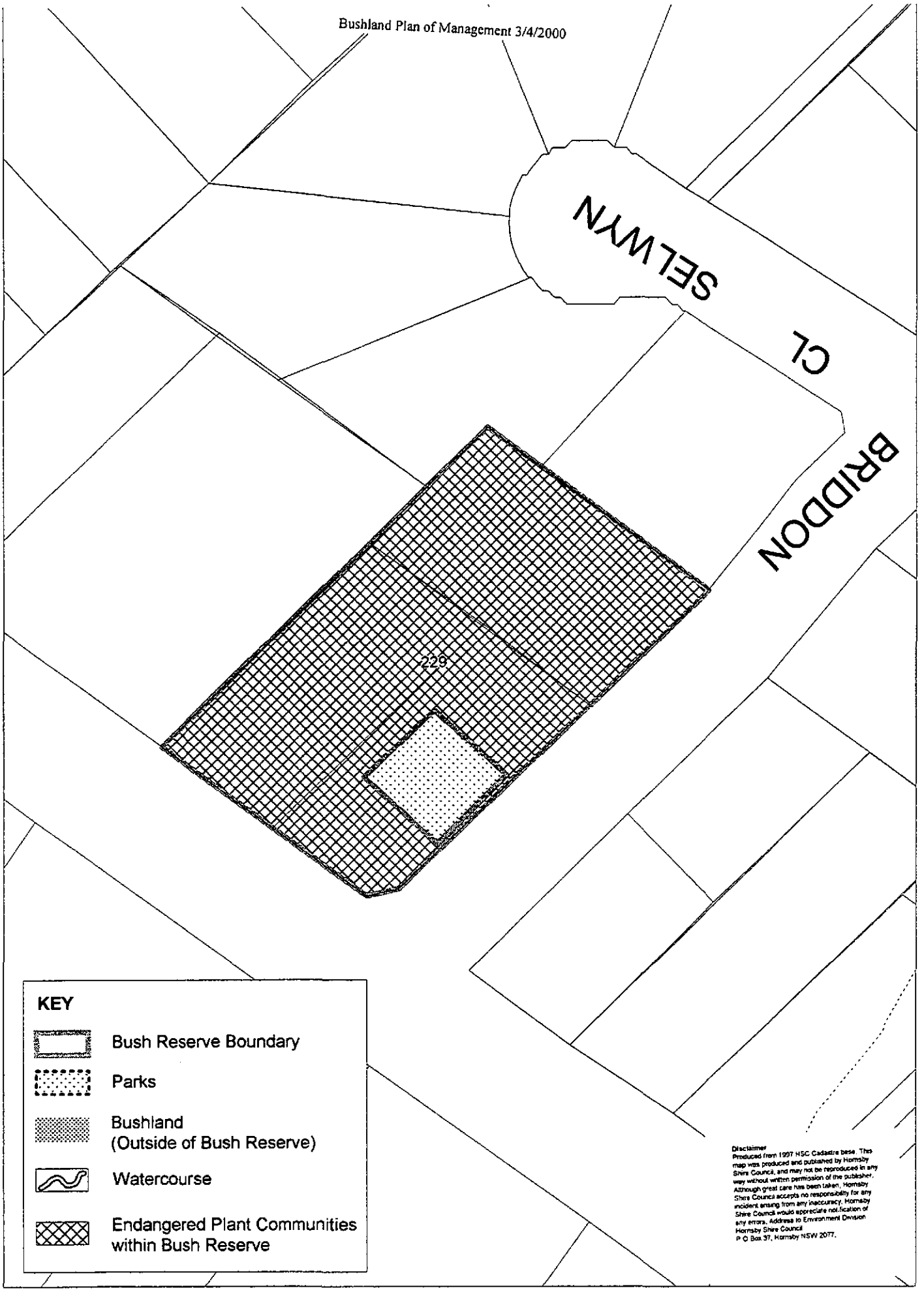
3.0 ACTION PLAN

MANAGEMENT STATEMENT	ACTION	RESPONSIBILITY	TIMEFRAME	PERFORMANCE MEASURE
Weed Invasion, Bush Regeneration and Vegetation Management Formalised activities within the natural area will require a lease or licence agreement with Council.	Any granting of leases, licences or other estates must be consistent with the core objectives for bushland as set out in the Local Government Amendment (Community Land Management) Regulation (1998).	HSC / proponents	as required O	Any granting of a lease, licence or other estate for activities within the natural area are consistent with the Local Government Amendment (Community Land Management) Regulation (1998). Activities allowable in the bushland do not impact on the conservation of bushland.
Consideration is given to regeneration of bushland for any activity proposed for Laurence St Reserve to mitigate the degrading influences on the Reserve.	Ensure that all activities are carried out with consideration of bushland protection and regeneration.	HSC/proponents	As required O	Protection of bushland
The Sydney Turpentine Ironbark Forest remnant is to be managed for nature conservation to protect this endangered ecological community.	Restrict activities in this area to bushland restoration and low impact scientific and educational use following full environmental assessment.	Bushland Manager	O	Activities in this area do not adversely impact the bushland.
Areas affected by weed invasion within Laurence St Reserve are to be rehabilitated using appropriate regeneration techniques.	Restoration and regeneration to be undertaken in areas affected by weed invasion.	Bushland Manager	as funding permits	Bushland condition is improved and maintained.
	Primary bush regeneration works should only be undertaken where sufficient follow up weed control and bush regeneration can be guaranteed.	Bushland Manager	as funding permits	Bushland condition is improved and maintained

	Cease mowing in areas with good regeneration potential where adequate funding exists for maintenance.	Bushland Manager/ Manager - Parks & Landscapes	as funding permits	Regeneration of native understorey vegetation.
	Encourage and support community involvement in restoration of the bushland within Laurence St Reserve as part of Council's volunteer Bushcare Program.	Bushland Management Supervisor	O	Bushcare Group established in Laurence St Reserve.
Indigenous species should be used wherever possible to rehabilitate degraded areas.	Any revegetation works within Laurence St Reserve should be composed of locally occurring indigenous plants.	Bushland Management Supervisor	O	Locally indigenous plant material is utilised in rehabilitation and landscaping works.
Adequate funding for bushland restoration will assist in the conservation of Sydney Turpentine Ironbark Forest in Laurence St Reserve.	Seek additional funding from State and Federal Government sources for restoration of the area.	Bushland Manager	O As funding permits	Council receives financial grants
Native and Introduced Fauna Native fauna habitat should be conserved and enhanced wherever feasible.	Maintain habitat and vegetation through a well-planned bush regeneration and habitat enhancement program. Maintain habitat by preventing removal of logs for firewood and the removal of bushrock.	Bushland Manager Bushland Manager	O/LT O	Protection and enhancement of native fauna habitat.
Consideration is given to native fauna and its habitat for any activity proposed for Laurence St Reserve.	Ensure fauna habitat needs are included in any proposal for restoration works within Laurence St Reserve.	Bushland Manager	O	Protection of fauna habitat

Control of domestic animals.	Encourage pet owners to control domestic cats and dogs through a public education campaign and by impoundment of free roaming dogs.	Bushland Manager /Environmental Surveillance Officer	O	Responsible pet ownership.
Aboriginal and European Heritage Sites Aboriginal and European heritage sites within the reserve are to be protected and conserved.	Consideration should be given to the importance of the heritage listing of the reserve in HSLEP for any proposed activity within the reserve.	Bushland Manager /Heritage Officer /Manager – Parks & Landscapes	O	Heritage items are preserved for future generations.
Fire Management Any fire management within Laurence St Reserve should be carried out in conjunction with bush regeneration works.	Any proposals for fire management in Laurence St Reserve are to be assessed by the Water Catchments Team	Bushland Manager / Manager – Fire Control	O	Fire regime is maintained for the health of the bushland.
Recreation and Access Access should be restricted to uses which will have minimal impact on the reserve's ecology.	Limit recreational activities in this area to passive recreational pursuits such as bushwalking, following full environmental assessment.	Bushland Manager	O	Recreational activities in this area do not adversely impact the bushland.
	Monitor recreational and educational uses of the reserve and their impact.	Bushland Manager	LT	
	Ensure the boundary between the playground area and the bushland remnant is well defined.	Bushland Manager / Manager – Parks & Landscapes	ST	

Use of informal trails through the natural area is to be discouraged wherever possible.	Unnecessary informal trails through the natural areas are to be closed, stabilised and revegetated using locally indigenous plant material	Bushland Manager	LT	Any informal trails through the natural area are rehabilitated to an acceptable standard
	Investigate the possibility of formalising a footpath to the playground to prevent further impacts such as soil compaction as a result of pedestrian traffic.	Manager – Parks & Landscapes / Bushland Manager	LT As funding permits	Reduction in impacts resulting from recreational use of the reserve.
Any proposal for track use, works or construction in the natural area will need to consider impacts on bushland.	Any proposal for use and works regarding existing trails or construction of new trails in the natural area will be subject to full environmental assessment.	Bushland Manager	as required	Proposals for track works or construction in the natural area are subject to stringent environmental assessment.
Boundaries and Neighbours The mitigation of negative impacts from neighbouring properties is essential to the long-term conservation of Laurence St Reserve.	Encourage adjoining landholders to reduce any impacts such as illegal vegetation dumping, encroachment and predation by domestic animals, and encourage involvement in Council's volunteer Bushcare Program.	Bushland Management Supervisor	O	Landscaped areas maintained. Protection of natural bushland areas.
	Encourage neighbours to create or maintain buffer zones of indigenous vegetation on private land adjoining the reserve.	Bushland Manager	O	Creation and maintenance of buffer zones which assist in protecting the reserve.
The boundary of the natural area should be well-defined to minimise the impact of any negative external influences.	Investigate methods for clearly defining the natural area such as signage, log barriers or fencing.	Bushland Manager / Manager – Parks & Landscapes	MT	Natural area is well-defined



HORNSBY SHIRE COUNCIL

Hornsby Shire Council

Laurence Street, Pennant Hills

Bush Reserve

February 23, 2000

0 20 40m

N

Appletree Drive Reserve
Draft Bushland Plan of Management

1.0 INTRODUCTION

This Draft Plan of Management for Appletree Drive Reserve has been developed by Hornsby Shire Council to comply with the Local Government Act (1993), which requires Plans of Management to be adopted by Councils for all 'community' land by July, 1996. Appletree Dr Reserve is recognised as a significant area and this individual Plan of Management has been developed specifically for this reserve.

Hornsby Shire Council Local Environment Plan (LEP)
The current Hornsby Shire Local Environment Plan 1999 zones Appletree Dr Reserve as Open Space A (Public Recreation - Local).

SIGNIFICANCE OF THE RESERVE

Hornsby Shire's bushland reserves are an important feature of the Shire's natural character and beauty. Bushland areas throughout Hornsby Shire and the northern Sydney region contribute significantly to the scenic amenity and beauty of this area.

Urban bushland areas are important for the following reasons:

- They provide a 'green space' in the built environment, contributing to the scenic amenity of urban areas
- They provide important habitat for native fauna species which would otherwise move away from urban areas. Urban bushland can form part of important wildlife corridors which provide shelter, food and habitat for migratory and nomadic species
- They are an important scientific resource, providing a record of the original vegetation of the district.
- They are an important educational resource, and often the first point of contact with nature for many urban residents as well as a venue for formal education. They provide nearby schools and other educational institutions with natural areas which can be visited without the need for a formal excursion, and where it is feasible to carry out studies requiring repeat investigations.
- Urban bushland provides recreational opportunities, enabling urban residents to undertake recreational pursuits in a bushland setting.

In addition to these general features, Appletree Dr Reserve has particular significance for the following reasons:

- The bushland remnant present within Appletree Dr Reserve has been identified as Sydney Turpentine Ironbark Forest, an Endangered Ecological Community protected under the Threatened Species Conservation Act (1995).
- The reserve is adjacent a residential area and Scout Hall providing local residents with an easily accessible bushland setting for passive recreational pursuits.

**NB: Under Section 56 of the Threatened Species Conservation Act (1995), the Director-General of the National Parks and Wildlife Service, is required to "prepare a recovery plan for each endangered or vulnerable species, population and ecological community, as soon as practicable after it is listed in Schedule 1 of the Act, to promote the recovery of the species, population or ecological community to a position of viability in nature".

Once a Recovery Plan has been prepared for Sydney Turpentine Ironbark Forest, this Plan of Management will be reviewed to ensure it is consistent with the Recovery Plan.

RESERVE DESCRIPTION

Appletree Drive reserve is located between Appletree and Shepherds Drive and Kanangra Cres, Cherrybrook. It occupies an area of approximately 1.7 hectares. Approximately 0.3 hectares is bushland with the remainder being formalised parkland and a scout hall. It is surrounded by residential development including a small shopping centre and carpark.

The bushland area is located in the western part of the reserve. It is small, rectangular in shape and isolated, not directly connected to any other bushland areas. This high edge to area ratio, makes it vulnerable to external influences especially weed propagules and pest animal predation. It is bounded in the south by the formalised park area, to the north-west by the scout hall, shopping centre and carpark, to the north by Appletree Drive road verge and to the east by residential properties.

Land Tenure

Appletree Dr Reserve is identified as a Public Reserve, Lots 1 & 2 DP 834236, Lot 88 409 DP 791034 and Lot 361 DP 263755, owned and managed by Hornsby Shire Council.

The bushland area is mostly contained within Lot 2 DP 834236.

The 1st Cherrybrook Scouts currently have a lease affecting Lot 1 DP 834326. Given the nature of the reserve it is unlikely that any further leases or licenses will arise, however any proposals should be considered on their merit and in consideration of how they meet the objectives of this plan.

Topography

The reserve is located on a gentle east facing slope to the east of Shepherds Drive which is located on a ridge top in the south-west of the Berowra Valley. Within the reserve, the landscape is gently sloping to the east from the Shopping centre / Scout Hall area.

Geology and soils

The soils present within Appletree Dr Reserve are primarily clay soils derived from Wianamatta Shale. "Naturally vegetated shale landscapes are now very rare due to their preferential settlement through forestry, agriculture and later urbanisation" (EPS Ecological Surveys and Planning, 1999).

Hydrology / Water Quality

There are no watercourses present in the bushland area, however the reserve is contained within the larger Berowra Creek catchment.

Flora

Vegetation

Appletree Dr Reserve was surveyed during November 1999 to determine the nature and distribution of plant communities, it's habitat value and the nature and intensity of weed invasion. The plant community present in Appletree Dr Reserve can be described as Community M: *Syncarpia glomulifera - Eucalyptus paniculata - Angophora costata* Open Forest as described in the *Hornsby Shire Bushland Survey* (Smith & Smith 1990).

Significant Flora

The Community M vegetation was described then as under-represented in the Shire and has now been listed as an endangered ecological community under Schedule 1 of the Threatened Species Conservation Act (1995).

There has been no comprehensive flora list compiled for this reserve, however the species present are consistent with the species listed as comprising the characteristic assemblage for Sydney Turpentine Ironbark Forest in Schedule 1 of the Threatened Species Conservation Act (1995).

Eucalyptus camfieldii, a species listed as vulnerable in Schedule 2 of the Threatened Species Conservation Act (1995) is also present within the reserve (*Threatened Biota Conservation Plan, ESP Ecological Surveys & Planning, 1999*).

Vegetation condition

The vegetation in the bushland area suffers only a small degree of degradation around the perimeter, and can be described as having an overall rating of fair as per Smith & Smith (1990).

Fauna

Common species such as possums, lizards and snakes are likely to visit the reserve. The avifauna of the reserve is likely to be typical of Shale and open forest habitats, though diversity may have declined due to surrounding residential and rural development and domestic pet and feral animal predation.

Fauna activity may have also declined due to the fact that it is an isolated parcel of bushland, not forming part of a continuous bushland corridor, this high edge to area ratio increases the susceptibility of resident native fauna to impacts such as predation. Further investigation would be required to ascertain whether the reserve is still important for certain native fauna species.

There has been no fauna surveys undertaken within this reserve.

Significant fauna

There are no significant fauna species recorded as being present in this reserve.

Aboriginal and European Heritage Sites

It is likely that the Aboriginal people of the Dharug group were the original inhabitants of the reserve and surrounding area of Cherrybrook. There are no records of heritage items of Aboriginal significance in the reserve, (*Koettig 1996*) and due to the nature and disturbance of the reserve, none would be expected.

There are no records of heritage items of European significance in the reserve (*Hornsby Shire Council LEP, 1999*). A survey of the reserve could be undertaken as part of any review of the heritage study.

2.0 MANAGEMENT ISSUES AND STRATEGIES

Weed invasion, Bush regeneration and Vegetation Management

Appletree Dr Reserve is affected by minor weed invasion. These weeds compete with the native species and if left unchecked, have the potential to cause simplification of the bushland's ecology and loss of biodiversity.

The majority of the bushland is free of weeds, with weed infestation restricted to the interface with developed areas including the formalised park area. Resilience is likely to be medium to high currently but will decline in the future as weeds become more established, modifying the vegetation structure. The weeds present are a result of impacts of the adjoining landuses including low density residential development, formalised parkland and road verge.

The main weed species include Blackberry (Rubus sp.), Plantain (*Plantago lanceolata*), Flatweed (*Hypochoeris radicata*), Kikuyu (*Pennisetum clandestina*) and Asparagus Fern (*Asparagus densiflorus*).

Weed invasion has been identified as a significant threat to the survival of Sydney Turpentine Ironbark Forest (*ESP Ecological Surveys & Planning, 1999*). This weed invasion should be addressed as part of the overall management of the reserve.

An integrated program of herbicide use as well as manual weed removal is needed and should be done so in co-ordination with any park maintenance or future upgrading of the site as resources become available for the Reserve.

Native and Introduced Fauna

Although there has been no formal fauna survey of Appletree Dr Reserve, it is still likely that native fauna species frequent the reserve and some may even reside there. Even the degraded, weedy areas can still provide some habitat and protection for native fauna species. Any restoration works undertaken in this reserve should consider that thickets of weeds can be temporary homes for native fauna until their natural habitat can be restored. Any primary clearing of weeds should be carried out gradually, so as refuge areas remain for native animals to utilise.

The high edge to area ratio of the reserve and the presence of cats and dogs in the surrounding residential area constitutes a significant threat to native wildlife. Public education on the protection of native fauna in the area would be useful to make surrounding landholders aware of possible faunal activity in the reserve and their protection under the National Parks and Wildlife Act (1974) and the Threatened Species Conservation Act (1995).

Fire Regime

Urban bushland fire management needs to consider the ecological needs of the bushland as well as the risk posed by wildfires to life and property. Fire management in urban bushland reserves should aim to minimise hazard to life and property whilst conserving ecological values of the reserve.

Due to the small size of this reserve it is unlikely that any hazard reduction work would be required, although there is a thick build-up of leaf litter on the forest floor and the remnant may benefit from an ecological burn in the future. Any proposals for hazard reduction burns should be carried out in conjunction with regeneration of the bushland for the benefit of native vegetation management.

Recreation and Access

There is currently an access track through the bushland area adjacent the residential properties to the east of the reserve from Appletree Drive through to the formalised park area. A number of informal trails are also present. As the bushland area is located next to the scout hall and park, access to these areas is essential. The boundary of the bushland area needs to be well-defined to prevent further impacts from adjoining landuses.

Due to the presence of the endangered ecological community, limited access to the bushland area needs to be considered to prevent the damage caused by informal tracks and trails. Access needs to be restricted to uses which will have minimal impact on the ecology of the bushland area.

Boundaries and Neighbours

Appletree Dr Reserve has a high edge to area ratio increasing its susceptibility to adverse external influences from the boundaries. Co-operation between Council and adjoining landholders is necessary for effective management of the reserve boundaries.

The boundary of the reserve with the adjoining residential and commercial properties is well-defined by fencing and the carpark verge. Neighbours of the reserve will be encouraged to work with Council to assist in the regeneration and maintenance of the reserve and to inform Council of any illegal dumping of garden refuse or acts of vandalism which may occur.

During the site inspection a number of piles of dumped rubbish, including domestic items, food scraps and garden clippings were located within the bushland area. Further investigation is required to ascertain the source of the dumping.

The 1st Cherrybrook Scouts currently hold a lease affecting Lot 1 DP 834326. It is important that Council ensure that the use of the Scout Hall and surroundings does not contribute in any way to degradation of the Sydney Turpentine Ironbark Forest remnant.

References:

Smith & Smith (1990) *Hornsby Shire Bushland Survey*
ESP Ecological Surveys & Planning (1999) *Hornsby Shire Threatened Biota Conservation Plan*
Hornsby Shire Council (1999) *Hornsby Shire Local Environment Plan*
Margrit Koettig Archaeological Services (1996) *Hornsby Shire Aboriginal Heritage Study.*

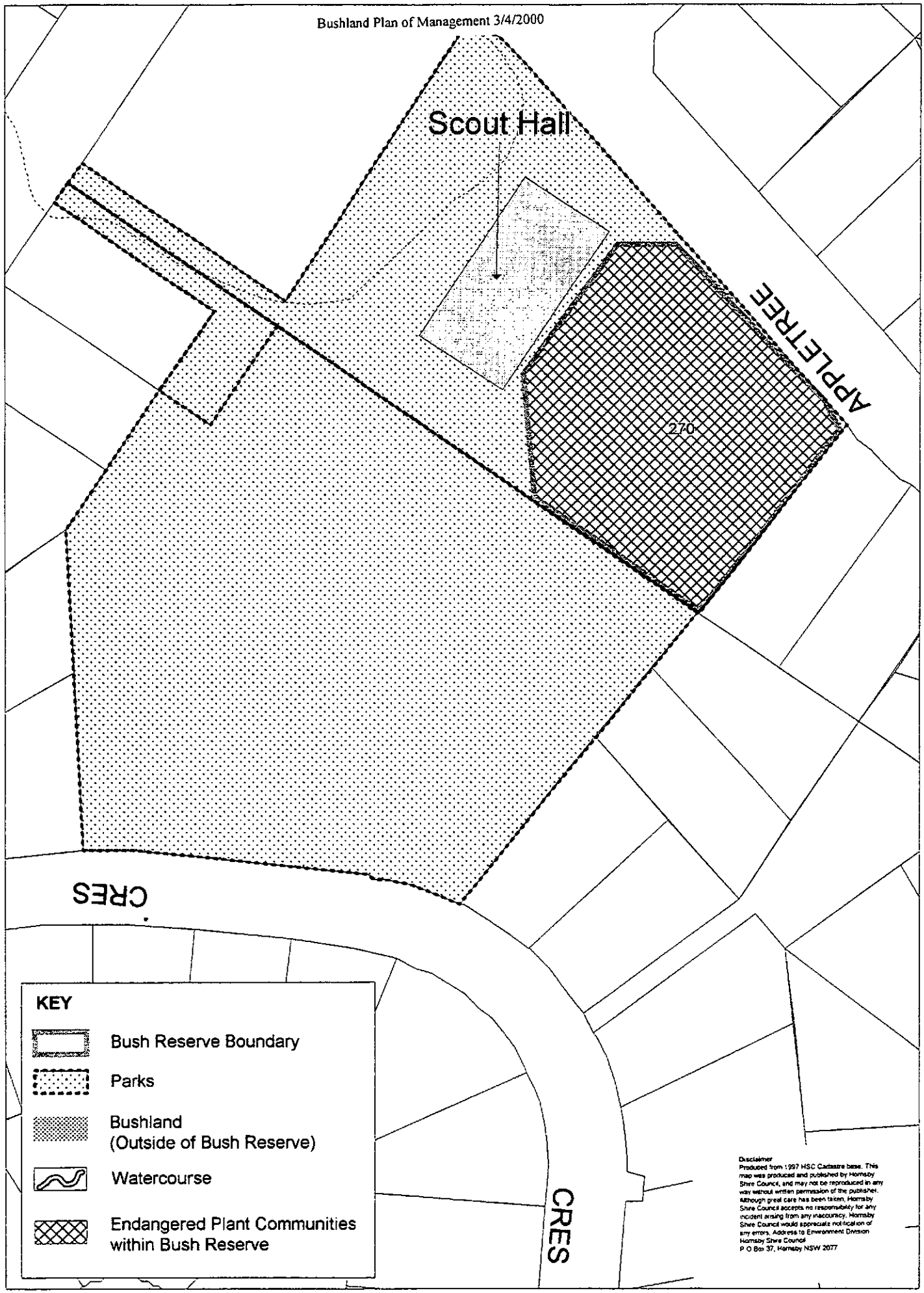
3.0 ACTION PLAN

MANAGEMENT STATEMENT	ACTION	RESPONSIBILITY	TIMEFRAME	PERFORMANCE MEASURE
Weed Invasion, Bush Regeneration and Vegetation Management Formalised activities within the natural area will require a lease or licence agreement with Council.	Any further granting of leases, licences or other estates must be consistent with the core objectives for bushland as set out in the Local Government Amendment (Community Land Management) Regulation (1998).	HSC / proponents	As required	Any granting of a lease, licence or other estate for activities within the natural area are consistent with the Local Government Amendment (Community Land Management) Regulation (1998). Activities allowable in the bushland do not impact on the conservation of bushland.
Consideration is given to regeneration of bushland for any activity proposed for Appletree Dr Reserve to mitigate the degrading influences on the Reserve.	Ensure that all activities are carried out with consideration of bushland protection and regeneration.	HSC/proponents	As required O	Protection of bushland
The Sydney Turpentine Ironbark Forest remnant is to be managed for nature conservation to protect this endangered ecological community.	Restrict activities in this area to bushland restoration and low impact scientific and educational use following full environmental assessment.	Bushland Manager	O	Activities in this area do not adversely impact the bushland.
Areas affected by weed invasion within Appletree Dr Reserve are to be rehabilitated using appropriate regeneration techniques.	Restoration and regeneration to be undertaken in areas affected by weed invasion.	Bushland Manager	as funding permits	Bushland condition is improved and maintained.
	Primary bush regeneration works should only be undertaken where sufficient follow up weed control and bush regeneration can be guaranteed.	Bushland Manager	as funding permits	Bushland condition is improved and maintained

	Encourage and support community involvement in restoration of the bushland within Appletree Dr Reserve as part of Council's volunteer Bushcare Program.	Bushland Management Supervisor	O	Bushcare Group established in Appletree Dr Reserve.
Indigenous species should be used wherever possible to rehabilitate degraded areas.	Any revegetation works within the Appletree Dr Reserve bushland site should be composed of locally occurring indigenous plants.	Bushland Management Supervisor	O	Locally indigenous plant material is utilised in rehabilitation and landscaping works.
Adequate funding for bushland restoration will assist in the conservation of Sydney Turpentine Ironbark Forest in Appletree Dr Reserve.	Seek additional funding from State and Federal Government sources for restoration of the area.	Bushland Manager	O As funding permits	Council receives financial grants
Native and Introduced Fauna Native fauna habitat should be conserved and enhanced wherever feasible.	Maintain habitat and vegetation through a well-planned bush regeneration and habitat enhancement program. Maintain habitat by preventing removal of logs for firewood and the removal of bushrock.	Bushland Manager Bushland Manager	O/LT O	Protection and enhancement of native fauna habitat.
Consideration is given to native fauna and its habitat for any activity proposed for Appletree Dr Reserve.	Ensure fauna habitat needs are included in any proposal for restoration works within Appletree Dr Reserve.	Bushland Manager	O	Protection of fauna habitat
Control of domestic animals.	Encourage pet owners to control domestic cats and dogs through a public education campaign and by impoundment of free roaming dogs.	Bushland Manager /Environmental Surveillance Officer	O	Responsible pet ownership.

Fire Management Any fire management within Appletree Dr Reserve should be carried out in conjunction with bush regeneration works.	Any proposals for fire management in Appletree Dr Reserve are to be assessed by the Water Catchments Team.	Bushland Manager / Manager - Fire Control	O	Fire regime is maintained for the health of the bushland.
Recreation and Access Access should be restricted to uses which will have minimal impact on the reserve's ecology.	Limit recreational activities in this area to passive recreational pursuits such as bushwalking, following full environmental assessment. Monitor recreational and educational uses of the reserve and their impact.	Bushland Manager Bushland Manager	O LT	Recreational activities in this area do not adversely impact the bushland.
Use of informal trails through the natural area is to be discouraged wherever possible.	Unnecessary informal trails through the natural areas are to be closed, stabilised and revegetated using locally indigenous plant material	Bushland Manager	LT	Any informal trails through the natural area are rehabilitated to an acceptable standard
Any proposal for track use, works or construction in the natural area will need to consider impacts on bushland.	Any proposal for use and works regarding existing trails or construction of new trails in the natural area will be subject to full environmental assessment.	Bushland Manager	as required	Proposals for track works or construction in the natural area are subject to stringent environmental assessment.

Boundaries and Neighbours The mitigation of negative impacts from neighbouring properties is essential to the long-term conservation of Appletree Dr Reserve.	Encourage adjoining landholders to reduce any impacts such as illegal vegetation and rubbish dumping, encroachments and predation by domestic animals, and encourage involvement in Council's volunteer Bushcare Program. Encourage neighbours to create or maintain buffer zones of indigenous vegetation on private land adjoining the reserve.	Bushland Management Supervisor Bushland Manager	O O	Landscaped areas maintained. Protection of natural bushland areas. Creation and maintenance of buffer zones which assist in protecting the reserve.
The boundary of the natural area should be well-defined to minimise the impact of any negative external influences.	Investigate methods for clearly defining the natural area such as signage, log barriers or fencing.	Bushland Manager /neighbouring landholders	MT	Natural area is well-defined
It is important that the adjoining landuses are consistent with the conservation of the Sydney Turpentine Ironbark Forest remnant.	Ensure the 1st Cherrybrook Scout Group is aware of the presence of the STIF remnant and that their activities do not impact upon the bushland.	Bushland Manager/ 1st Cherrybrook Scouts	ST/O (for term of lease)	Protection of natural area.



HORNSBY SHIRE COUNCIL

Hornsby Shire Council

Apple Tree Dr. Reserve

Bush Reserve

March 6, 2000

0 20 40m

N

McKinley Place Reserve
Draft Bushland Plan of Management

1.0 INTRODUCTION

This Draft Plan of Management for McKinley Pl Reserve has been developed by Hornsby Shire Council to comply with the Local Government Act (1993), which requires Plans of Management to be adopted by Councils for all 'community' land by July, 1996. McKinley Pl Reserve is recognised as a significant area and this individual Plan of Management has been developed specifically for this reserve.

Hornsby Shire Council Local Environment Plan (LEP)
The current Hornsby Shire Local Environment Plan 1999 zones McKinley Pl Reserve as Open Space A (Public Recreation - Local).

SIGNIFICANCE OF THE RESERVE

Hornsby Shire's bushland reserves are an important feature of the Shire's natural character and beauty. Urban bushland areas throughout Hornsby Shire and the northern Sydney region contribute significantly to the scenic amenity and beauty of this area.

Urban bushland areas are important for the following reasons:

- They provide a 'green space' in the built environment, contributing to the scenic amenity of urban areas
- They provide important habitat for native fauna species which would otherwise move away from urban areas. Urban bushland can form part of important wildlife corridors which provide shelter, food and habitat for migratory and nomadic species
- They are an important scientific resource, providing a record of the original vegetation of the district.
- They are an important educational resource, and often the first point of contact with nature for many urban residents as well as a venue for formal education. They provide nearby schools and other educational institutions with natural areas which can be visited without the need for a formal excursion, and where it is feasible to carry out studies requiring repeat investigations.
- Urban bushland provides recreational opportunities, enabling urban residents to undertake recreational pursuits in a bushland setting.

In addition to these general features, McKinley Place Reserve has particular significance for the following reasons:

- The bushland remnant present within McKinley Pl Reserve has been identified as Blue Gum High Forest, an Endangered Ecological Community protected under the Threatened Species Conservation Act (1995).
- The bushland forms a contiguous vegetated corridor along the tributary of Berowra Creek through an urbanised area adjoining Berowra Valley Regional Park further downstream.
- The reserve contains part of the 'Great North Walk' as well as part of the formalised Hornsby Shire Council 'Callicoma Walk'.

**NB: Under Section 56 of the Threatened Species Conservation Act (1995), the Director-General of the National Parks and Wildlife Service, is required to "prepare a recovery plan for each endangered or vulnerable species, population and ecological community, as soon as practicable after it is listed in Schedule 1 of the Act, to promote the recovery of the species, population or ecological community to a position of viability in nature".

Once a Recovery Plan has been prepared for Blue Gum High Forest, this Plan of Management will be reviewed to ensure it is consistent with the Recovery Plan.

RESERVE DESCRIPTION

McKinley Pl Reserve is located along a tributary of Berowra Creek beginning on the corner of Shepherds Drive adjacent the Cherrybrook Scout Hall, continuing downstream to the boundary with Berowra Valley Regional Park near the end of McKinley Place. It occupies an area of approximately 5.48ha most of which is the natural area. It is located between the Lakes Reserve, Cherrybrook and Berowra Valley Regional Park and bounded on both sides by residential properties in Gavin, McKinley and Brushbox Places and Acer Court.

The reserve is part of a riparian bushland corridor from The Lakes Reserve downstream to Berowra Valley Regional Park.

The reserve is linear in shape with a high edge to area ratio, making it vulnerable to external influences especially weed propagules and pest animal predation. Further downstream where the reserve adjoins Berowra Valley Regional Park, impacts from external influences are likely to be significantly reduced.

Land Tenure

McKinley Pl Reserve is identified as a Public Reserve, Lots 1 & 3 DP 738083, Lot PT9 DP 785842 and Lot 330 DP 777215, owned and managed by Hornsby Shire Council. The Girl Guides Association of NSW currently holds a lease affecting Lot 3 DP 738083. Given the nature of the reserve it is unlikely that any further leases or licenses will arise, however any proposals should be considered on their merit and in consideration of how they meet the objectives of this plan.

Topography

The reserve is located in a moderately steep-sided valley, running east-west along a tributary of Berowra Creek into Berowra Valley Regional Park. Within the reserve, the landscape is gently to moderately sloping from the northern and southern boundaries down to the creekline.

Geology and soils

The soils present within McKinley Pl Reserve are primarily clay soils derived from Wianamatta Shale. "Naturally vegetated shale landscapes are now very rare due to their preferential settlement through forestry, agriculture and later urbanisation" (*EPS Ecological Surveys and Planning, 1999*).

There are some sandstone outcrops on the higher northern perimeter of the reserve. The vegetation in this area is more indicative of soils derived from Hawkesbury Sandstone.

Hydrology

The watercourse present within the reserve is a tributary of Berowra Creek. The creek traverses the full length of the reserve. This Creek flows through community bushland and eventually adjoins Berowra Creek in the Berowra Valley Regional Park.

The present hydrological regime in the reserve is a result of the surrounding urban development as well as the development higher in the catchment.

Generally, the stormwater flows during rains events are increased by development which increases the amount of impervious surfaces within a catchment. Water runs off these surfaces more rapidly leading to increased peak flows and lower dry weather flows.

Water Quality

Historically, the dominant landuse in the catchment was market gardening. This would have contributed significantly to increasing nutrient levels in the catchment for this period. There is no current data for water quality within this reserve. Catchments such as this tributary of Berowra Creek Catchment with significant urban and commercial development can generate significant pollution, particularly nutrients but also suspended solids, metals, bacteria and chemical pollution, having the potential to seriously affect the quality of receiving waters.

Flora

Vegetation

McKinley Pl Reserve was surveyed during November 1999 to determine the nature and distribution of plant communities, it's habitat value and the nature and intensity of weed invasion. The plant community present in McKinley Pl Reserve can be described as Community K: *Eucalyptus pilularis - E.saligna - E.paniculata* Tall Open-forest and Community A: *Eucalyptus piperita – Angophora costata* Open Forest as described in the *Hornsby Shire Bushland Survey* (Smith & Smith 1990).

Significant flora

The vegetation Community K was described then as under-represented in the Shire. The vegetation of McKinley Pl Reserve has also been previously documented in the *Hornsby Shire Threatened Biota Conservation Plan* (ESP Ecological Surveys & Planning 1999) and has been identified as Blue Gum High Forest, an endangered ecological community listed under Schedule 1 of the Threatened Species Conservation Act (1995).

There has been no comprehensive flora list compiled for this reserve, however the species present are consistent with the species listed as comprising the characteristic assemblage for Blue Gum High Forest in Schedule 1 of the Threatened Species Conservation Act (1995).

Tetratheca glandulosa, an endangered species as per Schedule 1 of the Threatened Species Conservation Act (1995) has been recorded close by in Berowra Valley Regional Park, but has yet to be recorded within the reserve (ESP Ecological Surveys & Planning, 1999).

Vegetation condition

The vegetation in the bushland area suffers from varying degrees of degradation and can be described as having an overall rating of fair-poor as per Smith & Smith (1990).

Fauna

Common species such as possums, lizards and snakes are likely to visit the reserve. The avifauna of the reserve is likely to be typical of Shale and open forest habitats, though diversity may have declined due to surrounding residential development and domestic pet and feral animal predation. Further investigation would be required to ascertain whether the reserve is still important for certain native fauna species.

Fauna activity is still likely to be significant due to the fact that the reserve forms part of a continuous bushland corridor, ensuring a better chance of withstanding external influences such as predation.

There has been no fauna surveys undertaken within this reserve.

Significant fauna

The Glossy Black Cockatoo (*Calyptorhyncus lathami*), an endangered species as per Schedule 1 of the Threatened Species Conservation Act (1995) has been recorded close by in Berowra Valley Regional Park and it is likely that McKinley Pl Reserve is within the forage area for this species (ESP Ecological Surveys & Planning, 1999).

Aboriginal and European Heritage Sites

It is likely that the Aboriginal people of the Dharug group were the original inhabitants of the reserve and surrounding area. There are no records of heritage items of Aboriginal significance in the reserve, (*Koettig 1996*) and due to the nature and disturbance of the reserve, none would be expected.

There are no records of heritage items of European significance in the reserve (*Hornsby Shire Council LEP, 1999*). A survey of the reserve could be undertaken as part of any review of the heritage study.

2.0 MANAGEMENT ISSUES AND STRATEGIES

Weed invasion, Bush regeneration and Vegetation Management

McKinley Pl Reserve is affected by varying degrees of weed invasion. These weeds compete with the native species leading to simplification of the bushland's ecology and loss of biodiversity.

The majority of the canopy is intact throughout the reserve as are significant areas of understorey. However, weed infestation does occur and is particularly severe along the main creekline and other drainage lines as well as along the Gavin Place and McKinley Place road verge. Moderate weed infestation also occurs adjacent residential development along the perimeters of the reserve and along the firetrail and walking trails. There is an area on the southern side of the creek towards the end of McKinley Place which has been cleared in previous years. This area supports little to no native vegetation and mainly consists of exotic grasses.

Resilience throughout most of the reserve is likely to be medium to high currently but will decline in the future as weeds become more established modifying the vegetation structure. The weeds present are a result of impacts of the adjoining landuses including formalised parks and gardens, medium and low density residential development and school grounds and sporting ovals.

The main weed species include Small-leaved Privet (*Ligustrum sinense*), Wandering Jew (*Tradescantia albiflora*), Crofton Weed (*Ageratina adenophora*), Blackberry (*Rubus sp.*), Kikuyu (*Pennisetum clandestina*), Ehrharta (*Ehrharta erecta*), Prairie Grass (*Bromus catharticus*), Quaking Grass (*Briza maxima*), Broom (*Genista sp.*), Whisky Grass (*Andropogon virginicus*) and Honeysuckle (*Lonicera japonica*).

Weed invasion has been identified as a significant threat to the survival of Blue Gum High Forest (*ESP Ecological Surveys & Planning, 1999*). This weed invasion should be addressed as part of the overall management of the reserve.

An integrated program of herbicide use as well as manual weed removal is needed and should be done so in co-ordination with any maintenance or future upgrading of the site as resources become available for the Reserve.

Hydrology

In urbanised catchments such as the Berowra Creek catchment, nutrient levels are expected to be elevated. The presence of high nutrient concentrations provide ideal conditions for weed growth, giving these exotic plants a competitive advantage over native species. This can have significant impacts, inhibiting regeneration of the native plant community, thus threatening its long-term survival.

The excessive weed growth in the riparian zone of McKinley Pl Reserve, particularly near the Macquarie Drive end of the reserve can be atleast partly attributed to high levels of nutrients creating conditions favouring weed growth.

Native and Introduced Fauna

Although there has been no formal fauna survey of McKinley Pl Reserve, it is still likely that native fauna species frequent the reserve and some may even reside there. Even the degraded, weedy areas can still provide some habitat and protection for native fauna species. Any restoration works undertaken in this reserve should consider that thickets of weeds can be temporary homes for native fauna until their natural habitat can be restored. Any primary clearing of weeds should be carried out gradually, so as refuge areas remain for native animals to utilise.

The high edge to area ratio of the reserve and the presence of cats and dogs in the surrounding residential area constitutes a significant threat to native wildlife. Public education on the protection of native fauna in the area would be useful to make surrounding landholders aware of possible faunal activity in the reserve and their protection under the National Parks and Wildlife Act (1974) and the Threatened Species Conservation Act (1995).

Fire Regime

Urban bushland fire management needs to consider the ecological needs of the bushland as well as the risk posed by wildfires to life and property. Fire management in urban bushland reserves should aim to minimise hazard to life and property whilst conserving ecological values of the reserve.

Any proposals for hazard reduction burns should be carried out in conjunction with regeneration of the bushland for the benefit of native vegetation management.

Recreation and Access

There are several formalised trails providing good access to this reserve for passive recreational purposes. The reserve contains portions of two formalised walks, the 'Great North Walk', managed by the Department of Land & Water Conservation and the 'Callicoma Walk', managed by Hornsby Shire Council. Both of these walks are popular bushwalks for members of the local community as well as attracting bushwalkers from other areas. There are also a number of informal trails which intersect the reserve.

Due to the presence of the endangered ecological community, limited access considerations are needed to prevent the damage caused by informal tracks and trails. Access needs to be restricted to the use of formalised walking trails for passive recreational pursuits such as bushwalking.

Boundaries and Neighbours

McKinley Pl Reserve has a high edge to area ratio increasing its susceptibility to adverse external influences from the boundaries. Co-operation between Council and adjoining landholders is necessary for effective management of the reserve boundaries.

The boundary of the reserve with the adjoining residential properties is mainly well-defined by fencing. Neighbours of the reserve, particularly the Cherrybrook Guides, will be encouraged to work with Council to assist in the regeneration and maintenance of the reserve and to inform Council of any illegal dumping of garden refuse or acts of vandalism which may occur.

The Girl Guides Association of NSW currently hold a lease affecting Lot 3 DP 738083. It is important that Council ensure that the use of the Guide Hall and surroundings does not contribute in any way to degradation of the Blue Gum High Forest remnant.

References

Smith & Smith (1990) *Hornsby Shire Bushland Survey*

ESP Ecological Surveys & Planning (1999) *Hornsby Shire Threatened Biota Conservation Plan*

Hornsby Shire Council (1999) *Hornsby Shire Local Environment Plan*

Margrit Koettig Archaeological Services (1996) *Hornsby Shire Aboriginal Heritage Study*

3.0 ACTION PLAN

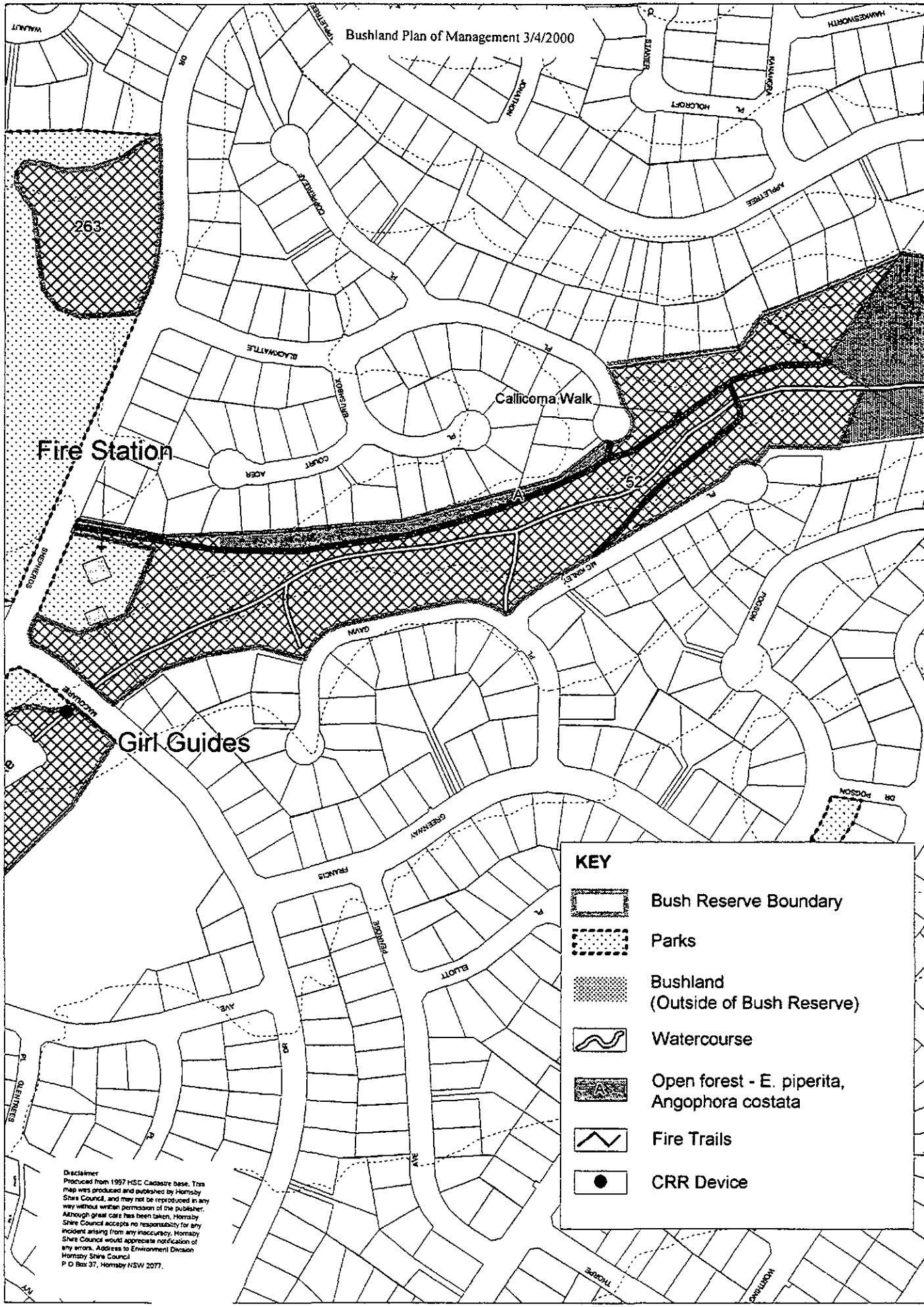
MANAGEMENT STATEMENT	ACTION	RESPONSIBILITY	TIMEFRAME	PERFORMANCE MEASURE
Weed Invasion, Bush Regeneration and Vegetation Management				
Formalised activities within the natural area will require a lease or licence agreement with Council.	Any further granting of leases, licences or other estates must be consistent with the core objectives for bushland as set out in the Local Government Amendment (Community Land Management) Regulation (1998).	HSC / proponents	As required O	Any granting of a lease, licence or other estate for activities within the natural area are consistent with the Local Government Amendment (Community Land Management) Regulation (1998). Activities allowable in the bushland do not impact on the conservation of bushland.
Consideration is given to regeneration of bushland for any activity proposed for McKinley Pl Reserve to mitigate the degrading influences on the Reserve.	Ensure that all activities are carried out with consideration of bushland protection and regeneration.	HSC/proponents	As required O	Protection of bushland
The Blue Gum High Forest remnant is to be managed for nature conservation to protect this endangered ecological community.	Restrict activities in this area to bushland restoration and low impact scientific and educational use following full environmental assessment.	Bushland Manager	O	Activities in this area do not adversely impact the bushland.
Areas affected by weed invasion within McKinley Pl Reserve are to be rehabilitated using appropriate regeneration techniques.	Restoration and regeneration to be undertaken in areas affected by weed invasion	Bushland Manager	as funding permits	Bushland condition is improved and maintained
	Primary bush regeneration works should only be undertaken where sufficient follow up weed control and bush regeneration can be guaranteed.	Bushland Manager	as funding permits	

	Encourage and support community involvement, including Cherrybrook Guides in restoration of the bushland within McKinley Pl Reserve as part of Council's volunteer Bushcare Program.	Bushland Management Supervisor	O	Bushcare Group established in McKinley Pl Reserve.
Indigenous species should be used wherever possible to rehabilitate degraded areas.	Any revegetation works within the McKinley Pl Reserve site should be composed of locally occurring indigenous plants.	Bushland Management Supervisor	O	Locally indigenous plant material is utilised in rehabilitation and landscaping works.
Adequate funding for bushland restoration will assist in the conservation of Blue Gum High Forest in McKinley Pl Reserve.	Seek additional funding from State and Federal Government sources for restoration of the area.	Bushland Manager	O As funding permits	Council receives financial grants
Hydrology / Water Quality				
Adequate control of stormwater and drainage from surrounding areas will assist in reducing negative impacts upon the bushland and contribute to the long-term conservation of McKinley Pl Reserve.	Investigate and implement any remediation strategies which will reduce the negative impacts of stormwater and urban runoff into McKinley Pl Reserve bushland area.	Manager - Water Catchments	O/MT	Reduction in impacts from stormwater and drainage.
	Ensure that full environmental assessment of the impacts including threatened species assessment, is carried out prior to any proposed stormwater and drainage mitigation activity.	Manager - Water Catchments	As required	Any proposals for activities within the reserve are subject to stringent environmental assessment.

Water quality in Berowra Creek should meet ANZECC water quality guidelines for Aquatic Ecosystem health.	Investigate and implement measures necessary to improve water quality within a total catchment management program.	Manager - Water Catchments	MT	Acceptable water quality in Berowra Creek.
It is important for local landholders to be aware of activities that can impact the water quality in Berowra Creek catchment.	Encourage local landholders to minimise activities which may have a detrimental impact on the water quality of Berowra Creek	HSC/landholders	O	Acceptable water quality in Berowra Creek.
Native and Introduced Fauna				
Native fauna habitat should be conserved and enhanced wherever feasible.	Maintain habitat and vegetation through a well-planned bush regeneration and habitat enhancement program.	Bushland Manager	O	Protection and enhancement of native fauna habitat.
	Maintain habitat by preventing removal of logs for firewood and the removal of bushrock.	Bushland Manager	O	
Consideration is given to native fauna and its habitat for any activity proposed for McKinley Pl Reserve.	Ensure fauna habitat needs are included in any proposal for restoration works within McKinley Pl Reserve.	Bushland Manager	O	Protection of fauna habitat
Control of domestic animals.	Encourage pet owners to control domestic cats and dogs through a public education campaign and by impoundment of free roaming dogs.	Bushland Manager /Environmental Surveillance Officer	LT/O	Responsible pet ownership.
Fire Management				
Any fire management within McKinley Pl Reserve should be carried out in conjunction with bush regeneration works.	Any proposals for fire management in McKinley Pl Reserve are to be assessed by the Water Catchments Team	Bushland Manager / Manager - Fire Control	O	Fire regime is maintained for the health of the bushland.

Recreation and Access Access should be restricted to uses which will have minimal impact on the reserve's ecology.	Limit recreational activities in this area to passive recreational pursuits such as bushwalking, following full environmental assessment. Monitor recreational and educational uses of the reserve and their impact.	Bushland Manager Bushland Manager	O LT	Recreational activities in this area do not adversely impact the bushland.
Existing formal public bushwalking tracks should be of a high standard.	Ensure the Great North Walk and the Callicoma Walk are maintained to a high standard.	Bushland Manager / DLWC	O	Great North Walk and Callicoma Walk bushwalking tracks are maintained to a high standard.
Use of informal trails through the natural area is to be discouraged wherever possible.	Unnecessary informal trails through the natural areas are to be closed, stabilised and revegetated using locally indigenous plant material	Bushland Manager	LT	Any informal trails through the natural area are rehabilitated to an acceptable standard
Any proposal for track use, works or construction in the natural area will need to consider impacts on bushland.	Any proposal for use and works regarding existing trails or construction of new trails in the natural area will be subject to full environmental assessment.	Bushland Manager	As required	Proposals for track works or construction in the natural area are subject to stringent environmental assessment.

Boundaries and Neighbours The mitigation of negative impacts from neighbouring properties is essential to the long-term conservation of McKinley Pl Reserve.	Encourage adjoining landholders to reduce any impacts such as illegal vegetation dumping and predation by domestic animals, and encourage involvement in Council's volunteer Bushcare Program.	Bushland Management Supervisor	O	Landscaped areas maintained. Protection of natural bushland areas.
	Encourage neighbours to create or maintain buffer zones of indigenous vegetation on private land adjoining the reserve.	Bushland Manager	O	Creation and maintenance of buffer zones which assist in protecting the reserve.
	Council will pursue the removal of private encroachments onto the reserve and require the restoration and regeneration of these areas.	Bushland Manager Environmental Surveillance Officer	As required LT	Reduction in encroachments.
The reserve boundaries should be well-defined and maintained to minimise the impact of any negative external influences.	Ensure that the boundary of the reserve with neighbouring properties is well defined and maintained.	Bushland Manager/ neighbouring landholders	MT	Natural area is well-defined. Boundaries maintained.
It is important that the adjoining landuses are consistent with the conservation of the Blue Gum High Forest remnant.	Ensure the Girl Guides are aware of the presence of the BGHF remnant and that their activities do not impact upon the bushland.	Bushland Manager/ Girl Guides	ST/O (for term of lease)	Protection of natural area.



HORNSBY SHIRE COUNCIL

Hornsby Shire Council

McKinley Pl. Reserve

March 15, 2000

N

0 50 200m

Waitara Creek Reserve (including Normanhurst Park and Dog Pound Creek)

Draft Bushland Plan of Management

INTRODUCTION

This Draft Plan of Management for Waitara Creek has been developed by Hornsby Shire Council to comply with the Local Government Act (1993), which requires Plans of Management to be adopted by Councils for all 'community' land by July, 1996. Waitara Creek Reserve is recognised as a significant area and this individual Plan of Management has been developed specifically for this reserve.

Hornsby Shire Council Local Environment Plan (LEP)

The current Hornsby Shire Local Environment Plan 1999 zones Waitara Creek Reserve as Open Space A (Public Recreation - Local).

SIGNIFICANCE OF THE RESERVE

Hornsby Shire's bushland reserves are an important feature of the Shire's natural character and beauty. Urban bushland areas throughout Hornsby Shire and the northern Sydney region contribute significantly to the scenic amenity and beauty of this area.

Urban bushland areas are important for the following reasons:

- They provide a 'green space' in the built environment, contributing to the scenic amenity of urban areas
- They provide important habitat for native fauna species which would otherwise move away from urban areas. Urban bushland can form part of important wildlife corridors which provide shelter, food and habitat for migratory and nomadic species
- They are an important scientific resource, providing a record of the original vegetation of the district.
- They are an important educational resource, and often the first point of contact with nature for many urban residents as well as a venue for formal education. They provide nearby schools and other educational institutions with natural areas which can be visited without the need for a formal excursion, and where it is feasible to carry out studies requiring repeat investigations.
- Urban bushland provide recreational opportunities, enabling urban residents to undertake recreational pursuits in a bushland setting.

In addition to these general features, Waitara Creek Reserve has particular significance for the following reasons:

- Part of the bushland remnant present within Waitara Creek Reserve has been identified as Sydney Turpentine Ironbark Forest, an Endangered Ecological Community protected under the Threatened Species Conservation Act (1995).
- The reserve contains Waitara Creek and Dog Pound Creek, a contiguous vegetated corridor and part of the larger Berowra Creek Catchment.
- The reserve is largely bounded by residential properties providing local residents with an easily accessible bushland area for passive recreational pursuits.

**NB: Under Section 56 of the Threatened Species Conservation Act (1995), the Director-General of the National Parks and Wildlife Service, is required to "prepare a recovery plan for each endangered or vulnerable species, population and ecological community, as soon as practicable after it is listed in Schedule 1 of the Act, to promote the recovery of the species, population or ecological community to a position of viability in nature".

Once a Recovery Plan has been prepared for Sydney Turpentine Ironbark Forest, this Plan of Management will be reviewed to ensure it is consistent with the Recovery Plan.

RESERVE DESCRIPTION

Waitara Creek Reserve, including Normanhurst Park and Dog Pound Creek bushland is located along Waitara Creek from Harris Road and Brian Avenue downstream to its junction with Dog Pound Creek and along Dog Pound Creek from Warrigal Drive downstream to its junction with Waitara Creek. It occupies an area of approximately 61.8 hectares with the natural area comprising approximately 59.5 hectares of the total area. It is surrounded mainly by residential properties and bushland managed by other authorities and is adjacent to Berowra Valley Regional Park downstream.

The reserve includes the formalised park area of Normanhurst Park which is located at the end of Harris Road.

Harris Rd and Brian Ave form the southern boundary of the Waitara Creek bushland with residential properties in Dartford Rd and Norman Ave to the south-west and Clovelly Rd and Brushwood Pl to the north-east. The Dog Pound Creek bushland is bounded by Warrigal Dr and Higgins Pl to the west, Sydney Water bushland to the south and Wareemba Ave to the east. Berowra Valley Regional Park is to the north of the reserve.

The reserve is part of a contiguous riparian bushland corridor along Waitara and Dog Pound Creeks downstream to its junction with Berowra Creek in Berowra Valley Regional Park.

The reserve relatively large and irregular in shape with a high edge to area ratio, making the perimeter areas vulnerable to external influences especially weed propagules and pest animal predation. Further downstream where the reserve becomes wider, impacts from external influences are likely to be significantly reduced.

Land Tenure

Waitara Creek Reserve is identified as a Public Reserve, Lots 18-20 DP 3468, Lot 2 DP 605749, Lot 23 DP 220061, Lot 191 DP 600794, Lot 21 DP 219175, Lot 50 DP 250520, Lot 6 DP 252696, Lot 4 DP 596849, Lot 41 DP 576173, Lot Z DP 416673 and Lot 10 DP 737216, owned and managed by Hornsby Shire Council. The park area is contained within Lots 18-20 DP 3468. The Scouts Association of NSW currently holds a lease over part of the reserve being number 22 Harris Road, Normanhurst. Given the nature of the reserve it is unlikely that any further leases or licenses will arise, however any proposals should be considered on their merit and in consideration of how they meet the objectives of this plan.

Topography

The reserve is located on a gentle to moderate slope, to the north-west of Pennant Hills Road which forms one of the main ridge-tops through the southern part of the Shire. Waitara Creek gently slopes in a north-westerly direction until its junction with Dog Pound Creek. Dog Pound Creek flows in a northerly direction until its junction with Waitara Creek. Within the reserve, the landscape along Waitara and Dog Pound Creeks is a moderately steep-sided valley sloping in towards the creekline.

Geology and soils

The soils present within Waitara Creek Reserve are a mixture of shale and sandstone derived soils. They are primarily sandy soils derived from Hawkesbury Sandstone, although transitional soils and clay soils derived from Wianamatta Shale are also present. "Naturally vegetated shale landscapes are now very rare due to their preferential settlement through forestry, agriculture and later urbanisation" (*EPS Ecological Surveys and Planning, 1999*).

Hydrology

The watercourse present within the reserve is Waitara Creek and Dog Pound Creek. The watercourse traverses the full length of the reserve. The watercourse flows through the Normanhurst residential area and privately owned bushland before entering the reserve, then it flows on into Berowra Creek in the Berowra Valley Regional Park.

The present hydrological regime in the reserve is a result of the surrounding urban development as well as the development higher in the catchment.

Generally, the stormwater flows during rains events are increased by development which increases the amount of impervious surfaces within a catchment. Water runs off these surfaces more rapidly leading to increased peak flows and lower dry weather flows.

The Stormwater Catchment Management Plan for Waitara Creek (*Webb, McKeown & Associates, 1998*) outlines a range of management issues, causes and possible management solutions. Hydrological management issues identified include flooding, ponding and property inundation.

Instream remediation works have been carried out in a section of Waitara Creek as part of Council's Catchment Remediation Rate Program which has included drainage channel stabilisation using rock lining and the construction of a small linear wetland.

Water Quality

There is no data recorded for water quality within this reserve although there are sampling sites further downstream near the West Hornsby Sewage Treatment Plant. Catchments such as the Waitara Creek Catchment with significant urban and industrial development can generate significant pollution including nutrients, suspended solids, metals, bacteria and chemical pollution, seriously affecting the quality of receiving waters.

The Stormwater Catchment Management Plan for Waitara Creek (*Webb, McKeown &*

Associates, 1998), outlines a range of water quality management issues, causes and possible solutions. The issues identified include poor ambient water quality, sewer overflows, recurring pollution from unknown source(s), elevated nutrient concentrations, elevated suspended solids concentrations, elevated bacterial concentrations, litter in watercourses, erosion of watercourses, weed growth in urban bushland, degraded aquatic habitats, degraded riparian vegetation, inappropriate streamflow regime and barriers to aquatic fauna migrations.

A linear wetland or mini-wetland was constructed and planted in Waitara Creek in 1999 as part of Council's Catchment Remediation Rate Program. It is located near the causeway where the firetrail from the end of Clovelly Road meets the creekline.

The wetland is deep in the middle with the sides plated out with native macrophytes. During normal flows the water drops into a pit before continuing downstream. During high rainfall flows may go over the causeway.

The wetland is an effective sedimentation basin and assists in flood control. It is likely to assist in reduction of faecal coliform bacteria although nutrient uptake is likely to be more limited until the macrophytes are fully established. The habitat value of this section of creekline to native aquatic fauna will also increase as the plants become more established.

Flora

Vegetation

Waitara Creek Reserve was surveyed during November 1999 to determine the nature and distribution of plant communities, it's habitat value and the nature and intensity of weed invasion. The plant communities present in Waitara Creek Reserve bushland area can be described as Community A: *Eucalyptus piperita – Angophora costata* Open-forest, Community L: *E.pilularis – A.costata – Syncarpia glomulifera* Tall Open-forest, Community C: *E.gummifera – E.haemastoma - E.oblonga* Woodland, Community J: *E.saligna* Tall Open-forest and a small area of Community M: *S. glomulifera – E.paniculata – A.costata* Tall Open-forest as described in the *Hornsby Shire Bushland Survey* (Smith & Smith 1990).

The Community M vegetation community was described then as under-represented in the Shire.

Significant flora

The Community M vegetation present within a small area of Waitara Creek Reserve has been previously documented in the *Hornsby Shire Threatened Biota Conservation Plan* (ESP Ecological Surveys & Planning 1999) and has been identified as Sydney Turpentine Ironbark Forest, an endangered ecological community listed in Schedule 1 of the Threatened Species Conservation Act (1995).

There has been no comprehensive flora list compiled for this reserve, however the species present are consistent with the species listed as comprising the characteristic assemblage for Sydney Turpentine Ironbark Forest in Schedule 1 of the Threatened Species Conservation Act (1995).

Vegetation condition

The vegetation in the bushland area suffers from varying degrees of degradation and can be described as having an overall rating of fair to poor as per Smith & Smith (1990).

Fauna

Common species such as possums, lizards and snakes are likely to inhabit the reserve. The avifauna of the reserve is likely to be typical of Shale and open forest habitats, though diversity may have declined due to surrounding residential development and domestic pet and feral animal predation.

The remnant contains stands of tall, mature eucalypts, favouring habitation by larger predatory birds, however there are some areas where exotic scramblers such as Blackberry and Lantana, are thick in the understorey providing suitable habitat for smaller birds. The permanent creeklines are likely to attract various frog species, small fish and insects. The bushland forms an important habitat type and is integral to the Waitara Creek bushland corridor.

Further investigation would be required to ascertain whether the reserve is still important for certain native fauna species.

There have been no fauna surveys undertaken within this reserve.

Significant fauna

A population of the Common Dunnart (*Sminthopsis murina*) resides in the Waitara Creek bushland corridor. The Common Dunnart is a mouse-sized insectivorous marsupial found in woodland, open forest and heathland. The species has suffered past loss of habitat for development while predation from red foxes, domestic, stray or feral cats is likely to be a continuing threat.

"The Waitara Creek population is of significant conservation value as it is the last known remaining population of the species in the

Sydney metropolitan area and may potentially provide source material for restocking neighbouring bushland remnants" (*Preliminary Determination, Scientific Committee, October 1999*).

The Powerful Owl (*Ninox strenua*) resides in the vicinity of the Waitara Creek Reserve. It is likely that it uses the bushland as forage habitat.

Aboriginal and European Heritage Sites

It is likely that the Aboriginal people of the Dharug group were the original inhabitants of the reserve and surrounding area. There are no records of heritage items of Aboriginal significance in the reserve, (*Koettig 1996*) and due to the nature and disturbance of the reserve, none would be expected.

There are no records of heritage items of European significance in the reserve (*Hornsby Shire Council LEP, 1999*). A survey of the reserve could be undertaken as part of any review of the heritage study.

2.0 MANAGEMENT ISSUES AND STRATEGIES

Weed invasion, Bush regeneration and Vegetation Management

Waitara Creek Reserve is affected by moderate to severe weed invasion. These weeds compete with the native species leading to simplification of the bushland's ecology and loss of biodiversity.

Much of the bushland is in good condition along the Waitara Creek section of the reserve. The Sydney Turpentine Ironbark Forest community suffers from relatively minor weed infestation. Weed invasion is primarily confined to the riparian area of the main creekline and smaller drainage lines. Weeds also occur along the residential boundary, particularly to the east of Waitara Creek. Resilience is likely to be medium to high currently but will decline in the future as weeds become more established modifying the vegetation structure. The weeds present are a result of impacts of the adjoining landuses including the formalised parks and oval area and residential development.

The upper sections of the Dog Pound Creek catchment, particularly the batter of the old tip and Dog Pound site off Warrigal Drive are highly degraded with Lantana, Blackberry and Honeysuckle being the main invasive species. Contract bush regeneration is currently being undertaken within this part of the reserve as part of Council's Contract Bush Regeneration Program. Works have taken place further downstream and have involved weed removal, fire management and habitat restoration.

It is important that works continue to ensure that the natural and assisted regeneration that has resulted to date is maintained and enhanced and the vegetation condition continues to improve.

The main weed species include Privet (*Ligustrum lucidum* and *Ligustrum sinense*), Honeysuckle (*Lonicera japonica*), Blackberry (*Rubus sp.*), Pink Lantana (*Lantana camara*) ,Wandering Jew (*Tradescantia albiflora*), Ehrharta (*Ehrharta erecta*), Morning Glory (*Ipomea indica*), Crofton Weed (*Ageratina adenophora*), *Cyperus eragrostis*, Kikuyu (*Pennisetum clandestina*), Creeping Buttercup (*Ranunculus repens*) and Mist Flower (*Ageratina riparia*).

Other weed species include Fishbone Fern (*Nephrolepis cordifolia*), Farmers Friend (*Bidens pilosa*), Wild Ginger (*Hedychium gardnerianum*), Elephants Ears (*Alocasia macrorhiza*), Plantain (*Plantago lanceolata*), Paspalum (*Paspalum dilatatum*), Paddy's Lucerne (*Sida rhombifolia*), African Love Grass (*Eragrostis curvula*), Barnyard Grass (*Echinochloa crus-galli*) and Pigeon Grass (*Setaria sp.*).

Weed invasion has been identified as a significant threat to the survival of Sydney Turpentine Ironbark Forest (*ESP Ecological Surveys & Planning, 1999*). This weed invasion should be addressed as part of the overall management of the reserve.

Volunteer bush regeneration is currently underway in the Waitara Creek Reserve as part of Council's volunteer Bushcare Program, and should be co-ordinated with any park maintenance or future upgrading of the site for recreational or other purposes as resources become available for the Reserve.

Hydrology / Water Quality

In urbanised catchments such as the Waitara Creek catchment, nutrient levels are expected to be elevated as a result of impacts such as road runoff and sewer leaks. The presence of high nutrient concentrations provide ideal conditions for weed growth, giving these exotic plants a competitive advantage over native species. This can have significant impacts, inhibiting regeneration of the native plant community, thus threatening its long-term survival.

The creekline is suffering moderate erosion in some sections with little diversity of instream habitat types mainly as a result of the presence of only one or two exotic riparian species. Any restoration works that take place need to occur

gradually and consider that weeds can act as a temporary stabiliser for creekbanks.

Native and Introduced Fauna

Although there has been no comprehensive fauna survey of Waitara Creek Reserve, it is still likely that native fauna species frequent the reserve and some may even reside there. Even the degraded, weedy areas can still provide some habitat and protection for native fauna species. Any restoration works undertaken in this reserve should consider that thickets of weeds can be temporary homes for native fauna until their natural habitat can be restored. Any primary clearing of weeds should be carried out gradually, so as refuge areas remain for native animals to utilise.

The high edge to area ratio of the reserve and the presence of cats and dogs in the surrounding residential area constitutes a significant threat to native wildlife. Public education on the protection of native fauna in the area would be useful to make surrounding landholders aware of possible faunal activity in the reserve and their protection under the National Parks and Wildlife Act (1974) and the Threatened Species Conservation Act (1995).

Any activities that occur within this reserve should consider the importance of the presence of the Common Dunnart and the possibility of the Powerful Owl utilising resources within the reserve. An effort should be made to collect information about the habitat requirements of these two species as part of any proposal for activities in the reserve.

Fire Regime

Urban bushland fire management needs to consider the ecological needs of the bushland as well as the risk posed by wildfires to life and property. Fire management in urban bushland reserves should aim to minimise hazard to life and property whilst conserving ecological values of the reserve.

Any proposals for hazard reduction burns should be carried out in conjunction with regeneration of the bushland for the benefit of native vegetation management and proposals for burns within this reserve should be assessed by the Water Catchments Team.

Recreation and Access

There is currently access into the reserve via a firetrail from the end of Clovelly Road down to Waitara Creek. There are no further formalised trails through the reserve although a well-used informal access track is present through the length of the reserve.

A firetrail provides good access to the Dog Pound Creek section of the reserve, from the corner of Wareemba Ave and Vale Rd into the upper areas of this part of the reserve. An informal trail links the Normanhurst residential area with this firetrail.

Due to the presence of the endangered ecological community, limited access considerations are needed to prevent the damage caused by informal tracks and trails. Access needs to be restricted to uses which will have minimal impact on the ecology of the bushland area.

Boundaries and Neighbours

Waitara Creek Reserve has a high edge to area ratio increasing its susceptibility to adverse external influences from the boundaries. There is evidence of garden escapes entering the reserves from adjoining properties. Co-operation between Council and residents is necessary for effective management of the reserve boundaries.

The boundary of the reserve is mostly well-defined by fencing and roadside verge. There are some un-fenced residential properties where it is difficult to assess the exact location of the reserve boundary.

Neighbours of the reserve will be encouraged to work with Council to assist in the regeneration and maintenance of the reserve and to inform Council of any illegal dumping of garden refuse or acts of vandalism which may occur.

References

ESP Ecological Surveys & Planning (1999) *Hornsby Shire Threatened Biota Conservation Plan*

Hornsby Shire Council (1999) *Hornsby Shire Local Environment Plan*

Margrit Koettig Archaeological Services (1996) *Hornsby Shire Aboriginal Heritage Study.*

Smith & Smith (1990) *Hornsby Shire Bushland Survey*

Webb, McKeown & Associates (1998) *Stormwater Catchment Management Plan - Waitara Creek*

ACTION PLAN

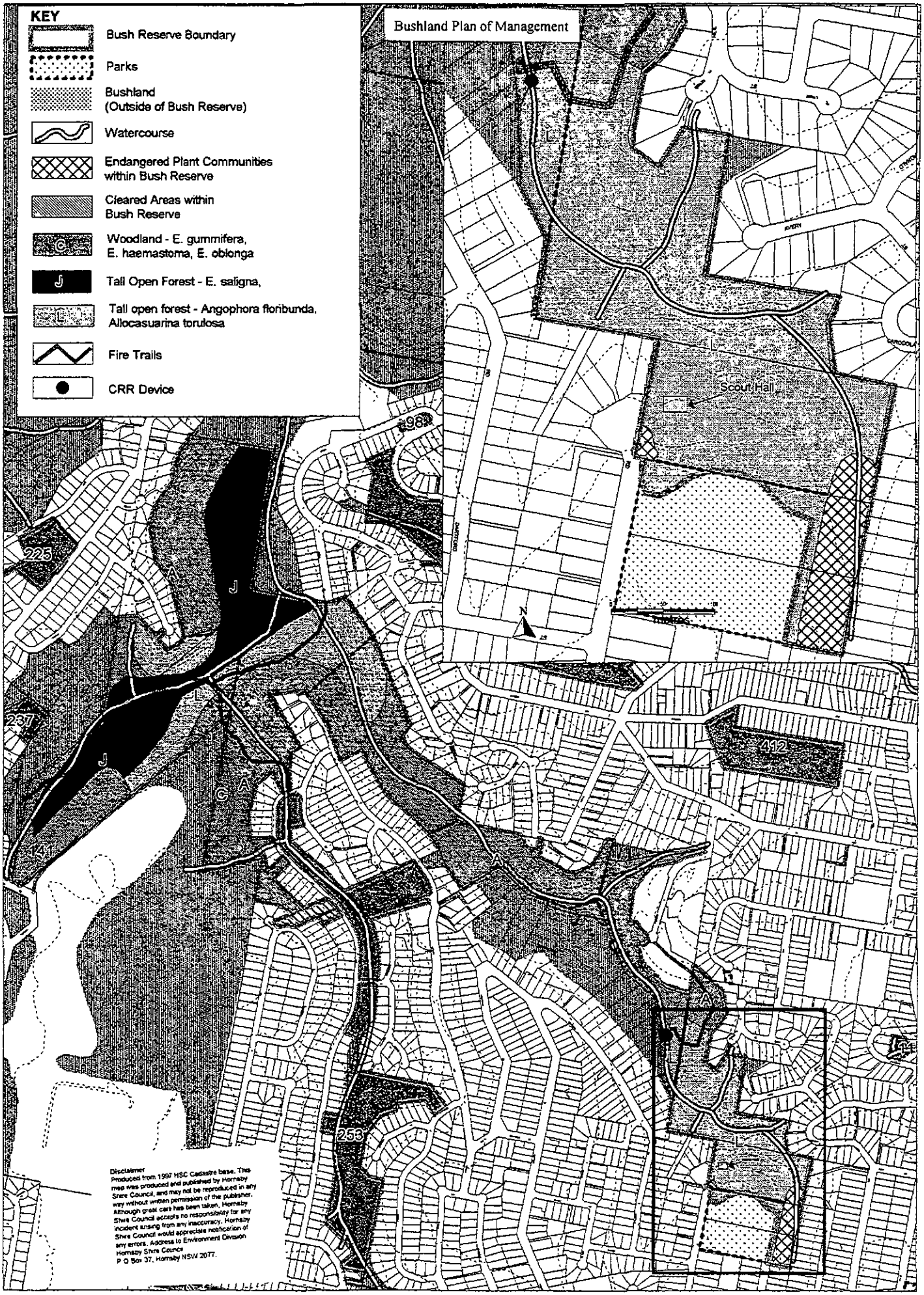
MANAGEMENT STATEMENT	ACTION	RESPONSIBILITY	TIMEFRAME	PERFORMANCE MEASURE
Weed Invasion, Bush Regeneration and Vegetation Management Formalised activities within the natural area will require a lease or licence agreement with Council.	Any granting of leases, licences or other estates must be consistent with the core objectives for bushland as set out in the Local Government Amendment (Community Land Management) Regulation 1998.	HSC / proponents	As required O	Any granting of a lease, licence or other estate for activities within the natural area are consistent with the Local Government Amendment (Community Land Management) Regulation 1998. Activities allowable in the bushland do not impact on the conservation of bushland.
Consideration is given to regeneration of bushland for any activity proposed for Waitara Creek Reserve to mitigate the degrading influences on the reserve.	Ensure that all activities are carried out with consideration of bushland protection and regeneration.	HSC	As required O	Protection of bushland
The Sydney Turpentine Ironbark Forest remnant is to be managed for nature conservation to protect this endangered ecological community.	Restrict activities in this area to bushland restoration and low impact scientific and educational use following full environmental assessment.	HSC	O	Activities in this area do not adversely affect bushland.
Areas affected by weed invasion within Waitara Creek Reserve are to be rehabilitated using appropriate regeneration techniques.	Restoration and regeneration to be undertaken where sufficient follow up weed control and bush regeneration can be guaranteed.	Bushland Manager	As funding permits	Bushland condition is improved and maintained.
	Continue existing bush regeneration contract works within Waitara Creek Reserve and the Waitara Creek / Dog Pound Creek catchment.	Bushland Manager	As funding permits	Bushland condition is improved and maintained

	Continue to support and provide training to the Bushcare Groups currently working in Waitara Creek Reserve and encourage further community involvement as part of Council's volunteer Bushcare Program.	Bushland Management Supervisor	O	Support for Bushcare Groups in Waitara Creek Reserve and further recruitment.
Indigenous species should be used wherever possible to rehabilitate degraded areas.	Any revegetation works within the Waitara Creek Reserve bushland site should be composed of locally occurring indigenous plants.	Bushland Management Supervisor	O	Locally indigenous plant material is utilised in rehabilitation and landscaping works.
Adequate funding for bushland restoration will assist in the conservation of Sydney Turpentine Ironbark Forest in Waitara Creek Reserve.	Seek additional funding from State and Federal Government sources for restoration of the area.	Bushland Manager	O As funding permits	Council receives financial grants
Hydrology / Water Quality Adequate control of stormwater and drainage from surrounding areas will assist in reducing negative impacts upon the bushland and contribute to the long-term conservation of Waitara Creek Reserve.	Investigate and implement any remediation strategies which will reduce the negative impacts of stormwater and urban runoff into Waitara Creek Reserve bushland area. Ensure that full environmental assessment of the impacts including threatened species assessment, is carried prior to any proposed stormwater and drainage mitigation activity.	Manager - Water Catchments Manager - Water Catchments	O/MT As required	Reduction in impacts from stormwater and drainage. Appropriate environmental assessment is carried out prior to any activity.

Water quality in Waitara Creek should meet ANZECC water quality guidelines for Aquatic Ecosystem health.	Investigate and implement measures necessary to improve water quality within a total catchment management program.	Manager - Water Catchments	MT	Acceptable water quality in Waitara Creek.
It is important for local landholders to be aware of activities that can impact the water quality in Waitara Creek catchment.	Encourage local landholders to minimise activities which may have a detrimental impact on the water quality of Waitara Creek	HSC/landholders	O	Acceptable water quality in Waitara Creek.
The CRR device should be regularly monitored and maintained to ensure it is operating effectively.	Ensure the litter basket is cleaned out on a regular basis as part of Council's maintenance program for all CRR devices.	Manager – Water Catchments	O	CRR device is well-maintained
Native and Introduced Fauna Native fauna habitat should be conserved and enhanced wherever feasible.	Maintain habitat and vegetation through a well-planned bush regeneration and habitat enhancement program. Maintain habitat by preventing removal of logs for firewood and the removal of bushrock.	Bushland Manager Bushland Manager	O/LT O	Protection and enhancement of native fauna habitat.
Consideration is given to native fauna and its habitat for any activity proposed for Waitara Creek Reserve.	Ensure fauna habitat needs are included in any proposal for restoration works within Waitara Creek Reserve.	Bushland Manager	O	Protection of fauna habitat
Control of domestic animals.	Encourage pet owners to control domestic cats and dogs through a public education campaign and by impoundment of free roaming dogs.	Bushland Manager /Environmental Surveillance Officer	O	Responsible pet ownership.

Fire Management Any fire management within Waitara Creek Reserve should be carried out in conjunction with bush regeneration works.	Any proposals for fire management in Waitara Creek Reserve are to be assessed by the Water Catchments Team.	Bushland Manager / Manager - Fire Control	O	Fire regime is maintained for the health of the bushland.
Recreation and Access Access to the natural area should be restricted to uses which will have minimal impact on the reserve's ecology.	Limit recreational activities in this area to passive recreational pursuits such as bushwalking, following full environmental assessment.	Bushland Manager	O	Recreational activities in this area do not adversely impact the bushland.
	Monitor recreational and educational uses of the reserve and their impact.	Bushland Manager	LT	
Use of informal trails through the natural area is to be discouraged wherever possible.	Unnecessary informal trails through the natural areas are to be closed, stabilised and revegetated using locally indigenous plant material.	Bushland Manager	LT	Any informal trails through the natural area are rehabilitated to an acceptable standard
	Investigate the feasibility of formalising the track from Normanhurst Park down to the firetrail near the end of Clovelly Road in Waitara Creek Reserve.	Bushland Manager	MT	Feasibility of formalising trail known.
	Investigate the feasibility of formalising the track from Warrigal Drive down to the firetrail near Dog Pound Creek.	Bushland Manager	MT	Feasibility of formalising trail known.
Any proposal for track use, works or construction in the natural area will need to consider impacts on bushland.	Any proposal for use and works regarding existing trails or construction of new trails in the natural area will be subject to full environmental assessment.	Bushland Manager	as required	Proposals for track works or construction in the natural area are subject to stringent environmental assessment.

Boundaries and Neighbours The mitigation of negative impacts from neighbouring properties is essential to the long-term conservation of Waitara Creek Reserve.	Encourage adjoining landholders to reduce any impacts such as illegal vegetation dumping and predation by domestic animals, and encourage involvement in Council's volunteer Bushcare Program.	Bushland Management Supervisor	O	Landscaped areas maintained. Protection of natural bushland areas.
	Encourage neighbours to create or maintain buffer zones of indigenous vegetation on private land adjoining the reserve.	Bushland Manager	O	Creation and maintenance of buffer zones which assist in protecting the reserve.
	Council will pursue the removal of private encroachments onto the reserve and require the restoration and regeneration of these areas.	Bushland Manager Environmental Surveillance Officer	As required LT	Reduction in encroachments.
Encourage a better understanding of the values and issues of the reserve with neighbouring landholders in an attempt to reduce encroachment into the bushland areas.	Address any encroachment issues promptly and within best management practices.	Bushland Manager	O	Reduction in encroachments into the reserve.
The boundary of the natural area should be well-defined to minimise the impact of any negative external influences.	Investigate methods for clearly defining the natural area such as signage, log barriers or fencing.	Bushland Manager /neighbouring landholders	LT	Natural area is well-defined



HORNSBY SHIRE COUNCIL

Hornsby Shire Council

Waitara Creek Reserve

(including Normanhurst Park & Dog Pound Creek)

March 15, 2000

0 100 200m

N

Ray Park
Draft Bushland Plan of Management

1.0 INTRODUCTION

This Draft Plan of Management for Ray Park has been developed by Hornsby Shire Council to comply with the Local Government Act (1993), which required Plans of Management to be adopted by Councils for all 'community' land by July, 1996. Ray Park is recognised as a significant area and this individual Plan of Management has been developed specifically for this reserve.

Hornsby Shire Council Local Environment Plan (LEP)
The current Hornsby Shire Local Environment Plan 1999 zones Ray Park as Open Space A (Public Recreation - Local).

SIGNIFICANCE OF THE RESERVE

Hornsby Shire's bushland reserves are an important feature of the Shire's natural character and beauty. Urban bushland areas throughout Hornsby Shire and the northern Sydney region contribute significantly to the scenic amenity and beauty of this area.

Urban bushland areas are important for the following reasons:

- They provide a 'green space' in the built environment, contributing to the scenic amenity of urban areas
- They provide important habitat for native fauna species which would otherwise move away from urban areas. Urban bushland can form part of important wildlife corridors which provide shelter, food and habitat for migratory and nomadic species
- They are an important scientific resource, providing a record of the original vegetation of the district.
- They are an important educational resource, and often the first point of contact with nature for many urban residents as well as a venue for formal education. They provide nearby schools and other educational institutions with natural areas which can be visited without the need for a formal excursion, and where it is feasible to carry out studies requiring repeat investigations.
- Urban bushland reserves provide recreational opportunities, enabling urban residents to undertake recreational pursuits in a bushland setting.

In addition to these general features, Ray Park has particular significance for the following reasons:

- Some of the bushland remnant present within Ray Park has been identified as Blue Gum High Forest, an Endangered Ecological Community protected under the Threatened Species Conservation Act (1995).
- The reserve contains a tributary of Devlins Creek, part of the larger Lane Cove River Catchment.
- The Park is popular with local residents for passive recreational pursuits.

**NB: Under Section 56 of the Threatened Species Conservation Act (1995), the Director-General of the National Parks and Wildlife Service, is required to "prepare a recovery plan for each endangered or vulnerable species, population and ecological community, as soon as practicable after it is listed in Schedule 1 of the Act, to promote the recovery of the species, population or ecological community to a position of viability in nature".

Once a Recovery Plan has been prepared for Blue Gum High Forest, this Plan of Management will be reviewed to ensure it is consistent with the Recovery Plan.

RESERVE DESCRIPTION

Ray Park is located on Plympton Road, Beecroft, and contains a tributary of Devlins Creek. It occupies an area of approximately 5.72 hectares with the bushland area comprising approximately 2.1 hectares. The reserve is in two parts, to the north and south of Plympton Road.

The northern part of the reserve is bounded by Orchard Road to the west, Bambara Crescent to the north, Calool Road to the east and Plympton Road to the south. This part of the reserve is mainly park with a scout hall located near the Plympton Road verge. Remnant bushland is located along a thin strip adjacent the creekline, consisting of remnant trees and some patchy native understorey.

The bushland area to the south of Plympton Road is bounded by Avonlea Drive in the west, Ridge Street to the south-east and Plympton

Road to the north. This area contains the formalised Ray Park and consists of park areas with a playing field, playground and picnic area and a natural area following the creeklines.

Both parts of the reserve are relatively small and linear in shape. Although not directly connected to adjacent bushland, the reserve forms part of a corridor along this tributary of Devlins Creek. The corridor although relatively contiguous along the creekline, is separated intermittently by roads. The linear shape of the reserve means that it has a high edge to area ratio, making it vulnerable to external influences especially weed propagules and pest animal predation.

This Plan of Management refers to the two parcels of land described above. The remainder of the bushland within the corridor is managed according to the Draft Bushland (Natural Areas) Plan of Management (2000).

Land Tenure

Ray Park is identified as a Public Reserve, Lot PT2 DP 500461, Lot 30 DP 218981, Lot 12 DP 237797, Lot 44 DP 218737, Lot 100 & 102 DP 831310, with the area north of Plympton Road being Lot 134 DP 203054, owned and managed by Hornsby Shire Council. A lease currently affects the scout hall building contained within Lot 134 DP 203054. Given the nature of the reserve it is unlikely that any further leases or licenses will arise, however any proposals should be considered on their merit and in consideration of how they meet the objectives of this plan.

Topography

The reserve is located on a gentle slope to the east of Pennant Hills Road which follows the main ridgetop through much of south-west of the Hornsby Shire. Within the reserve, the landscape is gently sloping to the east / north-east from Orchard Road and Avonlea Drive.

Geology and soils

The soils present within Ray Park are primarily clay soils derived from Wianamatta Shale. "Naturally vegetated shale landscapes are now very rare due to their preferential settlement through forestry, agriculture and later urbanisation" (*EPS Ecological Surveys and Planning, 1999*).

Hydrology

The watercourse present within the reserve is a tributary of Devlins Creek, traversing close to the full length of the reserve. This Creek flows through Beecroft residential area, community parkland and bushland downstream to Beecroft Reserve / Cheltenham Park where it flows through community bushland and eventually adjoins the Lane Cove River in Lane Cove National Park.

The present hydrological regime in the reserve is a result of the surrounding urban development as well as the development higher in the catchment.

Generally, the stormwater flows during rains events are increased by development which increases the amount of impervious surfaces within a catchment. Water runs off these surfaces more rapidly leading to increased peak flows and lower dry weather flows.

Water Quality

Catchments such as the Devlins Creek Catchment with significant urban development can generate significant pollution including nutrients, suspended solids, metals, bacteria and chemical pollution, seriously affecting the quality of receiving waters.

Sampling occurs in the tributary that runs through the reserve. Water quality monitoring has been occurring at this site since November 1999. Sampling has occurred on a fortnightly basis. As such there are only five data points available at this stage and all sampling has occurred during dry weather. The creek in this vicinity is very overgrown with weeds which would provide organic matter to the creek in a different way to the natural environment.

Based on these results the following variables are within the ANZECC (1992) guidelines for the protection of aquatic ecosystem health – pH, conductivity, salinity, oxidised nitrogen, total nitrogen, total phosphorus, and suspended solids. Due to the low flows experienced during the sampling period and the high levels of organic matter observed in the creek the concentration and saturation of dissolved oxygen was low on all sampling occasions. These low levels are potentially detrimental to the health of the aquatic ecosystem but it must be noted that dissolved oxygen works on a diurnal cycle.

The concentration of ammonia exceeded the ANZECC (1992) guidelines for the protection of aquatic ecosystems on all but one sampling occasion. The lower oxygen concentrations and abundance of organic matter present at this site would play an important role in the conversion of organic nitrogen to ammonia during the decay process of the organic matter.

On two sampling occasions the faecal coliform level exceeded the guidelines for primary contact recreation. These levels indicate faecal pollution which may be of human or animal

origin. During dry weather, these faecal contamination levels are more probably from animals rather than sewer overflows or leaks.

Catchments such as the Devlins Creek Catchment with significant urban development can generate significant pollution including nutrients, suspended solids, metals, bacteria and chemical pollution, seriously affecting the quality of receiving waters.

Flora

Vegetation

Ray Park was surveyed during November 1999 to determine the nature and distribution of plant communities, it's habitat value and the nature and intensity of weed invasion. The plant community present in Ray Park can be described as Community K: *Eucalyptus pilularis - E.saligna - E.paniculata* Tall Open-forest as described in the *Hornsby Shire Bushland Survey* (Smith & Smith 1990). This vegetation community was described then as under-represented in the Shire.

Significant flora

The vegetation of Ray Park has been previously documented in the *Hornsby Shire Threatened Biota Conservation Plan* (ESP Ecological Surveys & Planning 1999) and has been identified as Blue Gum High Forest, an endangered ecological community listed in Schedule 1 of the Threatened Species Conservation Act (1995).

There has been no comprehensive flora list compiled for this reserve, however the species present are consistent with the species listed as comprising the characteristic assemblage for Blue Gum High Forest in Schedule 1 of the Threatened Species Conservation Act (1995).

Vegetation condition

The vegetation in the bushland area suffers from varying degrees of degradation and can be described as having an overall rating of poor as per Smith & Smith (1990).

Fauna

Common species such as possums, lizards and snakes are likely to visit the reserve. The avifauna of the reserve is likely to be typical of Shale and open forest habitats, though diversity may have declined due to surrounding residential development and domestic pet and feral animal predation.

Fauna activity may have also declined due to the fact that it is an isolated parcel of bushland, not forming part of a continuous bushland corridor, this high edge to area ratio increases the susceptibility of resident native fauna to impacts such as predation. Further investigation would be required to ascertain whether the reserve is still important for certain native fauna species.

There have been no fauna surveys undertaken within this reserve.

Significant fauna

There are no significant fauna species recorded as being present in this reserve.

Aboriginal and European Heritage Sites

It is likely that the Aboriginal people of the Walumeda group were the original inhabitants of the reserve and surrounding area. There are no records of heritage items of Aboriginal significance in the reserve, (*Koettig 1996*) and due to the nature and disturbance of the reserve, none would be expected.

There are no records of heritage items of European significance in the reserve (*Hornsby Shire Council LEP, 1999*). A survey of the reserve could be undertaken as part of any review of the heritage study.

2.0 MANAGEMENT ISSUES AND STRATEGIES

Weed invasion, Bush regeneration and Vegetation Management

Ray Park is affected by moderate to severe weed invasion. These weeds compete with the native species leading to simplification of the bushland's ecology and loss of biodiversity.

The bushland in the reserve north of Plympton Road is a thin, degraded strip along the creekline. There are some canopy trees and small patches of native understorey. Weed infestation is severe and resilience is likely to be medium to low currently and will decline further in the future as weeds become more established, modifying the vegetation structure.

The majority of the canopy in the bushland south of Plympton Road is intact but weed infestation is severe in patches through the understorey. Weed infestation is particularly severe in the upstream area of the tributary entering the reserve from Lyndelle Place. Resilience is likely to be medium to high currently but will decline in the future as weeds become more established modifying the vegetation structure. The weeds present are a result of impacts of the adjoining landuses including formalised parks and gardens, medium and low density residential development and sporting ovals.

The main weed species include Wandering Jew (*Tradescantia albiflora*), Privet (*Ligustrum lucidum* and *Ligustrum sinense*), Camphor

Laurel (*Cinnamomum camphora*), Ehrharta (*Ehrharta erecta*), *Cyperus eragrostis*, Morning Glory (*Ipomea indica*), Turkey Rhubarb (*Acetosa sagittata*), Wild Tobacco (*Solanum mauritianum*), Kikuyu (*Pennisetum clandestina*), Crofton Weed (*Ageratina adenophora*), Cape Ivy (*Senecio mikaniodes*), Black-eyed Susan (*Thunbergia alata*), Elephants Ears (*Alocasia macrorhiza),* Willow (*Salix sp.*), Bamboo (*Bambusa sp.*) and Honeysuckle (*Lonicera japonica*).

Weed invasion has been identified as a significant threat to the survival of Blue Gum High Forest (*ESP Ecological Surveys & Planning, 1999*). This weed invasion should be addressed as part of the overall management of the reserve.

An integrated program of herbicide use as well as manual weed removal is needed and should be done so in co-ordination with any park maintenance or future upgrading of the site as resources become available for the Reserve.

The Bambara Bushcare Group is currently carrying out bush regeneration works in the bushland area north of Plympton Road. Their work has mainly concentrated on bushland further downstream, not covered by this plan of management. They have been regenerating the reserve for the past two years as part of Council's volunteer Bushcare Program. More recently, they have carried out some restoration works in this reserve Lot 134 DP 203054, in the vicinity of the scout hall.

Hydrology

The watercourse present within the reserve is a tributary of Devlins Creek. The creek traverses the full length of the reserve. This Creek flows through West Pennant Hills residential area and community and crown bushland and flows into Berowra Valley Regional Park on the northern side of Boundary Road.

The present hydrological regime in the reserve is a result of the surrounding urban development as well as the development higher in the catchment.

Generally, the stormwater flows during rains events are increased by development which increases the amount of impervious surfaces within a catchment. Water runs off these surfaces more rapidly leading to increased peak flows and lower dry weather flows.

Hydrology / Water Quality

In established urban catchments such as the Devlins Creek catchment, nutrient levels are expected to be elevated as a result of impacts such as road runoff and sewer leaks. Sewer lines run through the entire length of the reserve. The presence of high nutrient concentrations provide ideal conditions for weed growth, giving these exotic plants a competitive advantage over native species. This can have significant impacts, inhibiting regeneration of the native plant community, thus threatening its long-term survival.

This upper part of the Devlins Creek catchment is a developed residential catchment. The urbanisation of the catchment has resulted in fairly high flows with evidence of scouring in parts of the creekline. There is moderate erosion in some sections with little diversity of instream habitat types mainly as a result of the presence of only one or two exotic riparian species. With gradual restoration of the natural riparian revegetation, the habitat value of the reserve will increase.

Water Quality

In urbanised catchments such as the Devlins Creek catchment, nutrient levels are expected to be elevated. The presence of high nutrient concentrations provide ideal conditions for weed growth, giving these exotic plants a competitive advantage over native species. This can have significant impacts, inhibiting regeneration of the native plant community, thus threatening its long-term survival.

A project involving the construction of a small wetland and pond system within the reserve is to be carried out in 2000 as part of Council's Catchment Remediation Rate Program. The project area covers the riparian area in the reserve north of Plympton Road, between the walkway from Bambara Crescent down to the western corner of Lot 106 DP 203054. This project aims to assist in reducing the velocity of flows through the creek to minimise erosion, reduce the amount of sediment being carried on downstream, filter pollutants to improve water quality whilst at the same time restoring this part of the creekline by removing noxious and environmental weeds currently inhabiting the riparian zone and replacing them with native species.

Native and Introduced Fauna

Although there has been no formal fauna survey of Ray Park, it is still likely that native fauna species frequent the reserve and some may even reside there. Even the degraded, weedy areas can still provide some habitat and protection for native fauna species. Any restoration works undertaken in this reserve should consider that thickets of weeds can be temporary homes for native fauna until their natural habitat can be restored. Any primary clearing of weeds should be carried out

gradually, so as refuge areas remain for native animals to utilise.

The high edge to area ratio of the reserve and the presence of cats and dogs in the surrounding residential area constitutes a significant threat to native wildlife. Public education on the protection of native fauna in the area would be useful to make surrounding landholders aware of possible faunal activity in the reserve and their protection under the National Parks and Wildlife Act (1974) and the Threatened Species Conservation Act (1995).

Fire Regime

Urban bushland fire management needs to consider the ecological needs of the bushland as well as the risk posed by wildfires to life and property. Fire management in urban bushland reserves should aim to minimise hazard to life and property whilst conserving ecological values of the reserve.

Due to the narrow area of this riparian reserve it is unlikely that any hazard reduction work would be required. Any proposals for hazard reduction burns should be carried out in conjunction with regeneration of the bushland for the benefit of native vegetation management.

Recreation and Access

Due to large parkland area within the reserve there is plenty of access from the surrounding residential area. There are no formalised bushwalking trails present in the reserve north of Plympton Road. A formalised trail does exist in the reserve south of Plympton Road, from the playground / picnic area of Ray Park through the natural area to the playing field. There are also some smaller informal tracks through the natural area.

Due to the presence of the endangered ecological community, limited access considerations are needed to prevent the damage caused by informal tracks and trails. Access needs to be restricted to uses which will have minimal impact on the ecology of the bushland area.

Boundaries and Neighbours

Ray Park has a high edge to area ratio increasing its susceptibility to adverse external influences from the boundaries. Co-operation between Council, residents and the Bambara Bushcare Group is necessary for effective management of the reserve boundaries.

The boundary of the reserve is mostly well-defined by fencing and roadside verge although there are some unfenced private yards where it is difficult to ascertain the boundary. The boundary of the natural area and park is reasonably well-defined by mowing of the cleared area, however, more clearly defining the boundary would assist maintenance staff and ensure that any clearing of the natural area is prevented.

Neighbours of the reserve will be encouraged to work with Council to assist in the regeneration and maintenance of the reserve and to inform Council of any illegal dumping of garden refuse or acts of vandalism which may occur.

References

Smith & Smith (1990) *Hornsby Shire Bushland Survey*

ESP Ecological Surveys & Planning (1999) *Hornsby Shire Threatened Biota Conservation Plan*

Hornsby Shire Council (1999) *Hornsby Shire Local Environment Plan*

Margrit Koettig Archaeological Services (1996) *Hornsby Shire Aboriginal Heritage Study*

Hornsby Shire Council (1999) *Water Quality Monitoring Program, Annual Report 1998.*

3.0 ACTION PLAN

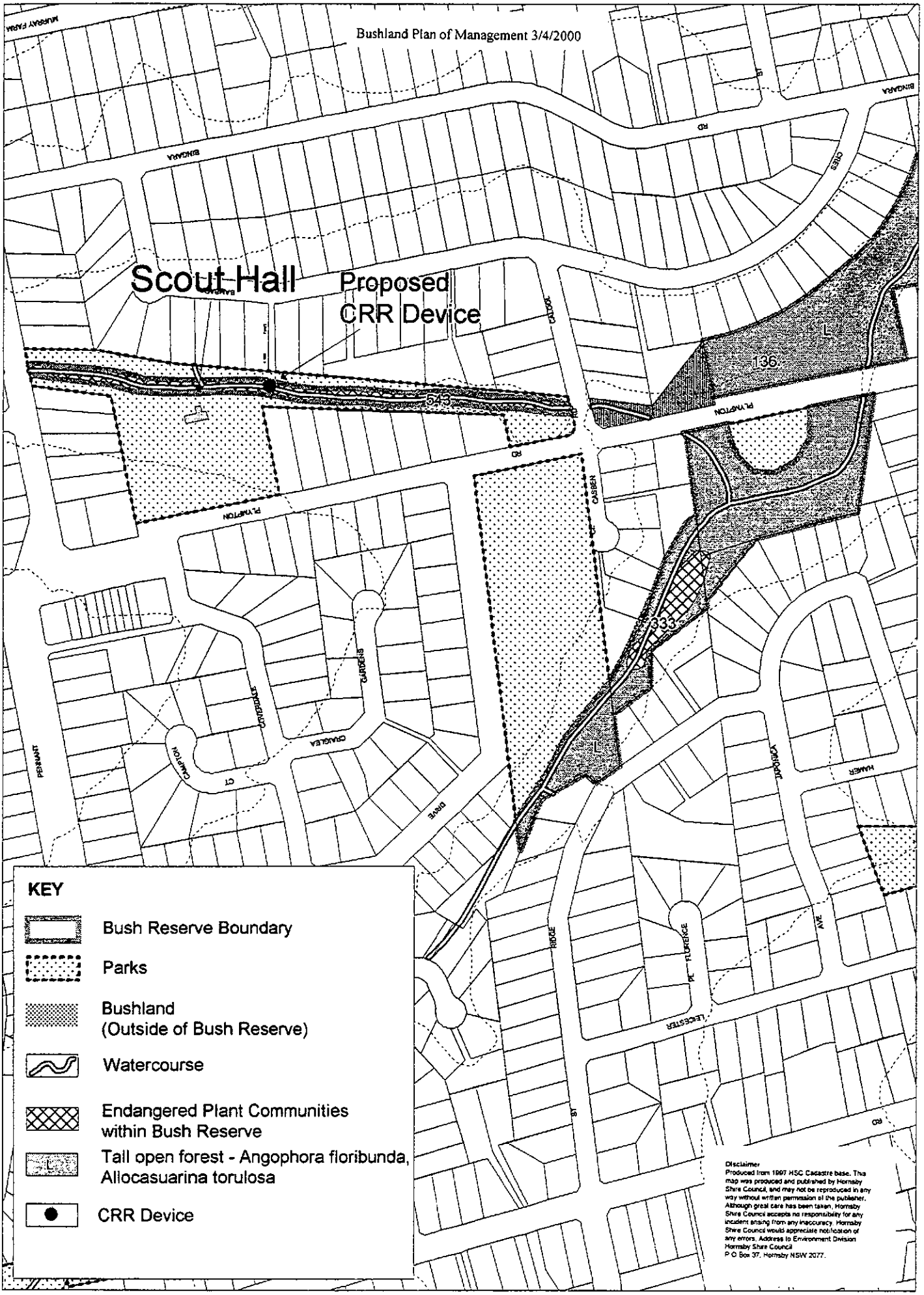
MANAGEMENT STATEMENT	ACTION	RESPONSIBILITY	TIMEFRAME	PERFORMANCE MEASURE
Weed Invasion, Bush Regeneration and Vegetation Management Formalised activities within the natural area will require a lease or licence agreement with Council.	Any granting of leases, licences or other estates must be consistent with the core objectives for bushland as set out in the Local Government Amendment (Community Land Management) Regulation (1998).	HSC / proponents	As required O	Any granting of a lease, licence or other estate for activities within the natural area are consistent with the Local Government Amendment (Community Land Management) Regulation (1998). Activities allowable in the bushland do not impact on the conservation of bushland.
Consideration is given to regeneration of bushland for any activity proposed for Ray Park to mitigate the degrading influences on the Park.	Ensure that all activities are carried out with consideration of bushland protection and regeneration.	HSC/proponents	As required O	Protection of bushland
The Blue Gum High Forest remnant is to be managed for nature conservation to protect this endangered ecological community.	Restrict activities in this area to bushland restoration and low impact scientific and educational use following full environmental assessment.	Bushland Manager	O	Activities in this area do not adversely impact the bushland.
Areas affected by weed invasion within Ray Park are to be rehabilitated using appropriate regeneration techniques.	Restoration and regeneration to be undertaken in areas affected by weed invasion.	Bushland Manager	As funding permits	Bushland condition is improved and maintained.
	Primary bush regeneration works should only be undertaken where sufficient follow up weed control and bush regeneration can be guaranteed.	Bushland Manager	As funding permits	Bushland condition is improved and maintained

	Continue to support and provide training to the Bushcare Group currently working in within Ray Park and encourage further community involvement as part of Council's volunteer Bushcare Program.	Bushland Management Supervisor	O	Support for Bushcare Group in Ray Park and further recruitment.
Indigenous species should be used wherever possible to rehabilitate degraded areas.	Any revegetation works within the Ray Park bushland site should be composed of locally occurring indigenous plants.	Bushland Management Supervisor	O	Locally indigenous plant material is utilised in rehabilitation and landscaping works.
Adequate funding for bushland restoration will assist in the conservation of Blue Gum High Forest in Ray Park.	Seek additional funding from State and Federal Government sources for restoration of the area.	Bushland Manager	O As funding permits	Council receives financial grants
Hydrology / Water Quality				
Adequate control of stormwater and drainage from surrounding areas will assist in reducing negative impacts upon the bushland and contribute to the long-term conservation of Ray Park.	Investigate and implement any remediation strategies which will reduce the negative impacts of stormwater and urban runoff into Ray Park bushland area.	Manager - Water Catchments	O	Reduction in impacts from stormwater and drainage.
	Ensure that full environmental assessment of the impacts including threatened species assessment, is carried out prior to any proposed stormwater and drainage mitigation activity	Manager - Water Catchments	As required	

Water quality in Devlins Creek should meet ANZECC water quality guidelines for Aquatic Ecosystem health.	Investigate and implement measures necessary to improve water quality within a total catchment management program.	Manager - Water Catchments	MT	Acceptable water quality in Devlins Creek.
	Ensure the constructed wetland and pond system is well-constructed and maintained consistent with best management practices.	CRR Project Manager	ST / O	CRR wetland and ponds are constructed to a high standard and well-maintained.
Native and Introduced Fauna				
Native fauna habitat should be conserved and enhanced wherever feasible.	Maintain habitat and vegetation through a well-planned bush regeneration and habitat enhancement program.	Bushland Manager	O/MT	Protection and enhancement of native fauna habitat.
	Maintain habitat by preventing removal of logs for firewood and the removal of bushrock.	Bushland Manager	O	
Consideration is given to native fauna and its habitat for any activity proposed for Ray Park.	Ensure fauna habitat needs are included in any proposal for restoration works within Ray Park.	Bushland Manager	O	Protection of fauna habitat
Control of domestic animals.	Encourage pet owners to control domestic cats and dogs through a public education campaign and by impoundment of free roaming dogs.	Bushland Manager /Environmental Surveillance Officer	O	Responsible pet ownership.
Fire Management				
Any fire management within Ray Park should be carried out in conjunction with bush regeneration works.	Any proposals for fire management in Ray Park are to be assessed by the Water Catchments Team	Bushland Manager / Manager - Fire Control	O	Fire regime is maintained for the health of the bushland.

Recreation and Access Access should be restricted to uses which will have minimal impact on the reserve's ecology.	Limit recreational activities in this area to passive recreational pursuits such as bushwalking, following full environmental assessment. Monitor recreational and educational uses of the reserve and their impact.	Bushland Manager Bushland Manager	O LT	Recreational activities in this area do not adversely impact the bushland.
Use of informal trails through the natural area is to be discouraged wherever possible.	Unnecessary informal trails through the natural areas are to be closed, stabilised and revegetated using locally indigenous plant material	Bushland Manager	ST	Any informal trails through the natural area are rehabilitated to an acceptable standard
Any proposal for track use, works or construction in the natural area will need to consider impacts on bushland.	Any proposal for use and works regarding existing trails or construction of new trails in the natural area will be subject to full environmental assessment.	Bushland Manager	as required	Proposals for track works or construction in the natural area are subject to stringent environmental assessment.

Boundaries and Neighbours The mitigation of negative impacts from neighbouring properties is essential to the long-term conservation of Ray Park.	Encourage adjoining landholders to reduce any impacts such as illegal vegetation dumping and predation by domestic animals, and encourage involvement in Council's volunteer Bushcare Program.	Bushland Management Supervisor	O	Landscaped areas maintained. Protection of natural bushland areas.
	Encourage neighbours to create or maintain buffer zones of indigenous vegetation on private land adjoining the reserve.	Bushland Manager	O	Creation and maintenance of buffer zones which assist in protecting the reserve.
	Council will pursue the removal of private encroachments onto the reserve and require the restoration and regeneration of these areas.	Bushland Manager	As required MT	Reduction in encroachments.
The reserve boundaries should be well-defined and maintained to minimise the impact of any negative external influences.	Ensure that the boundary of the reserve is well-maintained.	Bushland Manager /Private property owners	LT	Natural area is well-defined. Boundaries maintained.



HORNSBY SHIRE COUNCIL

Hornsby Shire Council

Ray Park

Bush Reserve

March 1, 2000

0 100 200m

N

Walumeda Reserve
Draft Bushland Plan of Management

INTRODUCTION

This Draft Plan of Management for Walumeda Reserve has been developed by Hornsby Shire Council to comply with the Local Government Act (1993), which requires Plans of Management to be adopted by Councils for all 'community' land by July, 1996. Wallumeda Reserve is recognised as a significant area and this individual Plan of Management has been developed specifically for this reserve.

Hornsby Shire Council Local Environment Plan (LEP)
The current Hornsby Shire Local Environment Plan (1999) zones Walumeda Reserve as Open Space A (Public Recreation - Local).

SIGNIFICANCE OF THE RESERVE

Hornsby Shire's bushland reserves are an important feature of the Shire's natural character and beauty. Urban bushland areas throughout Hornsby Shire and the northern Sydney region contribute significantly to the scenic amenity and beauty of this area.

Urban bushland areas are important for the following reasons:

- They provide a 'green space' in the built environment, contributing to the scenic amenity of urban areas
- They provide important habitat for native fauna species which would otherwise move away from urban areas. Urban bushland can form part of important wildlife corridors which provide shelter, food and habitat for migratory and nomadic species
- They are an important scientific resource, providing a record of the original vegetation of the district.
- They are an important educational resource, and often the first point of contact with nature for many urban residents as well as a venue for formal education. They provide nearby schools and other educational institutions with natural areas which can be visited without the need for a formal excursion, and where it is feasible to carry out studies requiring repeat investigations.
- Urban bushland provide recreational opportunities, enabling urban residents to undertake recreational pursuits in a bushland setting.

In addition to these general features, Walumeda Reserve has particular significance for the following reasons:

- The bushland remnant present within Walumeda Reserve has been identified as Blue Gum High Forest, an Endangered Ecological Community protected under the Threatened Species Conservation Act (1995).
- The reserve contains the headwaters of Berowra Creek, a contiguous vegetated corridor and part of the larger Berowra Creek Catchment.

**NB: Under Section 56 of the Threatened Species Conservation Act (1995), the Director-General of the National Parks and Wildlife Service, is required to "prepare a recovery plan for each endangered or vulnerable species, population and ecological community, as soon as practicable after it is listed in Schedule 1 of the Act, to promote the recovery of the species, population or ecological community to a position of viability in nature".

Once a Recovery Plan has been prepared for Blue Gum High Forest, this Plan of Management will be reviewed to ensure it is consistent with the Recovery Plan.

RESERVE DESCRIPTION

Walumeda Reserve is a riparian reserve located along Berowra Creek between John Savage Crescent and Boundary Road, West Pennant Hills. The reserve contains bushland, wetland and park area with playground. It occupies an area of approximately 3.84 hectares with natural area comprising approximately 27.8 hectares of the total area. It is surrounded by residential properties and roadside verge.

Boundary and Cherrybrook Roads form the northern boundary whilst residences in John Savage Crescent and Chelsea Road form the southern boundary. The reserve is bordered along each side by residential properties. The entire wetland area is contained within Crown land. The Crown land area will also be managed in accordance with this plan of management.

The reserve is part of an almost contiguous riparian bushland corridor along Berowra

Creek downstream into Berowra Valley Regional Park. Boundary Road separates the reserve from Berowra Valley Regional Park.

The reserve is linear and irregular in shape with a high edge to area ratio, making it vulnerable to external influences especially weed propagules and pest animal predation. Further downstream in Berowra Valley Regional Park, impacts from external influences are likely to be significantly reduced.

Land Tenure

Walumeda Reserve is identified as a Public Reserve, Lot 26 DP 220781, Lot 2 DP 605749 and Lot 16 DP 212664, owned and managed by Hornsby Shire Council. Lot 177 DP 752053 is a Crown Reserve owned by the Department of Land and Water Conservation, under care control and management of Hornsby Shire Council. No leases or licenses currently affect the land. Given the nature of the reserve it is unlikely that any leases or licenses will arise, however any proposals should be considered on their merit and in consideration of how they meet the objectives of this plan.

Topography

The reserve is located on a gentle slope to the north east of Castle Hill Road, which forms part of the south-western boundary of the shire. Within the reserve, the landscape is relatively flat to gently sloping to the north, following the creekline downstream from Verney Drive.

Geology and soils

The soils present within Walumeda Reserve are primarily clay soils derived from Wianamatta Shale. "Naturally vegetated shale landscapes are now very rare due to their preferential settlement through forestry, agriculture and later urbanisation" (*EPS Ecological Surveys and Planning, 1999*).

Hydrology

The watercourse present within the reserve is Berowra Creek. The creek traverses the full length of the reserve. This Creek flows through West Pennant Hills residential area and community and crown bushland and flows into Berowra Valley Regional Park on the northern side of Boundary Road.

The present hydrological regime in the reserve is a result of the surrounding urban development as well as the development higher in the catchment.

Generally, the stormwater flows during rains events are increased by development which increases the amount of impervious surfaces within a catchment. Water runs off these surfaces more rapidly leading to increased peak flows and lower dry weather flows.

Creek restoration works have been carried out in the upstream part of the reserve as part of the Environment Division's Catchment Remediation Program and the Works Division's Drainage Improvement Program.

Water Quality

Catchments such as the Berowra Creek Catchment with significant urban, industrial or agricultural development can generate significant pollution including nutrients, suspended solids, metals, bacteria and chemical pollution, seriously affecting the quality of receiving waters.

The wetland was constructed in 1997 in an attempt to capture nutrients/pollutants and sediments and prevent them from spreading further downstream into Berowra Valley Regional Park. A study entitled "*Survey of Macroinvertebrate Fauna in Berowra Creek, Cherrybrook*" was carried out in 1996 by the Australian Museum for Hornsby Council. This study occurred prior to the construction of the wetland with two sites upstream from the wetland site and four sites downstream. "The results from the survey indicate that the macroinvertebrate communities in the creek are similar in composition and predominantly consist of pollution/disturbance tolerant species". A further study will be carried out within the next few years to compare results from the 1996 survey.

Sampling has been carried out at two sites within this reserve as part of Council's Water Quality Monitoring Program. Site 50 is located in Berowra Creek, 100 metres upstream of the constructed wetland and Site 75 is located in Berowra Creek, directly below the wetland, above Boundary Road.

Site 50:

Sampling has been carried out at this site since 1996.

Physical indicators have been ranked as 'fair', chemical indicators were ranked as 'very poor' and secondary contact recreation has been ranked as 'poor' with high levels of faecal coliforms indicating sewage intrusion into the creek.

There has been a significant increase in the concentration of total phosphorus since sampling began at this site. There has been a significant increase in the concentration of oxidised and total nitrogen . This increase may be due to more rain which increases runoff and sewer leaks in the area.

Turbidity, total phosphorus, faecal coliforms, oxidised nitrogen, ammonia and suspended solids are all significantly greater in wet weather than dry weather. Both salinity and conductivity are significantly lower in wet weather than dry weather (*Hornsby Shire Council, June 1999*).

Site 75:

Sampling began at this site in 1998. Once the wetland is stabilised there will be greater improvements in water quality detected.

Physical indicators were ranked as 'very poor', chemical indicators have been ranked as 'very poor', primary contact recreation has been ranked as 'very poor' and secondary contact recreation has been ranked as 'poor' with high turbidity and faecal coliform levels (*Hornsby Shire Council, June 1999*).

Flora

Vegetation

Walumeda Reserve was surveyed during November 1999 to determine the nature and distribution of plant communities, it's habitat value and the nature and intensity of weed invasion. The plant community present in Walumeda Reserve can be described as Community J: *Eucalyptus saligna* Tall Open-forest as described in the *Hornsby Shire Bushland Survey* (Smith & Smith 1990). This vegetation community was described then as under-represented in the Shire.

Significant flora

The vegetation of Walumeda Reserve has been previously documented in the *Hornsby Shire Threatened Biota Conservation Plan* (ESP Ecological Surveys & Planning 1999) and has been identified as Blue Gum High Forest, an endangered ecological community listed under Schedule 1 of the Threatened Species Conservation Act (1995).

There has been no comprehensive flora list compiled for this reserve, however the species present are consistent with the species listed as comprising the characteristic assemblage for Blue Gum High Forest in Schedule 1 of the Threatened Species Conservation Act (1995).

Vegetation condition

The vegetation in the bushland area suffers from varying degrees of degradation and can be described as having an overall rating of poor as per Smith & Smith (1990).

Fauna

Walumeda Reserve contains a diversity of habitat as the bushland and wetland vegetation has complex structural diversity. Common species such as possums, lizards and snakes are likely to visit the reserve. The avifauna of the reserve is likely to be typical of Shale and open forest habitats, though diversity may have declined due to surrounding residential development and domestic pet and feral animal predation.

The remnant contains stands of tall, mature eucalypts, favouring habitation by larger predatory birds, however there are some areas where exotic scramblers such as Blackberry, are thick in the understorey providing suitable habitat for smaller birds. The permanent creekline is likely to attract various frog species, small fish and insects. The bushland forms an important habitat type and is integral to the Berowra Creek corridor.

The wetland area supports a variety of macroinvertebrates and other aquatic wildlife. A variety of frog species also inhabit the area. Insect life abounds in the wetland providing an important food resource for insect-eating wildlife (*Australian Museum Business Services, 1996*).

Further investigation would be required to ascertain whether the reserve is still important for certain native fauna species. For a reserve so small in size, there are a diversity of habitats present which would indicate the potential for a diverse range of species to inhabit the reserve.

Significant fauna

There are no significant fauna species recorded as being present in this reserve.

Aboriginal and European Heritage Sites

It is likely that the Aboriginal people of the Dharug group were the original inhabitants of the reserve and surrounding area. There are no records of heritage items of Aboriginal significance in the reserve, (*Koettig 1996*) and due to the nature and disturbance of the reserve, none would be expected.

Part of the reserve, Lot 16 DP 212664 has been listed as a heritage item of local significance in the *Hornsby Shire Council LEP (1999)*. A survey of the reserve could be undertaken as part of any review of the heritage study to identify any other items of heritage significance.

2.0 MANAGEMENT ISSUES AND STRATEGIES

Weed invasion, Bush regeneration and Vegetation Management

Walumeda Reserve is affected by moderate to severe weed invasion. These weeds compete

with the native species leading to simplification of the bushland's ecology and loss of biodiversity.

The majority of the canopy is intact but weed infestation is severe in patches through the understorey particularly along the creekline and boundaries with residential properties. Resilience is likely to be medium to high currently but will decline in the future as weeds become more established modifying the vegetation structure. The weeds present are a result of impacts of the adjoining landuses including formalised parks and gardens and medium and low density residential development.

The reserve narrows near the playground area to a riparian remnant with some recent revegetation works having been carried out. The boundary between the revegetation area and the grassed park area needs to be well-defined and maintained, as exotic grasses are beginning to creep in to the planted area.

The main weed species include Privet (*Ligustrum lucidum* and *Ligustrum sinense*), Wandering Jew (*Tradescantia albiflora*), Bamboo (*Bambusa sp.*), Willow (*Salix sp.*), Madeira Vine (*Anredera cordifolia*), Castor Oil Plant (*Ricinus communis*), Lantana (*Lantana camara*), Ginger (*Hedychium gardnerianum*), Erharta (*Ehrharta erecta*), Banana (*Musa paradisiaca*), Cassia (*Senna pendula*), Coral Tree (*Erythrina sykesii*), Jasmine (*Jasminum polyanthum*), Camphor Laurel (*Cinnamomum camphora*), Arundo (*Arundo donax*) and Wild Tobacco (*Solanum mauritianum*).

Other weed species present include Acer (*Acer negundo*), Elephant's Ear (*Alocasia macrorhiza*), Crofton Weed (*Ageratina adenophora*), Paddy's Lucerne (*Sida rhombifolia*), Barnyard Grass (*Echinochloa crus-galli*), Buttercup (*Ranunculus repens*), Cape Ivy (*Senecio mikaniodes*), Mist Flower (*Ageratina riparia*), Summer Grass (*Digitaria sanguinalis*), Kikuyu (*Pennisetum clandestinum*) and Fleabane (*Conyza bonariensis*).

Cyperus eragrostis and Arrowhead (*Saggitaria graminea*) are the main exotic species present within the wetland area. These species are currently important for filtering of nutrients. Treatment of these weed species will have to consider their role in nutrient uptake and ensure that native species are able to recolonise these areas or that enhancement planting takes place.

Weed invasion has been identified as a significant threat to the survival of Blue Gum High Forest (*ESP Ecological Surveys & Planning, 1999*). This weed invasion should be addressed as part of the overall management of the reserve.

A contract bush regeneration program is currently underway in the Wallumeda Wetland downstream of the gross pollutant trap in the crown land area. The bush regeneration works should be co-ordinated with any park maintenance or future upgrading of the site for recreational or other purposes as resources become available for the Reserve. This program is a long-term restoration project involving an integrated program of herbicide use as well as manual weed removal.

The New Farm Road Bushcare Group is currently carrying out bush regeneration works in the bushland area adjacent the playground on New Farm Road. They have been regenerating the reserve for the past two years as part of Council's volunteer Bushcare Program.

A Greencorp Project was carried out in the reserve in 1999 as part of a grant awarded to the Hawkesbury Nepean Catchment Management Trust. Clearing and weed matting on the western side of the creek was carried out with some revegetation works behind residential properties in John Savage Crescent.

Hydrology / Water Quality

In urbanised catchments such as the Berowra Creek catchment, nutrient levels are expected to be elevated as a result of impacts such as road runoff and sewer leaks. Sewer lines run through the entire length of the reserve. The presence of high nutrient concentrations provide ideal conditions for weed growth, giving these exotic plants a competitive advantage over native species. This can have significant impacts, inhibiting regeneration of the native plant community, thus threatening its long-term survival.

This upper part of the Berowra Creek catchment is a developed residential catchment. The urbanisation of the catchment has resulted in fairly high flows with evidence of scouring in parts of the creekline. There is moderate erosion in some sections with little diversity of instream habitat types mainly as a result of the presence of only one or two exotic riparian species. With gradual restoration of the natural riparian revegetation, the habitat value of the reserve will increase.

Rock-walling of the upper part of the creekline has been carried out recently as part of Council's Catchment Remediation Rate Program, to stabilise the creekbanks. Once plants become established in this section of the creek, it will provide important instream habitat.

Native and Introduced Fauna

Although there has been no formal fauna survey of Walumeda Reserve, it is still likely that native fauna species frequent the reserve and some may even reside there. Even the degraded, weedy areas can still provide some habitat and protection for native fauna species. Any restoration works undertaken in this reserve should consider that thickets of weeds can be temporary homes for native fauna until their natural habitat can be restored. Any primary clearing of weeds should be carried out gradually, so as refuge areas remain for native animals to utilise.

The high edge to area ratio of the reserve and the presence of cats and dogs in the surrounding residential area constitutes a significant threat to native wildlife. Public education on the protection of native fauna in the area would be useful to make surrounding landholders aware of possible faunal activity in the reserve and their protection under the National Parks and Wildlife Act (1974) and the Threatened Species Conservation Act (1995).

Fire Regime

Urban bushland fire management needs to consider the ecological needs of the bushland as well as the risk posed by wildfires to life and property. Fire management in urban bushland reserves should aim to minimise hazard to life and property whilst conserving ecological values of the reserve.

Due to the narrow area of this riparian reserve it is unlikely that any hazard reduction work would be required. Any proposals for hazard reduction burns should be carried out in conjunction with regeneration of the bushland for the benefit of native vegetation management.

Recreation and Access

Due to large parkland area within the reserve there is plenty of access from the surrounding residential area. There is a formalised walking trail through the reserve which is a feeder trail to the Benowie Walking Track, part of the Great North Walk. This track begins at Cumberland State Forest passing through West Pennant Hills and Cherrybrook into Berowra Valley Regional Park where it joins onto the Great North Walk near the Jungo Rest Area. This trail is managed and maintained by the Department of Land and Water Conservation.

Due to the presence of the endangered ecological community, limited access considerations are needed to prevent the damage caused by informal tracks and trails. Access needs to be restricted to uses which will have minimal impact on the ecology of the bushland area.

Boundaries and Neighbours

Walumeda Reserve has a high edge to area ratio increasing its susceptibility to adverse external influences from the boundaries. There is evidence of dumping of garden waste and garden escapes entering the reserves from adjoining properties. Co-operation between Council and residents is necessary for effective management of the reserve boundaries.

The boundary of the reserve is mostly well-defined by fencing and roadside verge although there are some unfenced private yards where it is difficult to ascertain the boundary. The boundary of the natural area and park is reasonably well-defined by mowing of the cleared area, however, more clearly defining the boundary would assist maintenance staff and ensure that any clearing of the natural area is prevented.

Neighbours of the reserve will be encouraged to work with Council to assist in the regeneration and maintenance of the reserve and to inform Council of any illegal dumping of garden refuse or acts of vandalism which may occur.

References

Smith & Smith (1990) *Hornsby Shire Bushland Survey*

ESP Ecological Surveys & Planning (1999) *Hornsby Shire Threatened Biota Conservation Plan*

Hornsby Shire Council (1999) *Hornsby Shire Local Environment Plan*

Margrit Koettig Archaeological Services (1996) *Hornsby Shire Aboriginal Heritage Study*

Australian Museum Business Services (1996) *Survey of Macroinvertebrate Fauna in Berowra Creek, Cherrybrook*

Hornsby Shire Council (1999) *Water Quality Monitoring Program, Annual Report 1998.*

ACTION PLAN

MANAGEMENT STATEMENT	ACTION	RESPONSIBILITY	TIMEFRAME	PERFORMANCE MEASURE
Weed Invasion, Bush Regeneration and Vegetation Management Formalised activities within the natural area will require a lease or licence agreement with Council.	Any granting of leases, licences or other estates must be consistent with the core objectives for bushland as set out in the Local Government Amendment (Community Land Management) Regulation (1998).	HSC / proponents	As required O	Any granting of a lease, licence or other estate for activities within the natural area are consistent with the Local Government Amendment (Community Land Management) Regulation (1998). Activities allowable in the bushland do not impact on the conservation of bushland.
Consideration is given to regeneration of bushland for any activity proposed for Walumeda Reserve to mitigate the degrading influences on the reserve.	Ensure that all activities are carried out with consideration of bushland protection and regeneration.	HSC	As required O	Protection of bushland
The Blue Gum High Forest remnant is to be managed for nature conservation to protect this endangered ecological community.	Restrict activities in this area to bushland restoration and low impact scientific and educational use following full environmental assessment.	HSC	O	Activities in this area do not adversely affect bushland.
Areas affected by weed invasion within Walumeda Reserve are to be rehabilitated using appropriate regeneration techniques.	Restoration and regeneration to be undertaken where sufficient follow up weed control and bush regeneration can be guaranteed.	Bushland Manager	As funding permits	Bushland condition is improved and maintained.
	Continue existing bush regeneration contract works within Walumeda Reserve	Bushland Manager	As funding permits	Bushland condition is improved and maintained

	and the Berowra Creek catchment.			

	Continue to support and provide training to the Bushcare Group currently working in within Walumeda Reserve and encourage further community involvement as part of Council's volunteer Bushcare Program.	Bushland Management Supervisor	O	Support for Bushcare Group in Walumeda Reserve and further recruitment.
Indigenous species should be used wherever possible to rehabilitate degraded areas.	Any revegetation works within the Walumeda Reserve site should be composed of locally occurring indigenous plants.	Bushland Management Supervisor	O	Locally indigenous plant material is utilised in rehabilitation and landscaping works.
Adequate funding for bushland restoration will assist in the conservation of Blue Gum High Forest in Walumeda Reserve.	Seek additional funding from State and Federal Government sources for restoration of the area.	Bushland Manager	O As required	Council receives financial grants
<u>Hydrology / Water Quality</u> Adequate control of stormwater and drainage from surrounding areas will assist in reducing negative impacts upon the bushland and contribute to the long-term conservation of Walumeda Reserve.	Investigate and implement any remediation strategies which will reduce the negative impacts of stormwater and urban runoff into Walumeda Reserve bushland area. Ensure that full environmental assessment of the impacts including threatened species assessment, is carried out prior to any further proposed stormwater and drainage mitigation	Manager - Water Catchments Manager - Water Catchments	O As required	Reduction in impacts from stormwater and drainage.

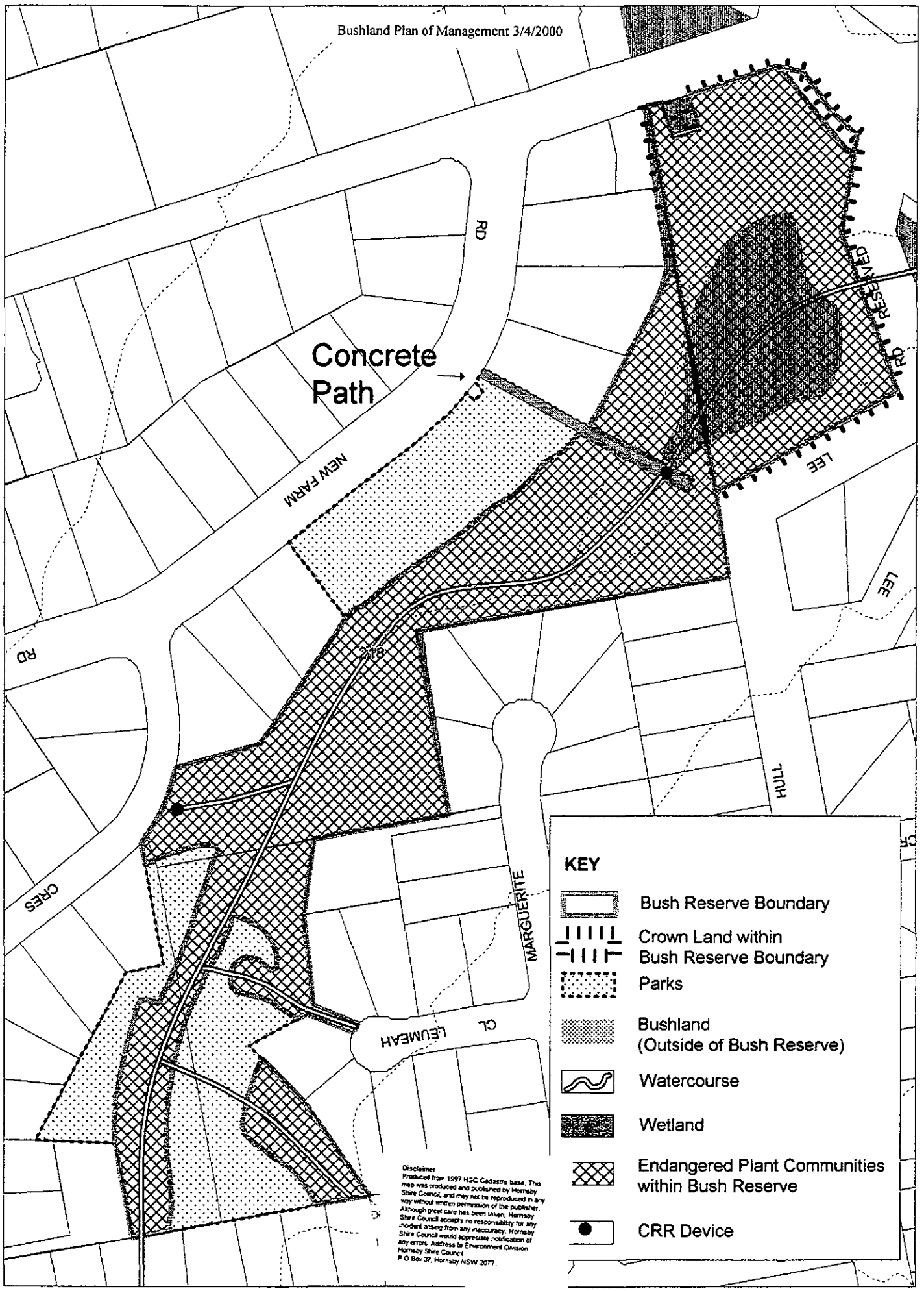
	activity			

Water quality in Berowra Creek should meet ANZECC water quality guidelines for Aquatic Ecosystem health.	Investigate and implement measures necessary to improve water quality within a total catchment management program.	Manager - Water Catchments	LT	Acceptable water quality in Berowra Creek.
Native and Introduced Fauna Native fauna habitat should be conserved and enhanced wherever feasible.	Maintain habitat and vegetation through a well-planned bush regeneration and habitat enhancement program. Maintain habitat by preventing removal of logs for firewood and the removal of bushrock.	Bushland Manager Bushland Manager	O/LT O	Protection and enhancement of native fauna habitat.
Consideration is given to native fauna and its habitat for any activity proposed for Walumeda Reserve.	Ensure fauna habitat needs are included in any proposal for restoration works within Walumeda Reserve.	Bushland Manager	O	Protection of fauna habitat
Control of domestic animals.	Encourage pet owners to control domestic cats and dogs through a public education campaign and by impoundment of free roaming dogs.	Bushland Manager /Environmental Surveillance Officer	O	Responsible pet ownership.
Aboriginal and European Heritage Sites Aboriginal and European heritage sites within the reserve are to be protected and conserved.	Consideration should be given to the importance of the heritage listing of the reserve in HSLEP for any proposed activity within the reserve.	Bushland Manager /Heritage Officer /Manager – Parks & Landscapes	O	Heritage items are preserved for future generations.

Fire Management Any fire management within Walumeda Reserve should be carried out in conjunction with bush regeneration works.	Any proposals for fire management in Walumeda Reserve are to be assessed by the Water Catchments Team	Bushland Manager / Manager - Fire Control	O	Fire regime is maintained for the health of the bushland.
Recreation and Access Access to the natural area should be restricted to uses which will have minimal impact on the reserve's ecology.	Limit recreational activities in this area to passive recreational pursuits such as bushwalking, following full environmental assessment. Monitor recreational and educational uses of the reserve and their impact.	Bushland Manager Bushland Manager	O LT	Recreational activities in this area do not adversely impact the bushland.
Formalised bush walking tracks should be well-constructed and maintained to reduce public risk.	Ensure the feeder track to the Great North Walk is well-maintained.	DLWC	O	Great North Walk is maintained to a high standard.
Use of informal trails through the natural area is to be discouraged wherever possible.	Unnecessary informal trails through the natural areas are to be closed, stabilised and revegetated using locally indigenous plant material Council will actively discourage public passage to privately owned property through the reserve.	Bushland Manager Bushland Manager	LT O	Any informal trails through the natural area are rehabilitated to an acceptable standard Reserve is not used for public access to private property.

Any proposal for track use, works or construction in the natural area will need to consider impacts on bushland.	Any proposal for use and works regarding existing trails or construction of new trails in the natural area will be subject to full environmental assessment.	Bushland Manager	as required	Proposals for track works or construction in the natural area are subject to stringent environmental assessment.

Boundaries and Neighbours				
The mitigation of negative impacts from neighbouring properties is essential to the long-term conservation of Walumeda Reserve.	Encourage adjoining landholders to reduce any impacts such as illegal vegetation dumping and predation by domestic animals, and encourage involvement in Council's volunteer Bushcare Program.	Bushland Management Supervisor	O	Landscaped areas maintained. Protection of natural bushland areas.
	Encourage neighbours to create or maintain buffer zones of indigenous vegetation on private land adjoining the reserve.	Bushland Manager	O	Creation and maintenance of buffer zones which assist in protecting the reserve.
	Council will pursue the removal of private encroachments onto the reserve and require the restoration and regeneration of these areas.	Bushland Manager Environmental Surveillance Officers	As required LT	Reduction in encroachments.
The reserve boundaries should be well-defined and maintained to minimise the impact of any negative external influences.	Ensure that the boundary of the reserve is well-maintained.	Bushland Manager /Private property owners	O/LT	Natural area is well-defined. Boundaries maintained.



HORNSBY SHIRE COUNCIL

Hornsby Shire Council

Walumeda Reserve

March 15, 2000

0 20 40m

N