

GUNDUNGURRA RESERVE PLAN OF MANAGEMENT

Prepared for:

Camden Council

Prepared by:

Environmental Partnership (NSW) Pty Ltd

2 River Street Birchgrove NSW 2041

P (02) 9555 1033 F (02) 9818 5292

admin@epnsw.com.au

www.epnsw.com.au

Issue / Revision	Date	Description	By	Chk	App
A/01	Aug 2002	PRELIMINARY	JN		
A/02	Oct 2002	PRELIMINARY DRAFT	JN	AH	
A/03	Nov 2002	DRAFT	JN	AH	
A/04	Oct 2003	DRAFT	JN		
A/05	Jan 2004	Final Draft	RC Camden Council		
A/06	Jul 2004	Adoption	RC Camden Council		
A/07	13 Oct 2009	Adoption of Amendment (AGL Lease)	RC Camden Council)		

CONTENTS

Executive Summary

- 1.0 Introduction**
- 2.0 Consultation**
- 3.0 Desired outcomes of the plan of management**
- 4.0 Issues and opportunities**
- 5.0 Summary of key outcomes**
- 6.0 Community land categorisations**
- 7.0 Masterplan**
- 8.0 Implementation**

1.0 Introduction

- 1.1 Background**
- 1.2 Structure of the Plan of Management**
- 1.3 Study area at a glance – existing management**

2.0 The Resource

2.1 Context

- 2.1.1 Local and regional context
- 2.1.2 Urban development

2.2 Heritage

- 2.2.1 Aboriginal heritage
- 2.2.2 European heritage

2.3 Biodiversity

- 2.3.1 Flora
- 2.3.2 Fauna

2.4 Geology

- 2.4.1 Soils
- 2.4.2 Drainage

2.5 Access

- 2.5.1 Traffic
- 2.5.2 Parking
- 2.5.3 Circulation

2.6 Park use and recreation

- 2.6.1 Current uses
- 2.6.2 User

2.7 Landscape and visual character

- 2.7.1 Visual character
- 2.7.2 Site features

2.8 Ownership and leases

2.9 Management and maintenance

3.0 Background Information Review

3.1 Previous studies

- 3.1.1 Camden Bushland Corridor Study (1996)
- 3.1.2 William Howe Regional Park Draft Plan of Management (1999)
- 3.1.3 Spring Farm Release Area Landscape Masterplan Report (2002)
- 3.1.4 Spring Farm Urban Release Area Fauna and Fauna Habitat Study(2002)
- 3.1.5 Spring Farm Vegetation Assessment
- 3.1.6 Draft Riparian Areas Plan of Management

3.1.7 Previous Plan of Management for Gundungurra Reserve

3.2 Planning context

- 3.2.1 Commonwealth Planning Policies
- 3.2.2 State Government Planning Policies
- 3.2.3 Camden Council Planning Policies

4.0 Basis for Management

4.1 Methodology

4.2 Consultation

- 4.2.1 Steering Committee
- 4.2.2 Publicity
- 4.2.3 Focus group

4.3 Values and roles

- 4.3.1 Natural Environment
- 4.3.2 Social / Cultural
- 4.3.3 Recreation
- 4.3.4 Education
- 4.3.5 Heritage
- 4.3.6 Intrinsic
- 4.3.7 Visual
- 4.3.8 Management and maintenance

4.4 Issues and opportunities

- 4.4.1 Natural Environment
- 4.4.2 Social / Cultural
- 4.4.3 Recreation
- 4.4.4 Education
- 4.4.5 Heritage
- 4.4.6 Intrinsic
- 4.4.7 Visual
- 4.4.8 Management and maintenance

4.5 Desired outcomes

- 4.5.1 Natural Environment
- 4.5.2 Social / Cultural
- 4.5.3 Recreation
- 4.5.4 Educational
- 4.5.5 Heritage
- 4.5.6 Intrinsic
- 4.5.7 Visual
- 4.5.8 Management and maintenance

4.6 Community land categorisation

5.0 Management Strategies

5.1 Management approach

5.2 Management Strategy Framework

- 5.2.1 Framework Format
- 5.2.2 Value
- 5.2.3 Desired Outcome (Objective)

- 5.2.4 Issues
- 5.2.5 Strategies

CONTENTS

5.2.6 Framework Categories

5.3 Core objectives

5.4 Detailed Management Strategies

5.4.1 Heritage

5.4.2 Recreational facilities and use

5.4.3 Pedestrian, cycle and disabled access

5.4.4 Vehicular access and parking

5.4.5 Bushland management

5.4.6 Ownership, zoning and adjoining landuse

5.4.7 Leases and license

5.4.8 Education

5.4.9 Management and maintenance

6.0 Masterplanning

6.1 Masterplanning Principles

6.2 Concept masterplan

6.2.1 Natural Environment

6.2.2 Access

6.2.3 Park Features

7.0 Action and Implementation

7.1 Staging

7.2 Works action plan

7.3 Funding

8.0 Bibliography

9.0 Appendix

A Management strategy framework

EXECUTIVE SUMMARY

1.0 Introduction

This specific plan of management applies to three parcels of land collectively known as Gundungurra Reserve which are under title to Camden Council and classified as community land under the Local Government Act.

The Gundungurra Reserve Plan of Management was commissioned by Camden Council in July 2002 and was undertaken by Landscape Architectural consultants Environmental Partnership over August – October 2002.

Due to the fragmentation of land parcels in the Reserve, its potential value to the community is best utilised as an extension of the surrounding open space systems. It is proposed that Gundungurra Reserve plays an integral role in the ongoing development of the Spring Farm Bush Corridor which potentially connects all three subject land parcels and forms a strategic and biodiversity link to the Nepean River Corridor, William Howe Regional Park and Mount Annan Botanic Gardens.

This focus of this study seeks to balance open space and recreational needs with conservation of the inherent and potential natural and cultural heritage qualities of Gundungurra Reserve. It also aims to guide Camden Council's development and maintenance of this important open space asset and provide an effective basis for day to day and long term decision making.

2.0 Consultation

At the core of the plan of management process was consultation with Council's Project Officer Group, a Steering Committee comprising of representatives from selected stakeholder groups / associations, and the Community Working Group derived through direct contact with organised groups, and a local letterbox drop.

The consultation programme included Two Steering Committee Meetings and a Community Workshop held at key phases during the course of the study, culminating with public exhibition of the draft plan.

3.0 Desired outcomes of the plan of management

Listed below is a summary of the desired outcomes for the plan of management as identified by the community working group and study team, and through outcomes of previous studies undertaken on the study area.

Natural Environment

Undertake a corridor wide approach to land management that prioritises the protection and improvement of natural bushland communities throughout Gundungurra Reserve and the Spring Farm Bushland Corridor.

Social / Cultural

Integrate community involvement into site planning and management of the Reserve.

Recreation

Provide for a sustainable level of passive recreation and access compatible with the environmental objectives for the Reserve and Bushland Corridor.

Educational

Enhance user understanding of the natural and cultural heritage items, character of the reserve and adjoining areas.

Heritage

Provide conservation of cultural heritage and appropriate interpretation in liaison with local stakeholders including local Aboriginal Land Councils and the National Parks and Wildlife Service.

Intrinsic

Open space improvements to Gundungurra Reserve to relate to surrounding land uses and incorporate ESD principles.

Visual

Conserve and enhance the natural character of the landscape whilst maintaining cultural landscape influences.

Management and maintenance

Provide sustainable maintenance to enhance environmental and recreational values.



Potential for edge effects



Fragmentation of core bush areas



Pimelia spicata (endangered species)

4.0 Issues and opportunities

Issues may include impacts on the land or environment, and potential conflicts between users or usage and other qualities of the site. Opportunities are the qualities of the site which make it suitable for natural value connection / enhancement, for community or recreational uses or activities, and which may not be fully realised at present.

Key issues and opportunities for ongoing planning and management of Gundungurra Reserve include the following (refer issues and opportunities plan opposite).

ISSUES	OPPORTUNITIES
Natural Environment	
<ul style="list-style-type: none"> fragmentation and isolation of individual open space parcels 	<ul style="list-style-type: none"> ongoing development of bushland corridor and relationship to William Howe Regional Park to provide linkages between open spaces
<ul style="list-style-type: none"> edge effects of urban development (weeds encroachment, visual, impact of roads on connectivity) 	<ul style="list-style-type: none"> provide buffer and transition zones at all edges (e.g. roadways, paths)
<ul style="list-style-type: none"> erosion of buffer zone (and open space / bushland) between Jacks Gully Landfill and Spring Farm 	<ul style="list-style-type: none"> Conservation of threatened and endangered species and communities including: <ul style="list-style-type: none"> Cumberland Plain Woodland Elderslie Banksia Scrub Forest Sydney Coastal River Flat Forest Pimelia Spicata Pomaderris brunnea
<ul style="list-style-type: none"> weed encroachment through site and related conflicts with bird habitat removal / control 	<ul style="list-style-type: none"> planning and management to focus on provision of passive recreational activities compatible with recreational values
<ul style="list-style-type: none"> potential impacts of recreational activities on natural values 	<ul style="list-style-type: none"> potential for integrated bushland restoration programme to reinforce bushland corridor role of open spaces
Social / Cultural	
<ul style="list-style-type: none"> increasing local / district population and related need for open space 	<ul style="list-style-type: none"> community awareness and 'ownership' of bushland corridor concept amongst a small but committed group
Recreation	
<ul style="list-style-type: none"> demand for high intensity recreational activities in the district (e.g. mountain biking, bmx, skate boarding) 	<ul style="list-style-type: none"> integration with William Howe Regional Park provides a more significant openspace for recreational use potential off-road access linkages through bush corridor
Education	
<ul style="list-style-type: none"> limited broad scale community awareness of natural and cultural 	<ul style="list-style-type: none"> Potential establishment of linkages and relationships between open space and local schools (e.g. outdoor classrooms)

EXECUTIVE SUMMARY

ISSUES	OPPORTUNITIES
Heritage	
<ul style="list-style-type: none"> lack of physical heritage elements within the open space areas 	<ul style="list-style-type: none"> importance of area as meeting place for Aboriginal peoples
Intrinsic	
<ul style="list-style-type: none"> urban development (Spring Farm) will change the visual and landscape character of the open spaces 	<ul style="list-style-type: none"> potential coordination with William Howe Regional Park as integrated open space area: <ul style="list-style-type: none"> – facilities – natural values – recreation – entry points – parking
Visual	
<ul style="list-style-type: none"> visual impact of edges to residential development on natural character 	<ul style="list-style-type: none"> open space (in particular when integrated with WHRP and other bushland corridor lands) provides visual relief to surrounding urban development
Management & maintenance	
<ul style="list-style-type: none"> although a 'low-moderate' fire risk, the consideration of fire management issues is important 	<ul style="list-style-type: none"> potential for shared maintenance responsibility with NPWS
<ul style="list-style-type: none"> ongoing maintenance / liability concerns of farm dams 	<ul style="list-style-type: none"> POM to provide basis for the sourcing of additional funding
<ul style="list-style-type: none"> maintenance requirements under powerline easements compromise natural habitat values 	<ul style="list-style-type: none"> Reduce potential risk from fire through undertaking of hazard reduction measures



Spring Farm Release Area prior to urban development



Maintenance / liability concerns related to farm dams

5.0 Summary of key outcomes

The key outcomes of the plan of management are delivered in two core areas of the document:

- ### Detailed Management Strategies

Detailed management recommendations (refer section 5.3)

- ### Masterplans

Development of the management strategies and policies into planning and design proposals as described in the Concept Masterplan. Refer to Executive Summary – 7.0 Masterplanning and Section 5.0 of Plan of Management.

Management Strategy Framework

Based on the identified values, outcomes, and issues / opportunities a Management Strategy Framework was developed to guide resolution of planning and management to provide a basis for assessment of issues that may arise in the future (refer Appendix A).

6.0 Community land categorizations

The Gundungurra Reserve POM identifies the following community land categorizations of the subject study area of Gundungurra Reserve Plan of Management in accordance with the guidelines of categorisations as set out in clauses 36B-36N of the local Government Act.

- Natural Area – Bushland
- Natural Area – Foreshore
- Park

Refer to Section 4.6 Community land categorization for the rationale on the determination of the categories and the plan for the extent of categorizations on site.

7.0 Masterplan

Masterplanning Principles

The following general principals have been established to guide development of a masterplan for the Gundungurra Reserve:

- A Protect and enhance endangered ecological communities;
- B Protect endangered and threatened species;
- C Facilitate natural restoration to promote bush corridor linkages which improve the biodiversity values of the area;
- D Facilitate passive recreation within the open space areas and corridors without compromising natural values;
- E Provide for a seamless boundary with William Howe Regional Park incorporating the integration of natural values and shared recreational use; and
- F Develop a collaborative approach as appropriate to the management of shared boundary areas.

The preceding table (5.0 Summary of key outcomes) summarised the key masterplanning proposals as identified on the Concept Masterplan (refer following page). Refer to Section 5.0 Masterplanning for detailed descriptions of the proposals.

Management Strategy Framework

Based on the identified values, outcomes, and issues / opportunities a Management Strategy Framework was developed to guide resolution of planning and management strategies to provide a basis for assessment of issues that may arise in the future (refer Appendix A).

8.0 Implementation

Section 7.0 of the plan of management describes a recommended works action plan for the implementation of planning and management recommendations.

The actions listed each involve a series of more detailed activities as outlined in the works action plan. The high priority works are supplemented in the works action plan by a range of medium and low priority actions that are recommended to be implemented as part of a long term programme.

The ability of Council to secure external grant funding to supplement it's capital works funding and the initial park establishment funding will ultimately determine the programme time frame of improvement works. Funding secured for specific grant types may also require the adjustment of priorities during the course of implementation.

1.0 INTRODUCTION

The introduction identifies the objectives of the plan of management, the format of the plan of management document, and existing management background for the existing study area

1.1 Background

This specific plan of management applies to Gundungurra Reserve which is owned by Camden Council and classified as community land under the Local Government Act.

The Gundungurra Reserve Plan of Management was commissioned by Camden Council in July 2002 and was undertaken by Landscape Architectural consultants Environmental Partnership over August – November 2002.

Gundungurra Reserve (the Reserve) originally consisted of five adjoining land parcels containing bushland and a power-line easement located along Welling Drive in Narellan Vale. Following the recent dedication of 53.5 hectares of bushland to Camden Council by Landcom and the NSW Government, Gundungurra Reserve is now comprised of three separate groups of land parcels totaling some 55 hectares in area.

Due to the fragmentation of land parcels in the Reserve, its potential value to the community is best utilised as an extension of the surrounding open space systems. It is proposed that Gundungurra Reserve plays an integral role in the development of the Spring Farm Bush Corridor which potentially connects all three land parcels and forms a strategic and biodiversity link to the Nepean River Corridor, William Howe Regional Park and Mount Annan Botanic Gardens.

This plan seeks to balance open space and recreational needs with conservation of the inherent natural and cultural heritage qualities of Gundungurra Reserve. It also aims to guide Camden Council's development and maintenance of this important open space asset and provide a suitable basis for day to day and long term decision making.

Specific objectives as identified in Council's brief include the following:

- Conserve the natural heritage values of the Gundungurra Reserve as part of the Spring Farm Bush Corridor Network.
- Conserve the cultural heritage values of the Reserve.
- Establish policies and programs for planning, resource management, maintenance and public use.
- Provide a masterplan that can be implemented in a progressive, consistent and coordinated manner.
- To establish a template on which future Plans of Management may be based.
- To examine recreation opportunities and usage thresholds consistent with the Reserves sensitivity.
- To optimise community involvement in the masterplanning process, design, development and ongoing management of Gundungurra Reserve.
- To foster relationships with adjacent landowners which enhance the identified values of Gundungurra Reserve (National Parks and Wildlife Service, Macarthur Waste Board, Landcom, adjoining residential property owners).



Remnant bushland in Gundungurra Reserve



Plaque commemorating formal handover of bushland to Council

1.2 Structure of the Plan of Management

The plan of management is presented in seven principal sections:

2 The Resource

Review of the existing physical and cultural character of the site as a basis for identification of values, desired outcomes and issues, and subsequent development of planning and management strategies

3 Background Information Review

Review of literature, reports, and studies relevant to the plan of management process, along with an identification of key implications of legislation and guidelines pertaining to the Reserve

4 Basis for Management

Identification of values, desired outcomes and issues to be considered in the development of planning and management strategies. Applies these factors to the categorisation of the community lands in accordance with the local government act

5 Management Strategies

Detailed management policies presented in practical categorisations relevant to open space management

6 Masterplanning

Application of planning and management strategies in the form of landscape masterplan proposals

7 Action and Implementation

Prioritisation of detailed actions required for the implementation of strategies including indicative costs and funding / management responsibilities

10 Appendix

Supporting documentation and related information

1.0 INTRODUCTION

1.3 Study area at a glance – existing management

The table following summarises existing features and management of the study area. Proposed community land categorisations under this plan of management are identified in Section 4.7 Study area at a glance – proposed management.

Item	Description
Site Name:	Gundungurra Reserve
Address:	43A Welling Drive, Narellan Vale NSW 2567 35 Welling Drive, Narellan Vale NSW 2567 25A Henrietta Drive, Narellan Vale NSW 2567 275, 275A Richardson Road, Narellan Vale NSW 2567
Key components:	Lot 608, Lot 1540 DP 845171 Lot 162 DP 800254 Lot 229 DP 803021 Lot 1, Lot 3, Lot 4 DP 1007608
Ownership:	Camden Council
Community land categorisation	None current
Care, control, management:	Camden Council Narellan Landcare Group
Area:	55 hectares
Zoning:	7 (d) Environmentally Sensitive Land – DP 1007608 2(d) residential – DP 845171, DP 800254, DP 803021
Conditions of park:	The park is predominantly a bushland reserve with remnants of the following vegetative communities in a range of conditions: <ul style="list-style-type: none"> • Cumberland Plains Woodland (highly degraded) • River Flat Forest (highly degraded) • native / pasture grasslands There is a formal park section accessed from Welling Drive which is in a good condition.
Maintenance:	Council undertakes the following maintenance: <ul style="list-style-type: none"> • monthly mowing and litter collection of the formal park area accessed from Welling Dr • quarterly fire break mowing • 'special request' maintenance as reported and as resources allow Narellan Landcare Group undertakes the following maintenance: <ul style="list-style-type: none"> • removal of large woody weeds and seed source (Boxthorn, African Olive) • replacement planting of revegetated areas as required
Assets:	1 No. park bench, 1 No. picnic setting (table and bench)
Condition of buildings:	N/A
Existing uses:	Passive recreation uses including: walking and picnics. Prohibited activities including off-road cycling, motorcycle riding and four wheel driving.
Leases / licenses:	N/A
Caveats / easements:	Integral energy easement along western boundary

2.0 THE RESOURCE

This section provides a review of the existing and past physical and cultural character as a means of understanding its key values to the community and major issues for management.

2.1 Context

2.1.1 Local and regional context

Gundungurra Reserve is located in the Camden Local Government Area approximately 70km from the Sydney CBD and approximately 5km from the Camden CBD.

The Reserve totals 55 hectares and includes three separate land parcels which potentially form part of the Spring Farm Bush Corridor. The Spring Farm Release Area is located between the land parcels, and is to be developed for residential housing. At the time of writing, the release area is comprised of open grasslands with scattered canopy trees and some areas of open cut sand mining to the south.

The northern parcel (26.5 ha) is located on Welling Drive and bordered by William Howe Regional Park to the east, the suburb of Narellan Vale to the north and west and the Spring Farm Release Area to the south. It is likely that the proposed East-West Link Road will form the southern boundary to the northern parcel in the future and provide an arterial connection to the South Western Motorway for the new release areas. The most noticeable features of this land parcel are the open grasslands and tall canopy trees which are in contrast to the surrounding suburban development on Welling Drive.

The southern parcel (23.5 ha) is bordered by Jacks Gully Waste Disposal Recycling Centre to the east, the Nepean River to the south, an Integral Energy substation to the west and the Spring Farm Release Area to the north. This area is generally sloping with steeper sections towards the river with most areas covered in weed infested Bushland. The land is bisected by Glenlee Road which is predominantly used by coal trucks travelling to and from the Glenlee Coal Washery located in nearby Campbelltown Council.

The eastern parcel (5 ha) is located between William Howe Regional Park and Jack's Gully Landfill. This land is has a predominantly rural character due to its predominance of native / pasture grassland and absence of canopy vegetation.

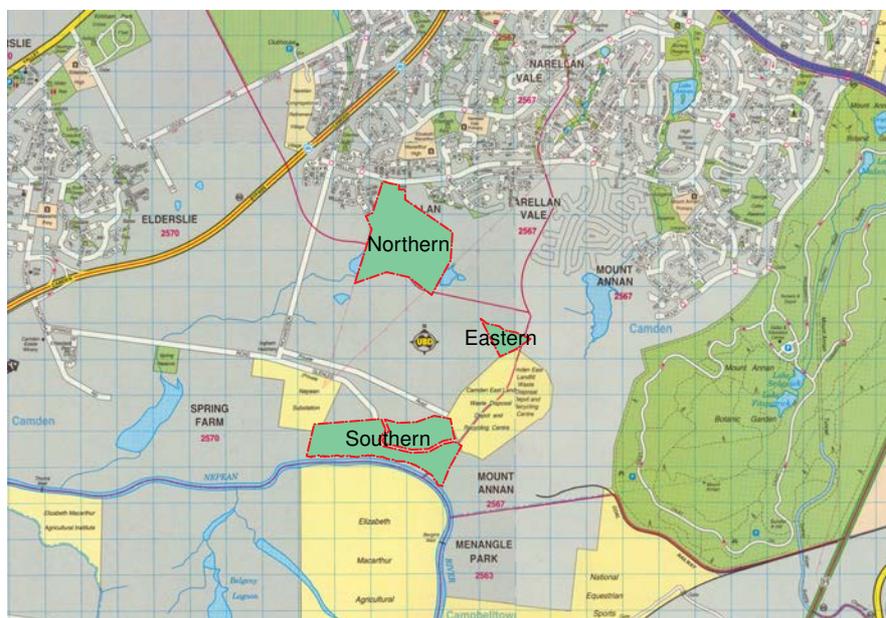


Figure 2.1: Site context

2.1.2 Urban development

The release of surrounding rural areas for urban growth over the past 10-15 years has resulted in the development of the suburbs of Narellan Vale and Mount Annan. Located to the north of the Gundungurra Reserve these suburbs are comprised of detached housing typically located on streets and cul-de-sacs.

Further residential subdivision development is planned for the nearby and adjoining areas. Spring Farm will be constructed on the land located between the Gundungurra Reserve parcels and extend to the west towards



William Howe Regional Park



Narellan Vale



Boundary to Jacks Gully Landfill



Integral Energy Sub-station



Spring Farm Release Area

14000 before present	Aboriginal presence in the area – Tharawal people.
1795 AD	Governor Hunter led an expedition to the 'Cowpastures'
early 1800s	The initial expansion of the colonial settlement – Nepean River District
1816	Appin Massacre
1818	William Howe granted 5000 acres of land at district, (Glenlee estate)
1820	Howe began shipping to England
1824	Glenlee house constructed
1849	Glenlee estate conveyed to executor on mortgage default
1852	The property was leased to Edward Howe Jnr
1855	William Howe aged 78
1859	Mary Howe aged 78 to James Fitzpatrick
1882	James Fitzpatrick died, aged 82
1939	James Fitzpatrick son of James Fitzpatrick, died, aged 82
1968	State Planning Authority established
1978	Glenlee Homes Trust established
late 1970s	the Macarthur Land Corporation established
early 1980s	elevated areas placed under control of DUDAF
1998	Land dedicated to William Howe Regional Park

the Camden bypass and the Nepean River. There are also plans to extend the Elderslie subdivision located to the north of the Camden bypass.

Narellan Vale and Mount Annan are reasonably well provided for in terms of access with open space path connections linking the suburb with surrounding areas. If this trend continues and improves within the new release areas then open space connections will be supplemented, and Gundungurra Reserve will be highly accessible via these connections.

With the development of residential areas and reduction of open spaces, it is expected that there will be a greater demand for open space which is suitable for varied recreation needs.

Quantity and quality of passive and active recreation areas provided in these release areas will impact on the role that Gundungurra Reserve plays. If recreation areas are not well provided for, residents of the release areas will turn to Gundungurra Reserve as a site for recreation, some of which may not be compatible with natural habitat values.

2.2 Heritage

2.2.1 Aboriginal heritage

The region has a long history of Aboriginal occupation. The Sweet Water D'harawals occupied the Cowpastures area, and consisted of some forty or fifty clans, each numbering in the vicinity of from thirty to sixty individuals. This area was an important Aboriginal meeting place and was known as “Yandel’ora Yugl” which means Land of Peace Between Peoples. Aboriginal groups were drawn to the region as a result of its proximity to the Nepean River and its plentiful supply of food and water.

A search of the NSW National Parks and Wildlife Service Aboriginal Heritage Information Management System has shown that five Aboriginal places are recorded near (but not on) the Reserve lands (refer Appendix H for search results). Five Open Camp Sites were listed in the search: “Clutha 1” and “Clutha 2” are located to the east of Jacks Gully Landfill; and “Glenlee6”, “Glenlee7”, and “Glenlee8” are located at Mount Annan.

All Aboriginal places and Aboriginal objects are protected under the National Parks and Wildlife Act 1974 and it is an offence to destroy, damage or deface them. Also Camden Local environmental Plan No 121 – Spring Farm sets out planning requirements.

2.2.2 European heritage

The first Europeans in the vicinity were an exploratory party who noted a stray herd of cattle in 1795. This discovery generated another expedition led by Governor Hunter that same year. He called the area the Cow Pastures.

The initial expansion of the colonial settlement in the early 1800s occurred in the Hawkesbury-Nepean River district. In colonial times, the importance of the Camden area was as a decentralised settlement centre and as a gateway to the southern highlands.

John Macarthur was granted 5000 acres on the southern banks of the Nepean River in 1805, where he established the ‘Camden Park’ estate. Numerous land grants occurring in the period from 1812 to 1818, the two largest grants were to William Howe and John Oxley. The holdings are likely to have been largely cleared of native vegetation between 1822 and 1828.

Since the first Europeans began occupation the area, the extensive open and forested woodland covering much of Western Sydney have been replaced with European settlements, agricultural and mining activities. In recent years the development of residential suburbs has overtaken agriculture and industry as the predominant land use.

With only a few remaining remnants of natural vegetation left, the conservation of this resource is of a high priority. An area of remnant Cumberland Plain Woodland adjacent to Welling Drive was earmarked for development. After extensive lobbying by community groups the State Government ensured the protection of this bushland by dedicating 53 hectares of land to the Spring Farm Bush Corridor. This land is known as Gundungurra Reserve.

2.0 THE RESOURCE

2.3 Biodiversity

2.3.1 Flora

Communities

Cumberland Plain Woodland is the dominant native vegetation community within the Reserve. It is located in the western half of the northern land parcel, and the north half of the southern land parcel. In the southern section, the Woodland grades into Sydney Coastal River-flat Forest, which occurs on the lower slopes of the Reserve adjacent to the Nepean River. Refer Figure 2.2: Flora

The Sydney Coastal River-flat Forest community is badly weed infested, particularly by Large-leaved Privet (*Ligustrum lucidum*), which has excluded native species in many areas.

Anne Clements and Associates (2002) identified several groups of Elderslie Banksia Scrub Forest on the adjoining Spring Farm Release Area.

Grassland is present in the eastern half of the northern land parcel. Isolated remnant trees and shrubs are also present (species characteristic of Cumberland Plain Woodland). An extensive infestation of African Box-thorn occurs within the Grassland.

Refer figure 2.2 Flora on the following page.

Conservation Significance

Rice Flower (*Pimelea spicata*) is located under Blackthorn (*Bursaria spinosa*) thickets, along the fence line in northern land parcel. This species is listed as Endangered under *Threatened Species Conservation Act 1995* and *Environmental Protection and Biodiversity Conservation Act 1999*. A boulder has been placed around one patch of the species to stop mowing within the vicinity.

Brown Pomaderris (*Pomaderris brunnea*), which is listed as Vulnerable under *Threatened Species Conservation Act 1995* and *Environmental Protection and Biodiversity Conservation Act 1999*, is located near the Nepean River within the Reserve. The Pomaderris was located within a Large Leaved Privet (*Ligustrum lucidum*) thicket, along an old access track.

It is also considered that the Reserve may provide potential habitat for Camden White Gum (*Eucalyptus benthamii* var. *benthamii*), which is listed as Vulnerable under *Threatened Species Conservation Act 1995* and *Environmental Protection and Biodiversity Conservation Act 1999*. This species is known to occur sporadically on the alluvial flats in the region (EDAW Camden Bushland Corridor Study). However, no individual of this Vulnerable species was observed during current site investigations.

Cumberland Plain Woodland is listed as an Endangered Ecological Community under *Threatened Species Conservation Act 1995* and *Environmental Protection and Biodiversity Conservation Act 1999*.

Sydney Coastal River-Flat Forest and Elderslie Banksia Scrub Forest are listed as an Endangered Ecological Community under *Threatened Species Conservation Act 1995*.

Weeds

Throughout the Reserve there is a high proportion of weed species in the shrub strata, and generally a low diversity of native shrub species.

The following noxious weeds have been observed within the Reserve:

- Pampas Grass (*Cortaderia* sp.) W2;
- Paterson's Curse (*Echium plantagineum*) W3;
- Large-leaved Privet (*Ligustrum lucidum*) W4b;
- African Boxthorn (*Lycium ferocissimum*) W2;
- Prickly Pear (*Opuntia* sp) W4f;
- Blackberry (*Rubus fruticosus*) W3; and
- St John's Wort (*Hypericum perforatum*) W2

The Noxious Weeds Act 1993 categorises the weeds, and requires that the following management actions are undertaken:

The presence of a **W1** weed on land must be notified to Council and the weed must be fully and continuously suppressed and destroyed.

A **W2** weed must be fully and continuously suppressed and destroyed.



Grasslands (foreground),
Cumberland Plain Woodland
(background)



Sydney Coastal River-flat Forest



Pimelea spicata



Weed infestation in the southern
land parcel

GUNDUNGURRA RESERVE – PLAN OF MANAGEMENT

A **W3** weed must be prevented from spreading and its numbers and distribution reduced.

A **W4a** weed must not be sold, propagated or knowingly distributed and any part of the weed must be prevented from growing within three (3) metres of the boundary of a property.

A **W4b** must not be sold, propagated or knowingly distributed and any existing weed(s) must be prevented from flowering and fruiting.

A **W4c** must not be sold, propagated or knowingly distributed and the weed must be prevented from spreading to adjoining property.

A **W4f** must not be sold, propagated or knowingly distributed. Any biological control or other control program directed by Council must be implemented.

A **W4g** must not be sold, propagated or knowingly distributed.

There is a severe infestation of Large-leaved Privet (*Ligustrum lucidum*) on the lower slopes of the southern section of the Reserve. This weed species has excluded most other species in this area.

African Boxthorn (*Lycium ferocissimum*) is also a dominant weed within the Reserve. Thickets of this species are present in the eastern portion of the northern section of the Reserve. Scattered occurrences of African Boxthorn occur throughout the Reserve.

Though not listed as noxious in Camden local government area, African Olive (*Olea europaea*) is considered to be a significant problem within the Reserve, dominating the shrub layer in many areas.

Refer Appendix G for a full list of Noxious Weeds present in the Camden LGA.

2.3.2 Fauna

A fauna study has not been included in this plan of management due to the constraints of the study programme, however existing information on fauna endemic to the area has been reviewed (Spring Farm Urban Release Area Fauna and Fauna Habitat Study 2002, Spring Farm Urban Release Area Local Environmental Study 2000, Camden Bush Corridor Study 1996, Biosis 1996).

Urban Bushland Management Consultants (2002) identified three main native vegetation communities present within the study area, which provide an array of habitat. These communities are Cumberland Plain Woodland, Elderslie Banksia Scrub Forest and Sydney Coastal River-flat Forest. In addition Anne Clements and Associates (2002) identified various other vegetation assemblages consisting of aquatic vegetation, paddocks, former orchards and vineyards, sand extraction areas and dense exotic trees.

Natural vegetation within the study area is weed infested and fragmented but it is still likely to be an important corridor for aquatic animals, birds, bats, macropods and arboreal animals. The potential exists to enhance the existing habitat value to fauna by increasing connectivity (and hence viability) and habitat quality through targeted planting and weed control programs.

The Fauna and Fauna Habitat Study by Conacher Travers (2002) reported that a total of 134 species were recorded within or adjacent to the study area comprising of 87 bird, 10 reptile, 6 amphibian, 27 mammal species and 4 molluscs.

In total, six threatened species have been recorded on or adjacent to the study area. These species are Large-eared Pied Bat, Common Bent-wing Bat, Eastern Freetail-bat, Greater Broad-nosed Bat, Grey-headed Flying Fox and Cumberland Plain Snail.

Fourteen regionally significant species listed under the Urban Bushland Biodiversity Study (NPWS, 1997) were recorded within the study area. These were the Common Bronzewing *Phaps chalcoptera*, Crested Shrike-tit *Falcunculus frontatus*, Great Egret *Ardea alba*, Oriental Cuckoo *Cuculus saturatus*, Wedge-tailed Eagle *Aquila audax*, Whistling Kite *Haliastur sphenurus*, Yellow-rumped Thornbill *Acanthiza chrysorrhoa*, Zebra Finch *Taeniopygia guttata*, Swamp Wallaby *Wallabia bicolor*, Common Wallaroo *Macropus robustus*, Short-beaked Echidna *Tachyglossus aculeatus*, Common Wombat *Vombatus ursinus*, Lace Monitor *Varanus varius* and Bearded Dragon *Pogona barbata*.

In addition, the locally significant Sugar Glider *Petaurus breviceps* was recorded within the study area within vegetation adjacent to Nepean River.



Dead trees provide valuable fauna habitat



Farm dams provide valuable fauna habitat

2.0 THE RESOURCE

Three bird species listed under the Japanese and Australian Migratory Bird Agreement (JAMBA) and the Chinese and Australian Migratory Bird Agreement (CAMBA) were identified as occurring within or adjacent to the study area. These species were Cattle Egret *Ardea ibis*, Great Egret *Ardea alba* and Oriental Cuckoo *Cuculus saturatus*.

In addition to the findings listed above a Camden Council Officer observed a Diamond Firetail (listed as vulnerable under the TSC Act) during a site visit on the 21st October 2002.

2.4 Geology

The Wollongong – Port Hacking Geological Series Sheet indicates that regionally the study area is underlain by Triassic Age Bringelly Shales, the uppermost formation of the Wianamatta Group. In the southern half of the study area Tertiary Age alluvium (the Elderslie Sand Deposit) overlies the Bringelly Shales.

The Tertiary alluvium comprises mainly sand, deposited when the Nepean River was flowing at a higher level. The deposit consists of silica sand in a high clay content matrix. Examples of the sand deposit can be observed in the active and abandoned extraction pits in the area.

The Bringelly Shale consists of claystone, siltstone, shale, laminite and sandstone. This formation is exposed in road and other cuttings in the study area.

2.4.1 Soils

The soil landscapes of the Wollongong – Port Hacking 1:100,000 Sheet indicates that there are three principal soil groupings identified in the study area. These are:

The Blacktown Soil Landscape

Occupies the gently undulating rises in the northern portion of the site with local relief of 10m to 30m. The soil in this landscape is typically comprised of shallow to moderately deep, moderately reactive, high plasticity clays of low fertility.

The Theresa Park Soil Landscape

Occupies the Tertiary alluvial terraces immediately north of the Nepean River. Typically the alluvium comprises quartz sand and lithic silt and clay.

The Luddenham soil landscape

Occurs on the higher elevation slopes to the north and the east of the study area and is comprised of shallow to moderately deep, moderately reactive, high plasticity clays with a high erosion hazard and potential for mass movement.

Disturbed Terrain

A fourth soil landscape mapping unit called Disturbed Terrain is located to the east of the southern parcel (adjoining the Nepean River). This unit covers the area where there has been significant site disturbance associated with the Glenlee coal processing facility. In this unit the hillslopes have been significantly modified, and the area has had coal washery chitter spread over it. This material may have adverse impacts on the soils and their suitability for the establishment and long term management of native vegetation.

Other sites of major disturbance occur for sand and soil extraction and land filling activities (Jack's Gully). These specific areas are not included in the Disturbed Terrain mapping unit. Each sand extraction site will require a site specific shaping of the final land surface prior to the establishment of permanent native vegetation as part of the bushland corridor.

2.4.2 Drainage

The main natural creekline in the study area is Spring Creek. Two arms flow to the west across the study area, with headwaters in the northern and western parcels of Gundungurra Reserve. The two arms connect just west of Richardson Road before joining with another arm upstream of Springs Road and flow into a large dam before discharging to the Nepean River. There are a number of small farm dams along the creek line which disrupt the natural flow of water through the area.

2.5 Access

Access to the Reserve is generally via informal trails which are utilised by surrounding residents. Formalisation of appropriate park access routes and low impact parking will be a priority for park development as usage increases in future years. Refer figure 2.3 Access on the following page.

2.5.1 Traffic

Two arterial connections are located near the Reserve: Narellan Road which links the Reserve to the Hume Highway; and Camden Bypass which provides a connection from Narellan Road to Elderslie, Camden South and beyond. Local collector roads which pass near the Reserve include: Richardson Road, Glenlee Road and Welling Drive which forms the northern boundary of the Reserve. (Refer Figure 2.3: Access)

The East-west Link Road is an arterial road planned to pass along the northern boundary of the Spring Farm Release Area and connect to the South Western Motorway. It is envisaged that the link road will have a major impact on the Reserve by defining its boundary with Spring Farm Urban Release Area and increasing regional usage through greater exposure to passing motorists.

2.5.2 Parking

On-street parking is currently available on Welling Drive adjacent to the northern boundary of the Reserve. The William Howe Regional Park POM identified potential for a parking area on the junction of the regional park and the northern land parcel (adjoining the proposed east west link road)

2.5.3 Circulation

The presence of unformed bush trails in the Reserve provide a general indication of circulation patterns and level of use. These trails are essentially desire lines created by traffic from a number of users including: walkers, cyclists and legal / illegal vehicles.

In the northern parcel two intersecting primary trails are present, one extending from the south western corner along the ridgeline to the northern boundary, and the other accessed from a locked gate (un-passable for vehicle due to concrete blocks behind gate) at Welling Drive and contained predominantly in the power-line easement along the western boundary. A number of secondary and tertiary trails are evident in the perimeter fire break and throughout the tree canopy and grassland. Two main connections are made with surrounding land parcels, to the east into William Howe Regional Park and the rural land to the south.

A network of unformed trails are present through the southern land parcel in a roughly east-west alignment parallel to the Nepean River.



Unformed trail in the northern land parcel



Welling Drive provides on-street parking for the Reserve

2.0 THE RESOURCE

2.6 Park use and recreation

2.6.1 Current uses

The predominant activities undertaken in Gundungurra Reserve has previously been for environmental conservation and restoration of the remnant Cumberland Plains Woodland plant community, carried out by the community groups (Landcare) and Camden Council.

Recreational uses currently undertaken in the Reserve are predominantly trail based activities including:

- walking
- off-road cycling (mountain bike / bmx)
- motor cycle use
- four wheel driving

Of these recreational activities, only walking is realistically compatible with the inherent natural values of the Reserve and related bushland corridor. The other trail based activities can lead to environmental degradation through erosion of the unformed trail surface, and fragmentation of the natural environment. Motorcycle's and four wheel drive vehicles conflict with fauna values and other path users due to their noise and speed, and necessitate significant barrier access controls within the Reserve.

A formal park area adjoins Welling Drive and acts as a northern gateway to the Reserve and a space for passive recreation.

2.6.2 User analysis

The Demographic Analysis included in the William Howe Regional Park Draft POM highlights a higher than average proportion of young families with children in Camden Council: "11.1% of the population are aged 0-5 compared to 8.5% for the Sydney Statistical Division, and the growth rate for this group is said to be one hundred times the state growth rate". This information (in the context of subsequent urban growth) combined with the surrounding residential land uses suggests that there will be a demand for "all ages" family recreational activities including walking, cycling, picnics, and gatherings.

2.7 Landscape and visual character

2.7.1 Visual character

The following landscape types dominate the overall character of the Reserve (refer Figure 2.4 Landscape and Visual Character):

Natural Bushland

Remnant vegetative communities cover the majority of the Reserve and are representative of the natural landscape which dominated the area prior to European settlement. The condition of these areas is typically degraded due to herbivorey grazing, weed infestation and fragmentation caused by the unconsolidated network of trails.

Rural Grassland

Undulating land covered with native / pasture grasslands and isolated trees are characteristic of a rural landscape created by European Settlers who cleared the Cumberland Plains Woodland for agricultural use. This cultural landscape type which has dominated the Camden area for the past 200 years and threatened the natural vegetation communities, is now an important cultural heritage reference and is in danger of disappearing due to its suitability for redevelopment as residential subdivision.

Most of the Spring Farm Release Area located between the Reserve land parcels is currently characterised by rural grassland, however this will be replaced with urban development in the near future.

2.7.2 Site features

The following site features contribute to the intrinsic character of the Reserve:

Farm dams

A number of man made water features are located around the Reserve and surrounding area. They are varied in size and shape, and provide opportunities for



Natural bushland



Nepean River



Rural grassland



Power line easement

wildlife habitat and passive recreation, subject to water quality / public safety constraints

Views

Views of the Reserve and surrounding areas are readily available due to the sloping landform and large areas which are cleared of canopy vegetation. These views provide a high degree of visual connectivity which is physically lacking in the Reserve due the fragmentation of land parcels.

Power line easement

An Integral Energy above ground electricity supply and associated easement form the western boundary of the northern land parcel.

Nepean River

The Nepean River corridor, albeit in a degraded condition, forms a potential natural biodiversity corridor which links the Reserve to other natural areas which adjoin the river corridor.

Residential subdivisions

The urban character of nearby residential subdivisions (Narellan Vale, Mount Annan and Spring Farm in the future) provide a visual contrast to the natural / rural landscape character of the Reserve.

William Howe Regional Park

Located to the east of the northern land parcel, William Howe Regional Park provides a seamless extension of open space due to the lack of a geographical boundary and the continuation of rural / natural character.

Sydney Water Reservoir

This man made feature is located at a natural highpoint, adjacent to William Howe Regional Park and is visible from the open space areas between the reservoir and the Nepean River.



Farm dam



Sydney Water Reservoir

2.8 Ownership and leases

All of the land parcels in the study area are under the ownership of Camden Council. In accordance with the provisions of the Local Government Act 1993, leases or licenses may be granted over the land which is the subject of this Plan of Management. Council is authorised to grant leases or licences for purposes permitted under the Local Government Act 1993 including for the purpose of the provision of public utilities and works associated with, or ancillary to public utilities. Council has been requested by AGL Energy Limited to lease land for its gas utility pipelines and associated and ancillary infrastructure. This Plan of Management authorises Council to grant a lease for a maximum period of 15 years as allowed under the Local Government Act 1993 and for those purposes consistent with the values and outcomes identified in the Basis for Management.

A well surface location (SF20) and access road, as defined within Project Application 06_0291 to the Department of Planning as a utility installation, will be leased to AGL. SF20 was given Project Approval by the Minister for Planning on 4 September 2008, as part of the Spring Farm and Menangle Park components of the Camden Gas Project. A copy of the Project Approval is provided in Appendix B.

An initial site layout will be presented to the Director General and approved prior to commencement of construction. As described in the Environmental Assessment, the maximum footprint required for the construction would be up to 10,000m² and the perimeter would be fenced as required by Health, Safety and Environment, and other requirements. Once the well has been drilled and completed, the fenced construction area is reduced to typically a 45m by 45m area during the well commissioning phase and the surplus construction area is rehabilitated. Following well commissioning, construction and initial rehabilitation, the footprint of SF20 will be approximately 20m by 20m. The access road to SF20 will be approximately 3m wide. The lease will encompass these land requirements.

2.9 Management and maintenance

Gundungurra Reserve is currently managed by Camden Council who is responsible for its maintenance.

Maintenance currently undertaken by Council includes:

- monthly mowing and litter collection of the formal park area accessed from Welling Dr;

GUNDUNGURRA RESERVE – PLAN OF MANAGEMENT

- quarterly fire break mowing; and
- 'special request' maintenance as reported and as resources allow.

The Narellan Landcare Group has put a great deal of effort into improving the Reserve including:

- planting 3000 trees;
 - encouraging natural regeneration;
 - replacement planting of revegetated areas as required;
 - defining paths; and
 - removal of large woody weeds and seed source (Boxthorn, African Olive).
- A Gundungurra Reserve Bushcare group is currently being developed and will be involved in the management and maintenance of the reserve following the adoption of this Plan of Management.

3.0 BACKGROUND INFORMATION REVIEW

3.1 Previous studies

3.1.1 Camden Bushland Corridor Study (1996)

The Camden Bushland Corridor Study was prepared for Camden Council by Edaw in 1996. The stated purpose of the study is to:

- Establish a bushland corridor system as part of a major urban release program near Camden
- Evaluate the area as to the possibility of developing a bushland corridor
- Recommend appropriate strategies for establishment and management to achieve optimum bushland values

The criteria used to establish bushland corridors within the study area are based on simple principles including: size of bushland, connectivity of bushland areas, minimal edge effects, biodiversity and lack of weed invasion.

The study mapped natural and social values on a GIS system to illustrate areas of highest biophysical and social / cultural suitability. These suitability maps provided the basis for the definition of the bushland corridors from which a number of bush corridor options were generated. The preferred option includes all lands with existing bushland values as well as lands that will enable these lands to be joined to create corridors. Refer Figure 3.1: Council Adopted Bush Corridor Option.

Conservation / restoration management goals for the corridor outlined in the study:

- To conserve bushland values in the study area by establishing a continuous corridor system within the Spring Farm locality utilising existing bushlands and lands that create opportunity for re-establishing bushlands;
- while also establishing conservation strategies for bushland not included in the corridor system;
- To restore bushland values to areas within remnant bushlands by instigating weed control strategies, regeneration strategies and replanting schemes;
- Recognise other land management needs, e.g. bushfire management close to residential areas; and
- To achieve other social and land use values or needs from the bushland consistent with the conservation of bushland values.

3.1.2 William Howe Regional Park Draft Plan of Management (1999)

The William Howe Regional Park Draft Plan of Management (WHRP POM) was prepared by Spackman and Mossop for the NSW National Parks and Wildlife Service in August 1999, following the transfer and gazettal of the ridgetop land in 1998. It aims to guide the future development and management of the William Howe Regional Park in the context of the overall Metropolitan Regional Parks system and the local open space system.

The WHRP POM recognises the Regional Park's limitations due to size, and uses this rationale as the basis for including the following surrounding lands (including Gundungurra Reserve and the Spring Farm Bush Corridor) in its study area. The POM highlights the opportunities for the Regional Park to be a focal point in a significant open space corridor, and makes recommendations for the surrounding land parcels based on this approach.

"These adjoining lands all have the potential to provide vital links beyond the park boundaries, which will increase the role and benefits of the park and are therefore addressed in this document". (Spackman and Mossop 1999)

Key recommendations of relevance to Gundungurra Reserve (refer Figure 3.2: William Howe Regional Park POM):

1. Potential lay-by parking underneath powerlines
2. Protect and restore highly disturbed remnants of Cumberland *Plain Woodland*
3. Retain areas of open grasslands that evoke the traditional agricultural landscape of the Camden area
4. Potential picnic / group gathering area:

- terrain less steep than other areas of William Howe Regional Park
 - meadows of native grass
 - dam focal point
5. Proposed path connections
 6. Link between main focus areas in William Howe Regional Park
 7. Reserve is adjacent to proposed main long term carpark for William Howe Regional Park
 8. Potential overflow carparking area

3.1.3 Spring Farm Release Area Landscape Masterplan Report (2003)

The landscape masterplan report is to form an integral part of the overriding Camden Council Development Control Plan (Spring Farm Release Area DCP). The Landscape Masterplan aims to provide an overall landscape vision / strategy with design guidelines for future development of the site including:

- ESD principles for residential development,
- Street tree masterplan,
- Streetscape structure and design including landscape management of existing trees and remnant vegetation, and
- Public open space and parkland design.

The bush corridor areas identified in the masterplan are of particular relevance to Gundungurra Reserve as is the internal open space and road network. The public open space network for Spring Farm is centralised around the bush corridors which divide the five villages.

Roadways are proposed along the edge of the bush corridor which are seen as desirable for minimising edge impacts usually associated with weed invasion from adjoining residential areas to provide a fire break.

The report states that “the remnant vegetative communities and habitats which exist within the corridor are to be protected and rehabilitated”.

However, it appears that the exact nature of the bush corridor differs from that recommended in the Camden Bushland Corridor Study due to the inclusion of picnic areas (including bbq’s, picnic shelters and amenities block), shared use pathways (2.5m wide), and other passive and active recreation areas included within its habitat.

3.1.4 Spring Farm Urban Release Area Fauna and Fauna Habitat Study 2002

A fauna and fauna habitat survey of the Spring Farm Release Area was undertaken in 2002 by Conacher Travers for the Consortium Landcom. A total of 134 species were recorded within or adjacent to the study area comprising of 87 bird, 10 reptile, 6 amphibian, 27 mammal species and 4 molluscs.

Recommendations for the incorporation of fauna and fauna habitat issues into future development of the Spring Farm Release Area are provided in the report. It has been recommended that further survey occur in the area south of the Integral Energy Sub-station to the significance of this area for implementation of the Masterplan.

The report concludes that although there may be some short term impacts upon certain parts of the study area the Masterplan will provide an overall benefit to fauna and fauna habitat values within the study area and local area, through the recommended retention of the majority of the existing native habitats, future rehabilitation and revegetation of habitats, a net increase in native terrestrial and aquatic habitats within the study area and provision of linkages.

3.0 BACKGROUND INFORMATION REVIEW

3.1.5 Spring Farm Vegetation Assessment

This study details the results of a series of flora surveys undertaken over the Spring Farm Urban Release by Anne Clements and Associates 2001-02.

The assessment identifies five main vegetation assemblages including three remnants of the original vegetation:

1. Eucalypt vegetation on shale (Cumberland Plain Woodland)
2. River-flat vegetation on Holocene alluvium (Sydney Coastal River-flat Forest)
3. Forest/Scrub on high level alluvial sand (Elderslie Banksia Scrub Forest)
4. Aquatic vegetation
5. Predominantly non-local native assemblages:
 - Agricultural land, further divided into:
 - Grazing paddocks
 - Former orchards and vineyards
 - Remnant elevated road bunds – on high level alluvium
 - Former and current sand extraction areas
 - Dense exotic trees
 - Other - including domestic gardens and road verges.

The native vegetation assemblages within the Study Area meet the criteria for three endangered ecological communities listed on the Commonwealth Environment Protection & Biodiversity Conservation Act 1999 and the NSW Threatened Species Conservation Act 1995.

A fourth assemblage is potentially present in the Council's riparian corridor, namely the recently nominated endangered ecological community, Moist Shale Woodland.

3.1.6 Riparian Areas Plan of Management

This 'natural areas' plan of management specifies the manner in which the riparian open space areas in the Camden LGA will be used and managed.

Strategies relevant to this study are listed below:

- Biodiversity conservation
 - put in place measures as necessary to protect and enhance the ecological viability and biodiversity of all riparian areas in the study area of this plan
 - priority of rehabilitation should be placed on those areas that form part of the bushland corridor proposed by Camden Council
 - decommissioning of old dams should incorporate ecological transfer of valuable native flora and fauna
- Vegetation management
 - a weed management program should be undertaken for all riparian lands within the study area
 - a stream restoration vegetation management plan should be undertaken
- Fauna management
 - put in place measures to manage pest and fauna sufficient to ensure the ecological viability and biodiversity of all riparian areas covered by this plan
- Water quality
 - minimise and ameliorate soil and bank erosion
- Recreation
 - encourage passive recreation and provide facilities for passive recreational use
 - cycling is encouraged on formed and constructed roads, tracks and designated cycle ways

- cycling is not to be permitted on informal tracks where use may lead to damage of natural vegetation, or contribute to soil erosion and / or track damage
- public access should be limited and restricted to locations where the environmental impacts can be minimised and managed
- public access to riparian areas should be enhanced, and integrated with the surrounding environment in order to develop a sense of community ownership and encourage greater community involvement in their management
- a masterplan for regional walking / cycling trails should be put in place to inform future planning decisions and development consent conditions
- Landscape character
 - scenic landscapes are to be protected and enhanced
 - increase opportunities for public access to the Nepean River and integrate it visually into the wider landscape at selected key points to increase the visibility of the river corridor
 - locally occurring native communities are to be re-established in any revegetation works to preserve the natural character of the riparian corridors
 - any new watercourse and wetland rehabilitation has to be consistent with a prescribed character that draws upon the pre-european natural communities
- Cultural heritage
 - Aboriginal and European cultural and historic sites are to be protected and maintained
 - cultural and historic sites as focus points within the riparian corridor system, including the use of interpretive material
- Monitoring and evaluation
 - water quality sampling should be undertaken, particularly before and after data where new developments are to be constructed

3.1.7 Previous Plan of Management for Gundungurra Reserve

This plan of management was prepared by Peter Dixon, Hawkesbury-Nepean Catchment Management Trust. The study was prepared prior to 53 hectare dedication from Landcom, when the park consisted of Lot 609 (3772 square metres) and Lot 1062 an electricity easement.

The study recommended that the park should undergo bush regeneration improvements and utilised as a gateway from the suburb of Narellan Vale to the proposed bush corridor. It also recommended that the electricity easement should be improved with a meandering service track and revegetated with non-indigenous species that grow no higher than 4 metres. Refer Figure 3.4: Previous POM.

3.2 Planning context

3.2.1 Commonwealth Planning Policies

Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth legislation provides a national framework for environment protection through a focus on protecting matters of national environmental significance and on the conservation of Australia's biodiversity.

3.2.2 State Government Planning Policies

Sydney Regional Environmental Plan No. 20 – Hawkesbury-Nepean River

Gundungurra Reserve falls within the catchment of the Hawkesbury-Nepean River which is covered by the Sydney Regional Environmental Plan (REP) No. 20 – Hawkesbury Nepean River.

3.0 BACKGROUND INFORMATION

The aim of the plan is to protect the environment of the river system by ensuring that the impacts of future land uses are considered in a regional context. This supports the Vision of the Hawkesbury-Nepean Environmental Planning Strategy, which is as stated:

“The health, integrity and diversity of the Hawkesbury-Nepean catchment must be maintained and, wherever possible, improved. The catchment and its river system must be able to meet the needs of its residents and users so that it can continue to be an area that is enjoyed and used by the people of Sydney now and in the future.”

Local Government Act 1993

Section 46 (1)(a) and (a1) of the Local Government Act 1993 provides that a lease may be granted for the provision of public utilities and works associated with or ancillary to public utilities, therefore the grant of a lease over the land for the construction. All of the land parcels in the study area are under the ownership of Camden Council. No current leases apply to the area. Section 46(3) states that Council must not grant a lease or licence for a period (including any period for which the lease or licence could be renewed by the exercise of an option) exceeding 21 years. Under the provisions of the PoM and in accordance with the provisions of the Local Government Act 1993, leases and/ or licences may be granted over the land the subject of this PoM for the purpose of utility installations for a period of not greater than 21 years.

Local Government Amendment (Community Land Management) Act 1998

The Local Government Act provides the legislative framework for a council's day to day operation. The Act emphasises a council's responsibility to actively manage land and to involve the community in developing a strategy for management. Of particular relevance is the requirement for all council property classified as Community lands to be categorised in accordance with the guidelines for the categorisation of community land (cl.6B-6JA). For lands categorised as Natural Area, specific planning and management strategies are to be provided. Strategies must reinforce and reflect the core objectives for community land (s. 36E-N).

Fisheries Management Act (1994)

Administered by NSW Fisheries, the Fisheries Management Act addresses the conservation of threatened fish and habitats in NSW waters. The Act contains up to date information on endangered / vulnerable species, populations, ecological communities, species presumed extinct, and key threatening processes.

Rivers and Foreshores Improvement Act 1948

The R&FI Act applies to natural and artificial water bodies, which are known as protected waters, and which include:

- all clearly defined drainage lines
- perennial (flowing) or intermittent (often dry) streams
- modified stream channels
- artificial channels diverting natural stream channels
- estuaries, coastal lakes or lagoons
- any perennial or intermittent lakes having a stream running into or from them and coastal lakes

The Nepean River is classified as protected waters. Part 3A of the Act is designed to control activities that have potential to cause adverse impacts to the water body and also applies to protected land which includes the bank, shore or bed of these water bodies, and adjacent land within 40 metres of the top of their banks. A Part 3A permit is generally required (apply to Department of Land and Water Conservation) for any works undertaken on, in or under protected land.

National Parks and Wildlife Act 1974

Under this act, the Director-General of the NPWS is responsible for the care, control and management of all national parks, historic sites, nature reserves, reserves, Aboriginal areas and state game Reserves. State recreation areas, karst conservation reserves and regional parks are also administered under the Act.

3.0 BACKGROUND INFORMATION

The Director-General is also responsible under this legislation for the protection and care of native fauna and flora, and Aboriginal places and relics throughout NSW.

Threatened Species Conservation Act 1995

This act outlines the duties of the NPWS in protecting threatened species, communities and critical habitat in New South Wales. An independent Scientific Committee has been set up under the Act to determine which species, populations and ecological communities should be listed as endangered, vulnerable or extinct under the act, and also to determine key threatening processes.

The major aims of the TSC Act are to:

- conserve biological diversity and promote ecologically sustainable development
- prevent the extinction and promote the recovery of threatened species, populations and ecological communities
- protect the critical habitat of those threatened species, populations and ecological communities that are endangered
- eliminate or manage certain processes that threaten the survival or evolutionary development of threatened species, populations and ecological communities
- ensure that the impact of any action affecting threatened species, populations and ecological communities is properly assessed
- encourage the conservation of threatened species, populations and ecological communities by the adoption of measures involving cooperative management

Noxious Weeds Act 1993

The Noxious Weeds Act 1993 seeks to control a range of introduced plants which have a detrimental effect on agriculture, human health, and the environment. The Act allows for the declaration of noxious plants in four (4) categories (W1 to W4), and these are categorised according to the specific action required to control them.

If noxious plants (as identified by the Act) are present on private land, the landholder has a legal responsibility to control them and to prevent their spread to adjoining land. Similarly, noxious plants occurring on public land must also be controlled, so that local government and State government agencies also must abide by the requirements of the Act. The local council enforces the Act on behalf of the Minister for Agriculture.

Rural Fires Act

The Rural Fires Act establishes an administrative framework for the prevention and control of rural fires. The objects of this Act are to provide:

- (a) for the prevention, mitigation and suppression of bush and other fires in local government areas (or parts of areas) and other parts of the State constituted as rural fire districts, and
- (b) for the co-ordination of bush fire fighting and bush fire prevention throughout the State, and
- (c) for the protection of persons from injury or death, and property from damage, arising from fires, and
- (d) for the protection of the environment by requiring certain activities referred to in paragraphs (a)-(c) to be carried out having regard to the principles of ecologically sustainable development described in section 6 (2) of the Protection of the Environment Administration Act 1991.

Soil Conservation Act

The Soil Conservation Act 1938 generally aims to ensure the conservation of the State's soil resources, to mitigate soil erosion and land degradation, and to conserve water resources. The act was responsible for establishing the soil conservation service but is now administered by the Department of Land and Water Conservation.

3.0 BACKGROUND INFORMATION

3.2.3 Camden Council Planning Policies

Camden 2025 Strategic Plan (1999)

The Camden 2025 Strategic Plan for Camden aims to provide direction for the future of the LGA and identifies the following five major areas as integral to providing quality of life to residents:

- Managing urban growth
- Accessibility
- Environmental systems
- Economic and community development

- Governance

As stated in the plan the desired outcome for Environmental Systems is:

“A Camden in which its unique natural systems have been protected and enhanced and are enjoyed and valued by the community”

Council objectives for Environmental Systems are listed below:

- protect and restore the water quality of rivers and creeks to ensure sustainable habitats and diverse recreational opportunities
- minimise adverse impacts on air quality
- preserve the areas biological diversity
- preserve and enhance the visual, cultural, and scenic landscape qualities
- minimise the level of household, commercial and industrial waste generation
- minimise any adverse impacts caused by increased noise levels

The following strategies for Environmental Systems are relevant to this study:

- develop and implement a Natural Corridors Plan
- implement a policy for conservation of known threatened ecological communities
- support local stream watch program
- conserve the important cultural and scenic landscapes that characterise the Camden area
- ensure development controls are consistent with landscape preservation objectives

Camden Structure Plan (2000)

The following aim, vision and desired outcomes are stated in the Camden Structure Plan.

Study Aim:

To provide a planning framework to the year 2025 which preserves Camden's unique characteristics while accommodating urban growth.

Vision:

An urban and rural community using its past and its environment to shape its future.

Desired Outcomes:

- Ecologically sustainable urban and rural activities
- Employment growth
- Improved accessibility
- Improved public transport
- Historical and environmental awareness

Strategies contained within the structure plan that are of relevance to this study are listed below:

- integrate significant areas of remnant vegetation into the open space / vegetation network

3.0 BACKGROUND INFORMATION

- establish an open space / vegetative corridor along the banks of the Nepean River including but not limited to riparian areas
- provide appropriate zoning protection and planning controls for these corridors

Camden Open Space Strategy

This strategy aims to preserve Camden's open space resources by adopting a sustainable approach to open space planning and management.

The Open Space Strategy provides a framework for decision making in the identification, conservation, acquisition and management of open space.

The strategy provides guidelines for the development / protection of public and private open space areas in the Camden LGA, and applies to the consideration of Development Applications (DA's) and in the preparation of Local Environmental Plans (LEP's) and Development Control Plans (DCP's).

The strategy identifies the following objectives to guide decision making:

- Environmental Preservation and Natural Systems Objectives
- Urban Development
- Rural Character
- Community Development and Recreation
- Accessibility
- Economic Development
- Governance

Camden Draft Natural Assets Policy

By integrating the regulatory requirements of state natural resource management legislation and policies and providing guidance for the development, redevelopment and subdivision of land which may impact on natural assets, the policy aims to:

- facilitate ecologically sustainable development;
- protect the environment of the Camden LGA;
- maintain the natural hydrological processes of the landscape; and
- provide an offsetting mechanism to provide flexibility in the implementation of the policy.

3.2.4 – Planning Approval for Gas Well

A well surface location (SF20) and access road, as defined within Project Application 06_0291 to the Department of Planning as a utility installation, will be leased to AGL. SF20 was given Project Approval by the Minister for Planning on 4 September 2008, as part of the Spring Farm and Menangle Park components of the Camden Gas Project. A copy of the Project Approval is provided in Appendix B

4.0 BASIS FOR MANAGEMENT

The basis for management describes the approach to determining management strategies for the site. This includes consultation at a variety of levels, and the identification of values, desired outcomes, and issues based on these factors and outcomes of Section 2 The Resource.

Based on these outcomes and in coordination with the development of the Management Strategy Framework (Refer Appendix A), community land categorisations in accordance with the Local Government Act are proposed.

4.1 Methodology

This section summarises the basis from which the plan of management strategies and actions have been developed. In accordance with the guidelines established in "Succeeding with Plans of Management" (DLWC / Manidis Roberts 1996), the Gundungurra Reserve Plan of Management has been prepared based on a "values based approach". Using values as the foundation of the plan of management process ensures the plan will remain valid for longer.

Alternatively an issues based approach (as often followed in plan preparation) whilst dealing effectively with the issues of the day has no flexibility to deal with new issues that arise over time, and may quickly become out of date. This is "based on the assumption that community values change at a much slower rate than issues" (DLWC / Manidis Roberts 1996).

The identification of values for the Gundungurra Reserve (refer 4.3 Values / roles) has provided a basis for decision making which enables each step in plan preparation to relate and cross reference back to the established values.

Through a synthesis of the findings of the preceding review and assessment phase with the outcomes of the Steering Committee and Community Working Groups, a basis for management has been resolved that identifies:

- values and roles of Gundungurra Reserve;
- issues and opportunities to be addressed in developing, planning and management strategies; and
- desired outcomes for the Masterplan and Plan of Management.

Figure 4.1 (below outlines the key steps in preparing a plan of management).

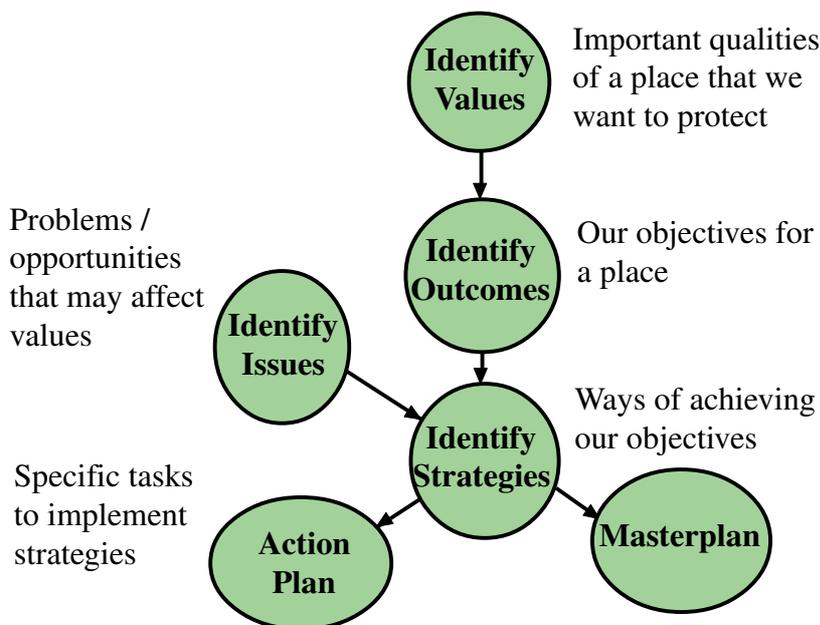


Figure 4.1: Key steps

GUNDUNGURRA RESERVE – PLAN OF MANAGEMENT

Figure 4.2 (below) outlines the broad study process incorporating the relationship of site values to plan development, and the integration of consultation with the key study phases.

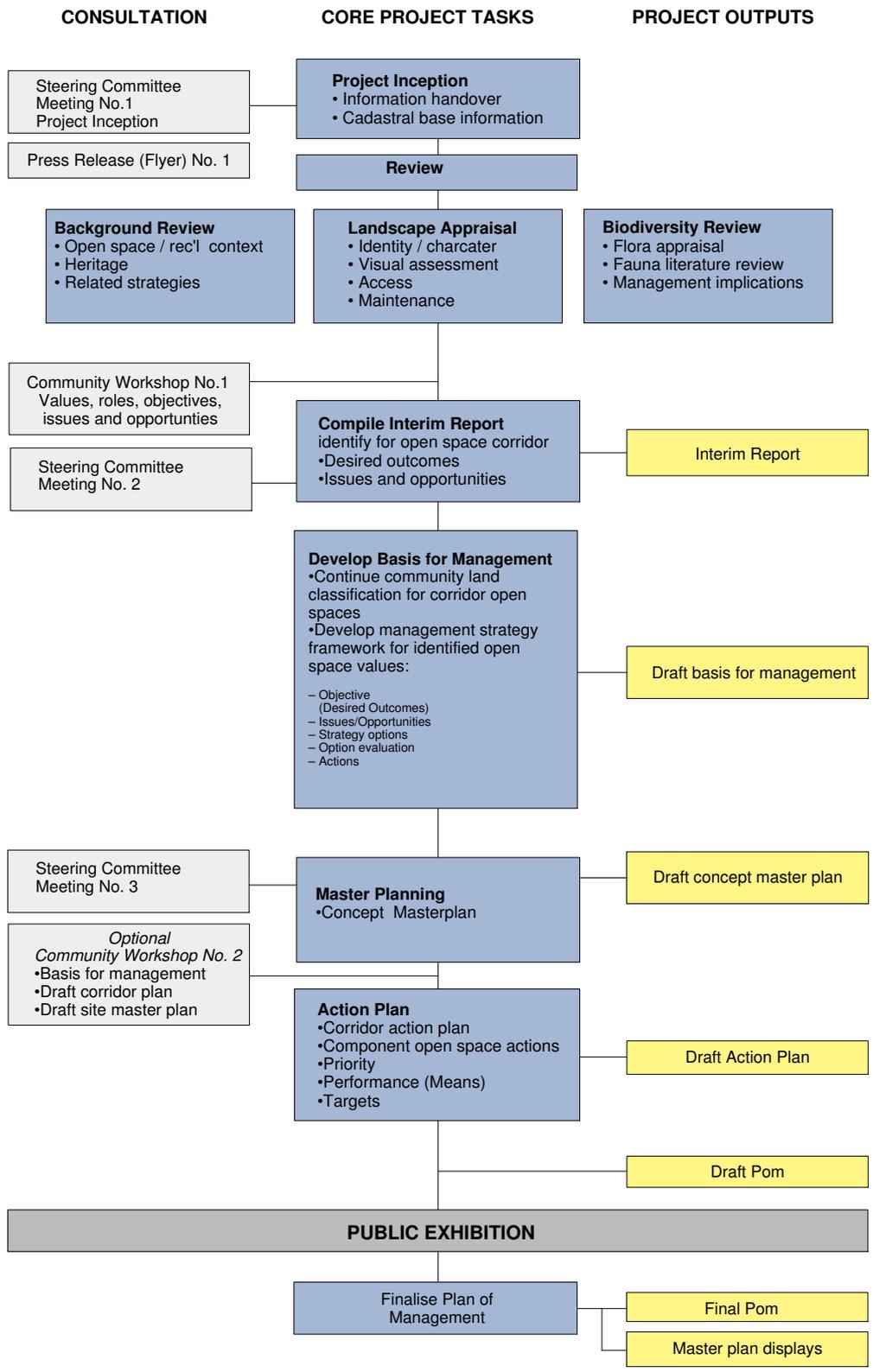


Figure 4.2: Methodology

4.0 BASIS FOR MANAGEMENT

4.2 Consultation

The plan of management has incorporated several consultation components aimed to both assist in the sourcing of information and development of planning and management strategies, and to inform relevant stakeholders and the local community of the study outcomes as they have developed.

4.2.1 Steering Committee

A Steering Committee was formed from stakeholder groups to guide the direction of the study. Those groups / individuals which were specifically contacted and invited to attend the steering committee meetings include:

- Councilors;
- Camden Council Officers;
- NSW National Parks and Wildlife Service;
- Mount Annan Botanic Gardens;
- Narellan Landcare group;
- Waste Services;
- Tharawal LALC; and
- local community group representatives

4.2.2 Publicity

Flyers containing information about the plan of management and community workshops were distributed by a letter box drop to local residents in streets adjacent to the corridor and were also posted on community notice boards.

4.2.3 Focus group

Community consultation was undertaken to ascertain key issues and values in relation to the study area and surrounds.

Respondents to the press release and stake holders sourced through organised groups participated in community workshops. The evening involved degrees of technical input by the consultants to initiate discussion of topics and issues on the agenda, however the emphasis was on involvement and input by community representatives.

4.3 Values and roles

Values are the qualities of the Reserve as identified in the community working group and previous studies that are significant, special or important and that should be protected or enhanced. Roles are the functions of the Reserve within the local and regional open space system. Values / roles for the Reserve are described in the generic topics below:

4.3.1 Natural Environment

- Conservation / protection of natural heritage values
- Bushland corridor network
- Bushland restoration and reinstatement
- Native fauna habitat
- Soil stability
- Drainage
- Scientific

4.3.2 Social / Cultural

- Open space system
- Community role in open space preservation
- Proximity to residential development
- Cultural landscape

4.3.3 Recreation

- Passive recreation
- Shared path network
- Equitable access
- Relationship to Spring Farm Urban Release Area

4.3.4 Education

- Natural and Cultural Heritage Interpretation

4.3.5 Heritage

- Cultural significance

4.3.6 Intrinsic

- Urban development in context of bush corridor
- Site access
- Site address
- Public transport
- Car parking

4.3.7 Visual

- Visual connections with surrounding open space
- Mixed visual character

4.3.8 Management and maintenance

- Fire management
- Dumping
- Access
- Farm dams
- Co-management of boundaries
- Funding

4.0 BASIS FOR MANAGEMENT

4.4 Issues and opportunities

Issues may include impacts on the land or environment, and potential conflicts between users or usage and other qualities of the site. Opportunities are the qualities of the site which make it suitable for natural value connection / enhancement, for community or recreational uses or activities, and which may not be fully realised at present.

The following items incorporate the discussions of the steering committee, community working group, the findings of the study team and the findings of previous studies.

4.4.1 Natural Environment

Fragmentation / isolation

<i>Issues</i>	<i>Opportunities</i>
<ul style="list-style-type: none"> Gundungurra Reserve is comprised of three separate parcels which are not connected The proposed East West Link Road along with smaller roads proposed in the Spring Farm Release Area Landscape Masterplan Report could potentially isolate land parcels within the bushland corridor Effectiveness of clumps of native vegetation as wildlife habitat is reduced due the absence of connections to other habitat areas 	<ul style="list-style-type: none"> Corridors add value to the environmental quality of bushland. This is especially true for wildlife values and also visual and recreational values.

Edge effect

<i>Issues</i>	<i>Opportunities</i>
<ul style="list-style-type: none"> Bush areas are potentially impacted by adjacent urban areas (edge impacts) Without weed control on adjoining lands (especially bird-dispersed species such as Privet, Olive, Lantana, Cestrum), bush regeneration will be difficult (and expensive to maintain) 	

Buffer

<i>Issues</i>	<i>Opportunities</i>
<ul style="list-style-type: none"> The effectiveness of a bush corridor network is being eroded by reduction in area adjacent to Jacks Gully Landfill. The proposed Odour Buffer was originally planned to be 450m wide, has been reduced to around 70m 	

4.4.1 Natural Environment (continued)

Threatened species / EEC's

Issues	Opportunities
<ul style="list-style-type: none"> • Cumberland Plains Woodland (northern and southern parcel), Sydney Coastal River Flat Forest (southern parcel) Elderslie Banksia Scrub Forest (located in between northern and southern land parcels) are listed as endangered ecological communities under the <i>NSW Threatened Species Conservation Act 1995</i> and the <i>Commonwealth Environmental Protection and Biodiversity Conservation Act 1999</i> • Threatening processes for EEC's / Threatened Species include: <ul style="list-style-type: none"> – land clearing for agriculture and urban development – sand mining – physical damage from recreational activities – mowing – weed invasion – increased soil nutrients – rubbish dumping – frequent fire (accidental and inappropriate fire regimes) – herbivore/ fauna predation (European red fox, feral cats, rabbits) – removal of dead wood, dead trees and logs • <i>Elderslie Banksia Scrub Forest</i> located on adjoining land (Spring Farm Urban Release Area) is threatened by urban development • <i>Pimelia spicata</i> (northern parcel) is listed as an Endangered species on Schedule 1 of the <i>NSW Threatened Species Act 1995</i> and as an Endangered species under the <i>Commonwealth Environmental Protection and Biodiversity Conservation Act 1999</i> • Current vehicle access track into Reserve along western edge dissects the two known occurrences of <i>P. spicata</i>. • <i>P. spicata</i> requires high light habitats (e.g. open grasslands to open woodland with native grass understorey). • <i>Pomaderris brunnea</i> (southern parcel) is listed as a Vulnerable species on Schedule 2 of the <i>NSW Threatened Species Act 1995</i> and as a Vulnerable species under the <i>C EP & B C Act 1999</i> 	<ul style="list-style-type: none"> • Ensure the ongoing ecological, biodiversity, habitat values of the land are maintained

4.0 BASIS FOR MANAGEMENT

4.4.1 Natural Environment (continued)

Drainage

Issues

- The presence of farm dams effects natural drainage patterns

Opportunities

Weeds

Issues

- Natural areas of site degraded due to high density of weed species present in the Reserve and adjoining lands (e.g. William Howe Regional Park)
- Under the *Noxious Weeds Act 1993*, landowners / managers are required by law to control weeds on their property
- The following noxious and environmental weeds are present:
 - African Box-thorn present on former pasture
 - African Olive and Privet widespread in shrub layer (dominant mid-story species eastern end of southern land parcel)
 - Saint Johns Wart

Opportunities

Recreational

Issues

- Potential impact of high intensity recreational activities on natural habitat values
- Track / pathway provision may fragment bushland and / or restored bushland areas
- Unauthorised recreational use of the reserve such as trail bike riding and mountain biking conflicts with the natural conservation objectives for the study area due to potential impacts of erosion, weed dispersal, noise (fauna), and vegetation damage

Opportunities

Land clearing

Issues

- Extent of existing canopy is limited due to land clearings for past agricultural uses

Opportunities

Grazing

Issues

- High levels of herbivory will compromise bush revegetation / regeneration programs

Opportunities

4.4.1 Natural Environment (continued)

Habitat

<i>Issues</i>	<i>Opportunities</i>
	<ul style="list-style-type: none"> • African boxthorn infestation in the northern land parcel provides valuable habitat for native bird species • Existing native vegetative communities provide limited wildlife habitat for of native fauna due to absence of a shrub layer • Farm dams provide valuable habitat for native fauna species • The areas of native / pasture grasslands and weeds (especially African Boxthorn) provide a valuable habitat for birds • Ensure the ongoing ecological, biodiversity and habitat values of the land are maintained

Feral animals

<i>Issues</i>	<i>Opportunities</i>
<ul style="list-style-type: none"> • Native fauna threatened by a range of feral and domestic animals • Rabbits are responsible for eating juvenile plants in revegetated areas and their burrows are susceptible to erosion 	

Restoration / reinstatement

<i>Issues</i>	<i>Opportunities</i>
<ul style="list-style-type: none"> • Difficult to restore woodland without costly maintenance program in Reserve to contain wind-dispersed pasture & weed grasses • Narellan Landcare Group has put a lot of effort into improving the reserve including: planting 3000 trees, encouraging natural regeneration, defining paths, and controlling weeds • Need for clearly identified actions on ground which meet Australian National Heritage Charter and National Trust, Endangered Ecological Community (EEC) and Threatened Species Recovery Plan requirements, and allow budgetary requirements to be developed • Potential for Gundungurra Reserve to act as a model for bushland restoration / reinstatement techniques in the local area 	

4.0 BASIS FOR MANAGEMENT

4.4.1 Natural Environment (continued)

Soils / riverbank stability

Issues	Opportunities
<ul style="list-style-type: none"> • Potential impact of weed removal on riverbank stability • Some steeper areas of the reserve are subject to soil erosion • Soil may be vulnerable to erosion during weed removal works • Possible areas of salinity, need for rehabilitation 	

Scientific

Issues	Opportunities
<ul style="list-style-type: none"> • Evaluation of restoration / reinstatement programs required • Potential for future impacts to biodiversity within the bushland corridor • Lack of fauna information for Gundungurra Reserve – impacts of habitat fragmentation and ecological values not fully understood 	

4.4.2 Social / Cultural

Issues	Opportunities
<ul style="list-style-type: none"> • Edge impacts of residential development on the reserve / bush corridor • Cultural significance of pastoral "grasslands" to Camden • Landscape types such as open grass areas and individual plant species such as pine trees have cultural significance due to their association with past land uses as, predominantly Dairy farms • Increasing population density in the surrounding suburban development resulting in demand for usable open space 	<ul style="list-style-type: none"> • Positive community involvement in bush corridor conservation • The site is highly valued by community members due to its integrated natural / rural character

4.4.3 Recreation

Issues	Opportunities
<ul style="list-style-type: none"> • The reserve is used for a range of recreational uses which are incompatible with the natural values such as mountain biking, BMX, and four wheel driving • Facilities for prohibited forms of recreation are not provided elsewhere in the surrounding area • Potential impact of paths on adjoining residential areas (through traffic, increased parking on local streets) • Potential for habitat areas to be impacted by access provision 	<ul style="list-style-type: none"> • The reserve is currently used for unstructured passive recreational activities (e.g. walking) • WHRP POM highlighted the potential for an activity focus in north western part of the Reserve adjacent to the dam in WHRP • Recreation potential around water elements (farm dams) with wetland qualities • Bush corridor provides opportunity for provision of shared pedestrian / cycle pathways

4.4.3 Recreation (continued)

- | | |
|---|---|
| <ul style="list-style-type: none"> • Equal access facilities are limited in the area • Demand for vehicle access close to site focal point to enable mobility impaired park users to access the area • Quantity and quality of passive and active recreation areas provided in release area will impact on the role of Gundungurra Reserve | <ul style="list-style-type: none"> • Nepean River corridor provides opportunity for path connection with Camden township |
|---|---|

4.4.4 Education

<i>Issues</i>	<i>Opportunities</i>
<ul style="list-style-type: none"> • A range of natural and cultural heritage items are present in the reserve 	

4.4.5 Heritage

<i>Issues</i>	<i>Opportunities</i>
<ul style="list-style-type: none"> • Due to the sites proximity to high points (WHRP) and the Nepean River, it is likely that the surrounding areas would have significance to Aboriginal people • Historic connection with 'Glenlee' Estate and early European settlement in the area 	

4.4.6 Intrinsic

<i>Issues</i>	<i>Opportunities</i>
<ul style="list-style-type: none"> • According to the Spring Farm Urban Release Area Local Environmental Study (2000) the Spring Farm development is only capable of achieving 200 ha developable area due to environmental and intrinsic constraints • Pressure to reduce the width of the Bush Corridor to achieve a higher gross density of dwellings per hectare (Government policy targets 15 dwellings / hectare gross density) • The site currently lacks any sense of address at entry points • Powerline easements on the site constrain potential uses and habitat management • No existing public transport infrastructure • It is anticipated that the existing parking situation (on-street parking along Welling Drive) may be insufficient to cater to increasing demands for an improved resource 	<ul style="list-style-type: none"> • The Gundungurra Reserve site has been identified as a potential entry point to WHRP • Location of on site carparking is best located adjacent to high use areas • Opportunity to incorporate parking with access from proposed link road

4.0 BASIS FOR MANGEMENT

4.4.7 Visual

<i>Issues</i>	<i>Opportunities</i>
<ul style="list-style-type: none"> • Native pasture grasslands with clumps of trees that exist on site are characteristic of the rural landscape (for the last 150 years) is rapidly vanishing and being replaced with urban sprawl • Visual impact caused by Sydney Water reservoir in WHRP • Potential impact of park shelters / furniture • Site is visible from adjoining open space areas in particular the WHRP Turkeys Nest Dam lookout 	<ul style="list-style-type: none"> • Remnant canopy trees are an important visual landmark and set the existing character of the northern land parcel (Welling Drive) • Community desire to retain views corridors from northern ridgeline

4.4.8 Management and maintenance

Fire management

<i>Issues</i>	<i>Opportunities</i>
<ul style="list-style-type: none"> • According to the Camden Bush Fire Risk Management Plan the bush fire hazard for Gundungurra Reserve is considered low in grassland areas, moderate in woodland areas (based principally on vegetation type and slope) and moderate on the fringe of residential areas • Fire regime for Cumberland Plain Woodland not fully understood, but it is generally accepted that a fire every 8-10 years can be beneficial to woodland health • Arson frequent in North reserve bordering older residential suburbs • The large areas of grassland and bushland may present a bush fire threat to natural areas and surrounding residences • Access for fire fighting/emergency vehicles into heart of reserve and around all perimeters is required • Potential for 'arcing' from high tension wires 	<ul style="list-style-type: none"> • Potential to use fire as a management / maintenance tool to reduce weed species, encourage natural regeneration and reduce fuel levels and subsequent bush fire risk

Dumping

<i>Issues</i>	<i>Opportunities</i>
<ul style="list-style-type: none"> • Open space land is subject to dumping from a number of sources 	

Access

<i>Issues</i>	<i>Opportunities</i>
<ul style="list-style-type: none"> • Access to the park at night, or by off-road vehicles can be detrimental to the environmental values of the park 	

Farm Dams

<i>Issues</i>	<i>Opportunities</i>
<ul style="list-style-type: none"> • Farm dams have ongoing maintenance requirements • Liability concerns for farm dams – potential for personal injury 	

(drowning) and damage to property in the event of structural failure

4.4.8 Management and maintenance (continued)

Co-management of boundaries

<i>Issues</i>	<i>Opportunities</i>
<ul style="list-style-type: none"> Open spaces are joined but managed by different authorities 	

Funding

<i>Issues</i>	<i>Opportunities</i>
<ul style="list-style-type: none"> POM will assist Council and Community groups obtain grants for further improvements (e.g. Natural Heritage Trust, Upper Nepean Committee) 	

4.5 Desired outcomes

Desired outcomes are expectations and objectives for making decisions (also known as goals and aims). The desired outcomes for Gundungurra Reserve have been listed below in the form of an overall objective and individual outcomes as listed in the Management Strategy Framework.

4.5.1 Natural Environment

Undertake a corridor wide approach to land management that prioritises the protection and improvement of natural bushland communities throughout Gundungurra Reserve and the Spring Farm Bushland Corridor.

Fragmentation / isolation

- Improve extent and quality of bushland and open space
- Corridor wide approach to land management
- Maximise the connectivity of bush parcels separated by roads and cleared areas
- Maintain the integrity of the bushland corridor strategy adopted by Council

Edge effect

- Minimise impacts of adjoining land use on natural areas

Threatened species / EEC's

- Protect and improve condition of endangered communities
- Protect and improve condition of threatened species

Drainage

- Reinstate natural drainage patterns throughout Gundungurra Reserve

Weeds

- Undertake catchment wide approach to weed control
- Ongoing reduction in level of weed impact through reserve

Recreational

- Bushland corridor to facilitate environmentally sustainable community recreational use
- Enforce restrictions to recreational use
- Facilitate bushland regeneration where possible

4.0 BASIS FOR MANAGEMENT

Land clearing

- Protect the ecological biodiversity and habitat values of the site

Grazing

- Prevent grazing on the Reserve

Fauna / habitat

- Conserve and enhance native fauna species and habitats

Feral animals

- Minimise the impact of threats to bushland

Restoration / reinstatement

- Ensure best management practices for ecological restoration
- Develop annual (or longer) bushland restoration and reinstatement work program

Soils / riverbank stability

- Ameliorate degraded soil to improve condition / composition

Scientific

- Undertake scientific monitoring of biodiversity to improve awareness of environmental condition and function

4.5.2 Social / Cultural

Integrate community involvement into site planning and management of the Reserve.

- Improve extent and usability of open space system
- Recognise community role in open space preservation
- Maximise positive and mitigate negative aspects of proximity of residential areas to bush corridor
- Retain reference to agricultural history of area in landscape character
- Community involvement in bushland issues maintained
- Preserve representative areas that exhibit rural character

4.5.3 Recreation

Provide for a sustainable level of passive recreation and access compatible with the environmental objectives for the Reserve and Bushland Corridor.

- Provide for a sustainable level of passive recreational usage
- Deter inappropriate / destructive recreational use of the reserve
- Provide shared pathway network for recreational and commuter use
- Cater for all potential users
- Integrated open space planning corridor and open space benefits

4.5.4 Educational

Enhance user understanding of the natural and cultural heritage items, character of the reserve and adjoining areas.

- Enhance user understanding of the natural and cultural heritage items, character of the reserve and adjoining areas.

4.5.5 Heritage

Provide conservation of cultural heritage and appropriate interpretation in liaison with local stakeholders including local Aboriginal Land Councils and the National Parks and Wildlife Service.

- Provide conservation of cultural heritage and appropriate interpretation in liaison with local stakeholders including local Aboriginal Land Councils and the National Parks and Wildlife Service.

4.5.6 Intrinsic

Open space improvements to Gundungurra Reserve relate to surrounding land uses and incorporate ESD principles.

- Create a residential subdivision based on ESD principles that respects the natural site constraints
- Maintain the integrity of the preferred bush corridor strategy adopted by Council
- Provide legible, comfortable and safe system of open space access
- Fragmented reserve lands to be unified in character and function
- Minimise impact of service easements
- Provide reliable public transport accessing the reserve
- Open space enhancement / use shall not impact on local resident amenity

4.5.7 Visual

Conserve and enhance the natural character of the landscape whilst maintaining cultural landscape influences.

- Maintain visual links to adjoining areas
- Retain balance of natural and cultural landscape
- Minimise visual impact of structures

4.5.8 Management and maintenance

Provide sustainable maintenance to enhance environmental and recreational values.

Fire management

- Minimise the threat of fire to the Reserve, adjoining residents and corridor lands (Asset Protection)
- Optimise practical use of fire as a management / maintenance tool

Dumping

- Limit the impact of adjoining landuses and recreational use with appropriate rubbish control measures

Access

- Control after hours and vehicle access to the park

Farm Dams

- Effectively manage and maintain farm dams for public safety and fauna habitat provision

Co-management of boundaries

- Undertake co-management of boundaries with NPWS

Funding

- Optimise funding of actions

Well Surface Location and Access Road
Hazard and Risk Management and Maintenance
<p>Ensure that no sensitive, residential or business development or active open space occurs within 20 metres measured from the edge of the SF20 compound during early/intermediate operation. During established operation this distance remains the same for sensitive development, reduces to 15 metres for residential and reduces to 10 metres for business and active open space.</p> <p>Application of the Camden Gas Project Emergency Response Plan (ERP) to the SF20 site.</p> <p>General inspection and maintenance of wells to form part of the ongoing operation of the well surface location in order to maintain the integrity of the equipment and systems.</p>

Well Surface Location and Access Road
Operational management measures such as weed and grass control would minimise the incidence of fires and bushfire or grassfires in the general area.
<i>Air Quality Management and Maintenance</i>
<p>Within the Air Quality Work Plan, the following mitigation measures are proposed during construction:</p> <ul style="list-style-type: none"> • Earthworks, vegetation clearing and soil disturbance would be minimised at sites wherever possible; • Disturbed surfaces would be remediated as soon as practical after disturbance with minimal lag time between clearing and remediation; • Construction activities shall be monitored to identify excessive dust generation. Dust control measures (such as the use of water carts) shall be implemented in the event of excessive dust generation; • Stockpiles and unsealed surfaces would be sprayed with water to minimise excessive dust generation (if necessary); • During high wind conditions, activities likely to generate dust would be minimised or ceased wherever possible; • Machinery, plant and equipment would be serviced, in good working order and would be fitted as required with appropriate exhaust emission control devices; • Unnecessary traffic movements would be eliminated or minimised; and • Surrounding residents would be notified prior to the start of construction activities and contact details would be provided for reporting and further information. <p>Within the Air Quality Work Plan, the following mitigation measures are proposed during production:</p> <ul style="list-style-type: none"> • Dust monitoring and control measures implemented as listed above; • Gas well surface locations would be monitored remotely from the control room at the gas plant and inspected regularly for gas leaks and emissions; and • Annual leak detection services would be undertaken by a third party operator;
<i>Flora and Fauna Management and Maintenance</i>
<p>Within the Flora and Fauna Work Plan and the Soil and Water Management Work Plan, the following mitigation measures will minimise potential impacts upon flora and fauna:</p> <ul style="list-style-type: none"> • Construction footprint to be kept to a minimum; • Clearing of native vegetation, to be avoided; • Erosion and sediment control measures to be installed around construction work and (where appropriate) adjacent to roads; • Significant habitat trees and EECs to be fenced off.
<i>Visual Amenity Management and Maintenance</i>
<p>Within the Rehabilitation and Landscape Work Plan, the following mitigation measures are proposed in respect of visual impact:</p> <ul style="list-style-type: none"> • Vehicles to remain on designated roads to avoid spread of weeds; • Rehabilitation within the construction footprint with endemic species; • Rehabilitation to be undertaken in accordance with best practice guidelines such as Recovering Bushland on the Cumberland Plain (DEC, 2005) and applicable local management plans such as the Gundungurra Reserve Plan of Management (Environmental Partnership Pty Ltd, 2004); • An enclosure would surround the wellhead infrastructure comprising fencing and materials that would integrate with the surrounding environment; • Landscape planting would utilise endemic species where relevant and be undertaken surrounding the well surface location in order to soften the potential visual impact and provide

Well Surface Location and Access Road
<p style="text-align: center;">screening of the development.</p> <p>The Work Plan would also:</p> <ul style="list-style-type: none"> • Be prepared in consultation with the landowner by suitably qualified experts; • Be submitted to the Director General for approval prior to commissioning; • Describe in detail, the short, medium and long term measures that would be implemented to: <ul style="list-style-type: none"> - Rehabilitate the site; - Implement planting of native vegetation; - Manage the remnant vegetation and habitat on the site; and - Landscape the site to mitigate visual impacts of the project. • A description of what measures would be implemented to rehabilitate the site; • Provide details of who is responsible for monitoring, reviewing and implementing the plan.
Noise and Vibration Management and Maintenance
<p>Within the Noise Management Work Plan, mitigation measures during construction include:</p> <ul style="list-style-type: none"> • Noise barriers to the north and east; • One mud pump to be operated at SF20 only and oriented to the south.
<p>The above compliance measures were recommended as a guide and do not limit the use of other mitigation options, so long as the measures used achieve the required criteria (<i>Wilkinson Murray Noise Assessment, June 2007</i>).</p> <ul style="list-style-type: none"> • Possible mitigation measures during operation include enclosure of well head, boundary fences or barriers for individual well heads. • Monitoring would be undertaken during the production phase to confirm the findings of the assessment and indicate whether further mitigation is required.
Heritage Management and Maintenance
<p>Within the Aboriginal Cultural Heritage Management Work Plan, the following measures are proposed:</p> <ul style="list-style-type: none"> • construction footprint would be constrained to the eastern sections of the study area; • the gas gathering line and access road would be positioned to avoid known Aboriginal heritage sites where possible. • Additionally, the appropriate procedures for avoiding gas gathering lines are outlined.

4.0 BASIS FOR MANAGEMENT

4.6 Community land categorisation

The following table provides a rationale for community land categorisation (the assigning of categories) as required by the Local Government Act.

The column on the left hand side of the table lists the community land categories. The central column summarises the guidelines for categorisation as set out in clauses 36B-36N of the Local Government Act. A tick (✓) in the columns on the right hand side of the table indicates that the guidelines for categorisation apply to that land parcel.

Figure 5.1: Land Categorisation (refer following page) identifies the recommended community land categorisations of the Gundungurra Reserve Plan of Management.

Community Land Category	Guidelines for Categorisation Local Government Amendment (Community Land Amendment) Act 1998 Cl. 6B-6JA	Applicable to land parcels		
		northern	southern	eastern
Natural Area	<ul style="list-style-type: none"> The land (whether in an undisturbed state or not) possesses a significant geological feature, geomorphological feature, landform, representative system or other natural feature or attribute that would be sufficient to further categorise the land as bushland, wetland, escarpment, watercourse or foreshore. 	✓	✓	✓
Natural Area (Bushland)	<ul style="list-style-type: none"> The land contains native vegetation which is: <ol style="list-style-type: none"> the natural vegetation (or a remainder of it) of the land; or although not the natural vegetation of the land, is still representative structure of floristics of the natural vegetation in the locality Such land includes: <ol style="list-style-type: none"> bushland that is mostly undisturbed with a good mix of tree ages, and natural regeneration, where the understorey is comprised of native grasses and herbs or native shrubs, and which contains a range of native habitats for native fauna (such as logs, shrubs, tree hollows and leaf litter); or moderately disturbed bushland with some regeneration of trees and shrubs, where there may be a regrowth area with trees of even ages, where native shrubs and grasses are present, in the understorey even though there may be some weed invasion; or Highly disturbed bushland where the native understorey has been removed, where there may be some weed invasion and where dead and dying trees are present, where there is no natural regeneration of trees and shrubs but where the land is still capable of being rehabilitated Land that is significant as part of an extended corridor of natural vegetation (N.B. not currently in the Guidelines for Categorisation in the Local Government Act) 	✓	✓	✓
Natural Area (Wetland)	<ul style="list-style-type: none"> The land includes marshes, mangroves, backwaters, billabongs, swamps, sedgelands, wet meadows or wet heathlands that form a waterbody that is inundated cyclically, intermittently or permanently with fresh, brackish or salt water, whether slow moving or stationary 			
Natural Area (Escarpment)	<ul style="list-style-type: none"> The land includes such features as a long cliff-like ridge or rock and significant or unusual geological, geomorphological or scenic qualities 			
Natural Area (Water course)	<ul style="list-style-type: none"> The land includes: <ol style="list-style-type: none"> any stream of water, whether perennial or intermittent flowing in a natural channel, a natural channel that has been artificially improved, or in an artificial channel that has changed its course, and any other stream of water into or from which it flows; associated riparian land or vegetation, including land that is protected land for the purposes of the Rivers and Foreshores Improvement Act or the Native Vegetation Conservation Act. 			

4.0 BASIS FOR MANAGEMENT

Community Land Category	Guidelines for Categorisation Local Government Amendment (Community Land Amendment) Act 1998 Cl. 6B-6JA	Applicable to land parcels		
		northern	southern	eastern
Natural Area (Foreshore)	<ul style="list-style-type: none"> The land is situated on the water's edge and forms a transition zone between the aquatic and terrestrial environment. 		✓	
Sportsground	<ul style="list-style-type: none"> The land is used or proposed to be used primarily for active recreation involving organised sports or the playing of outdoor games 			
Park	<ul style="list-style-type: none"> The land is used or proposed to be, improved by landscaping, gardens or the provision of non-sporting equipment and facilities, for use mainly for passive or active recreational, social, educational and cultural pursuits that do not unduly intrude on the peaceful enjoyment on the land by others 	✓		
Area of Cultural Significance	<ul style="list-style-type: none"> The land is an area of Aboriginal significance because the land: <ol style="list-style-type: none"> has been declared an Aboriginal Place under the National Parks and Wildlife Act; is significant to Aboriginal people in terms of their traditional or contemporary cultures (whether or not in an undisturbed state); is of significance or interest because of Aboriginal associations; displays physical evidence of Aboriginal occupation; is associated with Aboriginal stories; contains heritage items dating after European settlement that help to explain the relationship between Aboriginal people and later settlers; The land is an area of aesthetic significance, by virtue of: <ol style="list-style-type: none"> having strong visual/sensory appeal / cohesion; including a significant landmark; or having creative or technical qualities, such as architectural excellence; The land is an area of archaeological significance, because the area contains: <ol style="list-style-type: none"> evidence of past human activity (below ground or above ground, whether intact or ruined); or any other deposit, object or material that relate to the settlement of the land. The land is an area of historic significance, because of the importance of an association or position of the land in the evolving pattern of Australian cultural history. The land is an area of technical or research significance, because of the area's contribution to an understanding of Australia's cultural history or environment. The land is an area of social significance, because of the area's association with Aboriginal life after 1788 or the area's association with a contemporary community for social, spiritual or other reasons 			
General Community Use	<ul style="list-style-type: none"> The land may be made available for use for any purpose for which community land may be used, whether by the public at large or by specific sections of the public; and Is not required to be categorised as a natural area and does not satisfy the guidelines for categorisation as a natural area, sportsground, park or an area of cultural significance 			

5.0 MANAGEMENT STRATEGIES

Management policies will provide Council and those involved in management and maintenance of the open space corridor with guidelines for decision making and further research / design development of improvement actions.

5.1 Management approach

The strategies are a series of responses to the site's values and desired outcomes, and issues of the reserve as defined by review and assessment, and consultation with stakeholders. The development of the Management Strategy Framework (see Section 5.2 and Appendix A) provides a rationale for management decisions within Gundungurra Reserve.

The detailed management strategies outlined in this plan of management reflect the local Government Act's Community Land Categorisations as recommended for the open space corridor along with the related core objectives for management (refer Section 4.6 – Community land categorisation and Section 5.3 Core Objectives)

5.2 Management Strategy Framework

The Management Strategy Framework (refer Appendix A) has been developed based on the identified values, desired outcomes, and issues for the reserve as defined by review and assessment, and consultation with stakeholders.

The framework has been prepared as a basis for management decisions within the Reserve as open space and related improvements evolve over the next 10 - 15 years. As such the framework establishes principles for development of the Concept Masterplan. The Masterplan will provide a planning structure on which to formulate detailed design schemes for implementable improvement projects as funding becomes available.

5.2.1 Framework Format

The management strategy framework outlines the recommended management responses to the key site issues under the following headings: - definitions are based on those provided in 'Succeeding with Plans of Management' (DLWC & Manidis Roberts - 1996).

5.2.2 Value

The qualities of the community land that are significant, special or important and that we wish to protect or enhance.

5.2.3 Desired Outcome (Objective)

The optimum outcome, expectations, and directions upon which decision making should be based (also known as goals, aims and objectives).

5.2.4 Issues

Opportunities and problems that affect management and usage of community land.

5.2.5 Strategies

How to achieve the desired outcome.

5.2.6 Framework Categories

The framework presents the above as a series of site specific categories aimed to provide commentary across Council's site specific open space planning strategies:

Natural Environment

Physical and environmental factors relating to site quality and usage.

Social / Cultural

Factors relating to the role of the park as an amenity for social interaction and use.

Recreation

Usage of the park for passive and active pursuits.

Educational

Role of the park as a community educational resource.

Heritage

Conservation significance of and historical fabric.

Intrinsic

Specific factors contributing to site identity and character.

Visual

Relationship of the park to surrounding areas in terms of internal views and views into and out of the park area.

Management and maintenance

Factors relating to open space management and maintenance.

5.3 Core objectives

The table below provides a summary of the core objectives for the proposed community land categories which are setout in clauses 36B-36N of the Local Government (Community Land Amendment) Act 1998. The core objectives have been developed to guide management of the land in accordance with the values of its particular categorisation.

Category	Core Objectives for Community Land Categories Local Government (Community Land Amendment) Act 1998 S. 36B-36N
<i>Natural Area</i>	<ul style="list-style-type: none"> • Conserve biodiversity and maintain ecosystem function in respect of the land; • Maintain the land in its natural state and setting; • 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; • Assist in and facilitate the implementation of any provisions restricting the use and management of the land that are setout in a recovery plan or a threat abatement plan.
<i>Natural Area (Bushland)</i>	<ul style="list-style-type: none"> • Ensure the ongoing ecological viability of the land by protecting the ecological biodiversity and habitat, flora and fauna and other ecological values of the land; • Protect the aesthetic, heritage, recreational, educational and scientific values of the land; • Promote management in a manner that protects and enhances the values and quality of the land and facilitates public enjoyment of the land, and implement measures directed to minimising or mitigating any disturbance caused by human intrusion; • Restore degraded bushland; • Protect existing landforms such as natural drainage lines, watercourses and foreshores; • Retain bushland in parcels of a size and configuration that will enable the existing plant and animal communities to survive in the long term; • Protect bushland as a natural stabiliser of the soil surface.
<i>Natural Area (Foreshore)</i>	<ul style="list-style-type: none"> • Maintain the foreshore as a transition area between the aquatic and terrestrial environment, and protect and enhance all functions associated with the foreshore's role as a transitional area; • Facilitate the ecologically sustainable use of the foreshore; and mitigate impact on the foreshore by community use.
<i>Park</i>	<ul style="list-style-type: none"> • Encourage, promote and facilitate recreational, cultural, social and educational pastimes and activities; • Provide for passive recreational activities and pastimes and for the casual playing of games; • Improve the land in such a way as to promote and facilitate its use to achieve the other core objectives for its management.

5.0 MANAGEMENT STRATEGIES

5.4 Detailed Management Strategies

The following Management Strategies are identified within the open space management categories into which they will fall for day to day Council decision making and planning.

The strategies reflect the Local Government Act's Community Land Categorisations as recommended for the open space corridor along with the related core objectives for management (refer Section 4.6 – Community land categorization and Section 5.3 Core Objectives)

The assessment of performance in all areas of government operations is a fundamental component of Council Corporate Strategies. Additionally under the local Govt Act, the Plan of Management needs to set out how the Council proposes to achieve the Plan's objectives and performance targets, and additionally assess its performance in this regard. The following Table setting out the series of Management Strategies, defines the accompanying Performance Criteria, Monitoring Technique and Evaluation.

For Gundungarra Reserve it is important that regular reviews are carried out by the ultimate management authority to ensure that:

- Capitol works construction item meet design and quality objectives;
- Stakeholders are meeting individual commitments for operational, management, and maintenance responsibilities;
- Recurrent maintenance is of acceptable standard and regularity; and
- Park facilities are progressively evolving to meet the needs of local and regional recreational users.

Increasingly, park managers are giving attention not just to quantitative measures of performance but also to qualitative measures, based on the satisfaction derived from the public, their use of the park and the short term and long term benefits they accrue from the park experience. The performance indicators identified in this chapter are of no longer practical value unless data is available to measure them. This is relatively straight forward in the case of some indicators such as incoming revenue, expenditure and comments from users. However, in a number of other areas such as total use figures and qualitative measures such as levels of satisfaction and benefits, appropriate data is not available. It is recommended that as part of Camden Council's data base, that information is collated from requests for action, and from ongoing use surveys (in particular of active recreation use) which may take the form of resident questionnaires on an annual bases across the district area, if funding is available.

The range of appropriate performance indicators for Gundungarra Reserve should cover measures of both 'input' and 'output'. Input measures would include but not be limited to:

- level of ongoing funding
- input in kind by stakeholders
- incoming revenue (e.g. leases)

Output measures for the Reserve relate to its provision of recreational opportunities and community recreation benefits. This requires measures such as:

- number and type of recreational and educational users
- comments by local residents, lessees or regular users
- feedback from organized groups
- expenditure and recurrent costs
- use for special and community events
- media articles

As defined in 'Succeeding with Plans of Management' (DLWC and Manidis Roberts 1996) evaluation can be used to determine whether:

- the planning process was effective and satisfactory to stakeholders
- the plans strategies and outcomes are being achieved
- the plans strategies and outcomes remain appropriate
- the expectations of the stakeholders remain appropriate
- relevant legislative requirements remain appropriate
- the overall plan remains appropriate

Listed on the following pages are a series of performance indicators related to each of the Management Strategies. These indicators provide a basis for periodic reviews.

5.4.1 Heritage

General

The cultural heritage of Gundungurra Reserve is of high significance to the community predominantly due its landscape character.

The bushland communities in the reserve are a link to the character of the surrounding landscape prior to European settlement. The geographical high points and proximity to the Nepean River are believed to have made the study area an important place for Aboriginal communities as is evidenced by Aboriginal artifacts located on adjacent sites along the Nepean River.

A rural landscape character exists in the northern and eastern land parcels of the Reserve through the presence of native / pasture grasslands, scattered canopy trees and sloping landform. This landscape type (whose creation was responsible for threatening the natural bushland communities) is itself now an important character type to be conserved (in representative form) in a context of growing urban development.

It recommended that the natural and cultural heritage features (including landscapes) present within Gundungurra Reserve are protected and enhanced for the enjoyment of future generations.

Strategies	Performance Criteria	Monitoring technique	Evaluation
Heritage			
S1.1 Liaise with local Aboriginal Land Council's regarding potential for ongoing involvement strategies and implementation (FW5.1)	Representatives from local Aboriginal Land Council's have been contacted and are actively participating in implementation of interpretive strategies	Correspondence, meeting minutes, interpretive strategy output, courtesy follow up (by Council) with Land Council representatives	Effective involvement of local Aboriginal Lands Council's What can be done to improve involvement?
S1.2 Recognise the significance of early settlers in the area through interpretation (FW5.1)	Local historical societies contacted by interpretive consultants	Correspondence, meeting minutes, interpretive strategy output, courtesy follow up (by Council) with historical society representatives	Interpretive signage / artwork recognises and reflects the significance of early settlers How well was the process of consultation with historical societies carried out?
S1.3 Interpretive works should be undertaken in conjunction with William Howe Regional Park (FW4.1)	Camden Council and NPWS Metropolitan Parks Unit commission joint interpretive study	Correspondence, meeting minutes, interpretive strategy output, courtesy follow up (by Council) with NPWS representatives	Presence of a coordinated interpretive approach through the integrated open space
S1.4 Open space planning to integrate bushland enhancement objectives with consideration of reference to agricultural past as part of a cohesive scheme	Bushland enhancement works are carried out including the retention of some areas of landscape typical of the rural character of the area (native / pasture grass with isolated groups of trees)	Presence / retention of representative rural character areas	Representative areas of rural character retained within the Reserve How effectively have rural character areas been integrated with surrounding landscape types?

5.0 MANAGEMENT STRATEGIES

5.4.2 Recreational facilities and use

General

Due to the fundamental objective for bushland protection and improvement in Gundungurra Reserve (as part of the bushland corridor), recreational facilities and use for the site should be limited to activities which have a passive recreational focus, such as walking and cycling on proposed shared use trails and picnicking on maintained grass areas (categorised Park).

Recreational activities which currently occur on site (e.g. trail bike riding, off-road cycling and four wheel driving) need to be restricted through a combination of signage, policing and the installation of gates, bollards and fencing to prevent unauthorised vehicle entry.

<i>Strategies</i>	<i>Performance criteria</i>	<i>Monitoring technique</i>	<i>Evaluation</i>
Recreational facilities and use			
Passive recreation			
S2.1 POM to identify passive recreational emphasis in the site planning and facilities (FW8.3)	POM to contain recommendations for the inclusion to passive recreation areas and facilities Implementation of passive recreation area facilities	Implementation of works carried out, park usage monitoring, park user questionnaire / survey	Implementation works have been carried out and maintained How effectively does the park provide opportunities for passive recreation use by the local community?
S2.2 Provide for passive recreational use in appropriate location to avoid conflict with natural values (FW3.1)	Passive recreation areas / facilities to have minimal conflict with the natural values of environmentally sensitive land	Review locations of passive recreation areas as outlined in Concept Masterplan prior to implementation, monitor flora / fauna condition, monitor visible impacts on natural areas	Passive recreation areas and usage does not impact on natural areas
S2.3 Integrate sustainable passive recreational areas with park planning in conjunction with William Howe Regional Park and potential bush corridor access network (FW2.1)	Camden Council liaising with NPWS for coordinated implementation of passive recreation area and shared pathway provision to Gundungurra Reserve and William Howe Regional Park	Correspondence, meeting minutes	Implementation works been integrated in the Reserve and across common boundaries What could be done to improve the coordination between NPWS and Camden Council?
S2.4 Provide for passive recreational facilities consistent with existing and proposed uses in adjacent open spaces areas. e.g. walking, jogging, and other passive uses (FW3.1)	The planning, design and implementation of passive recreational facilities is compatible with existing passive recreational needs in the area and appropriate use of open space	Park usage monitoring, park use questionnaire, local resident questionnaire	Passive recreational facilities cater to existing passive recreational use of the Reserve What additional facilities should be provided?

GUNDUNGURRA RESERVE – PLAN FOR MANAGEMENT

S2.5	Investigate potential to integrate passive recreational areas across the park boundaries (William Howe Regional Park, Spring Farm Bushland Corridor) (FW3.1)	Refer S2.3	Refer S2.3	Refer S2.3
S2.6	Investigate potential for integration of passive recreational areas around farm dams (FW3.1)	POM to incorporate passive recreation areas with existing farm dams as a focal point Implementation of passive recreational elements	Implementation of improvement works, park usage monitoring park user questionnaire, local resident questionnaire	Farm dam provides a passive recreation and visual focus
S2.7	Manage inappropriate use of the reserve through signage detailing unlawful use, the erection of vehicle barriers (integrate with WHRP design treatments) , and the policing and fining of offenders (FW3.1)	POM to identify appropriate activities for the Reserve Impacts of inappropriate activities is minimized Activities catered for in appropriate accessible locations	Records of damage, public complaints	Edge control measures (as per WHRP) have reduced inappropriate use Are there any additional strategies that could be incorporated to reduce inappropriate use?
Active recreation				
S2.8	Council to review provision of active recreation facilities in locations where habitat values are not affected by high impact use (FW8.3)	Refer S2.2	Refer S2.2	Refer S2.2
S2.9	Provide district facilities for skating, BMX and mountain biking in environmentally and socially acceptable locations in or close to the new release areas (but not part in Bushland Corridor) (FW3.1)	Council undertakes investigations into provision of active recreational facilities in a nearby location where they will not impact on natural values	Completion of investigations, implementation of facilities, usage of facilities	Active recreation facilities constructed elsewhere in the LGA Facilities meet user needs of local residents What improvements could be made to improve facilities?
Prohibited activities				
S2.10	Recognise particular park uses that are not conducive to park values. Deter activities that are not appropriate to the park values through bollards, gates, signage, and community education (FW8.3)	Refer S2.7	Refer S2.7	Refer S2.7

5.0 MANAGEMENT STRATEGIES

S2.11	Integrate access control with measures adopted by NPWS on adjoining William Howe Regional Park (FW8.3)	Measures are implemented in coordination with NPWS and are effective in minimizing impacts	Implementation of works, records of damage, public complaints	Works implemented in the Reserve and across common boundaries
Park design features				
S2.12	Open space planning to recognise visual and functional linkages between separate reserve areas (FW7.1)	Concept Masterplan identifies proposed park use and relationships with adjoining land	Concept Masterplan, detailed design, implementation of works, park usage monitoring	Effective site design for defining land use areas within the Reserve
S2.13	Park built elements and furniture to have consideration for character of site and integrate / compliment character as appropriate (FW7.2)	Coordinated selection and design of park built elements considers the character of Gundungurra Reserve and William Howe Regional Park	Implementation of works, review by Council	Furniture items relate to the character of the Reserve, William Howe Regional Park and the Spring Farm Bushland Corridor
S2.14	Consider in open space planning potential for shared vehicle / pedestrian entry points and recreational areas (FW6.2)	Shared vehicle / pedestrian entry points implemented effectively	Implementation of works, review by Council	Masterplan, design and implementation provide effective shared vehicle / pedestrian entry points adjacent to park recreation focal points
S2.15	Establish site identity at entry points and throughout the separate parcels (FW6.3)	Landscape entry points convey a sense of identity of the Reserve	Site entry points implemented, survey of site (is site identity strongly recognizable), survey of residents (is site identity strongly recognizable),	Masterplan and design identify site identity features at entry points to Gundungurra Reserve

5.0 MANAGEMENT STRATEGIES

5.4.3 Pedestrian, cycle and disabled access

General

The extensive network of unformed pathways that exist within Gundungurra Reserve are contributing to environmental degradation through bush fragmentation and erosion. Closure and remediation of certain existing trails is required as a high priority.

Shared pathways with appropriate hard-wearing surface are to be provided for pedestrian / bicycle / disabled use throughout the Reserve. Aside from recreation, shared pathways are to be utilised by maintenance and emergency vehicles.

Path alignment should respond to potential desire lines, minimise impact on natural areas, and provide access connections within the Reserve and connections to the proposed trail system through the Bushland Corridor and William Howe Regional Park.

Detailed Policies:

Strategies	Performance criteria	Monitoring technique	Evaluation
Pedestrian, cycle, disabled access			
S3.1 Encourage shared pathway connections having regard for impacts on natural values and local resident amenity (FW3.2)	Shared pathway provision caters for passive recreational requirements of park users	Review by Council Bushland Officer during ongoing development, follow-up review after implementation	Concept Materplan and detailed design identifies shared pathway connections located to minimise impacts on core natural areas
S3.2 Shared path network to avoid fragmentation by 'skirting' core bushland areas using degraded sites for parking, recreational venues, etc. (FW1.1)	Refer S3.1	Refer S3.1	Refer S3.1
S3.3 Manage access in sensitive areas through planning of path alignment (FW3.2)	Refer S3.1	Refer S3.1	Refer S3.1
S3.4 Provide equal access facilities including pathways (FW3.3)	Masterplanning, design, and implementation incorporate provision for DA requirements as expressed in relevant codes	Review of design development by equal access specialist Comments / complaints by park users Park user questionnaire	Shared path provision, signage, and related park facilities cater effectively for use by mobility impaired users? Are there any improvements that could be made to improve usability of pathway by mobility impaired visitors?
S3.5 Integrate potential links with existing open space network to establish shared path network (FW3.2)	Users of the internal path network access from adjoining areas by path or cycle	Integration of masterplan with Spring Farm detailed planning Implementation works completed Park users questionnaire	Access link through the open space have clear and functional connections to street footpath and links through development (Spring Farm) open space
S3.6 Promote alternative means of transport for people travelling to the	Refer S3.5 Local resident awareness of shared path	Refer S3.5	Local and district users primarily access the open space corridor by foot or cycle

5.0 MANAGEMENT STRATEGIES

	Reserve (e.g. via proposed shared path network) (FW6.2)	network		
S3.7	Provide shared pathways in appropriate locations through the Nepean River foreshore area (FW 3.2)	Refer 3.1	Refer 3.1	Refer 3.1

5.4.4 Vehicular access and parking

General

Roads along park edges serve many purposes including definition of boundaries, fire department access, fire protection (fuel free zones) and passive surveillance.

Busy roads (such as the proposed east west link road) can also form barriers between open space areas. To address this constraint it is proposed that the east west link road incorporate a section of raised roadway to enable biodiversity and recreational connectivity between land parcels separated by the road.

Whilst alternative methods of accessing the Reserve such as public transport, bicycle, and walking are to be promoted, it is necessary to provide facilities for vehicle access and car parking to serve visitors that are elderly, mobility impaired, or driving to the Reserve from outside the local area.

Vehicular access to the Reserve is to be limited to carparks located adjacent to external roadways to enable easy access to high use park areas.

Detailed Policies:

Strategies	Performance criteria	Monitoring technique	Evaluation
Vehicular access and parking			
S4.1	Provide vehicle access / parking near park focal points to improve access for mobility impaired visitors (FW3.3)	Parking provision for users not able to access the Reserve by foot / cycle (eg district users, disabled, families) Level of open space user parking to adjoining streets	On-site carpark usage, potential visitor parking on adjoining streets Parking adequately provided for park users without impact on adjoining streets
S4.2	Open space planning and urban development to minimise edge impacts and maximise levels of passive surveillance (e.g. path access defining bushland areas, and roads between housing and bushland areas) (FW2.3)	Maintained grass areas are defined from habitat areas Effective buffers provided to residential edges (paths, maintenance zones)	Level of impact (weed encroachment inappropriate use) related to residential edges Residential edges and junctions between maintained recreation areas and habitat zones create minimal impacts
S4.3	Incorporate road underpass with east west link road at to ensure flora, fauna, and passive recreation connectivity (FW1.1)	Concept Masterplan and detailed design for link road park incorporate road underpass Implementation of underpass	Implementation of underpass with east west link road construction Monitor fauna movement and pedestrian / cycle use Road underpass for pedestrian / cycle access and biodiversity connectivity has been implemented Monitoring identifies effectiveness of fauna link

GUNDUNGURRA RESERVE – PLAN MANAGEMENT

(FW1.1)			
S4.4	Liaise with Integral Energy for diversion and limitation of maintenance access route along easement, and for revegetation with low growing species (less than 4m max height) (FW1.2)	Restoration / reinstatement of natural communities to easement zone for improved biodiversity Planning / management of restoration within authority requirements	Implementation works Endangered species protected Habitat quality and extent improved
S4.5	Review options for public transport provision with local service providers (i.e. bus stop in proximity of entry) (FW6.4)	Local bus access provision within proximity of Reserve Ability for district users to access by public transport	Provision of bus stop (primarily serving urban development with dual role of the Reserve) Numbers of users accessing the Reserve by bus Public transport is provided to the Reserve Bus stop is accessible to all park users
S4.6	Provide on-site parking within the open space to reduce the potential demand for on-street parking and impact on local residents (FW6.5)	Refer S2.14	Refer S2.14
S4.7	Locate on-site carpark in area that is close to proposed link road (for access) and recreational features (FW6.5)	Refer S2.14	Refer S2.14
S4.8	Provide adequate onsite parking provision for Gundungurra Reserve and William Howe Regional Park so that local streets are not impacted (FW3.2)	Refer S2.14	Refer S2.14

5.4.5 Bushland management

General

The protection, improvement and re-creation of natural bushland communities within the Reserve is a high priority due to the presence of endangered species and ecological communities (*Pimelia spicata*, *Pomaderris brunnea*, Cumberland Plains Woodland, and Sydney Coastal River Flat Forest – *Threatened Species Act 1995*, *Environmental Protection and Biodiversity Conservation Act 1999*) and the significance of Gundungurra Reserve within the proposed Spring Farm Bushland Corridor.

It is recommended that a Bushland Corridor Committee be formed by local stakeholders to manage the implementation of the bushland corridor through the various land parcels (Gundungurra Reserve, Spring Farm Urban Release Area and William Howe Regional Park) and authorities / organisations (Camden Council, NPWS and Narellan Landcare Group).

Bushland improvement works are to target core areas of existing bushland which can sustain natural regeneration, and improve gaps to create linkages between bushland areas as a long term strategy to improve biodiversity and native fauna habitat.

Within the bushland corridor areas of native / pasture grassland are to be retained and improved as a threatened plant community which is culturally significant in the Camden area.

Strategies	Performance criteria	Monitoring technique	Evaluation
Bushland management			
Bushland corridor			
S5.1 A special bush corridor committee should be formed to guide development and maintenance of the corridor (FW1.1)	Consultation on the development and maintenance of the corridor undertaken Formation of bushland corridor committee investigated Satisfaction of all stakeholders	Formation of committee & minutes Feedback from committee members and stakeholder groups	Public stakeholder input is effectively provided into development / management of the open space
S5.2 Committee should monitor implementation of the corridor in relation to land acquisition and adjoining development areas (FW1.1)	Monitoring of implementation undertaken	Feedback from stakeholder groups	Refer S5.1
S5.3 Liaise with adjacent land managers to ensure effective and coordinated approach to corridor management that optimises broader open space role of Gundungurra Reserve (FW1.1)	Liaison provided between bushland corridor committee, Camden Council, NPWS, Narellan Landcare Group, Landcom, Sydney Water, Waste Services regarding corridor management	Joint agreement / ownership of planning and management decisions Shared funding implementation and management responsibilities	That effective management of the bushland corridor is realised
S5.4 Liaise with Landcom to ensure that roads / pathways adjoin bush corridor rather than residential properties where possible (FW1.1)	Potential for weed encroachment, garden escape, use encroachment, visual intrusions are minimised	Amount of reserve / open space adjoining residential fence line Degree of edge impacts	Edge impacts of residential development on habitat values are minimised

GUNDUNGURRA RESERVE – PLAN OF MANAGEMENT

S5.5	Liaise with Landcom to review odour buffer provision in accordance with Council resolutions, etc. (FW1.1)	Liaison with Landcom regarding width / nature of odour buffer Potential enhancement of currently planned buffer width to improve visual and habitat qualities of buffer	Width of buffer as implemented	Buffer zone width maximized to address objectives of bush corridor strategy
S5.6	Urban development to promote the qualities of open space / bushland corridors as elements of a quality residential environment (FW6.1)	Promotion of natural values in marketing and residential education	Level of awareness generated through resultant survey Level of vandalism / other issues	Residents appreciate and value the bushland corridor and related natural values
S5.7	Corridors to be maintained at a width that provides potential for fauna movement and a functional visual and environmental buffer zone (FW6.1)	Maximisation of corridor width restoration / re-instatement with full strata (tree, shrub, and herb layer) to improve habitat function	Width of corridors as implemented	Residents appreciate and value the bushland corridor and related natural values
S5.8	Liaise with Sydney Water regarding potential for revegetation of reservoir land to achieve bush corridor / visual screening objectives (FW7.2)	Liaison with Sydney Water Improved habitat value of reservoir lands	Extent of restoration	Habitat quality improved and consolidated with adjoining bushland corridor / WHRP
S5.9	Revegetation strategy to incorporate view corridor provision related to formal viewing areas along northern ridgeline (FW7.1)	Masterplan and design recognizes view corridors Viewing points are implemented	Implementation of effective viewing points	Implementation of revegetation works retained view corridors to surrounding lands
Native / pasture grassland management				
S5.10	Recommended management regime for the grassland areas to include the 'spelling' of mown grass areas to allow the grasses to set native seed and regenerate, as well as supporting recreational use and fauna habitat (FW1.2)	Grass areas managed effectively as habitat and visual element with the Reserve	Level of grass regeneration Condition of grass vegetation	Maintenance regime is effective in achieving the objectives for native / pasture grasslands What improvements could be made to the maintenance regime?
S5.11	Revegetation / restoration works to integrate retention of quality native grassland areas (FW2.4)	Refer PS.10	Refer PS.10	Refer PS.10

GUNDUNGURRA RESERVE – PLAN OF MANAGEMENT

Bush restoration / re-instatement				
S5.12.1	Undertake best management practice for ecological restoration of bushland (CPW, EBSF, SCRFF) complying with the conservation principles, processes and actions of the Australian Natural Heritage Charter (ANHC) and bush regeneration techniques as per the National Trust and the Australian Association of Bush Regenerators (FW1.2)	Bushland improvement works effectively implemented Implementation works consistent with best management practices	Council bushland officer review of detailed bushland management strategy Review of bushland management outcomes on site	Ecological restoration works being implemented in compliance with best management practices outlined by aforementioned authorities
S5.12.2	Maintain ongoing role for landcare group (FW1.2)	Narellan landcare has been included in the bushland corridor committee and responsible for improvement works to the bushland corridor	Meeting minutes Liaison with landcare group	Narellan landcare group actively participating in bushland corridor committee, and the implementation of improvement works in the bushland corridor
S5.13	Seek to involve local schools and community groups in vegetation management and restoration processes, to establish awareness and a share of ownership (FW1.2)	Information / visits to local schools to promote awareness and shared ownership of the bushland corridor	Correspondence with schools Bush corridor fact sheets created for school groups School survey	Consultation is affective at fostering an appreciation of the natural environment
S5.14	Identify core bushland (i.e. areas with high conservation values) and facilitate bush regeneration programs in the areas (FW1.2)	Core bushland areas are effectively protected and undergoing restoration	Implementation of protection / improvement works	Bushland committee / Council has identified core bushland areas and targeted these areas for regeneration
S5.15	Develop long-term strategy through corridor to revegetate gaps and linkages to create large bushland areas with minimal edge to core ratio (minimisation of edge impacts) (FW1.2)	Objectives / strategies for bushland improvement are being implemented effectively	Review draft bushland strategies Monitoring of implementation works	Bushland committee has developed long term strategy to improve the integrity of the bushland corridor
S5.16	Concentrate on re-establishing canopy and sub-canopy species in the first 3-5 years of project, with placement of native understorey species to occur when site conditions are more favourable, and (many) adjoining weeds seed sources are removed (FW1.2)	Refer S5.15	Refer S5.15	Refer S5.15

GUNDUNGURRA RESERVE – PLAN OF MANAGEMENT

S5.17	Establish buffer zones between reserve bushland and development area (including undeveloped pastureland): identify appropriate buffer zone management strategies to protect bushland (e.g. 'temporary' screen planting, more frequent slashing, higher level of maintenance) (FW1.2)	Refer S5.15	Refer S5.15	Refer S5.15
S5.18	Develop site approach to local seed collection and plant propagation for use in revegetation works within the reserve and bush corridor (FW1.2)	Refer S5.15	Refer S5.15	Refer S5.15
S5.19	Identify recommended species and strategies for any new plantings on the site, and establish a staged program for the introduction of appropriate vegetative communities in suitable areas (FW1.2)	Refer S5.15	Refer S5.15	Refer S5.15
S5.20	Revegetation works to incorporate high (1m) rigid tree guards and/or fencing around all regeneration / revegetation areas to exclude rabbits, wallabies and other browsers (FW1.2)	Refer S5.15	Refer S5.15	Refer S5.15
S5.21	Minimise and ameliorate soil erosion effected areas through revegetation and local grading (FW1.4)	Refer S5.15	Refer S5.15	Refer S5.15
S5.22	Ensure appropriate erosion control measures are implemented during proposed works (FW1.4)	Refer S5.15	Refer S5.15	Refer S5.15

GUNDUNGURRA RESERVE – PLAN OF MANAGEMENT

Threatened species / communities			
S5.23.1 Ensure compliance with recommendations and strategies for NPWS Cumberland Plain Endangered Ecological Communities Recovery plan, due for completion in 2002 (FW1.2)	Recommendations in POM assessed for compliance with the proposed NPWS Recovery Plan	NPWS review of proposed action On-site monitoring	Proposed bushland restoration / reinstatement action and installation works comply with NPWS Recovery Plan
S5.23.2 Open space planning to provide for protection of significant communities and species on site (FW1.2)	Refer 3.1	Refer 3.1	Refer 3.1
S5.24 Undertake works to re-instate <i>Elderslie Banksia Scrub Woodland</i> in Gundungurra Reserve in accordance with conservation plan and Cumberland Plain Woodland Ecological Communities Recovery Plan due for completion in 2002(FW1.2)	Refer S5.23.1	Refer S5.23.1	Refer S5.23.1
S5.25 Manage process for rehabilitation of endangered communities via combination of passive management (e.g. slashing regime) and active management (bush regeneration, ecological burns) (FW1.2)	Refer S5.15	Refer S5.15	Refer S5.15
S5.26 Protect specimens of <i>P. spicata</i> within the reserve including under the powerline easement in the northern parcel (FW1.2)	Refer S5.15	Refer S5.15	Refer S5.15
S5.27 Alter vehicle access track to enter reserve further north of <i>Pimelia spicata</i> individuals, choosing a route to minimise vegetation clearance (FW1.2)	Refer S5.15, S4.4	Refer S5.15, S4.4	Refer S5.15, S4.4

GUNDUNGURRA RESERVE – PLAN OF MANAGEMENT

S5.28	Liaise with Integral Energy for diversion and limitation of maintenance access route along easement, and for revegetation with low growing species (less than 4m max height) (FW1.2)	Refer S5.15, S4.4	Refer S5.15, S4.4	Refer S5.15, S4.4
S5.29	Maintain some parts of the reserve as appropriate habitat for <i>Pimelia spicata</i> (i.e. open grassland to open woodland with native grass understorey) (FW1.2)	Refer S5.15	Refer S5.15	Refer S5.15
S5.30	Protect specimens of <i>Pomaderris brunnea</i> in the reserve including six individuals found in Privet grove on the banks of the Nepean River (FW1.2)	Refer S5.15	Refer S5.15	Refer S5.15
S5.31.1	Remove privet without damaging <i>Pomaderris brunnea</i> and consider provision of temporary shelter to reduce exposure to winds and sun (FW1.2)	Refer S5.15	Refer S5.15	Refer S5.15
Weed management				
S5.32	Camden Council to enforce <i>Noxious Weeds Act 1993</i> , requiring adjoining private landholders to control gazetted species on their own land, and undertaken similar control measures on adjoining public land (FW1.2)	Staged weed removal effectively managed and implemented	Level of weed presence of habitat areas Level of weed presence to adjoining land holdings	Camden Council undertaking removal of weeds on Council land and enforcing the control of noxious weeds on private property
S5.33	Establish a staged program for the removal of the weeds on site and their replacement with native shrub species, ensuring native fauna habitat is not compromised through this process (FW1.2)	Stage weed removal being carried out effectively Fauna habitat values not compromised through staged weed removal	Weed management plan Implementation of weed removal works Follow up monitoring	Camden Council and bushland corridor committee working together to achieve joint objectives for the removal of environmental and noxious weeds and replacement with natural vegetation
S5.34	Undertake staged approach to weed removal to maintain fauna values and ensure that a suitable habitat and usage has evolved prior to final weed removal (FW1.2)	Refer S5.33	Refer S5.33	Refer S5.33

5.0 MANAGEMENT STRATEGIES

S5.35	Weed management program to address areas adjacent to residential properties (FW1.2)	Refer S5.33	Refer S5.33	Refer S5.33
S5.36	Council to prepare grant application to NSW Agriculture seeking assistance with noxious weed control (contact NSW Agriculture, Windsor Office)	Staged weed removal being carried out effectively	Confirmation of funding for reasons for unavailability of funding	Camden Council have liaised with NSW Agriculture regarding potential assistance for the controlling of noxious weeds Weeds management works in progress
S5.37	Undertake concurrent weed control and revegetation works to avoid destabilisation of riverbanks (FW1.2)	Integrated weed removal / stabilization / habitat replacement approach	Strategy of funding staged / integrated approach Implementation of works	Staged weed removal and bushland reinstatement techniques for riverbank improvements Refer S5.15
Fauna Habitat				
S5.38	Improve wildlife habitat values through the improvement of the proposed bushland corridor (FW1.3)	Refer S5.7	Refer S5.7	Refer S5.7
S5.39	Improve flora and fauna biodiversity through the establishment of a shrub layer in revegetation areas (FW1.3)	Refer S5.7	Refer S5.7	Refer S5.7
S5.42	Prepare a habitat regeneration plan for dams that identifies extent of works, sources of weed invasion and pollution and recommends actions (FW1.3)	Plan prepared Implementation works carried out effectively	Plan brief, regeneration plan, implementation works, fauna survey	A habitat regeneration plan has been prepared for Camden Council and recommended actions have been implemented
S5.43	Undertake staged approach to weed removal to maintain fauna values and ensure that a suitable habitat and usage has evolved prior to final weed removal (FW1.3)	Refer S3.32, S3.33	Refer S3.32, S3.33	Refer S3.32, S3.33
S5.44	Carry out routine maintenance to farm dams including: periodic macrophyte removal, and dredging (FW8.5)	Refer S5.42	Refer S5.42	Refer S5.42

GUNDUNGURRA RESERVE – PLAN OF MANAGEMENT

S5.45	Establish an appropriate pest management plan for the park (FW1.3)	A pest management plan has been prepared for Camden Council and NPWS including recommendations for management of feral and domestic animals, and community awareness program	Council brief, pest management plan, implementation works, pest survey	Pest numbers reduced Successful coordination between adjoining land owners
S5.46	Manage feral and domestic animals in accordance with accepted Council policy and management practices and in liaison with NPWS (FW1.3)	Refer S5.45, S8.1	Refer S5.45, S8.1	Refer S5.45, S8.1
S5.47	Educate the community regarding the management of domestic animals (FW1.3)	Refer S5.45	Refer S5.45	Refer S5.45
S5.48	Implement threat abatement plan for foxes (FW1.2)	Threat abatement plan implemented Reduction in fox numbers	Completion of plan Monitoring of fox population Monitoring of native fauna population	Effective implementation of the threat abatement plan for foxes
Scientific				
S5.49	Undertake periodic fauna studies and analysis (FW1.6)	Fauna studies and analysis in progress	Reporting of data	Effective assessment of fauna population What changes could be made to methodology to improve assessment effectiveness and information output?
S5.50	Develop recording / monitoring / evaluation program (FW1.6)	Recording / monitoring / evaluation program in progress	Reporting of data	How effective is the program? What changes could be made to improve effectiveness?
S5.51	Evaluate potential future impacts on the bushland corridor (FW1.6)	Emergence of issue that were not identified in POM with related impacts	Recording of issues	Evaluation identifies potential inputs for which planning / management strategies provide affective mitigation
S5.52	Undertake salinity testing of land in Gundungurra Reserve (FW1.6)	Actions arising implemented	Recording of data	That salinity issues are identified and any required mitigation works implemented as appropriate

5.4.6 Ownership, zoning and adjoining landuse

<i>Strategies</i>	<i>Performance criteria</i>	<i>Monitoring technique</i>	<i>Evaluation</i>
Ownership, zoning and adjoining landuse			
S6.2 Liaise with Landcom to ensure an adequate and coordinated open space network is realised throughout the Spring Farm release area which can be complemented for local and district residents by Gundungurra Reserve enhancement (FW3.4)	Active and passive recreational needs of new residents adequately met in open space provision	Review of planning Monitoring of open space usage Resident questionnaire	Open space within the urban development effectively provides for local resident use, without undue pressure of bushland corridor (e.g. active recreation)

5.4.7 Leases and license

General

"All of the land parcels in the study area are under the ownership of Camden Council. In accordance with the provisions of the Local Government Act 1993, leases or licenses may be granted over the land which is the subject of this Plan of Management. Council is authorised to grant leases or licences for purposes permitted under the Local Government Act 1993 including for the purpose of the provision of public utilities and works associated with, or ancillary to public utilities. Council has been requested by AGL Energy Limited to lease land for its gas utility pipelines and associated and ancillary infrastructure for a period of approximately 15 years, which is expected to be the viable economic lifespan of SF20. Prior to the expiry of this period, AGL would seek to extend this lease should SF20 prove economically viable beyond the initial 15 year lease period. This Plan of Management authorises Council to grant a lease for those purposes consistent with the values and outcomes identified in the Basis for Management.

5.4.8 Education

General

Policies for education aim at increasing knowledge and awareness of residents and park visitors relating particularly to the natural environment and natural / cultural heritage of the area, and maximising the educational function / role of the open space to the local community.

Strategies	Performance criteria	Monitoring technique	Evaluation
Education			
P8.1 Plan and implement a public education program for local residents and adjoining land owners, aimed at promoting the values and sensitivity of the park, the appropriate use of pesticides, herbicides and other chemicals in the vicinity of the park, weed infestation and the management of domestic animals. e.g. letter box drops, picnic days, brochures (FW4.1)	Public education program successfully conveyed its message to park visitors and nearby residents	Level of dumping Level of garden escape Level of vandalism Community questionnaire surveys	Council and NPWS have undertaken joint public education programme Community awareness of environmental issues improved
P8.2 Develop interpretive plan for the reserve incorporating topics such as: the natural and cultural heritage of the area, community role in open space preservation, etc. (FW4.1)	Refer S1.3	ReferSP1.3	Refer S1.3
P8.3 Provide interpretation on site recognising role of community and other stakeholders including state and local government. Incorporate interpretation where possible into design development of open space enhancement / facilities, and into the design and implementation of public art (FW2.2)	Refer S1.3	Refer S1.3	Refer S1.3

5.0 MANAGEMENT STRATEGIES

5.4.9 Management and maintenance

General

Improvements to Gundungurra Reserve (focussing on habitat enhancement, environmental improvement and provision for passive recreation) along with an expected increase in population generated by the Spring Farm Release Area will dramatically increase usage and maintenance requirements for the Reserve.

Potential for integrated management / maintenance of the Reserve with National Parks and Wildlife Service to be explored including maintenance, bushfire management, rubbish control, and pest control at the interface with WHRP.

<i>Strategies</i>	<i>Performance criteria</i>	<i>Monitoring technique</i>	<i>Evaluation</i>
Management and maintenance			
Fire management			
P9.1 Prepare Fire Management Plan to meet land management objectives for the site (FW8.1)	Fire management plan prepared that addresses all lands in the bushland corridor (that meets the requirement of Rural Fires Act 2000 and SREP 20) and addresses the potential for fire as a maintenance / management tool	Completion of plan Implementation of strategies / recommendations Monitor fire occurrence / issue	Plan prepared for the whole corridor Agreement / appraisal by relevant parties Recommended works being implemented effectively What changes could be made to improve effectiveness/ efficiency?
P9.2 Management of species/plant communities by fire should be considered in the Fire Management Plan (FW8.1)	Refer S9.1	Refer S9.1	Refer S9.1
P9.3 Establish and maintain an adequate fire buffer around the park perimeter in accordance with SREP 20 and the Rural Fires Act 1997 (FW8.1)	Refer S9.1	Refer S9.1	Refer S9.1
P9.4 Ensure that adequate fire breaks are in place between residential areas and the reserve (FW8.1)	Refer S9.1	Refer S9.1	Refer S9.1
S9.5 Ensure ready access for emergency vehicles to bushland areas via perimeter fire breaks and shared path routes (FW8.1)	Refer S9.1	Refer S9.1	Refer S9.1

GUNDUNGURRA RESERVE – PLAN OF MANAGEMENT

P9.6	Consider recommendations for asset protection in respect to adjoining properties as per the Planning for Fire Protection Guidelines (FW8.1)	Refer S1.4, 5.10	Refer S1.4, 5.10	Refer S1.4, 5.10
P9.7	Maintain locked gates to prevent unauthorised use (FW8.1)	Concept Masterplan and Construction Drawings identified locked gates as a means of managing vehicle access to the Reserve coordinated with WHRP Other means of controlling access have been investigated	Planning / design of control measures Implementation of control measures Monitoring of illegal access	Implemented access control measures effectively preventing unauthorized vehicle entry to the site
P9.8.1	Ensure that land underneath powerlines is free from plants over 4 m in height (FW8.1)	Refer S4.4	Refer S4.4	Refer S4.4
P9.8.2	Develop and manage a fire regime for each of the EEC's	Refer S9.1	Refer S9.1	Refer S9.1
<i>Rubbish Control</i>				
P9.9	Plan and implement an educational program for adjoining residents and landowners to reduce or eliminate rubbish dumping (FW8.2)	Refer S8.1	Refer S8.1	Refer S8.1
P9.10	Establish a rubbish control strategy, either supplying recycling centres on the site, or install signage encouraging park visitors to take all rubbish with them (FW8.2)	Development of joint rubbish control strategy	Monitoring of rubbish management Park user comments / reports	Camden Council and NPWS have identified preferred strategy for joint rubbish control / collection for Gundungurra Reserve / William Howe Regional Park
P9.11	Ensure passive recreational areas are provided with nodal rubbish collection points to discourage dumping (FW8.2)	Refer S9.10	Refer S9.10	Refer S9.10
P9.12	On-going rabbit control program essential. Liaise with Rural Lands Protection Board to advise on control methods (FW8.5)	Refer S5.45	Refer S5.45	Refer S5.45

5.0 MANAGEMENT STRATEGIES

S9.13	Rabbit to be undertaken in conjunction with surrounding areas, liaise with NPWS (FW8.5)	Refer S5.45	Refer S5.45	Refer S5.45
Co-management of boundaries				
P9.14	POM to consider Memorandum of Understanding for general maintenance / other reserve management arrangements where applicable (FW8.5)	Development of memorandum for mutually beneficial management outcomes	Meeting minutes, project correspondence, memorandum of understanding	Memorandum of understanding for co-management of boundary areas has been prepared to the satisfaction of Camden Council and NPWS Metropolitan Park Unit
Funding				
P9.15	Use POM outputs to assist in grant submissions (FW8.5)	Grants obtained to supplement other funding sources	Level of grant funding assistance	Grand funding assists with extending potential implementation scope over the staged programme of implementation
Farm dam safety				
P9.16	Review structural stability and liability implications of farm dams (FW8.5)	Implementation for farm dam management / public safety identifies Mitigation measures implemented	Review complete Reporting of safety incidents	Farm dams retained / managed as park features without public safety implications

6.0 MASTERPLANNING

The recommended management strategies and detailed policies provide the basis for detailing of a concept masterplan that can guide ongoing enhancement and management of the open space. Whilst management and policy related actions such as further research or survey activities are primarily identified in Section 5, actions relating to site planning, open space, and environmental improvements are detailed further in this section.

6.1 Masterplanning Principles

Based on previous studies, outcomes of the Community Workshop and input from relevant stakeholders, the following general principals were established to guide development of a masterplan for the Gundungurra Reserve lands:

- A Protect and enhance endangered ecological communities;
- B Protect endangered and threatened species;
- C Facilitate natural restoration to promote bush corridor linkages which improve the biodiversity values of the area;
- D Facilitate passive recreation within the open space areas and corridors without compromising natural values;
- E Provide for a seamless boundary with William Howe Regional Park incorporating the integration of natural values and shared recreational use; and
- F Develop a collaborative approach as appropriate to the management of shared boundary areas.

6.2 Concept masterplan

The provision of a concept masterplan which fulfills the objectives and addresses the issues established in Section 4 (Basis for management) is an essential outcome of the plan of management process.

The summary following describes the design features incorporated in the preferred masterplan. Design features are grouped under the following general categories:

- Natural Environment
- Access
- Park Features

Several site cross sections are also provided following the Concept Masterplan.

6.2.1 Natural Environment

Threat management / mitigation

Endangered ecological communities (EEC's) and threatened species within the Reserve are threatened by a range of pressures. Management actions aimed at reducing or eliminating pressures are proposed to protect EEC/ threatened species including:

- prevention of physical damage from recreational activities;
- definition of maintained grass areas (to prevent damage through maintenance of restoration areas);
- weed management incorporating a staged approach approach to weed removal, bushland re-instatement and stabilisation techniques;
- prevention of increased soil nutrient loadings;
- prevention of dumping;
- prevention of frequent fire;
- prevention of herbivore/ fauna predation (European red fox, feral cats, rabbits); and
- prevention of habitat destruction (removal of dead wood, dead trees and logs).

Bushland restoration

Natural restoration of remnant bushland is the preferred method for protecting and improving the endangered ecological communities in the Reserve. Bush restoration techniques include fencing of core bushland areas, phased weed removal, and protection of self seeding regeneration.

Bushland re-instatement

Re-instatement of bushland is required to improve biodiversity values to existing degraded / cleared areas and includes the creation of bush areas to link stands of remnant bushland. Re-instatement techniques include weed removal, on-site seed collection, plant propagation, and establishment.

Both bushland restoration and re-instatement techniques should incorporate strategies aimed at threat management / mitigation. An area of Gundungurra Reserve is to be set aside specifically for the re-instatement of the Elderslie Banksia Scrub Forest subject to recommendations in the Cumberland Plain Endangered Ecological Communities Recovery Plan due for completion in 2002.

6.2.2 Access

Proposed road network (Spring Farm)

The proposed street hierarchy indicated on the concept masterplan is indicative of the layout which is likely to be constructed. Ideally residential streets should front onto the bush corridor lands to reduce edge effect impacts, and provide a fire buffer / access between bushland and residential areas. It is envisaged that the proposed East-West Link Road could include a raised section near the south west corner of the northern land parcel to permit flora/fauna/recreation connectivity between the Reserve and bushland corridor.

Proposed shared path network

A shared pedestrian / cycle network is proposed to define circulation routes throughout the Reserve, the adjoining bushland corridor and William Howe Regional Park. The alignment for the 2.5-3.0 metre wide pathway has considered the definition of maintenance zones and provision of logical pedestrian / cycle connections throughout the Reserve and surrounding areas (whilst minimising potential fragmentation of bushland).

NPWS access road / pathway

A dual purpose accessway through William Howe Regional Park serves as a pathway for park visitors and a vehicle route for maintenance staff.

6.2.3 Park Features

Proposed park features are numbered on the Concept Masterplan and are described following.

1. Park / corridor entry point

The proposed park / corridor entry is proposed adjacent to a park focal point element (rock outcrop) is to include a map of the area along with general park information. It is suggested that the proposed entry point would be marked by a subtle interpretive landscape feature that conveyed a sense of identity to park users. It is envisaged that the entry point will also provide access to William Howe Regional Park. A limited amount of off road parking is to be provided at the entry.

2. Rock outcrop lookout / interpretive feature

This natural high point is marked by a sandstone outcrop and offers views over the main passive recreation point in the Reserve. Interpretive signage describing the surrounding natural and man made landforms could be included in this feature.

3. Lookout / interpretive feature

The existing Turkeys Nest Dam lookout and picnic facilities are a focal point of William Howe Regional Park, and could potentially be accessed via a network of trails that connect the Regional Park with Gundungurra Reserve.

4. Picnic shelter

A number of picnic shelters are proposed throughout the main passive recreation area for use by families / small groups. The design of these shelters is to be contemporary, vandal resistant and incorporate ESD principles (e.g. manufactured from renewable / recycleable resources / recycle rainwater). All park furniture items should be considered to integrate with elements at William Howe Regional Park.

6.0 MASTERPLANNING

5. Large group picnic shelter / interpretive feature

A large picnic shelter is to be constructed on the dam foreshores (William Howe Regional Park) for use by large groups and extended families. It should incorporate interpretive signage ranging from pre/post contact Aboriginal life in the area to previous agricultural history of the Glenlee Estate.

6. Boardwalk

A steel boardwalk is proposed along the eastern dam edge (William Howe Regional Park) and should provide an equal access link between the large group shelter and the rock outcrop lookout. The inclusion of interpretive rest areas and a variety of edge treatments should provide a range of recreational experiences for the user.

7. Water feature (farm dams)

A number of farm dams exist within the Reserve and are proposed for retention as recreational focal points / wildlife habitats subject to outcome of safety / liability investigations by Council. The dams provide important visual / aesthetic focal points in addition to diversifying available natural habitat.

8. Pasture / native grass area

The conservation of representative areas of pasture / native grass areas is recommended (also recommended in WHRP POM) to preserve a cultural landscape type associated with farm use in the surrounding area. The grasslands which currently occur throughout the Spring Farm release area are a visual character which will soon be replaced with urban development.

9. Maintained grass area

A maintained grass area is proposed around the main focal point of the Reserve to define the main passive recreation area and facilitate picnics and other passive recreation activities.

10. Parking

It is anticipated that an on-site carpark will be required to meet the demands of increased park usage. Its siting adjacent to the propose link road and passive recreation area is intended to minimise potential visual and physical impacts on the Reserve and provide for equal access provision to park focal points for mobility impaired visitors.

7.0 ACTION AND IMPLEMENTATION

Whilst the preceding management and masterplanning sections describe the full range of required actions, existing resources will dictate the programme over which these can be achieved. This section describes the recommended priority of required actions and lists the detailed actions required for implementation.

7.1 Staging

The preliminary proposals as described in the Concept Masterplan comprise a range of potential improvements with varying community and environmental priority. The following works action plan assigns priority to the proposals based on those which are of most community benefit, with lower priority items to be implemented as budgetary and funding opportunities allow.

7.2 Works action plan

The Works Action Plan (Figure 7.1 following page) identifies tasks and areas of work which need to be addressed in order to implement the park enhancement works and management requirements.

It is essential that the Works Action Plans involve the active participation of all relevant departments of Camden Council along with appropriate community groups.

The Works Action Plans are in the form of a schedule that:

- establishes recommended priorities for worked items;
- describes the detailed activities required including pre-construction elements for capital works items;
- describes the nature of actions required (capital works, policy review, management action, liaison action);
- recommends possible sources of funding for the works; and
- notes specific comments relating to the implementation of that item.

7.3 Funding

In addition to funds available from Council's capitol works program and maintenance budgets, there are opportunities for grants and corporate sponsorship that could contribute to the completion of development works to the Gundungurra Reserve.

The review below, outlines applicable sources of external funding that should be pursued by both Council and the park's active stakeholders, to hasten the progress of park improvements.

The most applicable sources of funding are listed below, summarising these funding bodies and relevant application criteria.

Name of grant	Purpose	Administrating agency	Scope and limit of assistance
Public Reserves Management Fund Programme – Local Park and Reserves Public Reserves Management fund Programme - Showgrounds Assistance Scheme	Improvements to Crown Reserves	NSW Department of Land	Dollar for dollar funding but level of assistance is limited.
Job Skills	Over 21 year old trained labour for revegetation work	Dept, of Employment, Education and Training	Labour to assist in documented revegetation work. Grant covers funding for a co-ordinator and approx. 20 trainee staff for 12 months
Heritage 2001	Funding for physical conservation works on heritage sites & structures	NSW Heritage Office	Additional funding for items being directly from State Treasury. Capital works/project specific funding only, with expectation that Council or other authority will manage and maintain.
Metropolitan Greenspace	Funding for development and enhancement of open space	DIPNR	1 million total per year – average funding \$50-100,000.00 on dollar for dollar basis with council.
Australian Government Envirofund	Conserve Australia's environment and natural resources	Natural Heritage Trust	Grants of up to \$30,000.00 to carry out on ground action actions to target local problems

7.0 ACTION AND IMPLEMENTATION

No.	Item	Priority	Action Type	Activities Required	Possible Resources (funding and technical inputs)
1.0	Bushland Corridor Committee	High	Planning	<ul style="list-style-type: none"> • Investigate and establish a Bushland Corridor Committee to oversee the establishment and ongoing management of the Spring Farm Bushland Corridor • Committee should be formed by community members including representatives from the following stakeholder groups: <ul style="list-style-type: none"> – Camden Council – NSW National Parks and Wildlife Service – Narellan Landcare Group – local Aboriginal Land Council – Mount Annan Botanic Gardens – Waste Services • Bushland Management Committee to prioritise the following actions: <ul style="list-style-type: none"> – call for tenders, appoint suitably qualified bush regeneration contractor to prepare action plan detailing weed removal, seed collection, propagation, revegetation, labour sources and funding – liaise with Camden Council regarding the rezoning of all lands in the bushland corridor to 7(d2) Environmental Protection (bush corridor) – liaise with integral energy for diversion of maintenance access route along powerline easement (to protect <i>pimelia spicata</i> – endangered species) and for revegetation with low growing species – liaise with Sydney Water regarding potential revegetation of reservoir land to achieve bushland corridor / visual screening goals – liaise with Landcom to review odour buffer provisions in line with Council resolutions, etc – liaise with Landcom to ensure that roads / pathways in the Spring Farm Urban Release area adjoin bush corridor rather than residential areas – liaise with Landcom to ensure an adequate and coordinated open space network is realised throughout the Spring Farm release area which can be complemented for local and district residents by Gundungurra Reserve enhancement – seek funding assistance for the bushland corridor from the following groups: NSW agriculture, Natural Heritage Trust 	Camden Council, NSW National Parks and Wildlife Service, Narellan Landcare Group, local Aboriginal Land Council, Mount Annan Botanic Gardens, Waste Services, NSW Agriculture,

GUNDUNGURRA RESERVE – PLAN OF MANAGEMENT

No.	Item	Priority	Action Type	Activities Required	Possible Resources (funding and technical inputs)
2.0	Initiate bushland corridor improvement works	High	Capital Works	<ul style="list-style-type: none"> • Commence the ongoing implementation of Conservation, Restoration and Management strategies as recommended in the proposed action plan including: <ul style="list-style-type: none"> – immediate protection and natural restoration of core bushland areas – weed removal – restoration / re-instatement of endangered ecological communities (CPW, EBSF, SCRFF0) and threatened species – local seed collection and plant propagation for revegetation works – closure and restoration of surplus sections of existing trail network – incorporation of soil erosion measures and amelioration of eroded sites – maintenance regime for native / pasture grasslands – investigation of labour force for bushland works (e.g. Council, Narellan Landcare Group, School Groups, work for the dole program) 	Camden Council, NSW National Parks and Wildlife Service, Narellan Landcare Group, local Aboriginal Land Council, Mount Annan Botanic Gardens, Waste Services, NSW Agriculture, Metropolitan Greenspace Programme, Natural Heritage Trust
3.0	Fire management plan	High	Investigation / Planning & Design	<ul style="list-style-type: none"> • Prepare Fire Management Plan for Bushland Corridor (including: Gundungurra Reserve, William Howe Regional Park, Spring Farm Bushland Corridor, Jacks Gully Odour Buffer) to complement Camden Bush Fire Risk Management Plan (as prepared by local BFR Management Committee, under Rural Fires Act 2000) • Fire management plan to consider: <ul style="list-style-type: none"> – potential fire regime for threatened species / EEC management – establishment and maintenance of adequate fire buffer around the park perimeter in accordance with SREP 20 and the Rural Fires Act 1997 – threatened species / EEC recovery plans – natural and cultural heritage features – access for emergency vehicles to bushland areas via perimeter fire breaks and shared path routes – emergency vehicle access management (locked gates / bollards to prevent unauthorised use) – ensure that land underneath powerlines is free from plants over 4 m in height 	Councils Fire Planning Officer, Rural Fire Service, NPWS, Integral Energy, Mount Annan Botanic Gardens,

7.0 ACTION AND IMPLEMENTATION

No.	Item	Priority	Action Type	Activities Required	Possible Resources (funding and technical inputs)
4.0	Co-management agreement of shared boundary areas	Medium	Planning / Management	<ul style="list-style-type: none"> • Develop Memorandum of Understanding with NSW National Parks and Wildlife Service (NPWS) Metropolitan Parks Unit for the co-management of shared boundary areas between Gundungurra Reserve and William Howe Regional Park to enable a “seamless” boundary between the two areas • Memorandum to address the following shared responsibilities: <ul style="list-style-type: none"> – design of park / shared pathway / passive recreation area – construction of above – interpretive strategy including wayfinding and general park signage – fire management (fire breaks, access and potential fire regime) – leases / licenses (to be considered against values / desired outcomes of this POM) – general maintenance (mowing, weed management, etc.) – rubbish collection • Establishment of a rubbish control strategy, either supplying recycling centres on the site, or install signage encouraging park visitors to take all rubbish with them 	Camden Council, NPWS
5.0	Pest management strategy	Medium	Planning / Management	<ul style="list-style-type: none"> • Establish an appropriate pest management plan for the Reserve (in liaison with NPWS) including: <ul style="list-style-type: none"> – management of feral and domestic animals in accordance with accepted Council policy and management practices in liaison with NPWS – liaise with Rural Lands Protection Board to advise on control methods for rabbit control program – liaise with adjoining landowners (NPWS, Waste Services) regarding coordinated approach to rabbit control 	Camden Council, NPWS
6.0	Feral animal management implementation	Medium	Planning / Management	<ul style="list-style-type: none"> • Commence implementation of feral animal control measures as staged programme 	Camden Council, NPWS
7.0	Scientific monitoring	Medium	Investigation	<ul style="list-style-type: none"> • Undertake scientific monitoring of biodiversity to aimed at improving awareness of ecological condition and function including: <ul style="list-style-type: none"> – Undertake periodic fauna studies and analysis – Develop recording / monitoring / evaluation program – Evaluate potential future impacts on the bushland corridor 	Camden Council, NPWS

GUNDUNGURRA RESERVE – PLAN OF MANAGEMENT

No.	Item	Priority	Action Type	Activities Required	Possible Resources (funding and technical inputs)
8.0	Farm dam safety / habitat	Medium	Investigation / Planning & Design	<ul style="list-style-type: none"> • Review structural stability and liability implications of farm dams • Prepare a habitat regeneration plan for dams that identifies extent of works, sources of weed infestation and pollution and recommends actions for improvement works 	Camden Council, NPWS
9.0	Park detailed design	Medium	Planning / Design	<ul style="list-style-type: none"> • Write brief and advertise for Consultancy Proposals for preparation of detailed design of park improvement works for Gundungurra Reserve and a section of William Howe Regional Park around farm dam • Appoint suitably qualified consultant to undertake detailed design and construction documentation (incorporating staging of construction works as required) of park improvement works including: <ul style="list-style-type: none"> – park entry points – shared path alignment (ensuring that paths connect to existing and proposed path network beyond study area) – passive recreation areas around farm dam – interpretive lookout areas (northern ridgeline and rocky outcrop) – car parks – improvements to potential water features (farm dams) • Determine strategy for management of construction phase 	Camden Council, NPWS

7.0 ACTION AND IMPLEMENTATION

No.	Item	Priority	Planning / Design	Activities Required	Possible Resources (funding and technical input)
10.0	Interpretive strategy	Medium	Planning / Design	<ul style="list-style-type: none"> • Write brief for preparation of interpretive / wayfinding signage strategy for Gundungurra Reserve and William Howe Regional Park in conjunction with NPWS • Prepare strategy including: <ul style="list-style-type: none"> – development of general park signage / wayfinding system – liaison with Aboriginal land councils, Camden Council, community groups (including Camden / Campbelltown Historic Society, Narellan Landcare Group) regarding interpretive approach and content – development of interpretive signage content including significance of the area to Aboriginal inhabitants, European settlement, agricultural use, significance of the natural environment and threatening factors to natural areas, and the role of the local community and other stakeholders (including state and local government) in the conservation of open space / habitat areas – preparation of sign / public artwork – fabrication and installation of signage and public art components in conjunction with relevant capital works projects 	Camden Council, NPWS, Aboriginal land councils, Camden historic society, Campbelltown historic society, Narellan Landcare Group,
11.0	Construction of shared path system (northern land parcel)	Medium	Capital works	<ul style="list-style-type: none"> • Determine and undertake process for construction of shared path system, including <ul style="list-style-type: none"> – minor grading – grassing works – planting works – path construction (2.5-3.0m for main shared paths / 1.5m for secondary pedestrian paths) – bush / grass re-establishment to sides of path alignment – coordination of interpretive / wayfinding signage installation (refer interpretive strategy) 	Camden Council, NPWS, Metropolitan Greenspace Programme

GUNDUNGURRA RESERVE – PLAN OF MANAGEMENT

No.	Item	Priority	Action Type	Activities Required	Possible Resources (funding and technical inputs)
12.0	Construction of site entry points	Medium	Capital works	<ul style="list-style-type: none"> • Determine and undertake process for construction of lookout area including, <ul style="list-style-type: none"> – setout – minor earthworks – hardworks – softworks – coordination of interpretive / wayfinding signage installation (refer interpretive strategy) 	Camden Council, NPWS, Metropolitan Greenspace Programme
13.0	Construction of passive recreation area	Medium	Capital works	<ul style="list-style-type: none"> • Determine and undertake process for construction of passive recreation area including, <ul style="list-style-type: none"> – setout – weed removal – minor grading – grassing works – planting works – picnic shelters – park furniture – boardwalks – coordination of interpretive / wayfinding signage installation (refer interpretive strategy) 	Camden Council, NPWS
14.0	Park maintenance	Medium	Capital works	<ul style="list-style-type: none"> • Update Councils schedule for park maintenance to include the following: <ul style="list-style-type: none"> – rubbish removal – maintenance of grass areas • Plan and implement an educational program for adjoining residents and landowners to reduce or eliminate rubbish dumping 	Camden Council, NPWS
15.0	Public transport	Medium	Investigation / Management	<ul style="list-style-type: none"> • Liaise with public transport providers regarding provision of bus stop locations in close proximity to park entrances 	Camden Council
16.0	Public education programme	Medium	Capital works	<ul style="list-style-type: none"> • Plan and implement a public education program for local residents and adjoining land owners, aimed at promoting the values and sensitivity of the park, the appropriate use of pesticides, herbicides and other chemicals in the vicinity of the park, weed infestation and the management of domestic animals 	Camden Council, NPWS

7.0 ACTION AND IMPLEMENTATION

No.	Item	Priority	Action Type	Activities Required	Possible Resources (funding and technical input)
17.0	Construction of carparks	Medium	Capital works	<ul style="list-style-type: none"> • Determine and undertake process for construction of lookout are including <ul style="list-style-type: none"> – setout – minor earthworks – hardworks – softworks – coordination of interpretive / wayfinding signage installation (refer interpretive strategy) 	Camden Council, NPWS
18.0	Leases / licenses	Medium	Management	<ul style="list-style-type: none"> • Liaise with NPWS regarding potential for: <ul style="list-style-type: none"> – collection of park entrance fees – provision of a kiosk (possibly a temporary structure) adjacent to the proposed passive recreation focal area 	Camden Council, NPWS
19.0	Construction of northern ridgeline lookout area	Low	Capital works	<ul style="list-style-type: none"> • Determine and undertake process for construction of lookout are including: <ul style="list-style-type: none"> – setout – minor earthworks – hardworks – softworks – coordination of interpretive / wayfinding signage installation (refer interpretive strategy) 	Camden Council, NPWS
20.0	Construction of rocky outcrop lookout area	Low	Capital works	<ul style="list-style-type: none"> • Determine and undertake process for construction of lookout area including,: <ul style="list-style-type: none"> – setout – minor earthworks – hardworks – softworks – coordination of interpretive / wayfinding signage installation (refer interpretive strategy) 	Camden Council, NPWS
21.0	Shared pathway (eastern land)	Low	Capital works	<ul style="list-style-type: none"> • Determine and undertake process for construction of shared pathway including,: 	Camden Council

GUNDUNGURRA RESERVE – PLAN OF MANAGEMENT

No.	Item	Priority	Action Type	Activities Required	Possible Resources (funding and technical inputs)
	parcel)			<ul style="list-style-type: none"> - minor grading - grassing works - planting works - path construction - bush / grass re-establishment to sides of path alignment - coordination of interpretive / wayfinding signage installation (refer interpretive strategy) 	
22.0	Shared pathway (southern land parcel)	Low	Capital works	<ul style="list-style-type: none"> • Determine and undertake process for construction of shared pathway including: <ul style="list-style-type: none"> - minor grading - grassing works - planting works - path construction - bush / grass re-establishment to sides of path alignment - coordination of interpretive / wayfinding signage installation (refer interpretive strategy) 	Camden Council

5.0 MANAGEMENT STRATEGIES

8.0 BIBLIOGRAPHY

Anne Clements & Associates (2002),

Vegetation Assessment: Spring Farm Urban Release Area, Camden LGA

Lean & Hayward Pty Ltd

Benson D. & Howell J. (1995),

Taken for Granted: the bushland of Sydney and its suburbs

Kangaroo Press, Sydney

Camden Council (1996),

Plan of Management for General Community Land

Camden Council (1996),

Plan of Management for Natural Areas (Bushland)

Camden Council (1996),

Plan of Management for Parks

Camden Council (1996),

Plan of Management for Sports Grounds

Camden Council (1999),

Camden 2025 – A Strategic Plan for Camden

Camden Council (2000),

Camden Council Open Space Strategy

Camden Council (2002),

Natural Assets Policy

Conacher Travers (2002),

Spring Farm Release Area Fauna and Fauna Habitat Study

The Consortium Landcom

Context (2002),

Spring Farm Release Area Landscape Masterplan Report

Camden Council

Cycle Planning (1996),

Camden Council Bicycle Plan

Camden Council

Department of Land and Water Conservation and Mandis Roberts Consultants (1996),

Succeeding with Plans of Management

DLWC, Sydney

Department of Local Government (2000),

Public Land Management: Practice Note No.1

GUNDUNGURRA RESERVE – PLAN OF MANAGEMENT

Don Fox Planning Pty Ltd (2000),
Camden Structure Plan Report
Camden Council

Edaw (1996),
Camden Bushland Corridor Study
Camden Council

Hazelton P. A. and Tille P.J. (1990),
Wollongong-Port Hacking 1:100000 Sheet
Soil Conservation Service of NSW, Sydney

Patterson Britton and Partners Pty Ltd (2000),
Spring Farm Urban Release Area Local Environmental Study
Camden Council

Pittendrigh Skinkfield Bruce (2001),
Camden Riparian Areas Plan of Management – Preliminary Draft
Camden Council

Spackman and Mossop (1999),
William Howe Regional Park Draft Plan of Management
NSW National Parks and Wildlife Service, Metropolitan Regional Parks Unit

Urban Bushland Management Consultants (2002),
Final Report – Elderslie Banksia Scrub-Woodland Rehabilitation Project
Landcom