Hawkesbury City Council

attachment

to

item 58

Attachment 1

The Draft Argyle Bailey Memorial Reserve Plan of Management

date of meeting: 27 March 2007

location: council chambers

time: 5:00 p.m.

Argyle Bailey Memorial Reserve

(Swallow Rock Reserve)

EBENEZER

Draft Plan of Management

15 January 2007

prepared by

LandArc Pty Limited

Landscape, Environmental and Heritage Consultants

CONTROLLED DOCUMENT

Draft Issue D: 15 January 2007

This Plan of Management for
Argyle Bailey Memorial Reserve, Ebenezer
was prepared by

LandArc Pty Limited

Landscape, Environmental and Heritage Consultants

Suite 9, 55 Avalon Parade, Avalon NSW 2107

tel: 9973 1330 fax: 9973 1791 email: mail@landarc.com.au

CONTENTS

Page

LIST OF FIGURES:

LIST OF TABLES:

APPENDICES:

1.0 INTRODUCTION

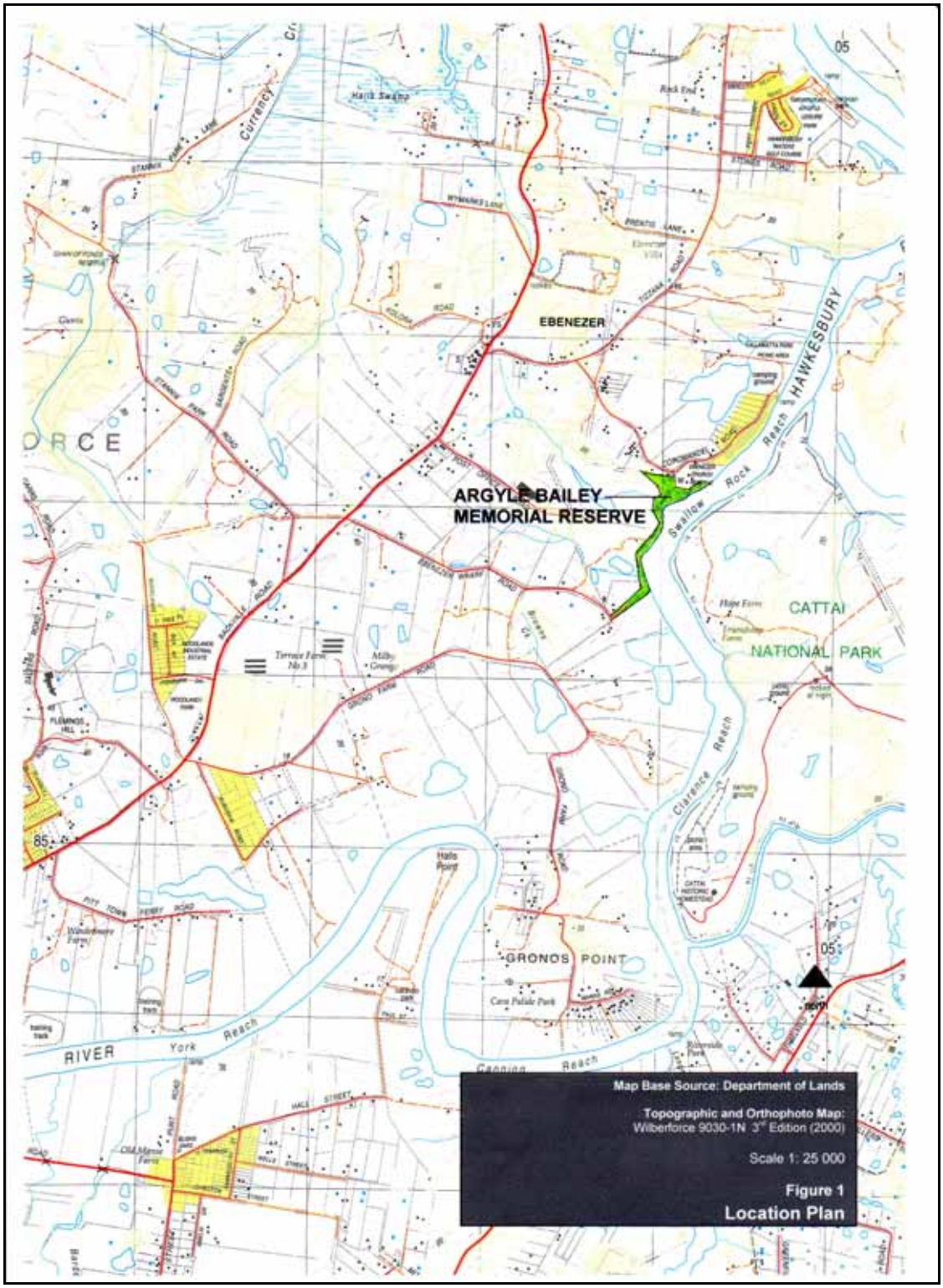
1.1 OVERVIEW

Argyle Bailey Memorial Reserve, also known as Swallow Rock Reserve, is located at Ebenezer on the western bank of the Hawkesbury River approximately 10 kilometres north of Windsor (refer to *Figure 1: Location Plan).* The reserve (R76154), gazetted in 1953, is owned by the Crown and administered by the Department of Lands under the *Crown Lands Act 1989*. The reserve was named after Argyle Bailey, Colo Shire alderman (1959-1973) and President (1967-73). In 1996 Hawkesbury City Council was appointed as Trust Manager to manage the affairs of the Reserve Trust (ie. responsibility for care, control and management).

The special combination of high scenic qualities along the river, river access, elevated vantage points and vistas, natural bushland setting, surrounding rural character, Aboriginal, archaeological and European cultural heritage values make the reserve a particularly attractive destination for local residents and people from further afield. The exceptional scenic values are recognised under the *State Regional Environmental Plan - SREP No. 20 Hawkesbury-Nepean River (No.2 – 1997).* The remnant native riparian vegetation is scheduled as an endangered ecological community under the *Threatened Species Conservation Act (1995).*

Argyle Bailey Memorial Reserve can be accessed either via Coromandel Road (northern portion adjacent to Ebenezer Uniting Church) or Ebenezer Wharf Road at the southern end. Ebenezer Uniting Church, established in 1809, is Australia's oldest church. Both entrances have ample car parking and easy graded pedestrian access to picnic facilities. Public amenities are located only within the northern car parking area. The reserve is less than fifteen minutes by car from the centre of Windsor and caters for passive recreation particularly as a destination for family picnics, bushwalking, swimming, bird-watching and environmental study. The reserve lies on a section of the Hawkesbury River which is popular for skiing, boating and related water-sports.

The reserve forms a narrow corridor and riparian buffer between the river and adjoining rural properties and like many other similar natural reserves in the Hawkesbury area has been adversely affected by past clearing, quarrying, bank erosion, altered drainage regimes, sedimentation, increased nutrient loadings, recreational impacts and exotic weed invasion. This plan of management aims to address these past and current issues and provide an integrated and sustainable approach to future management and rehabilitation of the reserve's core values and unique character.


EBENEZER
ARGYLE BAILEY
MEMORIAL RESERVE
HAWKESBURY
CATTAI
NATIONAL PARK
GRONOS POINT
RIVER
Map Base Source: Department of Lands
Topographic and Orthophoto Map:
Wilberforce 9030-1N 3rd Edition (2000)
Scale 1: 25 000
Figure 1
Location Plan

The reserve's unique combination of natural, scenic, environmental, heritage and recreational values are highly valued by the local community. The level of community involvement and commitment in the reserve's protection and restoration and education of park visitors is testament to these values. In 2005 the NSW Department of Planning provided grant assistance of $15,000.00 under the Greenspace Program to develop a plan of management, including a landscape master plan for the reserve. The funding was conditional upon the plan of management addressing key heritage values and establishing appropriate conservation and/ or interpretation elements for the Aboriginal site scatter, historic quarry, landing site and other historic elements.

In June 2006 LandArc Pty Limited – landscape, environmental and heritage consultants, were selected as the successful tender and commissioned to prepare this plan of management. Over the following months, a series of stakeholder meetings were held to discuss relevant issues and to establish appropriate guidelines in accordance with best practice guidelines and the legislative requirements for Crown reserve management.

1.2 ARGYLE BAILEY MEMORIAL RESERVE

Argyle Bailey Memorial Reserve, gazetted as Ebenezer Church Reserve in 1953, was later named after Argyle Bailey, Councillor (Alderman) and President of the former Colo Shire Council who died 5th February 1973. Argyle Bailey dedicated much of his working life to improving the quality of life for local residents in the Colo Shire. He was elected to Council in 1959 and was Shire President for seven years (1967-1973) before his sudden death at the age of 68 years. In 1981 Windsor Municipality and Colo Shire Council were amalgamated forming the new Shire of Hawkesbury, which was later declared the City of Hawkesbury in 1989. Furthermore, the name of Swallow Rock Reserve, a reference to Swallow Rock Reach on this section of the Hawkesbury River, has found popular support in recent years with signage in the reserve referring to "Swallow Rock Reach Walking Trail". This plan of management retains the use of "Argyle Bailey Memorial Reserve".

1.3 STUDY AREA

Argyle Bailey Memorial Reserve is a narrow linear-shaped public reserve covering a total area of 6.164 hectares (Ha) and extending approximately 850 metres along the river's western shoreline between Ebenezer Church (Coromandel Road) in the north and Ebenezer Wharf Road in the south. The reserve lies within the riparian corridor and shares a western boundary with privately-owned rural properties (refer to *Figure 2: Study Area)*. The reserve lies across the river from Cattai National Park (Hope Farm section).

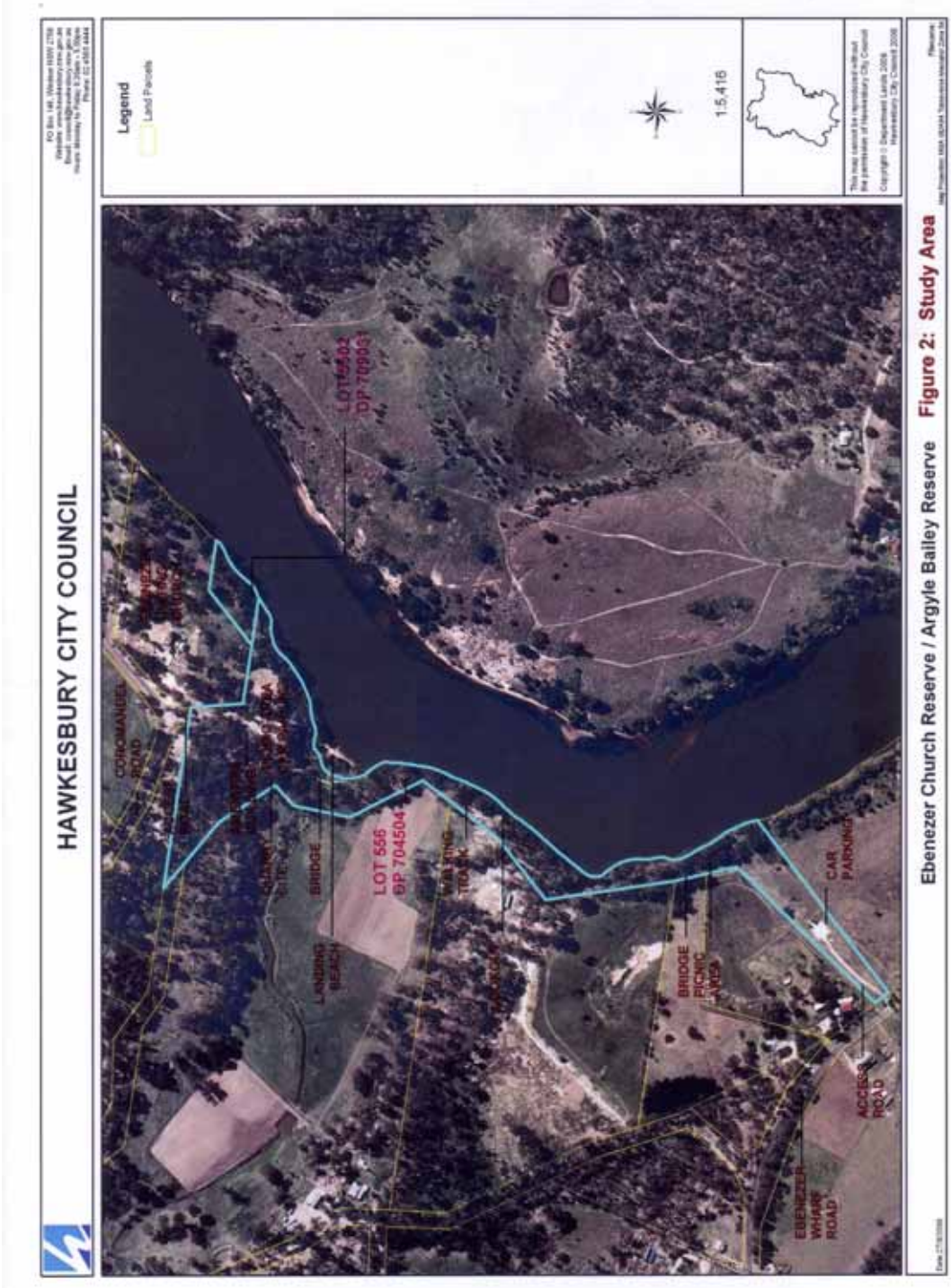
The shoreline varies from moderately steep banks to shear sandstone scarps and rock outcrops. Argyle Bailey Reserve contains a significant parcel of contiguous riparian bushland described as Sydney Coastal River-flat Forest (Riparian Forest and Alluvial Woodland). Shale Sandstone Transition Forest and small areas of Western Sydney Dry Rainforest are also present in the reserve. These communities occur within a narrow strip of varying width along the river and are dependent on underlying geology, soil types and topography. The northern portion and middle ridge sections of the

reserve retain a predominantly intact native canopy structure with a modified understorey. Most of the natural vegetation within the southern portion of the reserve was cleared many decades ago. This area has been subject to extensive modification for agricultural use including construction of drainage channels, cattle grazing and pasture improvement with exotic grasses.

Two drainage channels traverse the northern and southern sections of the reserve. These channels were constructed or modified to drain natural wetlands on adjoining private properties. Deep eroded gullies have formed in these locations. The historic landing beach is located immediately to the north of the northern channel. This beach provided river access to Ebenezer Church for early settlers. During the 1990s two pedestrian bridges (over the gullies) and a pedestrian track were constructed to provide access between the northern and southern car parks and picnic areas.

The northern portion of the reserve contains a sandstone quarry site which was used in the procurement of stone for construction of Ebenezer Church, Australia's oldest church. Over the years, the quarry site was recolonised by natural vegetation and exotic weed growth. A picnic area and unsealed car park is located on the lower ground immediately to the south of the church. The picnic area contains an amenities building and scattered picnic shelters and seating within a tall forest setting. The pedestrian track leads south along the river bank to a scenic lookout, another smaller picnic/ BBQ area and open car park at the southern end of the reserve. A total of nine licences/ permissive occupancies (primarily for irrigation purposes) exist within the reserve and include infrastructure such as pumps, pipelines, metering towers and other equipment.

PHOTO 1: Northern car park and picnic area – near walking track head looking south through tall native Eucalypts [foreground], surrounding hills and rural setting [background].


HAWKESBURY CITY COUNCIL
Legend
Land Parcels
1:5,416
LOT 7302 DP 709621
LOT 555 DP 704504
CORO MANDEL ROAD
BRIDGE
LANDING BEACH
CAR PARKING
BRIDGE PICNIC AREA
ACCESS ROAD
EBENEZER WHARF ROAD
Ebenezer Church Reserve / Argyle Bailey Reserve Figure 2: Study Area

1.4 AIMS AND OBJECTIVES

This plan of management has been prepared in accordance with the *Crown Lands Act 1989*, *Crown Lands Regulation 2000* and all other relevant policies, case law and legislation. The plan of management aims to provide a clear, concise and practical framework for the protection of assets, enhancement of recreational infrastructure and environmental management of the reserve. The plan of management also aims to be performance oriented in order to contribute towards Council achieving its strategic goals, vision, mission and strategic outcomes as identified in the *Hawkesbury City Council Management Plan 2006-2007.*

The Brief outlined the following aims and objectives:-

- *to prepare a plan of management which provides direction in appropriate management and development of the reserve;*
- *to determine the future management of the reserve and to define a balance between protection and conservation of the environment and the recreational needs of the wider community;*
- *to identify potential opportunities for future development of the reserve based on community priorities and available and potential funding sources;*
- *to determine the sustainable extent of passive recreational activity and water access to the river;*
- *to control and limit public access and the type of access;*
- *to identify existing and proposed recreational facilities and assess suitability in relation to the reserve's environment, including flood impacts (eg. height/ velocity of water, duration of flooding, public safety and economic factors);*
- *to identify potential Aboriginal and European heritage items/ places and to provide a conceptual strategy for their current and long-term management;*
- *to develop a staged management strategy identifying site rehabilitation and management objectives which enable the enhancement of both natural processes and suitable recreational opportunities;*
- *to prepare a concept plan showing practical future developments;*
- *to identify the costs and priorities for required works.*

While preparation of the plan of management has ensured an environment of consultation with the local community and key stakeholders, it is important to recognise that the approach has remained values-based rather than simply issues-driven in the management outcomes. This approach focuses on the longer term objectives of sustainable management. The following steps have guided the preparation of this plan of management:-

Section 2.0 Land Description and Planning

- ensure consistency with the Objects of the *Crown Lands Act 1989*;
- identify existing public purpose and any proposed changes to public purpose, reserve ownership and management;
- identify current uses, activities and condition of the land, and any buildings or other improvements;
- review existing zoning provisions (under Council's LEP) and consistency with the reserve's public purpose;
- address future permitted uses and development (including intensity and scale) and existing and future leases/ licences.

Section 3.0 Community Consultation

- identify and assess community and stakeholder issues affecting the reserve;
- ensure an adequate level of consultation with all stakeholders, including other Crown reserve uses (ie. licences/ permissive occupancies for pipeline and pump-sites and grazing).
- determine community goals, values, needs and expectations for the future use and management of the reserve;

Section 4.0 Basis for Management

- define the Crown reserve's role within the local government area and regional context (Western Sydney);
- identify and assess key values including the river/ riparian corridor and its scenic qualities, Aboriginal, cultural and natural heritage, endangered ecological communities, existing recreational uses, facilities and improvements and their condition;
- assess the impact of existing uses, activities and management regimes or future development and leases and licences on identified key values;
- review opportunities for future development, leases and licences;
- establish the framework for sustainable management strategies consistent with the Principles of Crown Land Management.

Section 5.0 Management Strategies

- establish appropriate management strategies in accordance with the Crown reserve's public purpose
- ensure a balanced, sustainable approach to conservation, rehabilitation and the recreational needs of the wider community;
- specify the purposes for which any further development of the land, buildings or improvements will be permitted, whether under lease/ licence or otherwise;
- describe the scale and intensity of such permitted use or development;
- develop performance targets (management objectives), the means of achieving these targets (management actions) and the means of assessing Council's performance with respect to the plan of management's objectives;
- assign directions and priorities (spanning the next 5-years) and provide cost estimates for implementation of proposed works; and
- develop a master plan for implementation of the strategic plan.

1.5 HISTORICAL BACKGROUND

Argyle Bailey Memorial Reserve, named after the former President of Colo Shire Council (1967-73), was originally gazetted in 1953 as Ebenezer Church Reserve in the Shire of Colo. Following amalgamation with the Municipality of Windsor in 1981 the reserve was managed by Hawkesbury Shire Council (1981-1989) which later became Hawkesbury City Council. Argyle Bailey Memorial Reserve is located within the riverine corridor of the Hawkesbury River and is subject to periodic flooding, albeit modified by upstream dam construction and other flood mitigation works. The reserve, like much of the floodplain, has been substantially modified by past clearing, agricultural activities, drainage alterations, nutrient enrichment, aquatic and terrestrial weed encroachment and changes to water quality, flow rates and riverbank stability.

The river, originally called Deerubbin (or Venrubben) by the Darug Aboriginal people was a vital source of water, food, fibres, tools, medicine, canoe making, transportation and other resources. In 1802 Scottish and English free settlers who arrived on the Coromandel took up local land grants. In the early years of settlement, competition over access to the river and all its resources led to a bitter struggle between the traditional owners, the Darug people and the new European settlers. Governor King intervened on behalf of the traditional custodians and agreed not to establish any further grants lower down the river however the Aboriginal population became increasingly marginalised. By 1805 the new settlement was called Portland Head after a rock formation said to resemble the Duke of Portland *(Nichols, M., 2004 pp.4-6 and 35)*. Ebenezer Church (Uniting) was built by the Coromandel settlers between 1809-1823. The church, located on a prominent ridge overlooking the river (adjacent to the reserve), was the first Presbyterian Church in the colony and is Australia's oldest functioning church. Ebenezer Church, the old schoolhouse, cemetery and historic tree (site of the first church service in 1803) are of National and State significance.

Throughout much of the nineteenth century this broad, deep stretch of water (adjacent to the reserve) provided river access for large boats (up to 100 tons) carrying produce from Windsor Wharf to Sydney. At the local level, the river and the landing beach in the reserve provided access to Ebenezer Church and neighbouring rural properties. The river also provided recreational opportunities for day trippers and holiday makers from the city as early as the 1830s. The river's attractions gained further momentum during the 1890s when swimming became a popular pastime.

Twenty-seven major floods were recorded along the Hawkesbury River during the nineteenth century claiming the lives of many early settlers. The great flood of 1867 was the highest flood ever recorded at Windsor. By the 1880s the extensive removal of riparian vegetation for agricultural purposes had significantly increased erosion and sedimentation of the river channel limiting the passage of large boats. A steam ship service using smaller boats was established at this time and continued through to the 1940s. Cheap road transport between the Richmond-Windsor area and Sydney markets finally brought the romantic era of the steam ship service to an end.

In 1950 the first water-skiing club in Australia was established at Sackville *(Nichols, M., 2004 pp.44-49)*. By the 1960s this stretch of the river had become a popular venue for motor boats and water-skiing with purpose-built caravan and trailer parks lining the adjacent shoreline. During the latter part of the twentieth century water quality and aquatic weed issues began to have a serious impact on water-based recreation. Fish stocks which were once plentiful had plummeted by the 1950s. Introduced European carp have been favoured under the disturbed conditions. In recent years the health threat posed by blue-green algae has further diminished recreational values. Aquatic and floating water-weeds such as *Egera* and *Salvinia* spp. have flourished under the reduced flow regime and long periods of drought. By the summer of 2003-04, aquatic floating weeds completely choked large stretches of the river restricting use of the waterway and affecting local water-based recreation and tourism businesses. While mechanical harvesting provided a temporary measure of control the underlying causes have not yet been properly addressed. Although these broader river catchment issues are beyond the scope of this plan of management they have a considerable impact on future uses and activities in this reserve.

Terrestrial weeds have also flourished within the floodplain, particularly in disturbed natural areas such as Argyle Bailey Memorial Reserve. Up until the 1990s rampant weed growth was smothering canopies and preventing natural regeneration of remnant native vegetation in the reserve. The ecological resilience of the reserve's endangered riparian communities hung in the balance. Under successive programs including local community volunteers (Bushcare), the state government funded youth training initiative (LEAP) and more recently, contract bush regenerators a weed management and restoration strategy was developed and implemented. This strategy has controlled and reduced weed growth and arrested the decline in native vegetation. It is currently re-shaping the visual character of the reserve and ecological integrity of its bushland.

Importantly, the reserve's significant scenic, natural, Indigenous/ European cultural heritage and archaeological values have been retained and protected. Hawkesbury City Council, the state government and local community have all made a valuable contribution towards the management and rehabilitation of these values for the benefit of current user groups as well as for future generations. These initiatives were an important part of other significant works undertaken at this time including development of the walking track (pedestrian link), construction of foot-bridges, interpretive signage, picnic areas and car parking. The reserve's existing recreational infrastructure remains low-key and typical of other bushland reserves in the Hawkesbury LGA. These facilities cater primarily to passive and nature-based recreational activities. The reserve offers significant opportunities for future upgrading of recreational infrastructure providing it is carefully balanced with appropriate protection and management of scenic, natural and cultural heritage values.

1.6 SUSTAINABLE MANAGEMENT

Over the next 10 years it is likely that the reserve will be shaped by major initiatives to reform water, land and natural resource management. These initiatives will seek to develop partnerships between councils, State government agencies, industry and the community to achieve sustainable outcomes. Hawkesbury City Council is actively involved in these initiatives in accordance with its principle policy statement – *Hawkesbury City Council Management Plan 2006-2007*. The Plan identifies the Council's commitment to protecting the City's unique character, which draws from and reflects natural and cultural heritage whilst growing and evolving in importance and influence. The Plan celebrates the City's diversity and vitality and continues to promote an environment of social equity and sustainability.

This plan of management aims to support the broad principle that all elements of the environment must stand in balance, contribute to an ecologically sustainable city and region and add to the quality of life within the Hawkesbury City LGA. Council's strategic planning process identified a number of significant/ priority areas, particularly with respect to land within riparian corridors which required the preparation of more detailed and specific management strategies. A number of significant area plans of management have been prepared (eg. Yarramundi Reserve) or have been assigned priority for preparation (eg. Argyle Bailey Memorial Reserve, Charles Kemp Reserve, Pugh's Lagoon/ Smiths Park and Woodbury Reserve). This significant area plan of management for Argyle Bailey Memorial Reserve supersedes the generic plan of management covering this reserve. The management strategy for Argyle Bailey Memorial Reserve will need to be consistent with Council's vision of a sustainable future and the legislative requirements under the *Crown Lands Act 1989*.

1.7 LIST OF ABBREVIATIONS USED IN THIS STUDY

CLA	Crown Lands Act 1989
CAPs	Catchment Action Plans
CMAs	Catchment Management Authorities
CPEECs	Cumberland Plain Endangered Ecological Communities
DCAC	Darug Custodian Aboriginal Corporation
DNR	NSW Department of Natural Resources
DofL	NSW Department of Lands
DofP	NSW Department of Planning
DEC	NSW Department of Environment and Conservation
HRCC	Hawkesbury River County Council
HRFC	Hawkesbury Rural Fire Service
LEP	Hawkesbury City Local Environmental Plan 1989
LGA	Local Government Area (Hawkesbury City Council)
NPWS	NSW National Parks & Wildlife Service
NSWRFS	New South Wales Rural Fire Services
SREP	Sydney Regional Environmental Plan
TSC Act	Threatened Species Conservation Act (1995)

2.0 LAND DESCRIPTION AND PLANNING

2.1 LAND TENURE

Argyle Bailey Memorial Reserve, covering an area of 6.164 hectares (Ha), is reserved Crown land (R76154) for the public purpose of Public Recreation. The Crown reserve consists of two separate land parcels, comprising Lot 556 in DP 704504 (5.791 Ha) and Lot 5502 in DP 709031 (0.3732 Ha), Parish of Wilberforce and County of Cook.

The Crown reserve was gazetted as Ebenezer Church Reserve on 14th August 1953 in the Trust Name of Ebenezer Church (R76154) Church Reserve (Lot 556 in DP 704504) and Ebenezer Church (R76154) Reserve Trust (Lot 5502 in DP 709031). Hawkesbury City Council was appointed as Trust Manager by notification in the Government Gazette on 20th December 1996. For further details see *Figure 2: Study Area* and *Table 1: Crown Reserve (R76154): Argyle Bailey Reserve.*

As of 15 February, 2006, the Department of Lands confirmed that the southern portion of the Crown reserve currently has six licences and two Permissive Occupancies granted for the purpose of “Pipeline and Pump site” to allow water to be pumped out of the Hawkesbury River across the Crown reserve to adjoining rural properties. A further Permissive Occupancy exists for the purpose of “Grazing” over the northern part of the reserve. For further details refer to *2.10 Leases and Licences* in this section.

A small parcel of Crown reserve (R33017) adjoining Hendrens Road was revoked on 13th August 1976 and added to the existing Crown reserve (R76154) for Public Recreation *(Government Gazette No.103, 13/08/1976).*

TABLE 1 :
CROWN RESERVE (R76154): ARGYLE BAILEY RESERVE

Land Tenure:	**Lot 556 in DP 704504**
Area:	5.791 hectares
Reserve Name:	Ebenezer Church Reserve
Reserve Type:	Reserve
Public Purpose:	Public Recreation
Reserve Gazetted:	14th August 1953
Trust Type:	Reserve Trust
Trust Name:	Ebenezer Church (R76154) Church Reserve
Management Type:	Council
Trust Manager:	Hawkesbury City Council (appointed by notification in Government Gazette 20/12/1996)
Leases/ licences:	as of 15/02/2006:
Purpose:	Pipeline and Pumpsite - Permissive Occupancy [2] - Licences [6]
Purpose:	Grazing - Permissive Occupancy [1]
Land Tenure:	**Lot 5502 in DP 709031**
Area:	0.3732 hectares
Reserve Name:	Ebenezer Church Reserve
Reserve Type:	Reserve
Public Purpose:	Public Recreation
Reserve Gazetted:	14th August 1953
Trust Type:	Reserve Trust
Trust Name:	Ebenezer Church (R76154) Reserve Trust
Management Type:	Council
Trust Manager:	Hawkesbury City Council (appointed by notification in Government Gazette 20/12/1996)
Leases/ licences:	nil

2.2 LAND DESCRIPTION

Table 2: Description of Crown Reserve – Existing Facilities & Improvements is divided into four separate columns with the following information provided for each land parcel:-

- Crown reserve (column 1);
- Lot/ DP number (column 2);
- description of land parcel, its facilities and improvements (column 3);
- condition of facilities and improvements (column 4).

Crown land
Crown land reservation for the public purpose of “Public Recreation”.

Lot/ DP number
Lot and DP number provide land tenure information for the land parcel according to the Department of Lands and Hawkesbury City Council’s property records.

Land description, facilities and improvements
This column provides a brief description of the land parcel, including facilities and improvements, landscape embellishment and the presence of remnant native vegetation and/ or exotic weeds. An indication of land management regimes (eg. mowing and general maintenance) is also provided.

Condition
This column refers to the general condition of facilities and improvements in accordance with the requirements of the *Local Government Act 1993*. The assessment of condition follows directly from the description of facilities and improvements (ie. same line) and provides a broad indicator of overall condition of these described items as follows:-

good described items are in relatively good condition and repair under the current works and maintenance program.
fair described items are in only fair condition and in need of repair/ improvements or an increased level of maintenance.
poor described items are in relatively poor condition requiring repair in some instances, improvements or an increased level of maintenance with some items requiring urgent attention.

The condition assessment refers primarily to built facilities and improvements. Refer to *4.0 Basis for Management* for a detailed description, condition and status of heritage items and native vegetation and *5.0 Management Strategies* for proposed capital works, maintenance and management with respect to all items.

TABLE 2: DESCRIPTION OF CROWN RESERVE – EXISTING FACILITIES & IMPROVEMENTS

Crown land	Lot/ DP	Existing Facilities/ Improvements	Condition
R76154	Lot 556 DP 704504	Area = 5.791 Ha	
		Natural area – steep vegetated riverbank/ adjoining undulating slopes, scarps/ rock outcrops and gullies	n/a
		native riparian vegetation/ exotic weeds	n/a
		steep eroded drainage channels/ gullies	poor
		historic quarry site [for church]	n/a
		northern access road/ car parking & picnic area:	
		unsealed gravel vehicular access road	fair
		unmade gravel car parking area	poor
		steel reinforced conc. vehicle barriers/ railing barriers	poor
		public amenities block - brick building/ metal roof	good
		incl. showers [unusable due to blue-green algae]	poor
		open mown grass areas/ picnic areas	good
		concrete painted shelters on conc. slabs X 4 in car park area [3] & upper slope [1] each w. partitioned picnic cubicles	good
		aluminium seats and tables [in each picnic cubicle]	good
		regulatory signage	fair
		litter bin X 1 [near amenities building]	good

Table 2 [continued]

Crown land	Lot/ DP	Existing Facilities/ Improvements	Condition
R76154	Lot 556 DP 704504	[continued]	
		walking track & bridges:	
		metal boom-gate/ timber posts [walking track head]	fair
		conc. blocks X 2 [vehicle barrier]	poor
		anodised aluminium signage [incl. maps/ natural history]	fair
		walking track [unsealed surface]	fair
		timber steps & metal hand-rails/ log retaining wall	poor
		timber bridge w. hand-rails/ chain-wire mesh panels [northern]	good
		rammed earth steps/ timber headers [to landing beach]	fair
		protective fencing/ signage [regen./ revegetation areas]	poor
		lookout area – timber slat/ metal frame seating X 1	fair
		metal safety rail/ mesh fence [damaged]	poor
		south of lookout – timber slat/ metal frame seating X 1	fair
		unmade paths/ multiple tracking	poor
		timber bridge w. hand-rails/ chain-wire mesh panels [southern]	good
		southern access road/ car parking & picnic area:	
		unsealed gravel vehicular access road	fair
		unmade gravel car parking area	good
		metal boom-gate/ log bollards & log edge wheel buffers	good
		steel reinforced conc. blocks - vehicle barriers	poor
		anodised aluminium signage [incl. location/ map]	fair
		regulatory signage X 1	fair
		open mown grass areas/ southern picnic area	good
		timber picnic shelters/ seating & tables X 3	good
		litter bin X 1 [near amenities building]	poor
		BBQs/ hotplates [timber fuel] X 3	poor
		Other infrastructure/ services:	
		electricity power poles/ overhead lines & meter boxes	good
		irrigation pump equipment [pumps/ piping & overland cables]	poor
		unmade service paths/ multiple tracking [bank erosion]	poor
		boundary fencing to adjoining properties [post & wire]	good
R76154	Lot 5502 DP 709031	Area = 0.373 Ha	
		Natural area – steep vegetated riverbank/ upper flat	
		area (partially cleared) and gently sloping ground	n/a
		native riparian vegetation/ exotic weeds	n/a
		unmade paths/ multiple tracking	poor
		no other facilities or improvements	

2.3 CROWN LANDS ACT 1989

The NSW Department of Lands, together with Reserve Trust/s appointed by the Minister, are responsible for management of the Crown reserve system throughout New South Wales. The *Crown Lands Act 1989* is the main government legislation affecting the planning, management and use of Crown land, including reservation or dedication for a range of public purposes and leasing and licensing. This NSW government legislation can be found on-line at the following URL: www.legislation.nsw.gov.au

2.4 PLANS OF MANAGEMENT FOR CROWN RESERVES

This plan of management for Argyle Bailey Memorial Reserve has been prepared according to the requirements of the *Crown Lands Act 1989*. A plan of management will satisfy the *Crown Lands Act 1989* providing the following points are addressed:

- the plan of management should be prepared by the reserve trust or trust manager, acting on behalf of the reserve trust (s.112 CLA)
  [REFER TO 2.5 TRUST MANAGEMENT IN THIS SECTION]

- Objects of Act (s.10 CLA)
  [REFER TO 2.6 OBJECTS OF CROWN LANDS ACT]

- the plan of management and its outcomes must incorporate and satisfy the ***principles of Crown land management*** (s.11 CLA)
  [REFER TO 2.7 PRINCIPLES OF CROWN LAND MANAGEMENT]

- existing and proposed land uses, developments, activities, leases, licences and management practices must be consistent with the dedicated ***public purpose*** of the reservation
  [REFER TO 2.8 PUBLIC PURPOSE(S) OF CROWN LAND]

- the plan of management must address any matters required by the Minister responsible for the Crown Lands (s.112 CLA)
  [SEE FOLLOWING NOTES]

- the Minister has the power to reserve land for a public purpose (s.87 CLA 1989)
  [SEE FOLLOWING NOTES]

- public exhibition of the draft plan and submissions must be referred to the Minister (responsible for the *Crown Lands Act*) prior to adoption.
  [SEE FOLLOWING NOTES]

In preparing a plan of management for a Crown reserve it is essential that the "public purpose" of the reserve establishes the basis for planning and management. Any proposed uses, developments and management practices must conform to the public purpose for the reserve or dedicated land, and conform with particular policies of the Department of Lands regarding Crown reserves (s.87 CLA 1989).

The Minister for Lands, under s.112 of the *Crown Lands Act 1989,* may initiate the preparation of a draft plan of management for the reserve or the Minister may consent to a reserve trust or trust manager acting on behalf of the reserve trust, to prepare a draft plan of management. It is important that the community has the opportunity to comment on the draft plan. Accordingly, the draft plan is placed on public exhibition (for not less than 28 days) to allow for public review and submissions.

The trust manager, acting on behalf of the reserve trust, must take comments from the Department into account before finalising the draft plan of management and requesting

Ministerial adoption of the plan. The adopted plan of management becomes a regulatory instrument which binds the trust manager (acting on behalf of the reserve trust) to follow the plan.

2.5 TRUST MANAGEMENT

Managing Crown Reserves

The management of a Crown reserve is generally in the form of one of the following:-

- reserve trust;
- devolved management under s.48 of the *Local Government Act 1993*;
- Departmental (Department of Lands) direct; and
- administrative orders.

Reserve Trust

A reserve trust is an incorporated entity that can be established and appointed to manage a Crown reserve (eg. community trust boards or administrators). It is not a branch of a department of government and is not conducted for private profit. Trusts are nominated by the Minister for Lands (s.92 CLA 1989). A trust board has functions conferred upon it under the *Crown Lands Act 1989*, including responsibility under the oversight of the Minister for Lands for care, control and management of a specific reserve, consistent with the public purpose of its reservation or dedication. The Minister cannot direct the trust as to how it is to manage the reserve unless the trust exceeds its powers (ie. if the trust was to act *ultra vires* – beyond the trust's legal power or authority). The Minister can otherwise only suggest or make representations to the trust with respect to management.

Trust Manager

Hawkesbury City Council has been appointed to manage the affairs of the trust under section 95 of the *Crown Lands Act 1989* (ie. Hawkesbury City Council has care, control and management of Argyle Bailey Reserve). Council's appointment as Trust Manager was notified in the Government Gazette on 20th December 1996.

Leases and Licences

Hawkesbury City Council, as trust manager, may enter into a lease or licence for the whole or part of the lands to which this plan of management applies (refer to *2.10 Leases and Licences*).

Proceeds

The net proceeds from a sale, easement, lease, or licence (including a temporary licence) on the reserve should be applied in accordance with directions (if any) given by the Minister for Lands (s.106 CLA 1989). This may include:

- direction that proceeds be paid to another reserve trust to be applied to the care, control and management of another trust's reserve.
- direction to Consolidated Fund or to the Public Reserve Management Fund under the *Public Reserves Management Act 1987*. In the absence of a direction from the Minister (which is the case with Argyle Bailey Reserve) the

proceeds shall be invested or applied for the general purpose of the reserve trust (ie. the proceeds must be spent within the reserve).

The reserve trust manager must separately account for all proceeds from activities on the reserve. Under section 122 of the *Crown Lands Act 1989*, the reserve trust must report on activities on the reserve as detailed in Clause 33 of the *Crown Lands Act Regulation (2000).*

Accountability

Clause 33 of the *Crown Lands Act Regulation (2000)* states that the reserve trust must prepare an annual report detailing the income, expenditure, assets, liabilities and improvements of the reserve as well as the details of any leases or licences granted by the Trust. The Minister (or the community) may request this information at any time. (Clause 34 (Schedule 4) of the Regulation states the following:

Where a reserve trust is managed by a council as defined in the Local Government Act 1993, the council is required to keep separate records to permit analysis of monetary details for each reserve. The account must among other things detail revenue and expenditure, improvements carried out on the reserve(s), and list all leases and licences granted or in force.

2.6 OBJECTS OF CROWN LANDS ACT

Section 10 – Objects of Act (s.10 CLA 1989) states that Crown land must be managed *"for the benefit of the people of New South Wales"* and to provide for the following:-

- *a proper assessment of Crown land;*
- *the management of Crown land having regard to the principles of Crown land management contained in this Act;*
- *the proper development and conservation of Crown land having regard to those principles;*
- *the regulation of the conditions under which Crown land is permitted to be occupied, used, sold, leased, licensed or otherwise dealt with;*
- *the reservation or dedication of Crown land for public purposes and the management and use of the reserved or dedicated land; and*
- *the collection, recording and dissemination of information in relation to Crown land.*

2.7 PRINCIPLES OF CROWN LAND MANAGEMENT

Section 11 of the *Crown Lands Act 1989* provides a set of principles for Crown land management which together form the basis for management and use of the reserve as follows:-

- *environmental protection principles be observed in relation to the management and administration of Crown land;*
- *the natural resources of Crown land (including water, soil, flora, fauna and scenic quality) be conserved wherever possible;*
- *public use and enjoyment of appropriate Crown land be encouraged;*
- *where appropriate, multiple use of Crown land be encouraged;*

- *where appropriate, Crown land should be used and managed in such a way that both the land and its resources are sustained in perpetuity; and*
- *Crown land be occupied, used, sold, leased, licensed or otherwise dealt with in the best interests of the State consistent with the above principles.*

2.8 PUBLIC PURPOSE(S) OF CROWN LAND

The *Crown Lands Act 1989* provides for the reservation and dedication of Crown land for a range of "public purposes" which must deliver a public benefit. Uses, activities, development, leases/ licences, and any other agreements in a Crown reserve are broadly defined by the public purpose of the reserve. All uses of Crown reserves must be acceptable according to their public purpose(s). It is important that zoning provisions in Council's Local Environmental Plan (LEP) are consistent with these objectives (refer to section *2.12 Zoning*).

Argyle Bailey Memorial Reserve was reserved for the public purpose(s) of "Public Recreation". The type of public recreation considered appropriate for this reserve is described as "informal, low-impact, passive recreation including related social and cultural activities".

Moreover, this Crown reserve contains significant natural, scenic and heritage values including riparian bushland (scheduled under the *Threatened Species Conservation Act 1995*), Aboriginal archaeological and cultural heritage (associations with items on NSW Heritage Register) and scenic values (identified in *SREP No.20 Hawkesbury – Nepean River (No.2 – 1997)* which require appropriate protection and management. It is therefore recommended by this plan of management that the public purpose(s) be amended to "Public Recreation and Environmental Protection" to further emphasise the significance of these values and to reflect the desired balance between appropriate low impact recreation and conservation (refer to *5.2 Action Plan – item A2*).

2.9 CASE LAW JUDGEMENTS

Case law judgements influence the policy and practice of the Department of Lands and Reserve Trust/s appointed by the Minister. The following case law judgements have relevance to this Crown reserve *(source: extract from notes provided by Ferguson, I., Department of Lands, 2006):-*

- *use of the reserve must be consistent with the public purpose for which the land is dedicated or reserved. This includes uses ancillary to or supportive of the reserve purpose;*
- *improvements and developments to land which is reserved or dedicated are confined to those which support, or are ancillary to, the public purpose of the reservation;*
- *a reserve cannot be used for a purpose relating to an activity that is occurring off the reserve and that is not consistent with the reserve purpose. (eg. car parking on a Crown reserve for "public recreation" that serves an adjoining land use would not be acceptable);*
- *land reserved or dedicated for "public recreation" must be open to the public generally as a right. Exclusive use of the reserve should be minimised to avoid sections of the community becoming alienated from*

using the reserve. The public may only be restricted from access to parts of the reserve and buildings if it is necessary for the public's enjoyment of the reserve or for health and safety reasons to be excluded, for example from a workshop, equipment storage or operational facilities.

- *access as of right does not mean entirely free access. Reasonable entry fees and charges may be imposed, as well as other legal constraints to entry (eg. health and safety or requirements for maintenance/ operational facilities or equipment storage relating to the reserve's public purpose;*
- *a lease or license must be consistent with the reason or purpose of the land's reservation or dedication.*

2.10 LEASES AND LICENCES

A lease or licence may be granted, in accordance with an express authorisation by this plan of management, providing the lease or licence is consistent with the reserve's public purpose, the *Crown Lands Act 1989 (s.102 CLA 1989)*, the *Crown Lands Regulation 2000,* case law and policy guidelines of the NSW Department of Lands, Council's Land Management Goals, adopted policies and other relevant legislation (refer to *5.0 Management Strategies: 5.1 Action Plan: item A8*).

The following is applicable:-

- *the reserve trust has significant interest in the estate over the reserved land;*
- *the reserve trust (not council) leases and licences uses in the reserve (s.102 CLA 1989);*
- *Crown land may be leased or licensed by the reserve trust – subject to the Minister's consent; (refer to s.102A for a reserve trust managed by council and appointed under s.95 CLA 1989);*
- *any lease over five years (including options) must be publicly notified;*
- *any proceeds are to be applied by the trust towards the care control and management of the reserve (s.106 CLA 1989).*

Temporary licences may be issued by the reserve trust to authorise uses or occupation of the reserve for a period less than 12 months for prescribed activities (eg. grazing) in accordance with the *Crown Lands Act 1989 (s.108)* and the *Crown Lands Regulation 2000*. These temporary licences are not required to be referred to the Minister for consent *Crown Lands Act 1989 (s.102 (d) CLA 89).*

Hawkesbury City Council, as reserve trust manager, may enter into a lease or licence for the whole or part of the reserve to which this plan of management applies provided that:-

- the uses/ activities within the reserve are in accordance with this plan of management and relevant Crown land management policies;
- the uses/ activities are consistent with the public purpose of the reserve and is considered to be in the public interest;
- the granting of the lease or licence is in accordance with the provisions of the *Crown Lands Act 1989*.

TABLE 3
Schedule of Existing Tenures – leases, licences or related easements

Existing tenures as of 15/02/2006 held over part of this Crown reserve (R76154) include the following:-

Purpose: Pipeline and Pumpsite:

1. Permissive Occupancy 11242 (PO 1950/3 Windsor) (R.W. King & K.C. King)
2. Permissive Occupancy 11341 (PO 1966/12 Windsor) (F. & M. Van Den Nieuwboer)
3. Licence No. 192618 (E.J. Azzopardi & J. Azzopardi)
4. Licence No. 200082 (S. & M.A. Attard)
5. Licence No. 318652 (Lofiva Pty Limited)
6. Licence No. 355314 (T. & L. Fowler)
7. Licence No. 370337 (S. & A.M. Vella)
8. Licence No. 386981 (E. Dunstan)

Purpose: Grazing:

9. Permissive Occupancy 173078 (PO 1988/5 Windsor) (L. Gillett)

Existing tenures – pipeline/ pumpsite and grazing

The existing tenures for the purposes of "pipeline and pumpsite" and "grazing" raise a number of issues with respect to the reserve's public purpose. Pipelines, pumpsites and metering equipment, located within the southern portion of the reserve, are in close proximity to existing public access and a designated picnic area. The siting, haphazard layout and lack of safety precautions raise issues with respect to public safety and risk management.

In particular, most of the pump equipment has no safety housing or lockable covers. Electrical cables, in some instances, are lying scattered on the ground rather than buried. Some towers with meter boxes and electrical cabling have no security to prevent public access. In addition, a permissive occupancy for grazing is currently in existence along the northern boundary of the reserve (ie. 20.115 metres wide strip west of the entry road off Coromandel Road). This area affected by the permissive occupancy contains bushland which is scheduled as an endangered ecological community under the *Threatened Species Conservation Act 1995*.

The existing tenures (ie. pipeline/ pumpsite and grazing) appear to raise issues with respect to the reserve's public purpose. In accordance with case law judgements *"a reserve cannot be used for a purpose relating to an activity that is occurring off the reserve and that is not consistent with the reserve purpose"* (refer to *2.9 Case Law Judgements – Department of Lands – Ferguson, I., Department of Lands, 2006*). These issues will need further investigation and consultation with stakeholders and the Department of Lands in order to comply with this plan of management.

2.11 OTHER RELEVANT LEGISLATION AND POLICIES

In addition to the requirements of the *Crown Lands Act 1989*, *Crown Lands Regulation 2000*, case law and Department of Lands policy, this plan of management has been prepared in accordance with the provisions contained in other relevant legislation and policy guidelines, including but not limited to the following:-

- Native Title Act (Commonwealth) 1993
- Local Government Act 1993, Local Government Amendment (Community Land Management) Act 1998 & Local Government (General) Regulation 1999
- Rivers and Foreshores Improvement Act 1948
- Catchment Management Authorities Act 2003
- Native Vegetation Conservation Act 2003
- Environment Protection and Biodiversity Conservation Act 1999
- Threatened Species Conservation Act 1995
- Fisheries Management Act 1994
- National Parks and Wildlife Act 1974
- NSW Heritage Act 1977
- Noxious Weeds Act 1993
- Rural Fires Act 1997
- Environmental Planning and Assessment Act 1979
- Disability Discrimination Act 1992
- SREP No. 20 Hawkesbury-Nepean River (No.2 – 1997)
- SEPP 19: Bushland in Urban Areas
- Hawkesbury Lower Nepean Catchment Blueprint 2003
- Hawkesbury Nepean Floodplain Management Strategy 1998
- NSW Flood Policy 1984
- NSW State Rivers and Estuaries Policy 1993
- NSW Wetlands Management Policy 1996
- NSW Floodplain Management Manual 2001

- Hawkesbury City Council Management Plan 2006-2007
- Hawkesbury Local Environmental Plan 1989
- Section 94 Contributions Plan Review 2001
- Hawkesbury City Council Charter
- Hawkesbury Cultural Plan 2006-2011

Native Title Act (Commonwealth) 1993

This Plan of Management acknowledges the significance of the Hawkesbury River and Ebenezer – Portland Head area as a traditional resource area for the Darug Aboriginal people. The preparation of this plan of management has pursued an open, transparent approach to community consultation including an open invitation to all the Darug Aboriginal groups. The plan of management encourages broader involvement with traditional Aboriginal custodians in the future management of the reserve (refer to *5.0 Management Strategies: 5.1 Action Plan, item B3*).

The general area is subject to Native Title Claim No: NC 97/8 by the applicant – Darug Aboriginal Corporation however it appears that there are no specific claims under the *Native Title Act (Commonwealth) 1993* affecting the reserve. If any significant proposal for development over this land is considered in the future a detailed investigation of Native Title will be required.

Local Government Act 1993
Community land needs to be categorised and managed in *accordance with core objectives as described in the Local Government Act 1993. The Crown Lands Act 1989* requires no categorisation of this Crown reserve however this process is considered to be supportive of the overall management objectives. Accordingly, Hawkesbury City Council has categorised this Crown reserve (refer to section *2.13 Land Categorisation* and *Figure 4: Land Categorisation*).

Environmental Planning and Assessment Act 1979
The *Environmental Planning and Assessment Act 1979* forms the basis of statutory planning in New South Wales, including the preparation of Local Environmental Plans (LEPs) which regulate land use and development. Hawkesbury City Council, as the consent authority under the *Local Environmental Plan 1989 (LEP 1989)* and the *Environmental Planning and Assessment Act 1979* controls development and the use of land on parks and reserves in the Hawkesbury City Council local government area.

Native Vegetation Conservation Act 2003
The new *Native Vegetation Conservation Act 2003* applies to State Protected Land within the Hawkesbury City LGA. Such land is defined as being "within 20 metres of the bank or within the bed of a prescribed stream or lake, land mapped as having a slope in excess of 18 degrees, land mapped as environmentally sensitive or land subject to siltation or erosion" (ie. the Hawkesbury River and its tributaries in this catchment).

The NVC Act does applies to this reserve and it is important that the riparian corridor is managed in a way which provides consistency with the following objectives of the Act:-

(a) to provide for the conservation and management of native vegetation on a regional basis;
(b) to encourage and promote native vegetation management in the social, economic and environmental interests of the State;
(c) to protect native vegetation of high conservation value;
(d) to improve the condition of existing native vegetation;
(e) to encourage the revegetation of land and the rehabilitation of land with appropriate native vegetation;
(f) to prevent the inappropriate clearing of vegetation;
(g) to promote the significance of native vegetation in accordance with the principles of ecological sustainable development.

Rivers and Foreshores Improvements Act 1948
Argyle Bailey Memorial Reserve is subject to the provisions of the *Rivers and Foreshores Improvements Act 1948*. This Act provides broad regulatory control over activities within the riparian corridor (ie. "protected lands" as defined in the Act) including the following:-

(a) making an excavation on, in or under protected land;
(b) removal of material from protected land; or
(c) works which obstruct or detrimentally affect the flow of protected waters, or which are likely to do so.

Protected land is defined under the *Rivers and Foreshores Improvements Act 1948* as:-

(a) land that is the bank, shore or bed of protected waters (ie. named and identified watercourses); or
(b) land that is not more than 40 metres from the top of the bank or shore of protected waters (measured horizontally from the top of the bank or shore); or
(c) material at any time deposited, naturally or otherwise and whether or not in layers, on or under land referred to in the above description.

Threatened species legislation

Argyle Bailey Memorial Reserve contains a mosaic of remnant Sydney Coastal River-flat Forest (Alluvial Woodland/ Riparian Forest), Shale/ Sandstone Transition Forest and small patches of Cumberland Plain Woodland, all of which are scheduled as endangered ecological communities under the *Threatened Species Conservation (TSC) Act 1995*. The TSC Act provides the legislative mechanisms for dealing with any listed items. When endangered species, populations or ecological communities are scheduled under the TSC Act, the following legal responses are triggered:-

(a) land can be declared as "critical habitat"; or
(b) a "recovery plan" must be prepared; and where key threatening processes have been identified under Schedule 3
(c) a "threat abatement plan" must be prepared.

To provide consistency with threatened species legislation this plan of management aims to address the following:-

- the plan must state whether the land has been declared as "critical habitat" or affected by a "recovery plan(s)" or "threat abatement plan";
- must have consistency in the management objectives of the land and the *Threatened Species Conservation Act* or the *Fisheries Management Act*;
- the draft plan must be forwarded to the Director General of National Parks and Wildlife or the Director of NSW Fisheries and must incorporate any requirements made by either person;
- no change in the use of the land is permitted until a plan of management has been adopted that meets the above requirements;
- no lease or licence can be granted until a plan of management is in place – (leases and/or licences that are in place before the land was affected by threatened species laws can continue to operate);
- no native plant species of an endangered ecological community may be "picked" without the prior granting of a Section 91 Licence under the TSC Act 1995.

The National Parks and Wildlife Service (NPWS) is currently developing a Draft Recovery Plan for all of the Cumberland Plain Endangered Ecological Communities (CPEECs). The future management of this Crown reserve will need to be consistent with this Recovery Plan.

SREP No. 20 Hawkesbury-Nepean River (No.2 – 1997)
This reserve is subject to the provisions under *SREP No.20 Hawkesbury – Nepean River (No.2 – 1997)* which controls any development which has the potential to impact on the river environment (ie. water quality, environmentally sensitive areas and riverine scenic quality).

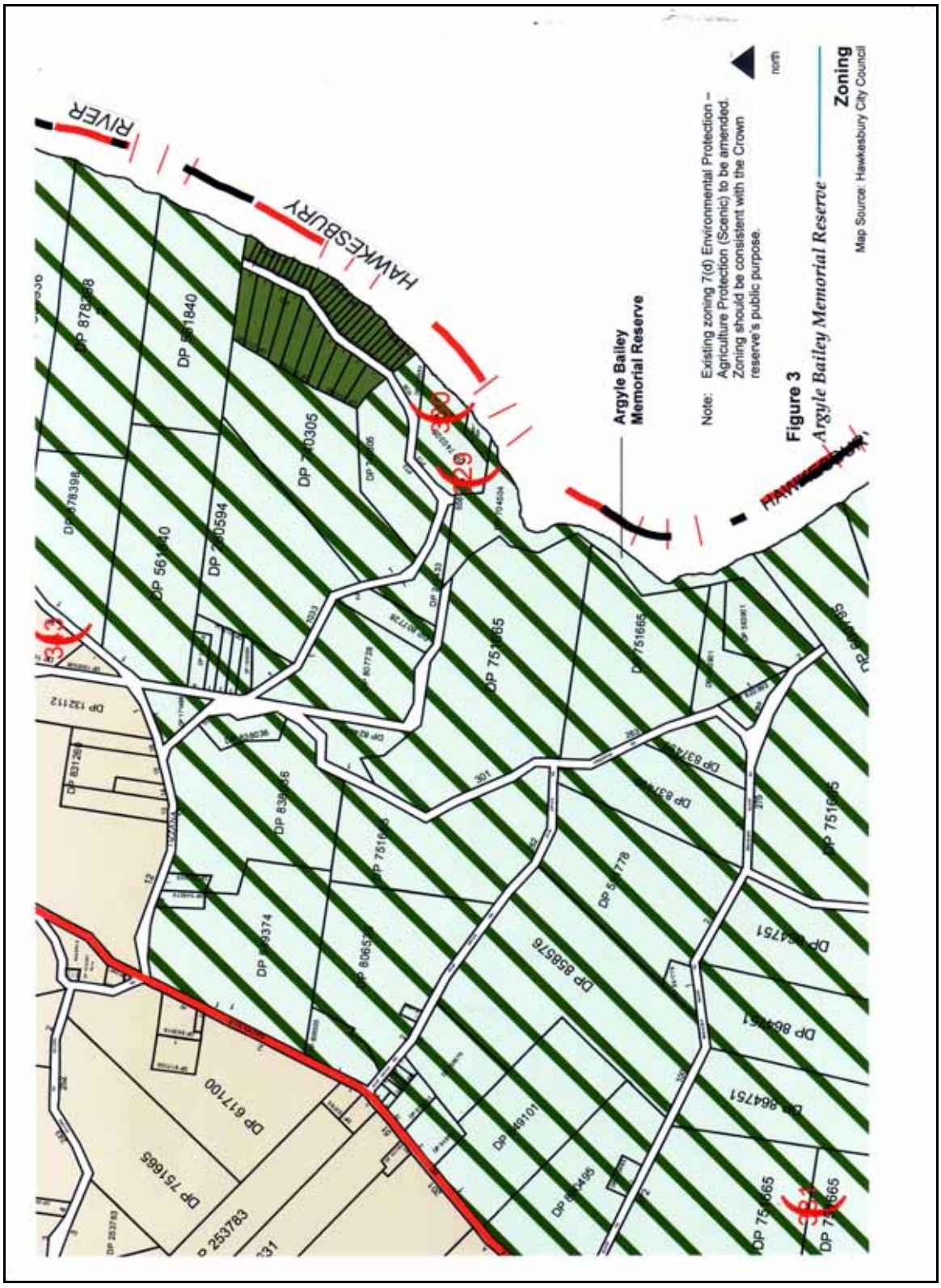
2.12 ZONING

The public purpose of the reserved Crown land determines appropriate uses and development (refer to *2.8 Public Purpose(s) of Crown Land*). It is therefore desirable that provisions in Council's Local Environmental Plan (LEP), particularly zoning of the land, are consistent with the reserve's ***public purpose*** (ie. "public recreation" to be amended to "**public recreation and environmental protection**").

This plan of management defines land uses, activities and developments that will be permitted in accordance with the reserve's public purpose (refer to *5.0 Management Strategies: 5.1 Action Plan, item A6).*

Existing Zoning
According to Hawkesbury City Council's updated LEP (September, 2006) Argyle Bailey Memorial Reserve is zoned as *7(d) Environmental Protection – Agriculture Protection (Scenic).* The objectives of this zone however relate to the protection of agricultural potential of rural land and promotion of and encouragement of agricultural production (refer to *Figure 3: Zoning).*

Proposed Amendments to Zoning
Argyle Bailey Memorial Reserve is surrounded by rural agricultural land uses identified with the above zoning. The zoning for the reserve however appears to be in error. This plan of management makes the recommendation for existing zoning of the Crown reserve to be amended to a more appropriate zoning in accordance with the public purpose of "public recreation and environmental protection". Open space and recreation objectives need to be considered in conjunction with the reserve's broader environmental and heritage significance and the need for appropriate management, ecological restoration and protection of habitat values from inappropriate recreational activities.


RIVER
HAWKESBURY
Argyle Bailey
Memorial Reserve
Note: Existing zoning 7(d) Environmental Protection – Agriculture Protection (Scenic) to be amended. Zoning should be consistent with the Crown reserve's public purpose.
north
Figure 3
Argyle Bailey Memorial Reserve
Zoning
Map Source: Hawkesbury City Council
DP 878398
DP 561840
DP 780594
DP 751665
DP 858576
DP 617100
DP 253783

2.13 LAND CATEGORISATION

Although it is not a requirement of the *Crown Lands Act (1989)* to categorise Crown reserves, the process is encouraged by the Department of Lands for purposes of consistency with Council's community land management objectives. Community land must be managed in accordance with the *Local Government Act 1993* and all other relevant legislation and policies. The ways in which community land can be used and managed are strictly governed in accordance with an adopted plan of management and any law permitting the use of the land for a specified purpose or otherwise regulating its use. The nature and use of community land may not change without an adopted plan of management. Community land must not be sold, exchanged or otherwise disposed of except in the instance of enabling the land to be added to Crown reserve or a protected area under the *National Parks and Wildlife Act 1974*. The use and management of community land must also be consistent with its designated categories and core objectives.

Types of categories

Community land must be categorised as either a natural area, a sportsground, a park, an area of cultural significance or for general community use, or a combination of these categories. The *Local Government Act 1993* has a further requirement that land categorised as a "natural area" must be given a sub-category of either bushland, wetland, escarpment, watercourse, foreshore or a category prescribed by the regulations.

Argyle Bailey Memorial Reserve (R76154) has been categorised by Hawkesbury City Council into the following (refer to *Figure 4: Land Categorisation*):-

- Natural area: watercourse;
- Natural area: bushland; and
- Park.

Natural Areas

These categories confirm the reserve's significance in terms of its natural area values (ie. natural area: watercourse/ natural area: bushland account for more than 80% of the reserve's area). The *Local Government Act 1993* was amended from 1 January 1999 to integrate the management of community land with threatened species laws, in particular the preparation of plans of management. In accordance with the guidelines for categorising community land under *Section 10, Local Government (General) Regulation 1999*:-

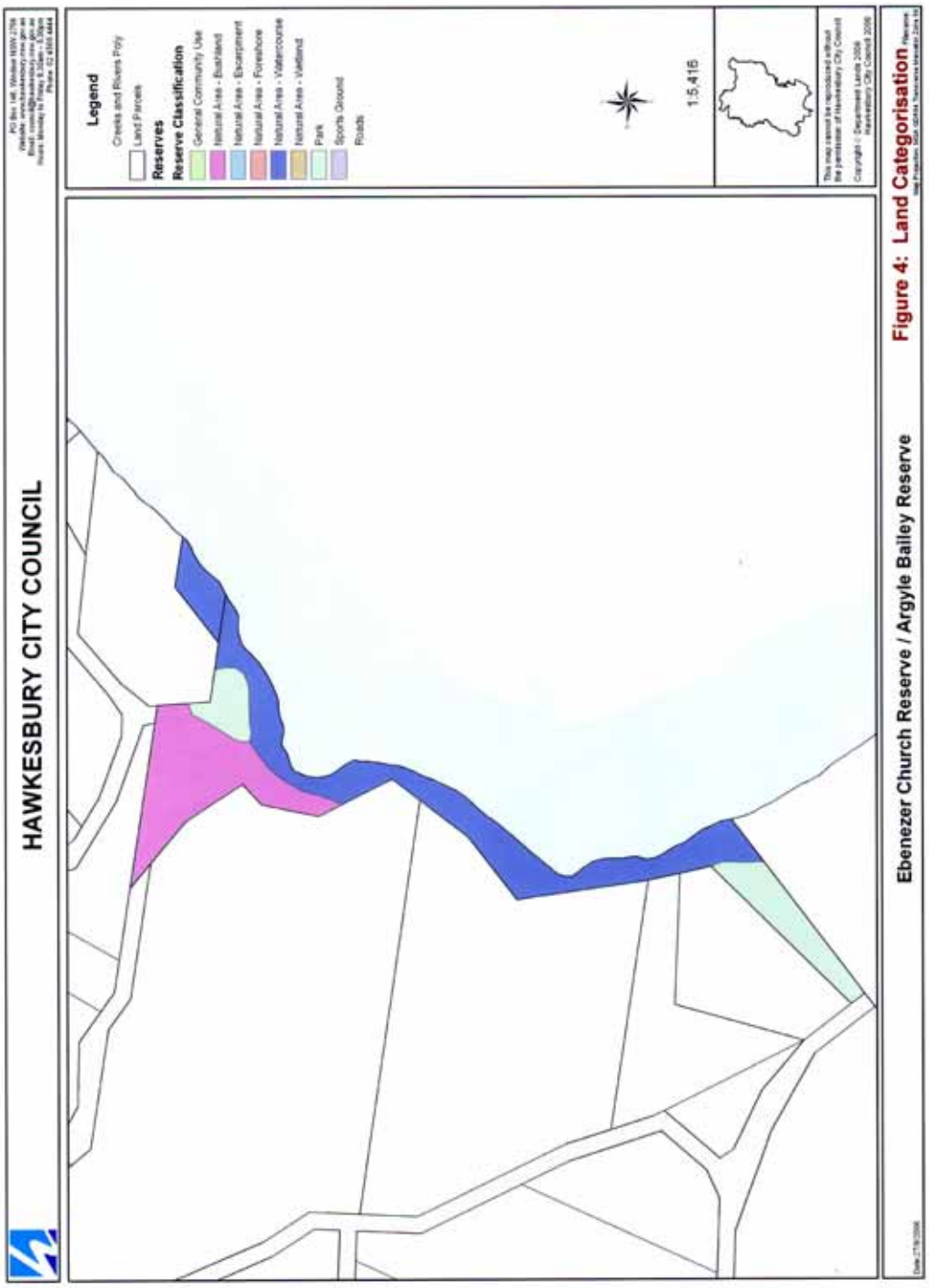
"Land should be categorised as a natural area under s.36(4) of the Act if the land, whether or not in an undisturbed state, possesses a significant geological feature, geomorphological feature, landform, representative system or other natural feature or attribute that would be sufficient to further categorise the land as bushland, wetland, escarpment, watercourse or foreshore under section 36(5) of the Act".

In accordance with the *Local Government Act 1993* the management of each category and sub-category is guided by a set of core objectives. Furthermore, natural areas have specific requirements in terms of permissible development, leases and licences. The occurrence of endangered ecological communities within the reserve adds further weight to the significance of these natural values and signals the need for an

appropriate response (refer to previous section *2.11 Other Relevant Legislation And Policies: Threatened Species Legislation*).

The “park” categorisation refers to two relatively small areas (less than 20% of total reserve area) including the northern and southern car parking areas and adjoining cleared land.

This plan of management supports the broader “natural area” categorisation and the core objectives for protection, management and rehabilitation of these natural values. This process is consistent with the proposed amendment to the reserve’s existing public purpose of “Public Recreation” to “Public Recreation and Environmental Protection” (refer to previous section *2.8 Public Purpose(s) of Crown Land*).


HAWKESBURY CITY COUNCIL
Legend
Creeks and Rivers Poly
Land Parcels
Reserves
Reserve Classification
General Community Use
Natural Area - Bushland
Natural Area - Escarpment
Natural Area - Foreshore
Natural Area - Watercourse
Natural Area - Wetland
Park
Sports Ground
Roads
1:5,416
Ebenezer Church Reserve / Argyle Bailey Reserve
Figure 4: Land Categorisation

3.0 COMMUNITY CONSULTATION

3.1 BACKGROUND

Community consultation is an important part of the plan of management process. The Department of Lands and Hawkesbury City Council promote an open, transparent approach to consultation, providing opportunities for stakeholders and members of the community to contribute comments and submissions or to discuss specific issues. The process is one of ongoing review and exploration of community attitudes, expectations and aspirations for Argyle Bailey Memorial Reserve.

A community workshop was held during preparation of the draft plan of management (refer to *3.2 Community Workshop*). Furthermore, community consultation will continue through to release of the draft plan of management (ie. public exhibition), at which time the community has a further opportunity to make final comments and submissions. This process highlights the importance of community involvement and ownership in the adopted plan of management.

In accordance with the *Crown Lands Regulation (2000)* the draft plan of management must be placed on public exhibition for a period of at least 28 days *(clause 35, CLR 2000).* A public notice detailing the location, dates and times for public exhibition and a call for submissions will be published in the local print media. During the exhibition period, the draft plan of management will be available for review at the Hawkesbury City Council Administrative Offices, Hawkesbury Central Library (in the Deerubbin Centre), Windsor and on Council's web-site http://www.hawkesbury.nsw.gov.au/

All public submissions and any comments submitted by other government agencies will be reviewed by the Department of Lands. The draft plan of management, as amended following public submissions and this review process, will be submitted to the Minister for adoption.

3.2 COMMUNITY WORKSHOP

A community workshop was held at Ebenezer Uniting Church Hall – Coromandel Road, Ebenezer on Wednesday 27th September 2006. The workshop was widely advertised by Hawkesbury City Council in local press releases and notices in Council's Administrative Offices and Hawkesbury Central Library. A further 24 stakeholders were directly mailed however, apart from the consultants and Council staff members only one person attended the workshop, Councillor Bob Porter. The workshop proceeded with a brief description of the plan of management process and a short power-point presentation by Noel Ruting, a Director of LandArc Pty Limited (refer to *Appendix I:*

Community Consultation – presentation material and pro-forma). Councillor Porter declared his interest with respect to his son's property adjoining the reserve. His comments were noted and are summarised in this section.

Apart from Councillors and individual participants, the key stakeholder groups contacted for the workshop included the following (in alphabetical order):-

- Swallow Rock Reserve Bushcare Group (former members)
- adjoining land owners (incl. Ebenezer Uniting Church)
- holders of irrigation licences and/ or permissive occupancy
- Darug Custodian Aboriginal Corporation

3.3 FURTHER CONSULTATION

A Community Issues Questionnaire (pro-forma – refer to *Appendix I)* was distributed to all stakeholders and three written responses were received (see *Appendix II: Written Submissions & Questionnaires*). A number of issues have been discussed with stakeholders who could not attend the workshop. These issues have been noted and reviewed as part of the consultation process.

Leanne Watson, Chairperson of the Darug Custodian Aboriginal Corporation (DCAC) provided a written submission with the Questionnaire. A site meeting was held on 29th November 2006 to further discuss the reserve's Aboriginal cultural and archaeological heritage. This meeting followed earlier investigations by Leanne Watson and Erin Wilkins in early February 2004 and preparation of a short report identifying the findings. In particular, the protection of Aboriginal site scatters as identified in these investigations and the need for improved educational and interpretive material were raised as key issues (see *4.0 Basis for Management – 4.6 Indigenous, archaeological and cultural heritage values*).

In further discussions, Ms Irene Moore (nee Bailey) also provided details in relation to her father, Argyle Bailey, and the naming of the reserve. This information has been included in the historical background.

NSW Department of Lands and Council's staff (including administration, community and planning services) have been consulted throughout preparation of the plan of management.

3.4 KEY ISSUES

A summary of key community and stakeholder issues has been compiled (for further detailed analysis and review see the relevant sections as indicated):-

1. **Land tenure and ownership issues** (see *2.0 Land Description and Planning*):

- ❖ proposed changes to public purpose and Council's LEP zoning;
- ❖ review existing leases and licenses/ permissive occupancies – pipeline/ pumpsite and grazing and address issues of public safety and consistency with reserve's public purpose;
- ❖ review infrastructure and public safety issues for existing tenures.

The existing tenures for pipeline/ pumpsite and grazing raise issues in relation to the Crown reserve's public purpose and require further review and consultation (for further details see *2.10 Leases and Licences* and *5.0 Management Strategies: 5.1 Action Plan item A8*).

2. **Natural and cultural environment** (see *4.0 Basis for Management – 4.5 Natural and cultural riparian setting & 4.7 Environment and Biodiversity*):

- ❖ significance of historic context – Ebenezer Church on the river;
- ❖ significance of Aboriginal archaeological and cultural heritage;
- ❖ riverine context/ natural riparian corridor, reserve's unique character, natural and cultural heritage values;
- ❖ beauty, peace and tranquillity;
- ❖ protect and enhance scenic qualities, bushland setting and biodiversity;
- ❖ protect archaeological and cultural heritage values:-
  - Aboriginal (eg. site scatters) and potential archaeological deposits (PAD);
  - non-Aboriginal/ historic church site (off-reserve) and curtilage (extending to reserve), quarry site and landing beach.
- ❖ support initiatives to control aquatic weeds (eg. *Egera* & *Salvinia* spp.) and river-edge weeds (eg. *Salix* spp.) impacting on water quality, biodiversity and recreation (eg. fishing, swimming and water-skiing);
- ❖ need to continue funding for weed management and restoration strategies (including priority areas, planting stock, bank stabilisation, protective devices, visitor education and management, etc);
- ❖ protect scenic vistas (eg. managing tree planting and fast-growing/ high maintenance weed species and native colonising species);
- ❖ protect and stabilise eroding river banks (localised erosion and collapse in two locations):-
  - south of the landing beach; and
  - near the southern picnic area.
- ❖ improve management of inappropriate recreational impacts (see below);
- ❖ support initiatives in feral animal control and management;
- ❖ adjoining private property issues:-
  - uncontrolled public access onto private property;
  - fire history (approx. 70% of reserve burnt in October 2002)/ need for no fuel zone (buffer) to protect existing residence located close to reserve boundary/ bushland;
  - cleared edges/ buffer impacts on reserve (eg. restricted bushland corridor/ bio-linkages, maintenance of high edge to area ratio, reduced ecological durability and resilience);
  - vehicular access into reserve/ maintenance of irrigation equipment;
  - clearing of natural vegetation/ native "woody weeds" blocking views over river (concerns particularly over introduction of larger shrubs);
  - impact on private view corridors and need for a more consultative approach to bush restoration in this location (ie. using selected local native trees with open canopies and a lower ground layer which will protect view corridors);

- management of wetland drainage channels (eg. impact on river bank stability/ peak floods, loss of wetlands/ associated biodiversity, transportation of pasture weeds/ ongoing weed management issues affecting reserve; and
- public safety/ dogs adjacent to reserve.

3. **Public access, recreation and public safety issues** (see *4.0 Basis for Management – 4.8 Public recreation and social values*):

- ❖ vehicle access, car parking and picnic areas:-
  - northern picnic area is more accessible/ greater variation of settings, good river access, range of recreational facilities and public amenities (toilets/ change-rooms), shower not useable;
  - southern picnic area requires visitors to "walk in from car parking area" and infrastructure limited/ damaged and poorly maintained);
  - poor signposting to reserve (main northern entry off Coromandel Road to car parking area, river access and the historic church);
- ❖ variable level of maintenance and improvements to pedestrian access track, steps, hand-rails, lookout, safety fencing and bridges;
- ❖ ongoing maintenance and repair of educational and interpretive signage (eg. natural history/ bushland management);
- ❖ multiple impacts of pedestrian, BMX, mountain-bikes, horse-riding and illegal motorbike access:-
  - pedestrian safety issues/ limited passing space in a number of locations;
  - narrow bridges with low handrails (over steep gullies) are not suitable for horse-riding/ risk management;
  - motorbike hazards/ impact on safety of other user groups;
  - poor sight-lines and visual/ physical obstructions (eg. overgrown edges to pathways, fallen branches, bank instability, etc.)
  - multiple tracking (eg. diversions around constructed steps or obstacles, access to riverbank and water);
  - ad hoc construction of cycle/ motor-bike tracks and jumps;
  - damage to existing track/ erosion;
  - level of maintenance, improvements and upgrading to track;
  - proximity to steep eroded river banks (some sections)/ public safety.
- ❖ limitations on public access and recreational infrastructure (eg. protected natural areas, riverbank and flood hazard zones);
- ❖ emergency vehicular access (restricted to northern and southern car parking areas or adjoining private properties);
- ❖ water access (eg. fishing, water skiing and swimming) – erosion to river banks/ multiple tracking and public safety (see below re: use of lookout);
- ❖ reserve is popular for walking and exercise (including walking dogs);
- ❖ locals use an extended loop track via Hendrens Road (unmade portion) and Coromandel Road beyond the reserve's boundaries;
- ❖ future development of appropriate recreational facilities;
- ❖ northern picnic area, including ageing shelters and amenities, are well-utilised and are in need of improved maintenance/ upgrading;
- ❖ southern picnic area is less accessible and not well-utilised:-

  - no public amenities;
  - maintenance issues (eg. rubbish removal, repair of damaged BBQ plate, no wood provided, etc.);
  - isolation attracts illegal behaviour (eg. drug and alcohol use, camping over weekends, vandalism);
  - proximity to irrigation equipment, piping and electrical cables;
- anti-social and illegal behaviour, including recurrent vandalism:-
  - to lookout safety fencing at lookout (removal for "run-up" jumping off high rock ledge into river);
  - amenities building (northern car parking area);
  - park signage, especially interpretive signage;
  - "circle-work" damage in northern car parking area;
  - removal of obstacles/ barriers preventing vehicular access onto pedestrian track (now limited due to steel reinforcing of blocks);
  - drug and alcohol abuse;
  - illegal camping
- management of peak visitor loadings for special events (eg. the annual "Bridge to Bridge" water skiing and jet boat races in May and November attracts significant numbers of visitors to the reserve's popular vantage points);
- lack of reserve identification signage at both entrances (ie. "Argyle Bailey Memorial Reserve");
- inadequate litter bins (no lids)/ maintenance
- visitor safety and security;
- flooding and public safety issues;
- priorities for future funding/ improvements:-
  - weed management (including "woody-weed" management) and restoration strategy;
  - improvements to public accessibility/ track upgrade;
  - address public safety issues;
  - improvements/ upgrading to northern car parking area/ picnic area and facilities;
  - rationalisation/ improvements to existing southern picnic area;
  - improvements to reserve identification signage (at entry points) and directional signage (to reserve) for visitors;
  - establish appropriate conservation and/ or interpretation elements for the Aboriginal site scatter, historic quarry, landing site and other historic elements.

…

4.0 BASIS FOR MANAGEMENT

4.1 OBJECTIVES

This section of the plan of management addresses the following objectives:-

- *to identify the values attached to this Crown reserve, why they are valued and the importance of each of these values, particularly with respect to changes to public purpose – "public recreation and environmental protection";*
- *to define the Crown reserve's role in the lives of the community and broader context of the Hawkesbury LGA and regional open space system;*
- *to establish a mechanism for reviewing and assessing specific issues and threats in relation to identified values;*
- *to establish the framework for sustainable management strategies consistent with the Principles of Crown Land Management; and*
- *to provide a vision for the future of this Crown reserve.*

4.2 COMMUNITY VALUES

This section of the plan of management examines the way Argyle Bailey Memorial Reserve is valued by the community. 'Values' can be simply described as the things which make a place important. This approach establishes a basis for managing these community assets so that they may be better protected, maintained and where possible, enhanced through further improvements.

The recent community consultation has identified the importance of the Crown reserve's riparian bushland setting, scenic values, tranquillity and solitude, Aboriginal, cultural and natural heritage values, environmental quality, and recreational and social values. The following list (although not ranked in any order) provides a summary of community values:-

- public access/ river and foreshore accessibility
- natural riparian bushland setting
- Aboriginal cultural heritage – site scatters/ potential archaeological deposits
- historic Ebenezer Church, quarry sites and landing beach and setting on the river (curtilage to the church)
- scenic vistas and visual character
- elevated viewpoints/ lookout over the river
- tranquillity, beauty and quiet solitude
- water quality and river flows
- opportunities for bushwalking, relaxation, picnics/ barbeques, swimming, fishing, horse-riding, walking the dog, bird-watching and passive recreation

- day-use picnic areas/ shelters, shade trees and public amenities
- level of maintenance, recreational facilities and amenities
- improvements to the walking track (including bridge linkages) and educational/ interpretive signage
- access to elevated viewpoints/ special events (eg. “Bridge to Bridge”)
- biodiversity (eg. endangered ecological communities under restoration/ regeneration program), aquatic and wetland habitats, avifauna
- observing wildlife/ bird watching

4.3 DETERMINING KEY VALUES

The community values, as listed above, can be divided into four key value categories as follows:-

1. Natural/ Cultural Riparian Setting
2. Indigenous, Cultural & Archaeological Heritage
3. Environment/ Biodiversity
4. Public Recreation and Social Values

These key value categories have been the subject of further research, field investigation and assessment during preparation of this plan of management. Each category contains a list of identified values. A ‘significance ranking’ has been assigned to each of these values based on either a local, regional (ie. Sydney metropolitan area) or state level in accordance with the assessment process (see *Table 4: Values and Level of Significance)*.

4.4 SIGNIFICANCE OF KEY VALUES

Argyle Bailey Memorial Reserve has important natural heritage values. It lies on the Hawkesbury River – a water resource and catchment of immense value to the broader Sydney metropolitan area. Although only relatively small in size, fragmented and degraded, this linear reserve contains significant native vegetation of regional and state significance (ie. reserve contains three endangered ecological communities scheduled under the TSC Act – Sydney Coastal River-flat Forest, Shale Sandstone Transition Forest and Western Sydney Dry Rainforest). Refer to following section *4.7 Environment and biodiversity*.

Notably, adjoining privately-owned agricultural properties and church land (Ebenezer Church) within the riparian corridor, contain significant stands of contiguous native vegetation providing important habitat and bio-linkages. The rural character is defined by a mosaic of open pasturelands and remnant native vegetation. The transitional combination of sandstone scarps, gentle rolling shale hills and gullies, rural and historic landscapes and diversity of native vegetation along this part of the river create a setting of high scenic quality of regional significance.

Aboriginal cultural heritage, including evidence of site scatters near the reserve’s boundary as well as other potential archaeological deposits are of regional significance in this traditional resource area of the Darug Aboriginal people. Refer to section *4.6 Indigenous, archaeological and cultural heritage values*.

The historic Ebenezer (Uniting) Church, Australia's oldest church (built between 1809-1823), the old schoolhouse, cemetery and historic tree (site of the first church service in 1803) are of National and State significance. These heritage items are scheduled in the Australian Heritage Places Inventory, NSW Heritage Register and Hawkesbury City LEP. Although not part of the Argyle Bailey Memorial Reserve, these historic elements make a significant contribution to the heritage values associated with this Crown reserve. Notably, the church's prominent ridge-top location overlooking the river, its historic curtilage and visual catchment extend over the northern part of the reserve. Effectively, the natural bushland setting provides an important visual component for the historic site and reinforces the original context and "sense of place".

The reserve also contains important historic elements such as the sandstone quarry site (utilised for church construction) and the landing beach (river access was the only means of transportation in the early years of settlement). This broader historic curtilage, including the quarry site and landing beach within the reserve, are believed to be worthy additions to the church listing on the State Register (these items and places are currently not scheduled).

The reserve's recreational opportunities are typically low-key, passive and/ or nature-based and generally consistent with the reserve's natural setting, relatively small size and type of facilities. These recreational values are generally restricted to local and sub-regional significance, drawing largely on a user catchment within the local district and Hawkesbury area (refer to *4.8 Public recreation and social values*).

PHOTO 2: The Hawkesbury – Nepean River system known to the local Darug people as "Deerubbin", provided a vast range of natural resources for many thousands of years.

…

TABLE 4: VALUES AND LEVEL OF SIGNIFICANCE			
Key Values	Level of Significance		
	Local	Regional	State
Natural & Cultural Riparian Setting			
scenic vistas, visual character and elevated viewpoints		regional	
natural riparian bushland & cultural setting	local		
Indigenous, Cultural & Archaeological Heritage Values			
Aboriginal site scatters/ archaeological sites		regional	
European – historic church/ schoolhouse & cemetery (adj. to reserve)			state
European – historic sandstone quarry site & landing beach		regional	state
Environmental and Biodiversity Values			
geodiversity – transitional landform, topography & soils	local		
water quality, river condition and flows		regional	
aquatic and riparian habitat values		regional	
endangered ecological communities/ threatened species			state
educational/ scientific values	local		
Public Recreation and Social Values			
public access/ river access, circulation & linkages	local	regional	
picnic areas/ shelters & public amenities	local	regional	
educational/ interpretive signage	local	regional	
opportunities for low-key passive/ cultural & nature-based recreation	local	regional	

Notes: Ebenezer Church/ the old schoolhouse, cemetery and (historic) tree are of National and State significance however they are not within the Crown reserve.
Regional opportunities exist for passive/ cultural and nature-based recreation subject to promotion of heritage values and improvements to recreational infrastructure.

4.5 NATURAL & CULTURAL RIPARIAN SETTING

Significance of landscape setting

The unique combination of scenic river setting, diversity of natural and cultural landscapes, rural and bushland character, heritage and low-key recreational facilities define Argyle Bailey Memorial Reserve as a significant recreational asset in the Hawkesbury City local government area. As a Crown reserve (within the broader Crown lands system), it also serves the public purpose of providing recreation for the people of New South Wales. These key values draw visitors seeking a range of passive recreational opportunities such as picnicking, fishing, bushwalking, bird watching and quiet relaxation as well as more active pursuits including water-skiing, horse riding and mountain bike riding. The reserve is also popular for watching big river events such as the “Bridge to Bridge” water ski and jet boat races.

Scenic and aesthetic values

The Hawkesbury River riparian corridor has outstanding scenic values as recognised under SREP No. 20 Hawkesbury-Nepean River (No.2 – 1997). Argyle Bailey Memorial Reserve offers magnificent vistas along this stretch of the river known as Swallow Rock Reach. The reserve's topography varies from rolling hills and steep gullies to elevated sandstone scarps affording a diverse range of filtered and open views along the river and over adjoining farmland. The riparian bushland setting and tranquillity of the river further enhance the visual and aesthetic qualities, particularly within the northern and mid-portions of the reserve. The lookout located in the elevated scarp area (mid-section of reserve) offers outstanding vistas of the river.

The southern portion of the reserve has been largely cleared and modified with open, pastureland. Groves of native River Oak *(Casuarina cunninghamiana)* dominate the steep river banks. Overall visual quality has a more open, rural-farm character and contrasts with the more intimate qualities, sense of enclosure and natural diversity of the northern bushland portion of the reserve.

Natural landscape values

The reserve's natural riparian vegetation creates an important visual foil and backdrop to largely cleared adjoining agricultural land. At the regional mapping level, the significance of this reserve's riparian vegetation is highlighted as a key linkage, albeit in places very narrow and compromised by adjoining agricultural land uses. This native vegetation, consisting of three endangered ecological communities scheduled under the TSC Act, has been the subject of an ongoing bush regeneration and restoration program since the 1990s. The significance of this vegetation is discussed in section *4.7 Environment and biodiversity – Endangered ecological communities*.

PHOTO 3: View looking south from the scenic lookout – a sandstone bluff high above the river. The safety fencing has been continually vandalised in recent years.

PHOTO 4: Ebenezer Uniting Church – Australia's oldest functioning church. The reserve has close historic associations with the church (built between 1809-1823).

PHOTO 5: The landing beach in the reserve (below Ebenezer Church) provided access to the church and old schoolhouse before roads were built. The beach remains a popular point of access to the river foreshores.

4.6 INDIGENOUS, ARCHAEOLOGICAL AND CULTURAL HERITAGE VALUES

"Deerubbin" and its significance to Indigenous people

The Hawkesbury – Nepean river system and associated riparian corridor provided a vast range of valuable resources for Aboriginal people for at least 30,000 years. These resources included fresh water, opportunities for fishing, hunting and special plants for food, fibres, tools, bark canoe making, transportation and medicine. The river provided important foods such as fish, eels, mussels, water birds and wild yams. The area was inhabited by the Darug (including much of the greater Sydney area) and Darkinung people (northern Hawkesbury area to Hunter Valley). The main spoken language was Darug with many different dialects spoken by smaller groups or clans including the Boorooberongal, Caddie, Gomerigal, Kurrajong, Burramattagal, Warmuli and many others. The Hawkesbury River was known as "Deerubbin" (or "Venrubben") by the Darug Aboriginal people, which is believed to mean "wide, deep water".

In 1789, the first exploration party to the Hawkesbury area, led by Governor Phillip, found extensive evidence of Aboriginal occupation along the banks of the river including "hunting huts", bark canoes, marks on trees, possum traps and bird decoys. In 1791, a larger exploration party including Governor Phillip, Captains John Hunter and Watkin Tench led by two Aborigines, Colebee and Balladerry, set out to determine if in fact the Nepean and Hawkesbury were the same or separate rivers. They were joined on this journey by Gombeeree, Yellomundee (or Yarramundi) and Djimba, all members of the Boorooberongal clan. *(Nichols, M., 2004, p.4* and *Penrith City e-history – Themes: The Early Land Alienation Pattern*).

The arrival of new settlers signalled dramatic changes to the lives of Indigenous people and their culture. Aboriginal people found that access to the river and vital resources such as food and fresh water were being denied. A bitter conflict erupted and although Governor King intervened on behalf of the traditional custodians and supported their claims, the Darug people became increasingly marginalised throughout the nineteenth century (refer to *1.5 Historical Background*).

Indigenous, cultural and archaeological values

Since Scottish and English free settlers took up local land grants in the area in 1802, this site has been extensively modified through land clearing, draining of wetlands and conversion to pastureland with exotic grasses and livestock. The earliest phase of development was marked by construction of Ebenezer (Uniting) Church, associated quarrying for stone, establishment of the cemetery and use of the landing beach for access. During the 20th century development of roads, car parking areas, buildings and other improvements would have further modified the site, albeit to varying levels.

The archaeological research conducted within the Hawkesbury – Nepean catchment area has revealed a rich archaeological context. The Hawkesbury area currently has approximately 200 recorded Aboriginal sites on the Department of Environment and Conservation (NSW) Aboriginal Sites Register. It is believed that this number may be as large as 4000 sites in the Hawkesbury LGA with more being discovered each year. The combination of elevation above water and proximity to water are considered important factors influencing prehistoric Aboriginal site locations. Recent research has confirmed that archaeological lithic assemblages (eg. whole or fragmentary stone

artefacts) may be preserved in sub-surface layers even where there has been significant disturbance to the land surface *(McDonald, 2001).* This may have important implications for Aboriginal heritage in Argyle Bailey Memorial Reserve.

There is archaeological evidence of Aboriginal site scatters adjacent to the northern portion of the reserve as confirmed in consultation with Leanne Watson, Chairperson Darug Custodian Aboriginal Corporation (DCAC). The Department of Environment and Conservation (DEC) has not yet recorded this site however two other sites on adjoining private land have been recorded. It is believed that Argyle Bailey Memorial Reserve has a "high potential" for further Aboriginal archaeological deposits *(Watson, L., DCAC, pers. comm. 2006).*

The DCAC has expressed concern over past protection and care of Aboriginal cultural heritage within the Hawkesbury area. It is considered that the area's archaeological significance should be used for continuing education in Indigenous heritage. In 2005 the NSW Department of Planning provided grant assistance under the Greenspace Program to develop a plan of management, including a landscape master plan for the reserve. The funding was conditional upon the plan of management addressing key heritage values and establishing appropriate conservation and/ or interpretation elements for the Aboriginal site scatter as well as the historic quarry, landing site and other historic elements.

In addition, Aboriginal heritage should be further investigated within the reserve to determine if any other places, relics or potential archaeological deposits (PAD) exist and if so, ensure that they are properly protected and managed. Under the *National Parks and Wildlife Act (1974)* and the *Heritage Act (1977)* all Aboriginal sites, whether recorded or not, are protected. This plan of management encourages a continuing consultative strategy to address these issues with the traditional Aboriginal custodians (refer to *5.0 Management Strategies, 5.2 Action Plan: items B1-B4).*

Historic Ebenezer Church/ old schoolhouse, cemetery and tree (adjoining the reserve)

Ebenezer (Uniting) Church is Australia's oldest remaining church. "It was the first Presbyterian Church in the colony and is the nation's oldest functioning church" *(NSW Heritage Register).* The church will be the focus of Bicentenary celebrations in 2009. The Hon. Malcolm Turnbull, Parliamentary Secretary to the Prime Minister, is a descendant of the "Coromandel" free settlers who came to the district in 1802 and settled on land grants in the Portland Head area. Built between 1809-1823, the church is located on a prominent ridge overlooking the river. Ebenezer Church, the old schoolhouse, cemetery and historic tree (site of the first church service in 1803) are of National and State significance. These heritage items are scheduled in the Australian Heritage Places Inventory, NSW Heritage Register and Hawkesbury City LEP (Uniting Church and Old Schoolhouse (item 329) and Uniting Church Cemetery (item 330)).

The church building doubled as a schoolhouse (est. 1810). The Schoolmaster's House (c.1817) is part of the historic church group. The cemetery is one of the most important in Australia and has associations with six generations of "Coromandel" settlers *(NSW Heritage Register).* An old growth specimen, a Grey Gum *(Eucalyptus punctata),* located on Coromandel Road opposite the church car park, was the site of the first church service held by Pastor James Mein in 1803. The tree sustained substantial damage during a severe wind storm in December 2005, removing much of its main

trunk and canopy. Notably, the remaining base of the tree is showing significant new regrowth. Although these heritage items are located outside the reserve boundary they play an important role in relation to the significance of the reserve. Together they make an important contribution to the local area's historic character and sense of place. They also have a flow-on effect attracting greater numbers of visitors to the reserve.

Historic sandstone quarry site and the landing beach (within the Crown reserve)

Ebenezer Church and Old Schoolhouse, the cemetery and grounds are set against a backdrop of open canopied old growth Eucalypts including Grey Gums *(Eucalyptus punctata)* and Forest Red Gum *(Eucalyptus tereticornis).* The Crown reserve's natural bushland setting further reinforces the significance of the site's rich cultural and natural heritage values. The landscape we see today, its character and moods, retain strong connections with the nineteenth century Arcadian vision of the Australian landscape. It was this vision that captured the imagination of many artists, attracting them to the Hawkesbury area during the late nineteenth century (refer to section *4.6 Indigenous and cultural heritage values*).

Furthermore, the northern portion of the reserve contains a small sandstone quarry which was used in the procurement of stone for construction of Ebenezer Church. This site has become largely overgrown as the natural vegetation and exotic weeds have recolonised the area. The landing beach, located immediately to the north of the main northern creek provided river access to Ebenezer Church – the only means of transportation for early settlers to the church and old schoolhouse. Children would have been rowed or rowed themselves to the landing beach and walked up to the schoolhouse. The beach would have also provided opportunities for socialising, picnics and family gatherings. Funeral processions traditionally took place on the river up until the early twentieth century (the funeral for John Grono in 1917 was one of the last river ceremonies). The beach was used as a landing place from which the coffin was carried up the hill to the church. *(Brill, T., undated notes).*

The quarry site and landing beach have strong associations with early construction of the church/ schoolhouse and river transportation during the nineteenth century. Together these historic elements within the reserve make a valuable contribution to heritage values. Notably, the church's ridge-top location and visual catchment extends over the northern part of the reserve to the river. This broader historic curtilage, including the quarry site and landing beach within the reserve, are believed to be worthy additions to the church listing on the NSW Heritage Register (these items are currently not scheduled on the State Register or Council's LEP – refer to *5.0 Management Strategies, 5.2 Action Plan: item B9*).

4.7 ENVIRONMENT AND BIODIVERSITY

Climate

The Hawkesbury River Valley has a warm temperate climate (ie. with a summer and winter season). Rain may occur at any time throughout the year. Median annual rainfall is 1000 millimetres. The catchment has recorded significant changing rainfall patterns, oscillating between periods of high and low rainfall. These patterns have defined alternating flood and drought regimes which affect the management of this reserve.

River catchment

The Hawkesbury – Nepean River system has a catchment area of almost 22,000 square kilometres. It extends from the Mulwaree River south of Goulburn to Broken Bay and Pittwater in the north-east and almost to Singleton in the north-west. The entire catchment is divided into two portions – Hawkesbury Lower Nepean Catchment (below Warragamba Dam) and the Warragamba Catchment. Argyle Bailey Memorial Reserve is located within the Hawkesbury Lower Nepean catchment (ie. the area downstream of Warragamba Dam and Nepean, Avon, Cordeaux and Cataract Dams).

The catchment has a long history of vegetation clearing, agricultural land-uses, ecosystem disturbance and modification, flood mitigation and dam construction and urban development. During the latter part of the nineteenth century as changes took hold within the catchment the river was also being transformed. The deep, natural profiles of the river bed gradually disappeared under the build up of silt. This in turn restricted shipping and the transportation of goods between Windsor and Sydney markets.

The construction of dams in the upper catchment, allocation of water for irrigation purposes and diversion of Sydney's drinking water (approximately 90% of river flow) have significantly altered downstream flows and reduced the frequency and impact of storm and flood events. Almost 70% of the Hawkesbury Lower Nepean Catchment is in a degraded condition. The catchment is experiencing extraordinary pressures from increasing urban development.

Stream condition and water quality

Water quality, aquatic biodiversity and recreational opportunities are all affected by restricted flow regimes, agricultural land uses, urban run-off, elevated nutrients and exotic weeds.

During the latter part of the twentieth century water quality, aquatic biodiversity and weed issues on the Hawkesbury – Nepean River began to impact on a range of recreational uses, particularly fishing, swimming and water-skiing. Fish stocks which were once plentiful had plummeted by the 1950s and fishing could no longer provide an easy meal for local families *(Athol Kemp, pers. comm., 2006).* Although fishing has remained a popular recreational activity on the river, the quality of the catch can be variable. Notably, introduced European carp have been favoured under the disturbed conditions.

In recent years the health threat posed by blue-green algae has further diminished these recreational values. As a safety precaution, Council has disconnected the river water supply to taps and showers in the reserve's public amenities building and notices warn the public not to bathe in or drink the water.

In addition, aquatic water-weeds such as *Egera* and *Salvinia* spp. have flourished under the reduced flow regime and long periods of drought. By the summer of 2003-2004 prolonged hot weather and low river flows provided perfect conditions for the floating water-weed *Salvinia* sp. to completely choke large stretches of the river. This had a huge impact on the use of the river for recreational purposes. Economically and socially, the event had significant repercussions for local businesses and regional tourism. While mechanical harvesting provided a temporary measure of control the underlying causes have not yet been properly addressed.

The Hawkesbury River at Swallow Rock Reach (Argyle Bailey Memorial Reserve) displays the following characteristics:

- modified stream flows as a result of weirs and upstream dams;
- previously cleared/ disturbed river banks (southern portion) planted and stabilised with native River Oak *(Casuarina cunninghamiana)*;
- localised bank instability and erosion along steep river banks (south of landing beach and lookout);
- large number of recreational power boats and water-skiing;
- eight irrigation pipeline and pump-site licences within reserve;
- high nutrient loadings, turbidity and reduced oxygen levels in water column;
- extensive aquatic weed infestation of *Egera* sp.;
- reduced level of recently targeted/ harvested noxious weeds (*Salvinia* sp).
- extensive infestations of exotic weeds along steep river banks incl. noxious weed species – Black Willow *(Salix nigra).*

Small intermittent drainage channels/ creeks (draining adjoining wetlands) display the following characteristics:

- steep, eroded gullies and channel instability;
- extensive exotic weed infestation;
- low levels of natural vegetation/ natural recruitment stabilising creek banks (some planted native trees under current restoration program);
- accumulated rubbish (eg. tyres, building waste, debris) in lower drainage channels following flooding – visual quality of historic landing beach is heavily impacted by weeds and rubbish.

Water quality monitoring is conducted by the Department of Natural Resources (DNR) in accordance with the Guidelines for Recreational Water Quality. During the summer months water quality is tested regularly. The *Hawkesbury Lower Nepean Catchment Blueprint (2002)* sets a number of river health management targets. The use of the AusRivAS rating system, based on key indicators of macro-invertebrate quantity and diversity, is designed to focus on improvements to overall health of the riverine ecosystem rather than only water quality.

Hawkesbury Lower Nepean Catchment Blueprint

The *Hawkesbury Lower Nepean Catchment Blueprint (2002)* has the primary objective to address the urgent need for sustainable management of the catchment. The *Catchment Blueprint* focuses on tackling issues at the sub-catchment level by adopting an integrated approach across several local government areas. The document also emphasises new opportunities with partnerships, education, advocacy and community involvement to deliver the desired outcomes including the following:-

- better management of river flows and groundwater;
- reduced degradation of water, biodiversity and land;
- improved quality and quantity of water; and
- improved quality, extent and connectivity of native habitat.

The *Catchment Blueprint* identifies a desired future envisaged by the people living in the catchment – a healthy environment with a productive and diverse catchment and river system. While many of the broader catchment initiatives are beyond the scope of this plan of management a number of objectives and targets are particularly relevant and have been used in the development of overall objectives and management strategies.

Following from this Blueprint, Catchment Management Authorities (CMAs) were established under the *Catchment Management Authorities Act 2003* (CMA Act) to coordinate an integrated approach to natural resource management in each of the catchments. The CMAs are statutory bodies working in partnership with the community, local government, state government and industry. The CMAs are responsible for preparing Catchment Action Plans (CAPs) and managing incentive programs to implement these plans. They are also responsible for administering and managing native vegetation consents and significant reforms under the new *Native Vegetation Act 2003*. The Hawkesbury Nepean CMA is responsible for the upper and lower Hawkesbury–Nepean catchment area.

Flooding

The riparian corridor is subject to flooding and high stream bank erosion hazard as well as deposition of sedimentary materials as the flood waters recede. Long periods of relative stability and deposition are followed by periodic flood events of short duration but with long lasting impacts on bank stability, erosion and sedimentation. The affects of these natural processes can also be magnified and exacerbated by human-induced impacts. Refer to the City's *Flood (1:100 year) Maps.*

Flood records at Windsor have been kept since 1790. In 1817, Governor Lachlan Macquarie recorded the catastrophic impact of floods in the valley. Successive floods during these early years devastated the early settlements. However the following period between 1817-1864 was relatively dry with minor flooding occurring in 1857 and 1860. In 1864 the largest flood was recorded up to that date. Only three years passed before yet another great flood occurred. This was the greatest flood ever recorded. Although many floods have been experienced since this time none have approached the levels set in 1867.

Diversion weirs were first constructed in the early 1880s and four dams were completed on the upper Nepean River between 1907 and 1935. Warragamba Dam was completed in 1960. The November 1961 flood was the largest recorded in the twentieth century. This event was followed by smaller floods in 1978, 1987, 1988, 1989 and 1990. The flood of August 1990 was the largest event since March 1978. It is evident that flooding can occur at any time of the year. Although linked to periods of higher rainfall, flood events follow no regular pattern.

Flood Planning

Flood planning needs to be in accordance with the *NSW Flood Policy (1984), NSW Floodplain Management Manual (2001), Hawkesbury Nepean Floodplain Management Strategy (adopted 1998)* and Council's Floodplain Risk Management Plan.

Design and construction of recreational buildings and other infrastructure in the reserve, including access roads, car parking areas, pathways, decking and bridges need to consider the implications of flood events. New structures should not obstruct,

reduce or interfere with upstream or downstream flood behaviour or adversely impact occupiers of the floodplain. The potential magnitude of flood impacts, including the rate of rise and duration need to be considered in the design.

Topography
The reserve's topography varies from very steep to gently undulating slopes and is largely restricted to the river bank. The northern portion of the reserve broadens to include the gentle rocky slopes adjacent to Ebenezer Church and other adjoining rural property. The highest point in the reserve is within the north-western corner near Coromandel Road (up to 20 metres AHD). The southern portion includes a small strip of floodplain and terrace. The soils tend to be shallow in these locations. The southern car parking area is approximately 10 metres AHD (refer to *Figure 1: Location Plan* for contours shown at 10 metres intervals).

The river banks are generally steep with local relief up to 10-12 metres AHD. The soils along the river banks tend to be deep sand loams deposited by successive flood events and are prone to instability and erosion. The river banks are dissected by two small, but deep gullies, which are believed to have been constructed or modified for the purpose of draining adjoining wetlands on private rural land holdings. These drainage channels are still dominated by exotic weeds and during periods of flood contribute to river bank instability, erosion and channel sedimentation.

The lookout is set on a localised steep bluff with surrounding rock outcrops and ledges. The bluff has been formed by the river eroding the Hawkesbury Sandstone bedrock. The shear cliff-face drops directly into the river below and creates a distinctive sense of place with outstanding scenic qualities. The rock outcrops continue to the south before merging with deeper deposited soils along the river bank.

Geology and soil landscapes
The reserve lies wholly within the riverine corridor of the Hawkesbury River. This is predominantly a fluvial landscape described as Freemans Reach (fr) in accordance with *"Soil Landscapes of the Sydney 1:100 000 Sheet"* (Chapman and Murphy, 1989). The soil landscape occurs discontinuously along the river bank north of Victoria Bridge, Penrith and typically includes meander scrolls, levees and wetlands within the present active floodplain. These wetlands (originally located within adjoining private land along the reserve's western boundary) have been largely drained and filled for agricultural uses. Soils typically consist of deep brown sands and loams, apedal to moderately structured and usually friable with the following limitations:-

- Fertility:
  generally low, low to very low available water holding capacity and low to very low levels of nitrogen and phosphorus.
- Erodibility:
  highly erodible due to the high percentage of fine sand and low to very low organic matter content.
- Erosion Hazard:
  very high to extreme for concentrated flows.
- Landscape Limitation:
  flood hazard, localised high water tables, localised seasonal waterlogging, water erosion hazard, wave erosion hazard and non-cohesive soil.

- Urban Capability:
  nil due to flooding.

The Hawkesbury Sandstone scarp and associated rock outcrops at the lookout may represent a localised example of the Gymea (gy) soil landscape unit (Chapman and Murphy, 1989). This soil landscape type is characterised by undulating to rolling rises and hills, slopes 10-25%, localised rock outcrops on low broken scarps. This soil landscape unit is not shown in this location on the map possibly due to its small size. The soils are typically shallow with loose, coarse sandy loam in the topsoil and earthy, yellowish brown clayey sand in the subsoil overlaying sandstone bedrock. Soil limitations include the following:-

- Fertility:
  Generally shallow, very strongly acidic, high permeability and very low nutrient status (very low levels of nitrogen and phosphorus).
- Erodibility:
  rock outcrops/ very low erodibility.
- Erosion Hazard:
  very high to extreme for concentrated flows.
- Landscape Limitation:
  erosion hazard, rock outcrop, localised rock fall hazard, steep slopes and cliffs and shallow soil.
- Urban Capability:
  generally low to moderate.

Riparian Vegetation Values

Natural riparian vegetation has many important values including, but not limited to, the following:-

- assists in maintaining good water quality;
- assists in riverbank stability and prevention of erosion;
- reduces turbidity and enhances biological productivity for aquatic invertebrates and fish;
- provides valuable habitat for both terrestrial and aquatic species;
- reservoir of natural heritage and biodiversity values;
- enhances opportunities for connectivity, gene pool exchange, faunal corridors and bio-linkages;
- provides high visual qualities; and
- improves recreational opportunities and diversity in the landscape.

Endangered ecological communities

In terms of biodiversity, western Sydney's Cumberland Plain is considered to be one of the most threatened regions in NSW. At least 300 native plant species have been identified in the riparian and associated floodplain habitats of the Hawkesbury – Nepean River. Argyle Bailey Memorial Reserve retains a dynamic mosaic of vegetation communities and habitats albeit disturbed, fragmented and modified by past clearing and continuing agricultural uses along its boundaries. The reserve's native vegetation has regional and state significance under the *TSC Act 1995*.

The reserve's vegetation communities create a subtle mosaic in their structural complexity, species diversity, level of connectivity and opportunities for genetic exchange. The vegetation condition gradually increases along a south to north gradient from cleared and modified pasturelands through to relatively intact native canopy and understorey within the northern portion of the reserve. Moreover, the reserve retains a high level of biodiversity, dynamic ecological processes, ongoing natural evolution and the ability for its ecosystems to be self-perpetuating. These are vital criteria defining the reserve's natural heritage values.

The Brief for this study identifies three different vegetation communities occurring in the reserve including River-flat Forest, Shale Sandstone Transition Forest and Cumberland Plain Woodland. A report titled *Swallow Rock Vegetation Management Plan* was prepared for Greening Australia, Hawkesbury City Council and the NSW Department of Public Works to guide the LEAP program *(Freimanis, E., undated)* established two separate vegetation communities – 'River-flat Forest' *(Benson, 1992)* and 'Ironbark-Red Gum-Grey Gum Woodland'. The River-flat Forest in the reserve was described as occurring on the steep levee banks along the river and back swamps and swales of the floodplain. The transitional community described as 'Ironbark-Red Gum-Grey Gum Woodland' was considered to be "a localised derivative of the regionally dominant Wianamatta shale based Grey Box-Ironbark Woodland *(Benson, 1991)* and Hawkesbury Sandstone species adapted to the sandstone cliffs that surround the Hawkesbury River" (Freimanis, E., p.14). The dominant tree species include Forest Red Gum *(Eucalyptus tereticornis),* Narrow-leaved Ironbark *(Eucalyptus crebra),* both shale based species, and Grey Gum *(Eucalyptus punctata)* usually associated with Hawkesbury sandstone. The presence of "low dense forest with many rainforest-like species" within the sheltered high ridges and sandstone outcrops was also noted in this earlier study (refer to Western Sydney Dry Rainforest).

NPWS mapping and ground truthing

The Western Sydney Native Vegetation Mapping Project was commenced by the National Parks and Wildlife Service (NPWS – now part of DEC) in 1998 to provide data on the distribution and relative condition of all remnant vegetation in Western Sydney. Special attention was given to vegetation communities scheduled in the *Threatened Species Conservation Act (TSC Act 1995*). The described communities in this plan of management are in accordance with the revised classifications of the *NPWS Native Vegetation Maps of the Cumberland Plain, Western Sydney, (1:25000 Map Series - October 2002).* Refer to *Figure 5: NPWS Native Vegetation of the Cumberland Plain – Map 14 of 16 Hawkesbury LGA Eastern Section (detail showing Argyle Bailey Memorial Reserve).*

The SCRFF listing in Part 3, Schedule 1 (TSC Act 1995) has been recently replaced with "River-flat eucalypt forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions". The SCRFF description however has been retained in the following discussion. The vegetation communities occurring within the reserve include the following:-

- Sydney Coastal River-flat Forest (SCRFF) is divided into two separate communities – Alluvial Woodland and Riparian Forest);
- Shale Sandstone Transition Forest (High Sandstone Influence); and
- Western Sydney Dry Rainforest.

PHOTO 6: View of Sydney Coastal River-flat Forest (Alluvial Woodland) in the reserve showing one of the dominant open canopy species, Forest Red Gum *(Eucalyptus tereticornis)* [midground] and dense regeneration of Sydney Green Wattle *(Acacia parramattensis)* [background] and Native Poison Peach *(Trema aspera)* [foreground]. The current structure is a response to the 2002 bush fire and a weed management and regeneration/ restoration strategy since the mid-1990s.

PHOTO 7: View of Sydney Coastal River-flat Forest (Riparian Forest) near the northern car park area. Wonga Vine *(Pandorea pandorana)* [foreground] is a dominant native vine in this community and is part of a larger suite of mesic species. In some places, this vegetation forms a dense closed canopy – a community known as Western Sydney Dry Rain Forest. The river bank is currently under weed management and restoration.

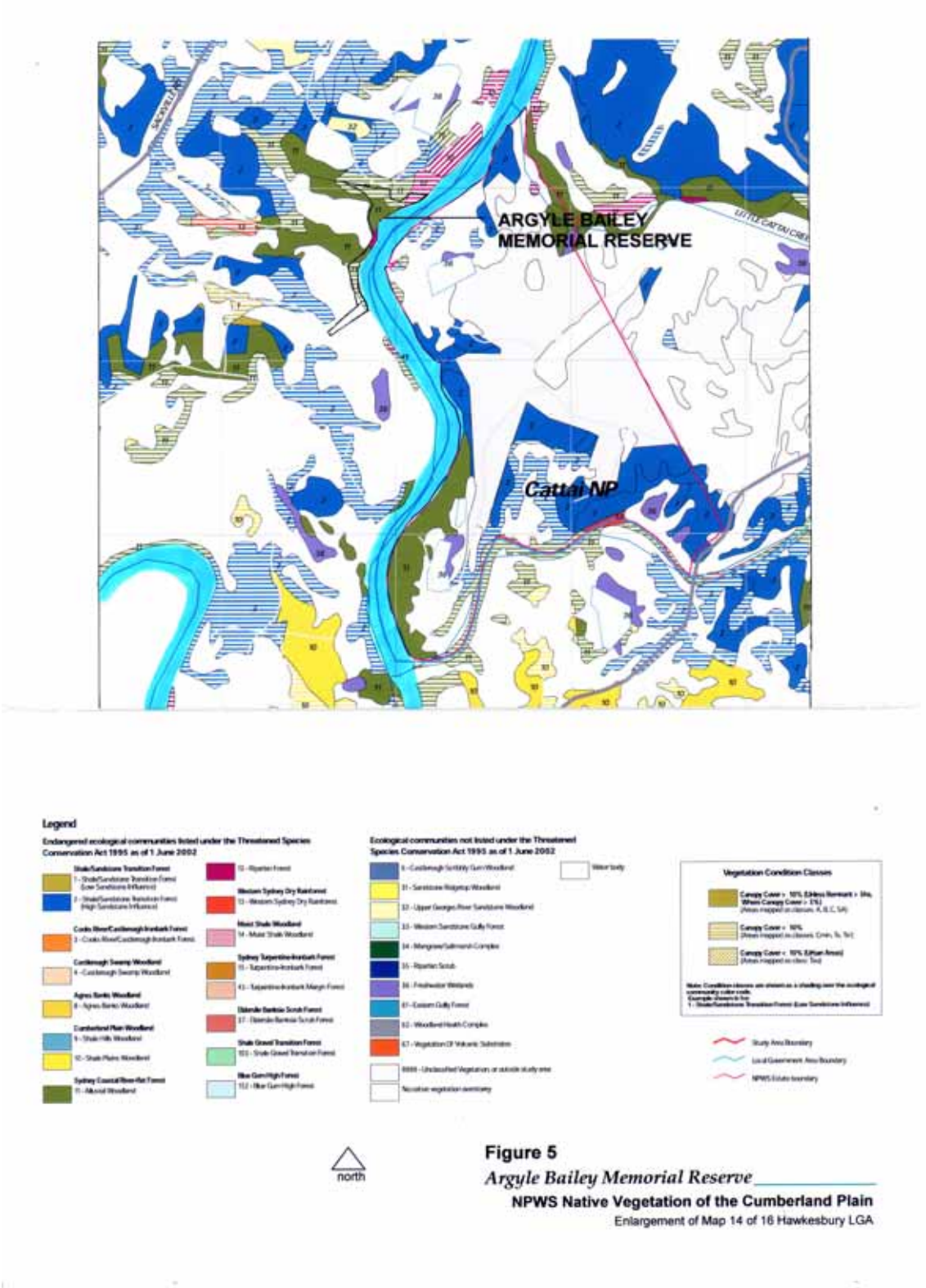


Figure 5
Argyle Bailey Memorial Reserve
NPWS Native Vegetation of the Cumberland Plain
Enlargement of Map 14 of 16 Hawkesbury LGA

It is important to recognise the limitations of the NPWS mapping data, particularly with respect to accuracy of aerial photographs, polygon size, mapping scale and other environmental data layers (eg. resolution of soil landscape layer at 1: 100000 scale).

Although the NPWS data shows only Alluvial Woodland – Map Unit 11 and Riparian Forest – Map Unit 12 (Sydney Coastal River-flat Forest) as occurring in the reserve, ground truthing has identified two other vegetation communities – Shale Sandstone Transition Forest and Western Sydney Dry Rainforest.

Sydney Coastal River-flat Forest (Map Units 11 and 12)
The SCRFF is now included within the broader description – "River-flat eucalypt forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions" in accordance with the Final Determination of the NSW Scientific Committee (17 Dec 2004). This community is listed in Part 3 of Schedule 1 (TSC Act 1995) and specific reference to "Sydney Coastal River-flat Forest (SCRFF)" has now been omitted. SCRFF was first gazetted as an endangered ecological community on 12 Feb 1999. In recent years the name and description of this diverse community has undergone a number of changes.

In 1992 River-flat Forest was described by Benson (Map Unit 9f). Under the NPWS mapping project this community was divided into three separate riparian communities: Map Unit 11 (Alluvial Woodland), Map Unit 12 (Riparian Forest) and Map Unit 5 (Riparian Woodland). Map Units 11 and 12 fall within the definition of the endangered ecological community "River-flat eucalypt forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions" , formerly "Sydney Coastal River-flat Forest". Map Unit 11 (Alluvial Woodland) is found on the floodplains of the Hawkesbury – Nepean River but grades into Map Unit 12 (Riparian Forest) on the levee banks immediately adjacent to the river. Both communities have no particular tree species occurring frequently across all sample sites. In addition, many species are shared between these and other scheduled communities in the reserve. A number of shallow water and semi-aquatic species, associated with this forest type, typically grow along the river's edge, helping to stabilise the banks. These species include Common Reed *(Phragmites australis),* Common Rush *(Juncus usitatus),* Marsh Club-rush *(Bolboschoenus fluviatilis),* Slender Knotweed *(Persicaria decipiens)* and Water Pepper *(Persicaria hydropiper).*

The NPWS map identifies a large portion of Argyle Bailey Memorial Reserve (and adjoining private land) as containing predominantly Map Unit 11 (Alluvial Woodland) with a small area of Map Unit 12 (Riparian Forest) north of the lookout and larger area surrounding the northern car park. Dominant canopy species include Forest Red Gum *(Eucalyptus tereticornis),* Cabbage Gum *(Eucalyptus amplifolia* subsp. *amplifolia),* Rough-barked Apple *(Angophora floribunda)* and Broad-leaved Apple *(Angophora subvelutina).* The River Oak *(Casuarina cunninghamiana)* is a common component along the shoreline and lower river bank. The small tree and shrub stratum varies from sparse to dense including *Acacia parramattensis, Melaleuca styphelioides*, *Melaleuca linarifolia, Tristaniopsis laurina, Callistemon salignus, Hymenanthera dentata, Bursaria spinosa, Ozothamnus diosmifolium, Trema aspera* and *Leptospermum polygalifolium.* The ground stratum is dominated by *Pteridium esculentum, Oplismenus aemulus, Microlaena stipoides* var. *stipoides, Lomandra longifolia, Einadia hastata, Entolasia stricta* and *Pratia purpurascens.* For a detailed species list refer to *Appendix III – Schedule of Existing Native Plant Species*.

The vegetation condition class for both map units varies with the most intact canopy cover occurring within the section between the northern car park area and the lookout. The southern portion of the reserve (including southern car parking area and river bank) is not mapped (ie. no native vegetation cover is present). This assessment of the vegetation condition class is generally consistent with ground truthing conducted during this study.

The canopy structure includes a range of age groups and densities from immature regrowth (including young planted saplings <10 years) through to open canopied old growth specimens (100-120 years+) The most common age group would be 30-60 years+ with a canopy height range averaging 15-20 metres within the Alluvial Woodland through to 20-30 metres in Riparian Forest. The understorey stratum varies in density from relatively open areas to dense thickets dominated by *Acacia* spp. which have established since the 2002 bushfires. In the more disturbed and cleared areas, particularly the steep river banks and eroded creek-lines, weeds still make up a major component of the understorey and ground layers.

Shale Sandstone Transition Forest (Map Unit 2)
Shale Sandstone Transition Forest (Map Unit 2) was gazetted as an endangered ecological community under the TSC Act 1995 following listing by the NSW Scientific Committee in the Final Determination (11 Sep 1998). NPWS mapping of Argyle Bailey Memorial Reserve does not include Shale Sandstone Transition Forest, previously identified as 'Ironbark-Red Gum-Grey Gum Woodland' *(Freimanis, E.).* Shale Sandstone Transition Forest is mapped in outlying areas (of private land) by the NPWS however the relatively small areas within the higher ridges of the reserve (ie. northern portion near Coromandel Road/ Ebenezer Church and the lookout area) have not been identified.

The *Native Vegetation Maps of the Cumberland Plain Western Sydney – Interpretation Guidelines (NPWS, 2000)* identify Narrow-leaved Ironbark *(Eucalyptus crebra)* and Grey Gum *(Eucalyptus punctata)* as dominant canopy species for this community. The small tree and shrub stratum is dominated by *Acacia parramattensis, Bursaria spinosa* and *Ozothamnus diosmifolium*. The ground stratum is dominated by *Themeda australis, Austrostipa ramosissima* and *Aristida vagans*. These typical species are consistent with the Shale Sandstone Transition Forest (High Sandstone Influence). Many of these species are also typical of the broad range of species found in Coastal River-flat Forest.

Cumberland Plain Woodland (ie. Shale Hills Woodland – Map Unit 9 and Shale Plains Woodland – Map Unit 10) has not been mapped in the reserve. It is believed that the 'Cumberland Plain Woodland' community description for vegetation in the reserve is not consistent with recent floristic classification. Ground truthing during preparation of the plan of management, including updating of native vegetation species lists, confirmed this assessment. The NPWS mapping shows Cumberland Plain Woodland (Shale Plains Woodland – Map Unit 10) occurring to the south of the reserve (Gronos Point area) where shale soil depths are higher.

Western Sydney Dry Rainforest (Map Unit 13)
Western Sydney Dry Rainforest in the Sydney Basin Bioregion (Map Unit 13) was gazetted as an endangered ecological community (24 Mar 2000) under the TSC Act

1995 following listing by the NSW Scientific Committee in the Final Determination. This community is not identified as occurring within the reserve in the NPWS mapping. Nevertheless, a large number of mesic/ dry rainforest understorey species occur in association with the above described communities (and canopy species) along the steep banks, bluffs and sheltered lower slopes of the reserve. It is believed that these component species form a distinctive community typical of Western Sydney Dry Rainforest.

The species composition within the reserve is quite diverse. The small tree/ shrub stratum includes *Backhousia myrtifolia, Clerodendrum tomentosum, Duboisia myoporoides, Ficus coronata, Rapanea variabilis, Notelaea longifolia* var. *longifolia* and *Trema aspera*. Vines include *Pandorea pandorana, Geitonoplesium cymosum, Smilax australis, Cissus antarctica* and *Morinda jasminoides*. The ground stratum includes *Austrostipa ramosissima, Pellaea falcata* var. *falcata*, *Pteris tremula, Doodia aspera* and *Adiantum aethiopicum*. This assemblage of mesic species occurs as small pockets of low closed forest/ understorey and scrub referred to as 'Vine Thicket' *(Benson & Howell, 1990)* and 'Dry Rainforest' *(Benson, Howell & McDougall 1996 and James, McDougall & Benson 1999).* This community contains component species which are of further scientific value. Significant species occurring within the reserve include the vines/ climbers *Maclura cochinchinensis* and *Aphanopetalum resinosum*.

Conservation significance
The conservation significance of the reserve's native riparian vegetation can be summarised as follows:-

- Sydney Coastal River-flat Forest (Alluvial Woodland/ Riparian Forest), Shale Sandstone Transition Forest and Western Sydney Dry Rainforest are all scheduled as endangered ecological communities under the *Threatened Species Conservation Act 1995* (TSC Act);
- these communities are part of the broader Cumberland Plain Endangered Ecological Communities (CPEECs) – the subject of a future Recovery Plan to be prepared by DEC;
- native riparian vegetation is broadly protected under the *Native Vegetation Conservation Act 2003*, *SREP No. 20 Hawkesbury-Nepean River (No.2 – 1997)* and *State Environmental Planning Policy No.19 (SEPP 19) – Bushland in Urban Areas*;
- important component within a highly fragmented corridor of Alluvial Woodland/ Riparian Forest along the Hawkesbury – Nepean corridor;
- reserve retains vital habitat and acts as a storehouse of genetic diversity with important ecological, scientific, educational and natural heritage values;
- occurrence of regionally significant species such *Maclura cochinchinensis* and *Aphanopetalum resinosum*;
- potential habitat for threatened fauna species such as the Greater Broad-nosed Bat, Eastern Free-tail Bat, Powerful Owl and Swift Parrot;
- opportunities to develop enhanced habitat values and bio-linkages.

Fauna Habitat
Much of the interpretive and educational signage along the main walking track focuses on the rich natural history and biodiversity within the reserve and along this section of the river. The signage includes a detailed description of plant communities and the

varying habitat, albeit largely modified and fragmented, for native birds, mammals, reptiles and invertebrates. Although the avifauna has been well documented there is currently no detailed assessment of the reserve's biodiversity.

The forest and woodland communities, and in places, dense weed understorey, provide habitat opportunities for a range of native fauna particularly species with mobility (eg. birds and bats), reptiles and smaller invertebrates. Feral animal populations including European foxes, cats and rabbits are known to occur in the reserve and surrounding areas. In the past, rabbits have decimated unprotected restoration planting work. European foxes and cats are likely to have a continuous impact on the recruitment of native faunal populations, particularly ground-dwelling species.

The Hawkesbury – Nepean catchment is inhabited by more than 190 species of birds, of which at least 46 are associated with aquatic/ riparian habitats. Argyle Bailey Memorial Reserve's riparian habitat is important for small bird species such as the Azure Kingfisher *(Alecedo azurea),* Superb Fairy-wren *(Malurus cyaneus)*, Double-barred Finch, Eastern Yellow Robin and Silvereye *(Zosterops lateralis)*. The reserve's understorey provides protection from the more aggressive and group territorial species such as the Noisy Miner *(Manorina melanocephala)* and Pied Currawong *(Strepera graculina).* These species have been favoured by past clearing and ongoing modification of habitat and their populations have expanded throughout the floodplain. Other common species which have benefited from clearing include the Galah *(Cacatua roseicapilla)* and Sulphur-crested Cockatoo *(Cacatua galerita).* The reserve provides habitat for other common species including the Welcome Swallow, Eastern Rosella, Australian Magpie, Australian Magpie-lark, Willie Wagtail, Crested Pigeon, Striated Thornbill and Satin Bowerbird. The broader valley area is frequented by many larger birds of prey including the White-bellied Sea Eagle, Whistling Kite and Australian Kestrel. The river environs provide habitat for the Australian Pelican, Little Pied Cormorant and many other water-birds. The reserve also provides potential habitat for endangered bird species such as the Powerful Owl and Swift Parrot scheduled under the *TSC Act 1995*.

The reserve provides habitat for many common reptiles such as the Long-necked Tortoise *(Chelodina longicollis)*, Eastern Water Dragon *(Physignathus lesueurii),* Eastern Water Skink *(Eulamprus quoyii),* Blue-tongued Lizard *(Tiliqua scincoides)*, Copper-tailed Skink *(Ctenotus taeniolatus),* Red-bellied Black Snake *(Pseudechis porphyriacus)* and Eastern Brown Snake *(Pseudonaja textilis)*. Common invertebrates include the Striped Marsh Frog *(Eimnodynastes perionii),* Common Eastern Froglet *(Crinia signfera)* and Peron's Tree Frog.

Mammal species are believed to include Swamp Wallaby *(Wallabia bicolor),* Common Brush-tailed Possum *(Trichosurus vulpecula),* Ring-tailed Possum *(Pseudocheirus peregrinus)* and Sugar Glider*(Petaurus breviceps).* Notably, the reserve offers potential habitat for threatened fauna species such as the Greater Broad-nosed Bat and Eastern Free-tail Bat. Microchiropteran bats may use the small hollows and fissures in older canopy trees, particularly old growth specimens. Although the native fauna population remains impoverished, this list is by no means comprehensive. It is believed that a detailed faunal assessment would be a useful tool for determining conservation significance and appropriate management strategies.

Managing Riparian Ecosystems

Riparian ecosystems are typically fragile by nature. They exhibit low resistance (ie. ability to withstand an initial impact) and low resilience (ie. ability to recover from an impact and return to its pre-disturbance condition). Small, fragmented and increasingly isolated populations may be easily overwhelmed by continuing internal and external pressures increasing the chances of local extinctions. This may occur through random fluctuations, introduced pathogens, habitat fragmentation and disturbance, predation, reproductive isolation and reduced gene flow.

Over many decades of change within the floodplain, the reserve's ecological values have been seriously compromised. Argyle Bailey Memorial Reserve is exposed to a broad range of ongoing management issues which affect long-term stability. These include:-

- riparian/ agricultural context (with largely cleared boundaries);
- exposure to flooding and ongoing weed recruitment;
- disturbed soils and elevated nutrient levels;
- modified river flows and sedimentation;
- erosion and river bank instability;
- fragmented and modified habitat;
- small size and narrow, linear configuration between the river and adjoining farmland (high edge to area ratio).

In isolation these factors will favour simplification and ecosystem instability. In such a degraded environment, change can occur rapidly and recovery is likely to be extremely slow without further human intervention.

Exotic Weeds – Impact on Disturbed Riparian Vegetation

In terms of native vegetation management, a weed is defined as any non-indigenous plant, including native species which may have been introduced from other genetic sources or geographical regions. Weeds create management problems for local councils as they draw scarce resources away from other areas of management. Community consultation identified weed management as an important continuing issue affecting the reserve.

Prior to implementation of the bushland management strategy, exotic weeds flourished in much of the reserve's bushland understorey, cleared land and aquatic habitat. The level of weed invasion has a close correlation with past clearing of native vegetation and soil disturbance (ie. highly disturbed/ modified areas tend to have high levels of weeds). Although providing some protection and stability to unstable river banks and eroded gullies, introduced weed species (environmental and noxious) had a negative impact on the reserve's native riparian vegetation, natural biodiversity, scenic and visual amenity. Dense weed thickets of exotic shrubs (eg. *Ligustrum* and *Lantana* spp.) and smothering vine growth (eg. *Cardiospermum* and *Acetosa* spp.) suppressed native riparian plant species, severely inhibited natural recruitment and reduced opportunities for enhanced habitat values.

Weeds tend to be fast-growing colonising species with highly aggressive reproductive strategies and can be divided into three main groups:-

- vines and climbers;
- woody weeds (including trees and shrubs); and
- persistent perennials/ groundcovers and annuals.

In a study prepared for Argyle Bailey Memorial Reserve (Swallow Rock Reserve), a total of 54 exotic weed species were identified *(Freimanis, E., undated c.1993?).* This list has been updated following rehabilitation work and recent ground truthing. When rehabilitation work commenced in the reserve in the mid-1990s the most common exotic vines and climbers were Balloon Vine *(Cardiospermum grandiflorum),* Turkey Rhubarb *(Acetosa sagittata),* Bridal Creeper *(Myrsiphyllum asparagoides),* Madeira Vine *(Anredera cordifolia)* and Moth Vine *(Araujia hortorum).* Lantana *(Lantana camara)* and Green Cestrum *(Cestrum parqui)* were the dominant shrubby weed components. Other tall growing shrubs included Privets *(Ligustrum* spp.*),* Castor Oil Plant *(Ricinus communis)*, Wild Tobacco *(Solanum mauritianum),* Mickey Mouse Bush *(Ochna serrulata)* and Paddy's Lucerne *(Sida rhombifolia).*

Persistent perennials included Trad *(Tradescantia albiflora),* Crofton weed *(Ageratina adenophora)* and Fennel *(Foeniculum vulgare).* Open grassed areas were dominated by exotics such as African Love Grass *(Eragrostis spp.),* Slender Pigeon Grass *(Setaria* spp.*),* Prairie Grass *(Bromus* spp.*),* Paspalum (*Paspalum dilatatum* and *P. urvillei)* and Kikuyu Grass *(Pennisetum clandestinum).* For an updated species list refer to *Appendix IV – Schedule of Exotic Weed Species*.

All of these species were introduced/ transported to the reserve and are typical of the Hawkesbury Valley floodplain. A number of weeds in the schedule are declared as noxious under the *Noxious Weeds Act 1993* for the control area of Hawkesbury River County Council (refer to *Table 5: Noxious Weed Species – Argyle Bailey Memorial Reserve* and *Appendix V: Noxious Weed Declarations for Hawkesbury River County Council*).

TABLE 5:
Noxious Weed Species – Argyle Bailey Memorial Reserve

Weed	Class	Legal Requirements
Blackberry *(Rubus fruticosus*)	4	control growth & spread
Crofton weed *(Ageratina adenophora)*	4	control growth & spread
Green Cestrum *(Cestrum parqui)*	3	continuously suppressed
Lantana *(Lantana* spp.*)*	5	notifiable weed
Prickly Pear *(Opuntia stricta)*	4	control growth & spread
Privet (Broad-leaf) *(Ligustrum lucidum)*	4	control growth & spread
Willows *(Salix nigra/ agg. spp.)*	5	notifiable weed

This section of the Hawkesbury River (Swallow Reach) adjoining the reserve, has been subject to periodic infestations by a number of noxious aquatic and semi-aquatic species which are not shown in Table 5. These species include Alligator Weed *(Alternanthera philoxeroides),* Salvinia *(Salvinia molesta),* Water hyacinth *(Eichhornia crassipes),* Cabomba *(Cabomba caroliniana)* and Ludwigia *(Ludwigia peruviana).* Ribbon Water-weed *(Egera densa)* has not yet been declared noxious however the

rapid infestation of the river by this submerged aquatic species is of particular concern. These aquatic and semi-aquatic weed species are highly adaptive and invasive under prevailing river conditions. They have a rapid capability for expansion creating stream blockages, modifying and reducing native aquatic habitat and affecting water quality and recreational opportunities.

Definitions

The following definitions have been adapted from the *Australian Natural Heritage Charter (1999)* and relate specifically to weed management and rehabilitation strategies for natural areas affected by human-induced impacts:

1. ***Regeneration*** – the recovery of natural integrity following disturbance or degradation (using minimal disturbance methods appropriate to ecological communities retaining a moderate to high level of resilience).

2. ***Restoration*** – returning existing habitats to a known past state or to an approximation of the natural condition by repairing degradation, by removing introduced species, or by reinstatement (moderate to high level of ecological disturbance and modification/ low resilience).

3. ***Enhancement*** – the introduction to a place of additional individuals of one or more organisms, species or elements of habitat or geodiversity that naturally exist there (moderate to high level of ecological disturbance and modification/ low resilience).

4. ***Reinstatement*** – to introduce to a place one or more species or elements of habitat or geodiversity that are known to have existed there naturally at a previous time but can no longer be found at that place (moderate to high level of ecological disturbance and modification/ low resilience).

These strategies have been integrated in the rehabilitation program in accordance with specific site conditions, level of disturbance and weed invasion, relative resilience and integrity of the reserve's riparian communities. Over the past two decades, three major groups have been involved (on the ground) in the rehabilitation program including Bushcare (local volunteers), the LEAP team (NSW government youth training initiative) and contract bush regenerators.

Bushcare

The dynamic nature and inherent instability of the reserve's riparian communities have posed significant challenges for ongoing weed management and rehabilitation. The level of weed invasion in the reserve presented a massive task for initial primary clearing and follow-up weeding. During the early to mid-1990s this initial work was undertaken by local community volunteers under the Bushcare program. Unfortunately, this small group no longer takes an active role in the reserve.

Bushcare is a community-based program which encourages local volunteers to assist in the rehabilitation of bushland reserves. This work is coordinated through Council staff and is often part of a broader program involving contract bush regenerators. Volunteers are provided with direction and technical advice including training, tools, signage for work sites, rubbish removal, newsletters and use of a community nursery

to propagate local native plants. It is an integral part of managing Hawkesbury City's bushland. This plan of management encourages the re-establishment of a community-based volunteer group to assist in the rehabilitation of the reserve's bushland.

Weed Management Strategy –
review of the LEAP initiative and other works (1990s period)
A collaborative initiative between Greening Australia's Landcare and Environment Action Program (LEAP) project team, Hawkesbury City Council and the Department of Public Works established an innovative program to address the reserve's management and recreational infrastructure. The LEAP project team was developed through the youth (15-20 year old age group) education, training and vocational program funded by the Department of Employment. In 1993 funding was provided for developing the reserve's walking track (including two pedestrian bridges), signage, primary weed management initiatives and restoration planting. The program was guided by a bushland management plan – *Swallow Rock Vegetation Management Plan (Freimanis, E., undated)* which established the following key objectives:-

- to identify existing plant communities and degraded (weed) areas;
- to develop appropriate conservation strategies;
- to address long-term ecological sustainability and durability; and
- to provide a workable plan for implementation by the LEAP team.

The level of weed invasion and restoration potential for the reserve's native bushland was assessed and mapped. Six management units (MU) and respective strategies were developed according to specific intra-site conditions as follows:-

- MU 1 – southern portion (adjoining Ebenezer Wharf Road/ car parking area to southern bridge (adjacent to picnic area) and narrow sections along western boundary adjoining cleared (privately-owned) pastureland:
  - largely cleared/ modified with 95-100% weed/ pasture cover
  - history of agricultural use (ie. grazing/ cropping)
  - minimal remnant native vegetation
  - flood prone/ low native seed source/ low resilience
  - proposed ecological reconstruction (incl. buffer zones)
  - targeted weeding/ rabbit control & fencing
  - high initial costs/ high maintenance

- MU 2 – alluvial river banks (south and north of lookout), constructed drainage channels/ gullies (2) and slopes surrounding the landing beach (south of the northern car parking area):
  - largely disturbed/ modified 90-100% weed cover
  - extensive vine weed growth smothering native trees/ shrubby weeds dominating understorey
  - native canopy species may be present/ 0-5% native understorey
  - some small remnant native clusters/ core areas
  - planted River Oaks on southern river bank
  - flood prone/ high erosion risk
  - low native seed source/ low resilience
  - targeted primary weeding/ follow-up secondary maintenance
  - erosion control devices/ protective fencing & rabbit control
  - proposed ecological reconstruction (provenance-sourced planting)

- high initial costs/ high maintenance (recurring)

- MU 3 – transitional zones including area immediately north of southern pedestrian bridge, buffer area between northern car park and quarry site and alluvial river bank (south-east of northern car park/ picnic area):
  - variable level of disturbance/ 50-90% weed cover
  - native canopy present/ 1-50% native groundcover
  - remnant native clusters/ core areas present
  - buffer between resilient core areas and highly disturbed vegetation
  - exposure to edge effects & electricity easement/ low overhead lines
  - flood prone/ high erosion risk
  - low to medium native seed source/ low to medium resilience
  - targeted primary weeding/ follow-up secondary maintenance
  - erosion control devices/ temporary protective fencing & rabbit control
  - proposed regeneration/ restoration (provenance-sourced planting)
  - high initial costs/ high maintenance (recurring)

- MU 4 – elevated transitional zones including lookout area (slopes to middle ridge) and northern strip adjoining entry road (western side):
  - variable level of disturbance/ 50-90% weed cover
  - native canopy present/ 1-50% native groundcover
  - presence of resilient core areas
  - generally not subject to regular flooding/ low erosion risk
  - potential medium native seed source/ medium resilience
  - targeted primary weeding/ follow-up secondary maintenance
  - proposed regeneration/ restoration (provenance-sourced planting)
  - construct buffer zones, temporary protective fencing & rabbit control
  - high initial costs/ medium maintenance (recurring)

- MU 5 – native ecosystem core zones including steep scarp (lookout area/ middle ridge), north-eastern alluvial river bank (below Ebenezer Church) and upper north-western corner (including historic quarry site):
  - low to medium level of disturbance/ 0-50% weed cover
  - native canopy present/ 50-100% native groundcover
  - resilient core areas/ potential to colonise adjoining degraded areas
  - potential high native seed source/ high resilience
  - minimal disturbance targeted primary weeding/ follow-up secondary maintenance with some restoration (provenance-sourced planting)
  - erosion control devices/ temporary protective fencing & rabbit control
  - low initial costs/ low maintenance (recurring)

- MU 6 – active recreation zone including the vehicular entry roads and car parking areas (northern and southern), grassed picnic areas and the walking track:
  - maintenance of recreational infrastructure
  - exotic grasses/ regular mowing regime
  - need for regular control of “edge” weeds
  - establishment of signage/ buffer planting
  - regular removal/ disposal of cleared weed piles off-site
  - high initial costs/ high maintenance (recurring)

The LEAP initiative was primarily a youth education and training program, subject to short-term funding. The program was in conjunction with landscape works which included construction of the main pedestrian track and bridges. Targeted primary weeding became the main priority for the LEAP team. Restoration planting followed during the secondary phases of weeding and consolidation.

PHOTO 8: View of lower creek-line (northern gully) adjacent to the historic landing beach. Willows (including Black Willows – *Salix* spp.) dominate this environmentally degraded area. The channel is filled with accumulated rubbish and debris.

PHOTO 9: The western boundary of the reserve adjoins cleared agricultural land including largely drained wetlands. The reserve is confined to a very narrow riparian buffer strip. Opportunities exist for establishing improved buffers and expanding habitat along the edge of the reserve and linking to other contiguous bushland.

Contract bush regeneration and restoration program

Importantly, the LEAP report identified the need for ongoing community involvement and funding for contract bush regenerators to ensure effective consolidation. Contract bush regenerators have worked in the reserve since the late 1990s. Funding was initially provided by the Hawkesbury Nepean Catchment Management Trust (HNCMT). The program has continued to target and control re-invasion by exotic weed species and provide an enhanced level of resilience for the reserve's bushland. These targeted areas have included the following:-

1. northern gully area/ adjoining slopes, the northern bridge area (adjacent to the main walking track) and river banks near landing beach (MU 2);
2. the quarry site and adjoining upper slopes near northern car park area (MU 5/ MU 3);
3. lookout area including upper southern slopes (MU 5/ MU 4);
4. buffers, edges and boundaries to core areas (MU 1);
5. alluvial river banks adjoining northern car parking area (current primary work) (MU 3/ MU 5);
6. removal/ control of weed growth (particularly vines) within the southern portion of the reserve (MU 1/ MU 2).

2002 bushfire and fire management

A low intensity bushfire burnt approximately 70% of the reserve on 8 October 2002. All the bushland south of the northern bridge was burnt to the river's edge. The initial impact included loss of all restoration planting in these areas and collapse of some large old growth Eucalypts (eg. a mature Grey Gum fell and damaged the safety fencing at the lookout). Fire also damaged the southern bridge deck and irrigation pump-sites. The loss of understorey plants (both native and exotic weed species) together with fallen trees over the walking track exposed the reserve to further multiple tracking and trampling of new native regrowth and regeneration.

The restoration planting (local provenance-sourced stock) within the northern gully area was not affected by the fire. Some of these canopy trees, including Cabbage Gum *(Eucalyptus amplifolia* subsp. *amplifolia)* and Forest Red Gum *(Eucalyptus tereticornis)* are now up to 5-7 metres in height. The populations of some weed species were temporarily reduced however the weed understorey and vines soon re-established in the more disturbed sites. Notably, native species particularly *Acacia parramattensis, Breynia oblongifolia, Dodonaea triquetra, Ozothamnus diosmifolium, Trema aspera, Austrostipa ramosissima*, *Pteridium esculentum, Themeda australis* and *Microlaena stipoides* have rapidly re-colonised the more resilient bushland areas. Successive years of drought have further altered the species and structural diversity of these communities. It is unclear as to whether these changes are long term or indicative of local environmental variability.

The dense regrowth of native colonising shrubs since the 2002 bushfire has further fuelled the debate over the preferred structural characteristics and visual character of the riparian vegetation. The density of native regenerating shrubs raises issues of public safety and risk management on the track, particularly with respect to multi-uses and various user groups. View corridors of adjoining private land-owners have also been adversely affected by understorey growth leading to clearing of portions of the reserve. This complex mix of values and issues highlights the need for a balanced and consultative approach to reserve management, conservation and rehabilitation.

Fire will continue to be an important factor shaping the structural character, species diversity and sustainability of the reserve's ecological communities. Regeneration and biodiversity enhancement programs need to be integrated with the objectives of fire management policy (ie. protection of life and property). Accordingly, ecological fire management should be coordinated with the NSW Rural Fire Service (NSWRFS) or local Fire Brigade and NPWS officers. Bushfire hazard reduction within the reserve and/ or on adjoining private properties needs to be implemented in a manner which protects vital habitat and biodiversity values.

Future management
Key aims and objectives for weed management and rehabilitation of the reserve's natural areas include the following:-

- address long term objectives of building ecosystem resilience and durability;
- seek appropriate funding to fully implement these long term objectives and deliver a sustainable outcome;
- continue to use skilled labour (ie. qualified and experienced contract bush regenerators) to drive implementation of the strategy;
- promote community education, involvement and stewardship in the ongoing management of the reserve's bushland;
- promote involvement by community volunteers (ie. re-establish an active Bushcare group), school groups and employment training programs;
- focus on protection, maintenance and consolidation of areas previously targeted in the program (ie. continue stabilisation of targeted areas 1-5);
- continue to selectively target and control exotic weeds in conjunction with appropriate restoration and enhancement strategies (southern reserve including southern drainage channel/ gully area and river banks);
- target eroding river banks for stabilisation, protection and restoration planting;
- upgrade protection of areas under regeneration/ restoration, improve visitor management and control multiple-tracking;
- install additional interpretive signage to raise visitor awareness of heritage values (eg. Aboriginal archaeological significance and colonial history – quarry site and landing beach);
- develop opportunities for consolidating gains (eg. reduce edge to area ratios, enhance buffers and bio-linkages);
- expand the program (subject to appropriate funding) to include ecological reconstruction (restoration, enhancement and reinstatement) of the southern portion of reserve.

The strategy should be consistent with Best Practice Guidelines for Bush Regeneration on the Cumberland Plain (DLWC and Australian Association of Bush Regenerators, 2003), Management Principles to Guide the Restoration and Rehabilitation of Indigenous Vegetation (Greening Australia) and Florabank Guidelines for native seed collection, production, handling and storage. Only local provenance-sourced native plant species should be used in restoration, enhancement and reinstatement works. The strategy should aim to establish a representative level of species and structural diversity which is appropriate to the reserve's ecological communities and site-specific conditions. Refer to *Appendix III: Schedule of Existing Native Species.*

Northern section (including middle ridge/ lookout)
For much of the northern and mid-sections of the reserve the program is entering a phase of consolidation with ongoing maintenance weeding and restoration planting (where appropriate). The limited resources available need to remain focused on consolidation, restoration and enhancement of key targeted areas. These include the northern gully/ landing beach area, the quarry site and river banks adjoining the northern car parking area. It is important to ensure the long term ecological resilience and sustainability of these riparian communities. In the short-term (ie. 5-years) more resources will be required in areas of high disturbance/ low ecological resilience (ie. northern gully/ landing beach area and adjoining river banks). In the longer term, these areas have the potential to form a more resilient combined core area of high ecological integrity and durability. Edge conditions will also be reduced. This will have flow-on benefits for heritage (natural and cultural), recreational and scenic values as well as reducing ongoing costs associated with weed management.

Southern section
Subject to available funding, the program should be expanded to address the long term reconstruction (ie. restoration, enhancement and reinstatement) of ecological communities within the southern portion of the reserve. In the short term (ie. 5-years), the highly disturbed southern gully area and adjoining river banks require ongoing targeted weeding to prevent re-invasion by weeds. This should be supplemented with restoration planting using local provenance-sourced canopy species. The southern car parking area (off Ebenezer Wharf Road) and adjoining open grassed area should similarly be targeted for landscape restoration works to reduce mown areas and enhance visual and ecological values.

Connectivity and bio-linkages
The creation of enhanced faunal corridors, bio-linkages, buffers and “mosaics” aim to reduce the effects of isolation, ecosystem simplification and instability. Opportunities exist for improved linkages along this riparian corridor and adjoining bushland areas. It is important to recognise however that these corridors or bio-linkages, while potentially enhancing vital habitat and increasing the movement of mobile species, can also extend edge effects. Faunal corridors can also act as conduits facilitating movement of weed species, feral animals and diseases between isolated populations *(Hobbs, 1997 and Crome, 1997).* Suitable bio-linkages may not be the only limiting factor for many species – it may be determined by the size and quality of suitable remaining habitat and the level of predation (eg. foxes).

The establishment of riparian buffers, particularly within the narrow corridor adjoining cleared private farmland, should be considered in the strategy to reduce edge effects as well as providing improved habitat values. There may be opportunities for mutually beneficial agreements (ie. management of view corridors and tree planting/ buffers on adjoining private land within a “reduced fuel zone”). Opportunities also exist to reduce the size of open mown areas (eg. southern car park area/ adjoining open grassed area), to establish appropriate buffers and to enhance visual character. This approach would have the potential to improve opportunities for maintaining ecosystem resilience. It would also provide valuable habitat for faunal species dependent on these dynamic edge conditions for their survival and evolution *(Harrington, 1995).*

PHOTO 10: View of southern bridge/ gully and southern picnic area [left background]. The gully area and adjoining river banks are dominated by exotic weed species such as Lantana *(Lantana camara),* Balloon Vine *(Cardiospermum grandiflorum)* and Trad *(Tradescantia albiflora).* These species dominated much of the reserve only a decade ago. The weeds in this area will be targeted for weed management and restoration subject to funding. Native River Oaks *(Casuarina cunninghamiana)* [mid-ground] have been planted to stabilise the river/ creek banks.

PHOTO 11: Trail bikes and BMX bikes cause significant damage to the reserve's natural areas through compaction, multiple tracking, destruction of vegetation, changes to natural soil profiles and the seed bank. High impact sports, vandalism and illegal activities (eg. motorbikes and camping) continue to be major management issues affecting the reserve.

PHOTO 12: View of the cleared paddock and southern car park area (looking towards Ebenezer Wharf Road). The strategy aims to retain the low-key rural/ natural setting and to enhance opportunities for bio-linkages, buffers and habitat through additional planting and restoration using local provenance sourced native species.

PHOTO 13: The southern portion of the reserve (river bank) contains a number of irrigation pump-sites and piping, overground electrical cabling and unsecured meter boxes on elevated towers. This infrastructure, currently under licence or permissive occupancy on the Crown reserve, raises issues over public safety and risk management. These issues need to be addressed in accordance with this plan of management.

4.8 PUBLIC RECREATION AND SOCIAL VALUES

Regional context – open space

Hawkesbury City Council manages over 1,500 hectares (Ha) of native bushland in sixty-one (61) separate parks and reserves within the local government area *(HCC web-site, Your environment: Bushcare, 2006).* Argyle Bailey Memorial Reserve, located on the Hawkesbury River, is an integral component of this natural parks and reserves system. Furthermore, it is important to recognise the reserve's regional significance within the broader Crown reserves system. In accordance with the *Crown Lands Act* (s.10 CLA 1989) the reserve must be managed for the benefit of the people of New South Wales (refer to *2.6 Objects of Crown Lands Act*).

Demographics and regional demand

In 2001 the Hawkesbury City LGA had a population of 63,548. A total of 94% of the population lives in the far south-eastern portion of the LGA. It is a culturally diverse community with more than 12% of the population born overseas (43% of this group were born to mainly non-English speaking countries). In 2001, the LGA's Indigenous population was 1,023 (1.7% of total population) with 45% being under 15 years of age. The ABS projections estimate a population of 83,920 by 2031 (ie. overall increase of 25.2% over this time frame). Although recent demographic trends show an ageing population shift across Australia and within the Hawkesbury LGA, the City also has substantial numbers of younger families with children.

The *Hawkesbury Cultural Plan 2006-2011* (adopted by Council 30.05.2006) identifies the significance of the Hawkesbury River and its landscape as the "symbolic heart of the Hawkesbury community". During preparation of the Cultural Plan, the community identified the river as its "most distinctive cultural asset, playing a major role in the Hawkesbury's sense of identity and its sense of place". The community recognised the significance of the river in terms of its fragile ecology, influence on the environment, its role in history and ongoing impact on economic and social development. The river's protection, sustainable management and promotion of natural and cultural values were considered to be key issues. The community supported opportunities to increase environmental awareness, to celebrate its history and heritage through community arts projects and to promote better protection and management through partnerships with key stakeholders and various government departments.

Recent research into regional demand and opportunities in the broader Western Sydney, prepared by the Department of Planning (formerly DIPNR), identified a number of key issues and needs which are relevant to the future management of Argyle Bailey Memorial Reserve as follows:-

- demand for quality recreational settings (eg. natural areas/ river-side);
- public access to water and the river (eg. fishing, water-skiing);
- need for broad community access for a culturally diverse community, range of age groups and abilities (including people with a disability);
- growing community participation in informal passive recreation activities (eg. walking, picnics and socialising with friends); and
- demand for higher impact activities (eg. trail bikes and limitations for meeting this demand).

In terms of visitor preferences and recreational choices the research identified "nature reserves and waterways" as the top priority for further improvements. Recreational values are closely linked with environmental quality and the opportunities provided by the setting. This research is supported by the community consultation undertaken for this plan of management. Community responses highlighted the following recreational values associated with this reserve:-

- public access/ river and foreshore accessibility
- natural riparian bushland setting
- scenic vistas and visual character
- historic/ cultural elements including church, quarry site and landing beach
- tranquillity, beauty and quiet solitude
- opportunities for passive and nature-based recreation
- day-use picnic areas/ shelters, shade trees and public amenities
- access to elevated viewpoints/ special events (eg. "Bridge to Bridge")
- observing wildlife/ bird watching

For a detailed list and discussion of these values refer to *4.2 Community Values*.

Recreational setting

The reserve's passive recreational opportunities are generally restricted to local and sub-regional significance, drawing largely on a user catchment within the local district and Hawkesbury area. The unique combination of scenic river setting, tranquil rural and bushland character and cultural heritage values attracts visitors seeking a range of passive and nature-based recreational opportunities including picnicking, fishing, bushwalking, bird watching and quiet relaxation. The reserve is also popular for active pursuits such as water-skiing, horse riding and mountain bike riding. This section of the river has a long association with motor boats and water-skiing (the first water-skiing club in Australia was established at Sackville in 1950). Nowadays the reserve attracts large numbers of visitors to watch big river events such as the "Bridge to Bridge" water ski and jet boat races. These water-based activities however, are increasingly affected by water quality issues and aquatic weeds.

Public access and existing recreational infrastructure

Recreational infrastructure in Argyle Bailey Memorial Reserve is low-key and typical of many of Hawkesbury City's bushland reserves. This reserve and its river environs are easily accessed via two separate sealed roads – Coromandel Road (northern entry) or Ebenezer Wharf Road (southern entry). River access is also possible at the landing beach below Ebenezer Uniting Church. Directional signposting to the reserve is minimal (eg. signposting to "Toilets" at Coromandel Road). Although a NSW Public Works sign identifies "Swallow Rock Reach Walking Trail" at each entry point, there are no signs identifying "Argyle Bailey Memorial Reserve".

The northern car parking area is shaded by tall native trees. Motor vehicles have unimpeded access to flat grassed areas (ie. no vehicular restrictions within picnic area). The southern car parking area, delineated by log barriers, has no shade trees and is physically separated from the picnic area, the river and riparian corridor. Concrete block vehicular barriers and bollards in each of the car parks prevent off-road/ 4WD vehicles entering the main part of the reserve. These barriers do not prevent illegal motor-bike/ trail-bike access into the reserve.

A single graded, unsealed walking track links the northern and southern car parks/ picnic areas (approximately 1,200 metres in length/ 40 minutes return). The track includes steps and some ramps of medium grade. A spur track/ steps lead to the landing beach and river's edge. A set of timber steps with metal handrails above the landing beach are in poor condition. Multiple tracking caused by pedestrian traffic, horse-riders (avoiding steps) and bike-riders (seeking jumps and alternate routes) are having a cumulative negative impact on native vegetation and bank stability. Old temporary mesh fencing/ steel posts installed to restrict visitor access and protect areas under rehabilitation are in very poor condition and no longer serve any functional purpose.

The walking track has two pedestrian bridges with safety handrails/ mesh panels (approx. 1800mm width). These bridges cross over eroded gullies (drainage channels). Although the track is unsuitable for wheel chair access, the northern picnic area caters for people with disabilities (ie. easy access between picnic tables and car parking). The track passes a scenic lookout over the river (middle ridge section). The lookout's metal safety fence (standard gauge metal safety rails with chain-wire panels) is continually vandalised to allow "run-up" jumping from the bluff into the river below.

The facilities in the northern (Coromandel Road) picnic area include a brick amenities building, concrete block picnic shelters/ seating, litter bins and interpretive signage. While functional, the amenities building and picnic shelters are in need of upgrading and refurbishment. Fresh drinking water is not available (no town water supply). Showers and taps cannot be used due to the potential health risks posed by blue-green algae in the river. The southern picnic area is smaller and contains three picnic tables/ seating and small metal/ grill and plate wood-fuelled barbeques. No wood is provided and there are no public amenities. The picnic area is approximately 100 metres from the car parking area (pedestrian access only).

A total of nine licences/ permissive occupancies (primarily for irrigation purposes) exist within the reserve and include infrastructure such as irrigation pumps, pipelines, electrical cabling and metering towers. The southern picnic area is in close proximity to a number of pump sites and towers. Some elevated platforms on the towers and connecting overhead electrical cables are accessible by the public and require urgent attention.

Key recreational issues are discussed in *3.0 Community Consultation – 3. Public access, recreation and public safety issues.* For a detailed description of facilities, improvements and their condition, refer to *Table 2: Description of Crown Reserve – Existing Facilities & Improvements.*

Managing recreational values

The upgrading of picnic areas, interpretive signage, introduction of new recreational facilities and promotion of the reserve's Aboriginal, archaeological and cultural heritage may have a range of impacts. Some positive benefits in raising the reserve's profile may include increased government funding for these improvements and greater opportunities for protection and management of these values. The reserve needs secure long-term funding for the weed management and restoration strategy. These changes however may increase potential negative impacts such as greater visitor numbers, perceived crowding in high use areas (eg. picnic areas), conflict between old

and new user groups over incompatible activities and dissatisfaction with the overall experience.

The potential exists for increased natural resource impacts through increased visitor loadings and changing types of user groups. For example, the reserve has been publicised in trail bike and mountain bike magazines. Trail bikes are not permitted in the reserve. Horse riding, mountain bikes and trail bikes are causing continuing problems with multiple tracking and erosion. All are potentially incompatible uses with pedestrian traffic on the narrow track and foot-bridges. Larger numbers of weekend and holiday visitors could also impact on the tranquillity and solitude of the reserve, important values expressed in community consultation. Peak visitor loadings during events such as the “Bridge to Bridge” water skiing and jet boat races in May and November each year expose sensitive ecological areas under restoration to trampling, compaction and erosion. Over time these creeping or incremental changes gradually lead to natural resource degradation, loss of experiential quality and visitor/ user group displacement. An understanding of this process has important implications for the management of the reserve.

The strategy should improve the level of control and management of public access to popular recreational locations and seek to reduce recreational impacts in fragile and environmentally sensitive areas. The strategy should provide enhanced opportunities for visitors to enjoy the reserve’s scenic qualities (eg. picnic areas/ lookout), natural environment and its historic sites (eg. landing beach and quarry site). These heritage sites offer special opportunities for interpretation and education.

It is essential that all environmental and social impacts are managed on a sustainable basis. This section of the plan of management has defined the reserve’s key values and established objective limits on the types and amounts of change that are either desirable or acceptable. Accordingly, visitor and site management strategies should focus on the following objectives:-

- maintain and promote long term sustainability of the reserve as a limited and finite resource;
- continue to address water quality, river flow, aquatic weed and bank erosion issues which potentially reduce recreational and other values;
- continue to provide and maintain safe, easy access to the river, recreational facilities and along the riparian corridor;
- implement measures to improve visitor management and education in low-impact activities;
- provide for recreational infrastructure and activities within the most durable sites having regard for public safety and security;
- provide enhanced protection of sensitive ecological areas under regeneration/ restoration;
- continue to consolidate and expand upon the weed management and restoration strategy including promotion of community awareness, volunteer involvement and public education; and
- improve visitor interpretation and understanding of the reserve’s natural and cultural heritage values.

In establishing limits of desirable or acceptable change, this plan of management provides a framework for the reserve's future management.

4.9 VISION STATEMENT

The following statement provides a vision for Argyle Bailey Memorial Reserve which forms the basis for the following management strategies:-

"To ensure appropriate protection, sustainable management and enhancement of this reserve's unique natural, scenic, heritage, environmental and recreational values in accordance with the principles of Crown land management for the benefit of the broader community and for future generations".

PHOTO 14: View of one of the old "cubicle-style" shelters [foreground] and public amenities building [left background] in the main northern picnic area. Appropriate low-key upgrades and replacement of ageing facilities are proposed for this area. The strategy aims to protect and enhance the reserve's unique qualities and heritage values whilst improving the passive and nature-based recreational experience.

5.0 MANAGEMENT STRATEGIES

5.1 OVERVIEW

This section of the plan of management addresses the following objectives:-

- ❑ to develop an action plan for implementing the management objectives (ie. desired outcomes);
- ❑ to develop performance targets to assess and monitor strategies;
- ❑ to assign directions and priorities (spanning the next 5-years);
- ❑ to address future leases and licences; and
- ❑ to develop a master plan for implementation of the strategic plan.

5.2 ACTION PLAN

Each page of the following table (refer to *Table 6: 5.2 Action Plan – Sheets 1-8*) is divided into six separate columns as follows:-

- *key management objectives* or *desired outcomes* (column 1);
- *performance targets* (column 2);
- *item* or reference number (column 3);
- *means of achievement* or *management actions* (column 4);
- *means of assessment* of the actions (column 5);
- *priority ranking* for each management action (column 6).

Desired Outcomes (column 1)
There are four sections to the action plan. These sections are divided into the following headings in accordance with the desired outcomes as shown:-

1. **Crown land management – development, activities, leases and licences**
   To establish an appropriate management framework and guidelines for assessing development, activities, leases and licenses in accordance with the requirements of the Crown Lands Act 1989, case law judgements and other relevant policy.

2. **Aboriginal, archaeological and cultural heritage**
   To protect, manage and provide appropriate information relating to Aboriginal, archaeological and cultural heritage values.

3. **Environment/ biodiversity**
   To protect, manage and enhance environmental quality, scenic character, stream health and biodiversity values.

4. **Recreation, access and facilities**
   To maintain and enhance appropriate recreational infrastructure including low-key public access/ linkages and opportunities for passive/ nature-based recreation.

Performance targets (column 2)
The *desired outcomes* are in accordance with the discussion and recommendations in *4.0 Basis for Management* which in turn have guided the development of *performance targets* in the action plan.

Management actions/ item no. (columns 3 and 4)
The performance targets or management objectives provide the framework for developing specific *management actions* or the *means of achievement*. Each action is assigned an item number based on the relevant section (eg. Sec. 1: Crown land management – development, activities, leases and licences **A1** to **A9**, followed by Sec. 2 – **B1 to B9**, etc.).

Performance measures (column 5)
The action plan establishes a system of checks and balances to assess actions in relation to performance (ie. *means of assessment)*.

Priorities
Priorities for each management action are assigned according to relative importance – very high, high, medium and low. It is envisaged that actions will be addressed on a priority basis, by the Policy and Services Unit responsible, and in accordance with the means of assessment as follows:-

VERY HIGH	=	1 year
HIGH	=	1-2 years
MEDIUM	=	3-4 years
LOW	=	up to 5 years

5.3 CAPITAL WORKS PROGRAM

Priorities and cost estimates are further developed in the 5-year capital works program (refer to *Table 7: Capital Works Program*). The Opinion of Probable Landscape Construction Costs is based on the Landscape Masterplan and is indicative only.

5.4 LANDSCAPE MASTER PLAN

The Landscape Masterplan (see *Figure 6: Landscape Masterplan*) identifies key management actions to be implemented throughout the 5-year capital works program, subject to available funding.

5.0 MANAGEMENT STRATEGIES

5.2 Action Plan

Table 6

	Performance Target (Management objectives)	Item	Means of Achievement (Management Actions)	Means of Assessment (of the actions)	Priority
Crown reserve management	**Desired Outcome: To establish an appropriate management framework and provide guidelines for assessing development, land uses, activities, leases and licences.**				
	To ensure the reserve's planning and management are in accordance with relevant legislation and policy.	A1	Implement actions identified in this plan of management [refer to A2-D10] in accordance with *Crown Lands Act 1989*, case law and all other relevant policy.	Adoption of plan of management. Level of implementation over 5-years.	high ongoing
	Public purpose: To recognise reserve's broader environmental, scenic and heritage values and to address issues relating to existing dedicated *public purpose* of the reservation. To provide appropriate protection and management of other identified values.	A2	Review and amend reserve's dedicated *public purpose* from "Public Recreation" to "Public Recreation and Environmental Protection" to promote the significance of identified values and to ensure an appropriate balance between low-impact recreational activities/ development and conservation values.	Crown reserve's dedicated *public purpose* addressed and amended accordingly.	high
	LEP zoning: To ensure public purpose determines appropriate uses and development and to address anomalies with existing LEP zoning [update 2006] of reserve.	A3	Amend existing LEP zoning of Crown reserve [currently *7(d) Environmental Protection - Agriculture Protection (Scenic)*] and ensure consistency with amended *public purpose* of reserve [ie. "Public Recreation and Environmental Protection].	Anomalies in current zoning [under Council's LEP] addressed and amended accordingly.	high
	Existing tenures: To address issues relating to existing tenures and to ensure consistency with case law judgements.	A4	Review existing pipeline/ pumpsite and grazing tenures with respect to the reserve's *public purpose* and private purposes/ activities occurring off the reserve.	Investigation completed and recommendations implemented.	medium
	To address issues in relation to public safety and risk management associated with existing tenures.	A5	Ensure that all pipeline and pumpsites and associated infrastructure are installed and maintained in accordance with all building and safety standards. Restrict public access to towers/ meter boxes and electrical cabling.	All public safety issues addressed.	very high
	Future development, land uses and activities: To satisfy the principles of Crown land management in accordance with the *Crown Lands Act 1989*. To ensure consistency with dedicated *public purpose*. To protect the reserve's values and its passive recreational setting from inappropriate development. To provide a balanced and appropriate level of recreational infrastructure and to implement actions which will prevent incremental impacts. To properly address public safety and security. To improve visitor education and interpretation. To ensure that adjoining land uses, activities or development do not adversely impact on the reserve's values.	A6	Development proposals, land uses, activities, leases, licences and management practices in the reserve must be consistent with the following requirements: - *Crown Lands Act 1989*, case law judgements and other relevant policy; - demonstrate consistency with dedicated *public purpose* of the reservation; - provide a clear connection with role of Crown reserve and recreational setting; - protect and enhance natural riparian setting, scenic quality, biodiversity, Aboriginal, archaeological and cultural heritage values and promote environmental sustainability; - address flood planning, bush fire hazard and risk management issues; - protect and restore native riparian vegetation/ habitat, bank stability and bio-linkages; - ensure consistency with existing character, scale and intensity of development; - promote balanced, sustainable management and improvement of recreational infrastructure and opportunities for low-impact activities; - contribute to diversity and quality of recreational and community uses - restrict inappropriate uses and activities, particularly high impact activities; - maintain and improve public safety and security; - adequately provide for public access, equity and broad community use; - facilitate broader community education and interpretation of identified values; - ensure that reserve's ecological/ habitat values are not adversely affected, alienated or fragmented in any way by adjoining land uses or activities.	Number and % of proposed developments that address and adhere to development guidelines. Measure trends over time.	ongoing

1 of 8

5.0 MANAGEMENT STRATEGIES

5.2 Action Plan

	Performance Target (Management objectives)	Item	Means of Achievement (Management Actions)	Means of Assessment (of the actions)	Priority
Crown reserve management	**Desired Outcome: To establish an appropriate management framework and provide guidelines for assessing development, land uses, activities, leases and licences.**				
	Proposed recreational development: To permit the use of the land for sustainable development of appropriate recreational and community facilities.	A7	This plan of management expressly authorises proposed improvements and upgrading to recreational facilities and amenities [as shown in *Figure 6: Landscape Masterplan*] subject to compliance with development guidelines items A1-A3 & A5. For further details refer to D1-D17.	Proposed staged development/ capital works items completed subject to available funding and priorities for capital works program.	ongoing [see D1-D7]
	Future leases and licences: To provide express authorisation for appropriate leases and licences. To ensure consistency with *Crown Lands Act 1989*, public purpose, case law and other relevant policy. To protect the reserve's values from inappropriate leases and licences.	A8	This plan of management expressly authorises the granting of leases or licences over this Crown reserve for the purposes of providing goods, services and facilities and the carrying out of activities appropriate to the current and future needs of the community providing the purpose for which the lease or licence is granted is consistent with the reserve's public purpose (ie. Public Recreation and Environmental Protection - see item A2), the *Crown Lands Act 1989* (s.102 CLA 1989), *Crown Lands Regulation 2000*, case law judgements and other relevant Department of Lands and Council policy.	Leases/ licences granted in accordance with this plan of of management, the *Crown Lands Act 1989*, case law judgements and other relevant policy. Measure trends over time.	ongoing
	Name of Reserve: To address current inconsistencies in the naming of the reserve.	A9	Review status of current reserve name - "Argyle Bailey Memorial Reserve" with respect to Geographical Names Register of NSW. Reserve originally gazetted as "Ebenezer Church Reserve", also known as "Swallow Rock Reserve" and identified in trail signage as "Swallow Rock Reach Walking Trail".	Review undertaken and recommendations implemented. Reserve signage consistent with recommendation.	high
heritage	**Desired Outcome: To protect, manage and provide appropriate information relating to Aboriginal, archaeological and cultural heritage values.**				
	To promote further research, investigation and interpretation of archaeological sites and relics.	B1	Continue to research Aboriginal and archaeological heritage within the reserve and broader Hawkesbury area in consultation with traditional Aboriginal custodians.	Investigations undertaken and recommendations implemented.	high
	To ensure improved protection and management of recorded and potential archaeological sites.	B2	Potential archaeological deposits (PAD), existing identified sites and relics within the reserve or adjoining the reserve are to be properly protected and managed in accordance with the *National Parks & Wildlife Act 1974* and the *Heritage Act 1977*.	Archaeological sites and relics protected in accordance with relevant legislation.	high ongoing
	To promote opportunities for dialogue and consultation with traditional Aboriginal custodians.	B3	Promote opportunities for consultation with the Indigenous community and encourage the support, interpretation and communication of Aboriginal cultural heritage.	Number of programs initiated/ level of involvement. Measure trends over time.	high ongoing
	To establish appropriate conservation and/ or interpretation elements in relation to Indigenous cultural and archaeological heritage.	B4	Install generic signage describing the role of "Deerubbin" in the lives of the Darug people [eg. provision of fresh water, fishing, hunting and plants for food, fibres, tools, bark canoe-making, transportation and medicine] and the changes which followed European settlement of the valley. Develop text and graphics for the signage in consultation with the indigenous community. Install signage panels under cover [ie. open information shelter/ kiosk] within the northern picnic area. Ensure signage has no negative impact on existing or potential archaeological sites.	Research undertaken and recommendations implemented.	high
	To promote research and interpretation of cultural heritage and social values associated with early European settlement of this area.	B5	Continue to research and expand upon the community's understanding of the reserve's rich local history [eg. its relationship with Australia's oldest remaining church, school-house and cemetery, historic curtilage, the sandstone quarry site and the landing beach].		high

2 of 8

5.0 MANAGEMENT STRATEGIES

5.2 Action Plan

	Performance Target (Management objectives)	Item	Means of Achievement (Management Actions)	Means of Assessment (of the actions)	Priority
heritage	**Desired Outcome: To protect, manage and provide appropriate information relating to Aboriginal, archaeological and cultural heritage values.**				
	To promote community-based heritage programs.	B6	Continue to develop community-based local heritage programs through Council's web-site, brochures and library.	Number of programs initiated/ level of involvement. Measure trends over time.	high ongoing
	To improve quality of visitor experience, education and interpretation.	B7	Install interpretive signage at the quarry site and landing beach - upper bank [currently in Council's workshop]. Minimise any negative impact on these sites/ regeneration.	Interpretive signage installed.	very high
	To promote opportunities for community education, interpretation and improved protection of key heritage values.	B8	Investigate options for improving visual, heritage and recreational linkages between the church grounds and the reserve. Develop and install an integrated signage system with maps/ graphics which creates a story-line linked to proposed information shelter/ kiosk. [see items B4, B7 and D7]	Interpretive signage developed and installed.	high
	To expand and consolidate current heritage listings and ensure appropriate protection and conservation measures.	B9	Investigate opportunities to add the quarry site and landing beach [within the reserve] to the broader historic curtilage of the church/ schoolhouse and cemetery listing on the NSW Heritage Register and Council's LEP.	Investigation undertaken and recommendations implemented.	high
environment and biodiversity	**Desired Outcome: To protect, manage and enhance environmental quality, scenic character, stream health and biodiversity values.**				
	Stream condition and water quality: To protect and restore the riparian environment and to address water quality and river health priorities.	C1	Continue to work in partnership with the Hawkesbury Nepean CMA to ensure effective implementation of water quality and river health priorities in accordance with the *Hawkesbury Lower Nepean Catchment Blueprint* and Catchment Action Plan [CAP].	Works implemented in accordance with HLNCP and CAP targets and priorities.	ongoing
	To address causes of riverbank instability and ensure that uses and activities are consistent with protecting bank stability.	C2	Investigate the causes of localised river bank erosion and collapse in following locations:- - south of the landing beach; and - near the southern picnic area.	Investigation completed and recommendations implemented in accordance with HLNCP.	very high
	To protect and restore river bank stability.		Implement appropriate methods of stabilisation including installation of coir log type retaining structures, jute-fibre matting and long-stem planting [see item C23].	Area of stabilised bank under restoration [5 years]. Measure trends over time.	very high
	To reduce the level of bulk pollutants and improve visual, scenic and environmental quality.	C3	Remove accumulated rubbish and debris [eg. old tyres, building waste, plastics, etc.] along the river banks and adjacent creek channels, particularly within high use recreational areas [eg. landing beach - see item C11].	Works implemented in accordance with this plan of management.	high
	To promote public use of the reserve and to address current restrictions imposed on the use of recreational facilities.	C4	Provide an alternate water supply in amenities building [see item D4]. Water supply [pumped from the river] to taps and showers in the amenities building has been disconnected. Notices warn of potential health threat of blue-green algae.	as above	high
	Protecting scenic and visual quality: To protect scenic and recreational amenity values.	C5	Provide appropriate resources for design and integration of proposed improvements to recreational facilities, consistent with the reserve's high scenic values [see items D1-D5].	Works implemented in accordance with the development guidelines identified in this plan of management.	ongoing
	To improve quality of the natural setting through restoration and regeneration of the reserve.	C6	Provide appropriate resources for continuing the weed management and bush regeneration/ restoration strategy [see items C7-C20]. Protect and manage scenic vistas and view corridors [see item C13].	Works implemented in accordance with this plan of management.	ongoing
	To improve the condition and visual quality of existing service infrastructure.	C7	Review options to rationalise and consolidate pump-sites and pipeline infrastructure to improve visual and scenic quality within the southern portion of the reserve.	Investigation completed and recommendations implemented. Number of sites that adhere to development guidelines.	medium

3 of 8

5.0 MANAGEMENT STRATEGIES

5.2 Action Plan

	Performance Target (Management objectives)	Item	Means of Achievement (Management Actions)	Means of Assessment (of the actions)	Priority
environment and biodiversity	**Desired Outcome: To protect, manage and enhance environmental quality, scenic character, stream health and biodiversity values.**				
	Biodiversity management: To address key threatening processes. To control pest species and to enhance biodiversity and habitat values.	C8 C9	Continue to identify, monitor and restrict the impact of key threatening processes [ie. weed invasion, predation by foxes/ feral cats, illegal clearing, multiple tracking, etc]. Implement a program to control feral animals [eg. European fox, rabbits] as declared under the *Rural Lands Protection Act 1998*.	No. of targeted/ funded programs and results. Measure trends over time. Control of pest animals in accordance with legislation.	very high ongoing medium ongoing
	Aquatic/ semi-aquatic weed management To monitor and control noxious weed species and to provide support for targeted programs. To target noxious weed species within the reserve and waters edge.	C10 C11	Monitor and control noxious aquatic and semi-aquatic weeds in accordance with the *Noxious Weeds Act 1993*. Continue to support targeted programs to control noxious weed species such as Salvinia, Black Willow and Alligator Weed. Target noxious weed infestations [eg. Black Willow (*Salix* spp.)] within the lower creek channel adjacent to the landing beach. Establish long-stem native planting along toe of creek banks/ waters edge [see items C3, C15 and C23].	Targeted noxious aquatic, semi-aquatic and riparian weeds controlled in accordance with legislation. as above Area/ % of river bank under restoration [over 5 years].	high ongoing very high
	Weed management/ restoration strategy: To ensure the implementation of best-practice standards for the management of natural areas. To assist in and facilitate the implementation of any provisions restricting the use and management of the land that are set out in a recovery plan or threat abatement plan prepared under the *Threatened Species Conservation Act 1995* or *Fisheries Management Act 1994*.	C12	Ensure that the whole of this Crown reserve is managed in accordance with the prescribed best-practice standards of natural area management as follows:- - *Draft Recovery Plan for the Cumberland Plain Endangered Ecological Communities [CPEECs]*; - *Draft Best Practice Guidelines for Bush Regeneration on the Cumberland Plain* [DLWC and the Australian Association of Bush Regenerators, 2003]; - *Management Principles to Guide the Restoration and Rehabilitation of Indigenous Vegetation* [Greening Australia]; - *the series of Florabank Guidelines for native seed collection, production, handling and storage*; and - *Hawkesbury-Nepean Riverbank Management Program.*	Compliance in all respects with the national goal of the *BushCare National Vegetation Initiative* - ie. to halt any further losses and to achieve a positive net gain. Number of incidences/ area affected by non-compliance with threatened species legislation and policy. Measure trends over time.	high ongoing
	To address the long term objectives of building ecosystem resilience and durability.	C13	Continue to implement an integrated weed management and targeted restoration strategy. Maintain focus on recovery, recruitment, long term durability, expansion and consolidation of fragmented natural habitat, native populations and species.	Level of funding per annum linked to positive net gains. Area/ % of reserve under restoration [over 5 years]. Relative condition of bushland [over 5 years].	very high ongoing
	To consolidate existing net gains and promote long-term sustainability.	C14	Consolidate core habitat areas through staged removal of weed species and buffer enhancement. Continue minimal disturbance bush regeneration approach where positive net gains are achievable [ie. high levels of resilience]. Ensure that the program protects and enhances vital habitat for dependent and threatened species.	Area under regeneration per annum. Measure trends over time.	very high ongoing
	To secure genetic integrity as a key component of the restoration and enhancement strategy. To establish a representative level of species and structural diversity.	C15	Continue restoration, enhancement and reinstatement strategies for areas which display a high level of soil disturbance and modification. Use local native, provenance-scoured species in the program [ie. local genotypes]. Ensure that existing site soils are not amended and that soils or mulches are not imported for use in these strategies, including translocation or use of ex situ soil profiles and seed banks.	Area under restoration/ enhancement per annum. Measure trends over time.	high ongoing
	To promote partnerships with state government agencies, industry and local land holders to secure sustainable environmental outcomes. To ensure a high level of expertise in implementing the strategy.	C16 C17	Continue to seek grant funding for the weed management and restoration strategy from various State and Federal government sources [eg. Natural Heritage Fund, Hawkesbury Nepean CMA, Metropolitan Greenspace, etc]. Continue to use skilled contract labour [ie. qualified and experienced contract bush regenerators] to implement the restoration strategy.	Level of funding per annum. Measure trends over time. Level of funding for contract bush regeneration per annum. Annual/ quarterly progress reports.	very high ongoing ongoing

4 of 8

5.0 MANAGEMENT STRATEGIES

5.2 Action Plan

	Performance Target (Management objectives)	Item	Means of Achievement (Management Actions)	Means of Assessment (of the actions)	Priority
environment and biodiversity	**Desired Outcome: To protect, manage and enhance environmental quality, scenic character, stream health and biodiversity values.**				
	To re-establish a local volunteer network and participation in the reserve's restoration.	C18	Promote environmental education and opportunities for local volunteer involvement in the program. Seek to re-establish a BushCare group to assist in rehabilitation work.	Numbers of people/ groups actively involved in the environmental program. Measure trends over time.	high ongoing
	To promote opportunities for local youth employment and training.	C19	Review opportunities for employment training programs [ie. upgrading of main northern picnic area/ amenities and facilities]. See items D10-12.	Review conducted/ grant funding sourced and program established for capital works project.	medium ongoing
	To promote dialogue and partnerships with adjoining land owners to address environmental and conservation issues affecting reserve.	C20	Liaise with adjoining land owners to address environmental issues affecting the reserve. Establish opportunities/ partnerships for enhancing conservation values [ie. improving wetland holding capacity/ reducing peak flows in drainage channels, biodiversity and weed management, creation of buffers/ bio-linkages to reserve, managing view corridors, bush fire management/ reduced fuel zones, conservation agreements and incentives].	Number of meetings held with land owners. Number of programs initiated/ level of involvement. Measure trends over time.	medium ongoing
	To address the long term objectives of building ecosystem resilience and durability. To maintain and consolidate existing gains. To secure and consolidate habitat values, bio-linkages and buffers.	C21	Continue to protect, maintain and consolidate regeneration/ restoration areas previously targeted in the program [ie. Areas 1-6]. For a detailed discussion of condition, status and conservation strategies refer to *4.0 Basis for Management: Weed management strategy* :- 1. Northern gully area/ adjoining slopes, northern bridge area [adjacent to main walking track] and river banks near landing beach; 2. Quarry site and adjoining upper slopes near northern car park area; 3. Lookout area including upper southern slopes; 4. Buffers, edges and boundaries to core areas; 5. Alluvial river banks adjoining northern car park area; and 6. Continue to selectively target and control exotic weeds, particularly vines, within the southern portion of the reserve.	Level of funding per annum linked to positive net gains. Area/ % of reserve under restoration [over 5 years]. Relative condition of bushland [over 5 years].	very high ongoing
	To address current issues affecting the integrity, resilience and durability of native vegetation.	C22	Further priority areas for future restoration work are subject to appropriate staged funding [see items C23-C28].	Capital works items completed subject to available funding and priorities.	see below
	To protect and stabilise eroding river banks.	C23	Stabilise eroding river banks [2 X locations] and establish restoration/ reinstatement planting using local provenance- sourced long-stem native plants [see item C15].	Area under restoration [over 5 years]. Monitor condition and stability [over 5 years].	very high
	To improve visitor management and control multiple-tracking.	C24	Rationalise existing walking track [incl. alternate tracks/ steps, etc]. Clearly identify the track and restrict opportunities for multiple tracking [see item D17].	Capital works items completed subject to available funding and priorities.	high
	To upgrade protective measures for areas under bush regeneration/ restoration.	C25	Clearly delineate management zones [eg. significant habitat and/ or areas under regeneration/ restoration strategy]. Where necessary, install sawn hwd. timber/ galv. star-steel posts and tensioned wire protective fencing or alternatively use traditional split hwd. post and rail fencing [ie. within high use areas]. Utilise fallen logs/ branches to construct barriers [where possible]. Provide signage to identify and help protect fragile natural areas from inappropriate uses and trampling.	as above Number of incidences of vandalism per annum. Measure trends over time.	high ongoing
	To expand the restoration strategy to include reconstruction of ecological communities within the southern portion of the reserve.	C26	Expand targeted weed management/ restoration strategy to include highly disturbed southern gully area and adjoining alluvial river banks. Supplement weeding/ maintenance with extensive planting of local provenance-sourced canopy species.	Area/ % of reserve under restoration [over 5 years]. Relative condition of bushland [over 5 years].	low ongoing
	To improve the visual and environmental quality of the southern car park area.	C27	Establish defined areas [no mowing areas] for planting native canopy species [local provenance-sourced] adjacent to southern car park area [off Ebenezer Wharf Road] and within adjoining open grassed areas [see *Figure 6: Landscape Master Plan*]. Ensure that broad-scale mowing is restricted to open grassed areas only.	Landscaping completed in accordance with available funding and priorities for capital works program. Reduction in mown area [over 5 years].	medium ongoing

5.0 MANAGEMENT STRATEGIES

5.2 Action Plan

	Performance Target (Management objectives)	Item	Means of Achievement (Management Actions)	Means of Assessment (of the actions)	Priority
environment and biodiversity	**Desired Outcome: To protect, manage and enhance environmental quality, scenic character, stream health and biodiversity values.**				
	To minimise negative visual impact of vehicular barriers in car park areas.	C28	Provide landscape buffer strips to existing concrete block barriers [northern and southern car park areas]. Install local provenance-sourced groundcovers/ vines. Ensure a mixed palette is maintained in accordance with overall strategy for this natural area [eg. *Austrostipa, Lomandra, Dianella, Pteridium, Kennedia, Imperata* spp.]	Landscaping completed in accordance with available funding and priorities for capital works program.	medium ongoing
	To promote sustainable environmental outcomes for this Crown reserve and adjoining land owners.	C29	Liaise with adjoining land owners to protect and manage view corridors [private/ public] through a program of selective thinning of fast-growing shrub/ understorey species [eg. *Acacia* spp.] and promotion of open canopy species with a low ground layer. Protect reserve from further clearing or soil disturbance.	Agreement and works implemented in accordance with this plan of management.	medium ongoing
	To promote dialogue and partnerships with all service/ utilities managers and to promote sustainable outcomes for conservation. To review alternatives to current maintenance regime.	C30	Liaise with Integral Energy with respect to native vegetation clearance under low overhead power-lines through the narrow southern/ mid-section of the reserve [north of the southern bridge]. Establish a more sympathetic and cooperative approach to selective pruning of trees and tall shrubs rather than lopping/ alignment of the corridor. Investigate options for aerial bundling through this portion of reserve.	Meetings held/ cooperative approach established. Measure trends over time. Investigation conducted and recommendations implemented.	high ongoing
	To ensure that the restoration strategy is consistent with the protection of scenic and recreational amenity values.	C31	Protect important scenic vistas and view corridors [ie. near the lookout, landing beach and river banks near the main [northern] picnic area] through selective pruning by contract bush regenerators in accordance with the strategy.	Scenic vistas and view corridors protected. Works implemented in accordance with this plan of management. Measure trends over time.	high ongoing
	To provide for broad public use of and access to the reserve and to ensure a high level of public safety and security.	C32	Establish a maintenance regime which affords a high level of visual surveillance and security for visitors. Protect and maintain important sight-lines [ie. entry roads/ car parks and picnic areas, amenities building, walking track, the lookout and landing beach].	Works implemented in accordance with this plan of management. Visitor safety and security issues addressed.	high ongoing
	To minimise negative impacts of rubbish dumping and vandalism.	C33	Ensure that piles of weeds and/ or bagged weeds are removed regularly from the reserve, particularly within high use areas [eg. picnic areas/ car park areas].	Regular vegetation/ rubbish removal in accordance with this plan of management.	high ongoing
	Bushfire management: To promote cooperative partnerships with adjoining land owners, community volunteers and environmental agencies.	C34	Liaise with Hawkesbury Rural Fire Service and Richmond NPWS to establish an appropriate fire regime [incl. no fuel and reduced fuel zones to adjoining property - see items C20 and D1-D2]. Promote cooperative plans to facilitate an appropriate ecological fire regime for the reserve's endangered ecological communities [incl. expanding buffer zones and establishing thresholds for protecting biodiversity and threatened species].	Appropriate fire regimes implemented in accordance with cooperative plans.	medium
	To address ecological fire management.	C35	Seek necessary approvals for ecological burn-offs during restoration work.	Approvals granted for ecological fire management.	medium
recreation	**Desired Outcome: To maintain and enhance appropriate recreational infrastructure including low-key public access/ linkages and opportunities for passive/ nature-based recreation.**				
	Public safety/ emergency services: To provide emergency access to the reserve.	D1	Maintain access for emergency services vehicles into the northern and southern portions of the reserve and adjoining properties along the western boundary.	Emergency vehicular access/ fire trails maintained.	ongoing
	To protect life, property and the environment and to address post fire or flood recovery procedures.	D2	Ensure that procedures for emergency evacuation are implemented in accordance with Council's relevant bushfire and flood plans. Following bushfire or flooding and prior to re-opening reserve, assess any damage to property/ infrastructure and public risk and prepare an inventory for repairs.	Procedures implemented in accordance with relevant plans. Post fire/ flood inventory prepared.	ongoing
	To address flood planning, public safety and risk management.	D3	Ensure that flood planning, management and provision of recreational infrastructure [incl. improvements/ upgrades] are consistent with relevant strategies and plans.	as above	ongoing

5.0 MANAGEMENT STRATEGIES

5.2 Action Plan

Performance Target (Management objectives)	Item	Means of Achievement (Management Actions)	Means of Assessment (of the actions)	Priority
recreation, access and facilities				
Desired Outcome: To maintain and enhance appropriate recreational infrastructure including low-key public access/ linkages and opportunities for passive/ nature-based recreation.				
Public access and recreational facilities: To maintain and enhance existing passive recreational open space and facilities.	D4	Continue to maintain and enhance existing passive open spaces and facilities, including picnic settings/ picnic shelters, BBQs, car parking areas, walking track, bridges, lookout and signage. Provide a high standard of maintenance and presentation within these high-use areas. Protect and manage scenic vistas [see items C31-C32].	Maintenance in accordance with service standards. Measure trends over time.	ongoing
To improve visitor awareness and accessibility to the reserve.	D5	Install directional signage at key intersections along approaches to reserve [ie. Sackville Road/ Ebenezer Wharf Road & Tizzana Road and Coromandel Road].	Signage installed in accordance with this plan of management.	high
To improve visitor awareness and accessibility to the reserve.	D6	Install identification signage "Argyle Bailey Memorial Reserve" at key entry points to reserve [ie. Ebenezer Wharf Road cul-de-sac (southern entry) & intersection of Coromandel Road/ entry road (northern entry)]. See item A8.	Proposed staged developments/ capital works items completed subject to appropriate funding.	high
To improve visitor orientation, recreational experience, awareness of heritage items and appropriate behaviour, facilities/ amenities, linkages and scenic lookout.	D7	Continue to improve identification, directional, regulatory and interpretive signage. Develop and install an integrated system of signage to 'brand' the reserve as part of a heritage trail [ie. highlight the church/ cemetery (adjoining) and the reserve's significant natural, Aboriginal, archaeological and cultural values]. Signs should be durable, vandal- resistant and include use of maps, sensory and multi-lingual options [see items B4-B5 & B7-B8].	Works implemented subject to appropriate funding.	high
To address illegal and inappropriate uses and activities.	D8	Install signage at entry points to walking track/ car parks identifying prohibited uses/ activities [eg. trail-bikes, camping, etc]. Provide clear graphics/ symbols on signage.	as above	medium
Northern [main] picnic area: To improve quality and function of picnic shelters.	D9	Re-paint concrete picnic shelters [seek architectural advice for colour scheme]. Re-grade and compact edges with decomposed granite to provide flush access.	as above	high
To address suitability, use and aesthetics of ageing recreational facilities.	D10	Review options for removal, replacement and rationalisation of all [4] picnic shelters/ cubicles including tables and seating. Consider staged replacement [over 5-10 years].	Works implemented subject to review and recommendations.	low
To upgrade existing facilities and enhance recreational opportunities.	D11	Install gas-fuelled BBQ area [incl. 2 X hotplates] with 2 X picnic tables and shelter. [refer to *Figure 6: Landscape Master Plan*]. Refer to items D10 and D12.	Works implemented subject to review and recommendations.	low
Southern picnic area: To review provision of facilities and	D12	Remove existing damaged 1 X BBQ hotplate. Provide cut wood for BBQs on a regular basis. Continue to monitor visitor behaviour and activities [eg. illegal camping, etc]. Review options to down-grade facilities to 2 X picnic tables/ seating and shelter.	Number of instances/ targets of vandalism per annum. Measure trends over time.	high
To address illegal and inappropriate uses	D13	Maintain existing vehicular barriers [anchored conc. blocks]. Establish suitable planting [see item C28]. Maintain log bollers/ bollards and unsealed gravel finishes to entry roads and car parking areas. Clearly delineate areas under regeneration/ restoration [see items C21, C25 & C27]. Continue regular mowing of picnic areas. Retain informal character and access to grassed picnic areas.	Works implemented subject to review and recommendations. Number of instances/ targets of vandalism per annum. Measure trends over time.	ongoing
Car parking areas [northern/ southern]: To maintain control over vehicular access and to visually soften intrusive elements.	D14	Continue to maintain a high level of general maintenance, cleaning, repairs and lock-up/ security of building [after sunset] to address potential anti-social behaviour, vandalism or other inappropriate behaviour [eg. camping].	Maintenance in accordance with service standards. Number of instances/ targets of vandalism per annum. Measure trends over time.	ongoing
To provide appropriate maintenance and management consistent with overall strategy.		Paint interior walls [eg. white] to improve reflective light levels.	Works implemented subject to appropriate funding.	low
Public amenities building: To provide a high standard of maintenance and to address security and vandalism.	D15	Install ramps for disabled access linked to car park/ picnic area.		
To improve overall amenity value and facilitate broad community access.				

7 of 8

5.0 MANAGEMENT STRATEGIES

5.2 Action Plan

	Performance Target (Management objectives)	Item	Means of Achievement (Management Actions)	Means of Assessment (of the actions)	Priority
recreation, access and facilities	**Desired Outcome: To maintain and enhance appropriate recreational infrastructure including low-key public access/ linkages and opportunities for passive/ nature-based recreation.**				
	Public amenities building [cont'd]: To address current restrictions imposed on water supply [ie. blue-green algae threat].	D16	Install rain water tank[s] attached to amenities building and connected to existing taps and showers] to avoid potential contamination by blue-green algae. Review option to provide solar panels for water heating [see item C4].	Works implemented in accordance with this plan of management. Review conducted and recommendations implemented.	high
	Walking track and lookout area: To improve visitor management and control multiple-tracking. To maintain and upgrade public access network. To address public safety issues and to replace ageing and damaged infrastructure. To promote appropriate uses and activities consistent with natural setting.	D17	Upgrade condition of the existing walking track [incl. use of compacted decomposed granite or crushed sandstone in eroded or unstable sections] and restrict opportunities for multiple tracking in the following locations:-	Capital works items completed subject to available funding.	see below
			1. Landing beach steps: Maintain existing steps/ consolidate compacted aggregate between timber risers. Install protective fencing along steps [restoration area].	as above	high
			2. Immediately south of northern bridge: Install protective fencing/ barriers across alternate [eastern] track adjacent to log retaining wall. Remove old timber steps/ metal hand-rail [in poor condition] and block alternate access to beach [via steep embankment below steps].	as above Number of instances/ targets of vandalism per annum. Measure trends over time.	high
			3. Remove old [temporary] protective fencing, star-steel posts and plastic webbing [in various locations along track]. Install temporary log barriers as required;	as above	high
			4. Timber/ rammed earth steps: Install protective fencing or log barriers [eg. fallen tree trunks] to channel multiple tracking around second set of steps. Review options to construct an alternate graded [eastern] route around steps and monitor impacts [eg. horse-riding & mountain bikes].	as above Number of instances/ targets of vandalism per annum. Measure trends over time.	medium
			5. Near the lookout: Remove constructed earth BMX/ trail-bike jumps and control multiple tracking with fallen branches and logs.	as above	high
			6. Scenic lookout/ scarp area: Construct vandal-resistant, powder-coated steel post and rail safety fence [with vertical steel battens to panels] drilled and anchored to sandstone outcrop. Install interpretive and regulatory signage and 1 X steel-frame/ timber bench seat at lookout. Remove old timber slat seat.	as above Number of instances/ targets of vandalism per annum. Measure trends over time.	very high
			7. Maintain all existing anodised aluminium signage. Replace damaged signs. Install additional interpretive signage [ie. see item D7].	as above	high ongoing

8 of 8

TABLE 7:

5.3 CAPITAL WORKS PROGRAM

ITEM	ACTION	CAPITAL COST ($)	IMPLEMENTATION
			2008 2009 2010 2011 2012
A1-A9	Crown reserve management		
A1	see following items for details	see below	
A2-4/ A9	no capital works component	not costed	
A5	private irrigation licences/ address safety standards	not costed	
A6-A8	see following items for details	see below	
B1-B9	Heritage		
B1-B3	continue research/ consultation (indigenous/ archaeological heritage)	$5,000.00	
B4	develop and install signage/ information kiosk - Aboriginal heritage	$30,000.00	
B5-B6	continue research/ consultation (Non-Indigenous heritage)	$5,000.00	
B7-B8	install ex. signage/ develop link between church and information kiosk [B4]	$10,000.00	
B9	no capital works component	not costed	
C1-C35	Environment and biodiversity		
C1	no capital works component	not costed	
C2-C3	investigate river bank erosion/ implement restoration strategy/ clean-up rubbish	$20,000.00	
C4	install water tanks to amenities building	$10,000.00	
C5-C6	see following items [D1-D6 & C7-C20] for details	see below	
C7	see item A5 above	not costed	
C8-C9	monitor threatening processes/ implement feral animal control	$5,000.00	
C10-C11	targeted noxious aquatic and semi-aquatic weeds program	not costed	
C12-C22	continue implementing targeted weed management/ restoration strategy	$100,000.00	
C23	see items C2-C3 above	see above	
C24	see item D17 below	see below	
C25	delineate management zones/ temporary fencing and signage	$30,000.00	
C26	see items C12-C22 above	see above	
C27-C28	landscaping/ restoration of southern paddock/ car park area & block barriers	$60,000.00	
C29-C35	see items C12-C22 above	see above	
D1-D17	Recreation, access and facilities		
D1-D3	no capital works component	not costed	
D4	see items D5-D17 below	see below	
D5-D8	develop and install directional, identification and other signage [see items B4/ 7- 8]	$12,000.00	
D9-D10	maintenance/ phasing out ageing facilities	not costed	
D11	install 2 X gas BBQs/ 2 X picnic tables and shelter	$60,000.00	
D12	review maintenance/ option for down-scaling southern picnic area	not costed	
D13-D14	maintenance of picnic areas/ car parking areas	not costed	
D15-D16	upgrade amenities building/ connecting ramps [see item C4]	$10,000.00	
D17	upgrade walking track and address multiple tracking issues [items 1-7]:	see below	
D17/ 1	landing beach steps	$2,000.00	
D17/ 2	works immediately south of northern bridge	$10,000.00	
D17/ 3	temporary protective fencing maintenance [see other items above]	not costed	
D17/ 4	alternate track construction/ closure of second steps	$10,000.00	
D17/ 5	remove jumps/ barriers and restoration	$2,000.00	
D17/ 6	scenic lookout safety fencing, signage and seating	$40,000.00	
D17/ 7	maintenance of signage/ additional signage [see other items above]	see above	
	TOTALS	$421,000.00	

Note: Opinion of probable landscape constructions costs is based on *Fig 6: Landscape Masterplan*. All figures shown are indicative only.

SUMMARY OF ANNUAL BUDGETS	CAPITAL COST ($)
2008	$97,000.00
2009	$92,000.00
2010	$66,000.00
2011	$45,000.00
2012	$121,000.00
TOTALS	$421,000.00

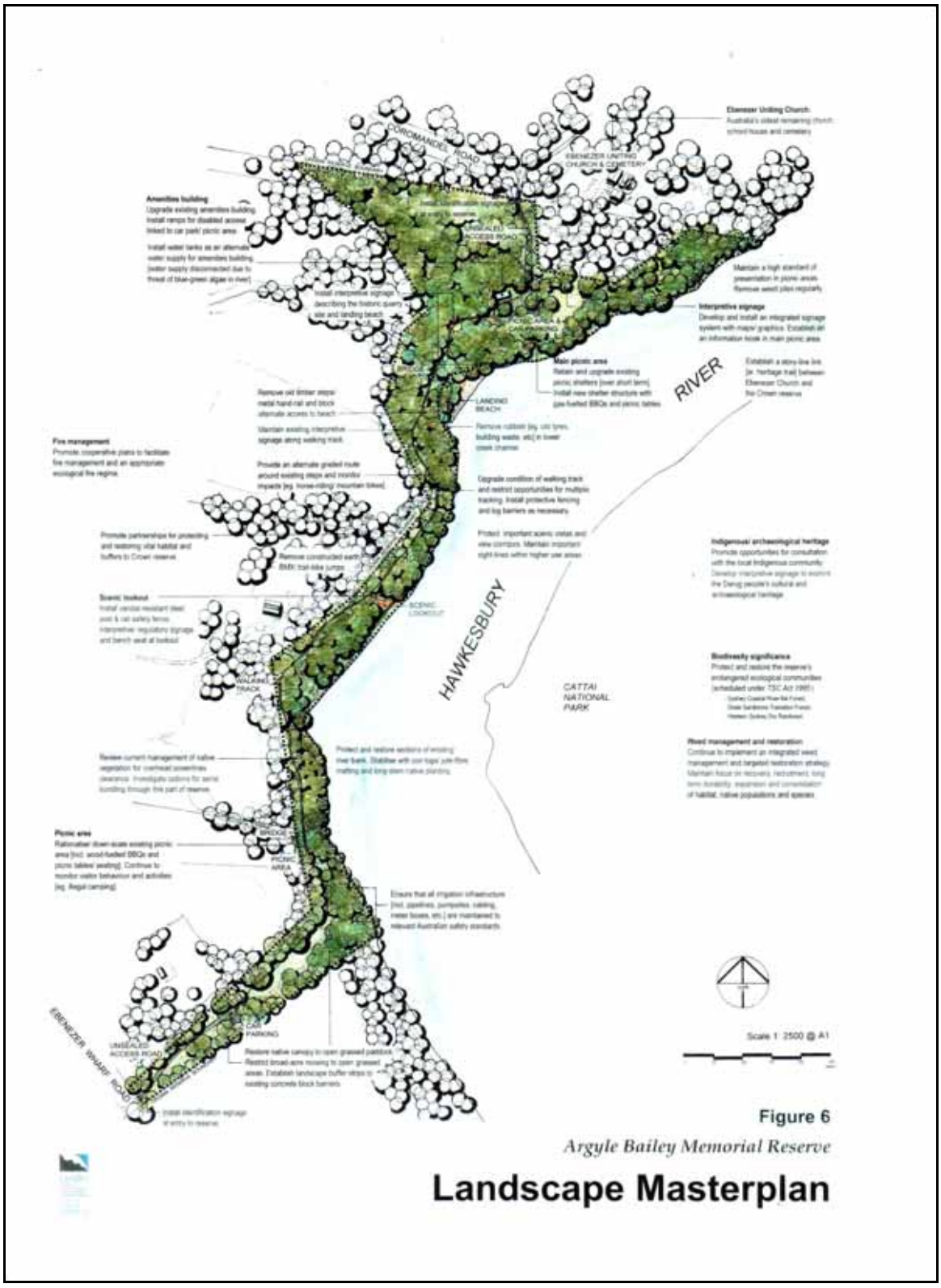


Figure 6

Argyle Bailey Memorial Reserve

Landscape Masterplan

...

BIBLIOGRAPHY

Publications and Policy Documents

Bannerman, S.M. & Hazelton, P.A. (1990) Soil Landscapes of the Penrith 1:100 000 Sheet.

Beadle, N.C.W., Evans, O.D. and Carolin, R.C. (1986) Flora of the Sydney Region. Reed Books.

Benson, D. & Howell, J. (1990) Taken for Granted: The Bushland of Sydney and its Suburbs. Kangaroo Press, Sydney.

Benson, D., Howell, J. & McDougall, L. (1995) Riverside Plants of the Hawkesbury Nepean. Royal Botanic Gardens, Sydney.

Benson, D. & McDougall, L. (1991) Rare Bushland Plants of Western Sydney. Royal Botanic Gardens, Sydney.

Biodiversity: Draft NSW Biodiversity Strategy. (1997) New South Wales National Parks & Wildlife Service.

Buchanan, R. (1989) Bush Regeneration – Recovering Australian Landscapes. TAFE NSW.

The Constructed Wetlands Manual Volume 1. (1998) Department of Land and Water Conservation, New South Wales.

The Constructed Wetlands Manual Volume 2. (1998) Department of Land and Water Conservation, New South Wales.

Chadwick, T. (2002) Black Willow *(Salix nigra)* Management Plan for the Nepean River. Department of Land and Water Conservation, New South Wales.

Cripps, E., Binning, C. & Young, M. (1999) Opportunity Denied: Review of the Legislative Ability of Local Government to Conserve Native Vegetation. National Program on Rehabilitation, Management and Conservation of Remnant Vegetation, Research Report 2/99, Environment Australia, Canberra.

Disappearing Acts – A Guide to Australia's Threatened Species Law. (2000) National Environmental Defenders Office Network , Sydney.

Draft Guidelines for Monitoring a Bushcare Project – A Component of the Trust's Manual: "Aspects of Catchment Health" . (2000) Hawkesbury Nepean Catchment Management Trust.

Eagles, P.F.J (1984) The Planning and Management of Environmentally Sensitive Areas. Longman, London & New York.

Fairley, A & Moore, P (1989) Native Plants of the Sydney District: An Identification Guide, 1995 Reprint, Kangaroo Press in association with The Society for Growing Plants - NSW Ltd.

Faulding, M., Kelly, A.H.H., Bateson, P., & Donovan, I. (2001) Biodiversity Planning Guide for NSW Local Government. NSW National Parks and Wildlife Service, Sydney.

Geology of the Sydney 1:100 000 Sheet 9130, Geological Survey of New South Wales. (1985) New South Wales Department of Mineral Resources (1985)

Geomorphic Categorisation of Streams in the Hawkesbury Nepean Catchment. (2001) Department of Land and Water Conservation, New South Wales.

Graefe, A., Kuss, F.R. and Vaske, J. (1990) Visitor Impact Management: The Planning Framework, Vol. 2. National Parks and Conservation Association, Washington DC.

Graefe, A., Kuss, F.R, & Vaske, J. (1990) Visitor Impact Management: A Review of Research, Vol.1. National Parks and Conservation Association, Washington DC.

Guidelines and Application Form for Clearing Vegetation under the Native Vegetation Conservation Act – adding Value to the Natural Assets of New South Wales. (1997) Department of Land and Water Conservation, New South Wales.

Guidelines on Integrated Development and the Rivers and Foreshores Improvement Act 1948. (2000) Department of Land and Water Conservation, New South Wales.

Hammitt, W.E. & Cole, D.N (1987) Wildland Recreation: Ecology and Management. John Wiley & Sons, New York.

Hawkesbury City Council Charter. Hawkesbury City Council.

Hawkesbury City Council Section 94 Contributions Plan Review 2001. Hawkesbury City Council.

Hawkesbury Cultural Plan 2006-2011. Hawkesbury City Council.

Hawkesbury Local Environmental Plan 1989. Hawkesbury City Council.

Hawkesbury City Council Management Plan 2006-2007. Hawkesbury City Council.

Hawkesbury Lower Nepean Catchment Blueprint. (2003) NSW Department of Land and Water Conservation and Local Government Advisory Group.

The Hawkesbury - Nepean Riverbank Management Program, Penrith to Wisemans Ferry Information Package. (1999) Hawkesbury Nepean Catchment Management Trust and Department of Land and Water Conservation, New South Wales.

Interpretation Guidelines for the Native Vegetation Maps of the Cumberland Plain, Western Sydney. (2000) New South Wales National Parks and Wildlife Service.

McDonald, J. (2001). Subsurface Testing for Prehistoric Archaeological Sites: Results of a field program at the proposed access road into Nurragingy Reserve, Blacktown, NSW. Report for Blacktown City Council.
Natural Channel Design Guidelines. (2000) Brisbane City Council.

The New South Wales State Rivers and Estuaries Policies. (1992) New South Wales Government Total Catchment Management.

The New South Wales Floodplain Management Manual. (2001) Department of Land and Water Conservation, New South Wales.

The New South Wales Wetlands Management Policy. (1996) Department of Land and Water Conservation, New South Wales.

Newton, S. (ed.) (2001) Bushland or Buildings? - The Dilemma for Biodiversity Conservation in Urban Areas, Conference Proceedings. Nature Conservation Council of NSW.

On the Brink: Your Bush, Their Habitat, Our Act. Is the Threatened Species Conservation Act Working? Proceedings of the Conference held at the University of Sydney, Camperdown. (1997) Nature Conservation Council of NSW.

Policy and Guidelines for Bridges, Roads, Causeways, Culverts and Similar Structures. (1999) New South Wales Fisheries.

Practice Note No.1 – Revised: Public Land Management. (2000) Department of Local Government

Protecting Wetlands in Sydney's Coastal Councils: Background Information and Literature Review Report. (2000) Sydney Coastal Councils Group Inc.
Bobinson, L. (2003) Field Guide to the Native Plants of Sydney (revised 3rd edition) Kangaroo Press, Sydney.

Succeeding with Plans of Management: A Guide to the Local Government Act and Crown Lands Act. (1996) New South Wales Department of Land & Water Conservation

Sydney Coastal Councils Group Inc. (2000) Protecting Wetlands in Sydney's Coastal Councils: Background Information and Literature Review Report. Prepared by Sainty and Associates Pty Ltd.

Threatened Species Conservation Act 1995, Schedules 1,2 and 3. (2000) New South Wales Scientific Committee

Journal Articles

Benson, D. & McDougall, L. (1998) Ecology of Sydney plant species Part 6: Dicotyledon family Myrtaceae. Cunninghamia. 5(4): 808-983 National Herbarium of New South Wales, Royal Botanic Gardens, Sydney.

Burden, R.F & Randerson, P.F (1991) Quantitative Studies of the Effects of Human Trampling on Vegetation as an Aid to the Management of Semi-Natural Areas.

Cole, D.N. and Bayfield, N.G (1993) Recreational Trampling of Vegetation: Standard Experimental Procedures. Biological Conservation. 63: 209-215.

Kelly, J.R & Harwell, M.A (1990) Indicators of Ecosystem Recovery. Environmental Management. 14: 527- 545.

Kuss, F.R & Graefe, A.F (1995) Effects of Recreation Trampling on Natural Area Vegetation. National Recreation and Park Association. 17: 715-727.

Prosser, G (1986) The Limits of Acceptable Change: An Introduction to a Framework for Natural Area Planning. Australian Parks and Recreation. 22: 2: 5-10.
Villa, F., Rossi, O. and Sartore, F. (1992) Understanding the Role of Chronic

Environmental Disturbance in the Context of Island Biogeographic Theory. Environmental Management 16 (5), 633-666.

…

APPENDICES

I: Community Consultation – presentation material and pro-forma
II: Written Submissions & Questionnaires
III: Schedule of Existing Native Plant Species
IV: Schedule of Existing Weed Species
V: Noxious Weed Declarations for Hawkesbury River County Council refer to http://www.dpi.nsw.gov.au/agriculture/noxweed/noxious-app

Argyle Bailey Memorial Reserve

(Swallow Rock Reserve)

EBENEZER

Community Workshop

Draft Plan of Management

Date: Wednesday 27 September 2006
Time: 7.00 – 8.30 pm
Venue: Ebenezer Uniting Church Hall, Coromandel Road, Ebenezer

Why do we need a plan of management?

A plan of management provides the framework for managing public land. Community consultation is a vital part of this process. Argyle Bailey Memorial Reserve (also known as Swallow Rock Reserve) is a Crown reserve under the care, control and management of Hawkesbury City Council.

This unique bushland reserve on the Hawkesbury River has outstanding scenic, natural, environmental, archaeological, heritage and recreational values. These values are affected by a range of issues. It is important that the draft plan of management establishes how these values should be protected, managed and enhanced. The plan of management will be prepared in accordance with the *Crown Lands Act 1989* and other relevant Federal and State legislation.

What is the purpose of a community workshop?

The main purpose of the community workshop is to discuss the way the community uses and values the reserve and to identify important issues affecting these values and opportunities for future management. The workshop aims to provide a transparent and equitable forum for all user groups, stakeholders and individuals. Your input into the management of this Crown reserve is encouraged by Council and the NSW Department of Lands.

To support any comments you wish to make please fill out the ***Community Issues Questionnaire***. Please leave completed issues questionnaires at the desk when you leave or if you need more time these can be mailed to:

Landarc Pty Limited, PO Box 304 Avalon NSW 2107.

Please return these within fourteen days. If there are any specific issues you need to discuss following the community workshop, please contact the Director of LandArc, Noel Ruting during office hours on 9973 1330.

Community issues raised at the workshop will be addressed in the draft plan of management. Further comments on the draft will be invited during the public exhibition period (see over page for details).

What are the expected outcomes for the draft plan of management?

The draft plan of management will establish a framework for managing the reserve in accordance with the *Crown Lands Act 1989* and other relevant legislation. The following will be addressed:-

- identify and assess the reserve's values, public purpose, existing uses and condition and its role within the Hawkesbury City Council local government area and broader regional context;
- identify and assess key issues affecting the reserve's values;
- develop guidelines for protecting and enhancing key values;
- establish future permitted uses, activities and development, leases and/ or licences consistent with reserve's public purpose and the principles for Crown land management;
- develop appropriately staged management strategies including priorities for a strategic plan (5-years) and estimated capital works expenditure; and
- prepare a landscape master plan.

When will the draft plan of management be exhibited?

The draft plan of management will go on public exhibition at Council's Administration Centre, Hawkesbury Central Library (in the Deerubbin Centre), Windsor and Council's web-site. It is envisaged that the draft plan of management will be completed by 6 November 2006.

The draft plan of management goes on public display for four weeks and a further two weeks are allowed for final written submissions (ie. a total of 6 weeks for submissions from commencement of public exhibition to closure). The public exhibition dates will be advertised by Council. After consideration of public submissions the draft plan of management will be forwarded to the Minister for Lands for adoption.

…

Argyle Bailey Memorial Reserve

(Swallow Rock Reserve)

Community Workshop
Draft Plan of Management

7:00 pm - Wednesday 27 September 2006
Ebenezer Uniting Church Hall
Coromandel Road, Ebenezer

1. Welcome & introductions

2. Brief overview of plan of management process

3. Discussion

- Planning & environmental context:
    - Hawkesbury River/ regional open space
    - Crown reserve (legislative requirements)
    - location/ park boundaries
    - surrounding land uses

- Natural & cultural heritage values:
    - natural riparian setting/ biodiversity and environmental values
    - scenic qualities/ vistas
    - Aboriginal archaeological heritage values (site scatters)
    - European cultural heritage (ie. church, quarry, landing beach)
    - river access/ passive recreational opportunities

- Management issues:
    - protection and rehabilitation of riparian vegetation (remnant native species/ endangered ecological community)
    - drainage alterations and nutrient loadings
    - bank erosion and sedimentation
    - introduced noxious and environmental weeds
    - flooding and bushfires
    - passive recreation/ user groups (bushwalking, horse-riding, bird-watching, swimming)
    - current service provision in recreational facilities (eg. picnic/ BBQ areas, shelters/ seating, public amenities)
    - public access, car parking and pedestrian linkages
    - public safety/ risk management
    - recreational impacts (eg. multiple tracking, erosion, trampling)
    - interpretation/ environmental education
    - supply and demand issues
    - planning issues (*Crown Lands Act, NVC Act, TSC Act*, etc)

4. Conclusion

- time-frame for draft plan of management
- public exhibition and plan adoption
- exploring issues papers

8:30pm

Community Issues

Draft Plan of Management
Argyle Bailey Memorial Reserve, Ebenezer

A draft plan of management is being prepared for Argyle Bailey Memorial Reserve (also known as Swallow Rock Reserve), Ebenezer. Community consultation is a vital part of the plan of management process.

Please take a few minutes to fill out the following questionnaire.

1. **May we have some personal details.** *(please circle item)*

AGE

<20 20-35 36-50 50-65 >65

SEX

Male Female

2. **Please provide your residential postcode.**

☐

3. **How often do you visit the reserve?** *(please tick box)*

☐ Less than once a year

☐ 1-3 times a year

☐ 4-6 times a year

☐ Frequent visitor *(please circle item below)*

monthly weekly most days

4. **Do you have a seasonal preference for visiting the reserve?**
(please circle items as applicable)

spring summer autumn winter all year round

5. **What do you like most about the reserve?**

_____

_____

_____

_____

please continue over page

6. What do you believe are the three most important issues affecting the reserve?

What actions would you suggest to address these issues?

a) Please describe below the first issue you wish to raise.

b) Please describe below the second issue.

c) Please describe below the third issue.

Thank you.

Please return this survey to the desk before you leave or mail within 14 days to:

LandArc Pty Limited
PO Box 304
Avalon NSW 2107

APPENDIX III:

Schedule of Existing Native Plant Species

Species are listed in alphabetical order and are based on a schedule prepared for the *Swallow Rock Reserve Vegetation Management Plan (Freimanis, E., undated).* Additional species were identified during field surveys by Noel Ruting (LandArc Pty Limited) and Michelle Engelhardt (Hawkesbury City Council) 2006 and are included in the following schedule (denoted [1]).

KEY:
Habitat (typical species assemblages):

SCRFF = Sydney Coastal River-flat Forest
SSTF = Shale/ Sandstone Transition Forest
WSDR = Western Sydney Dry Rainforest
ALL = all listed communities

BOTANICAL NAME	COMMON NAME	HABITAT
Acacia binervia	Coast Myall	SCRFF
Acacia decurrens	Green Wattle	SSTF
Acacia falcata	Sickle Wattle	SSTF
Acacia floribunda	Sally Wattle	SCRFF
Acacia linifolia	Flax Wattle	SSTF
Acacia parramattensis	Sydney Green Wattle	ALL
Acmena smithii	Lilly Pilly	SCRFF/ WSDR
Acronychia oblongifolia	Common Acronychia	SCRFF/ WSDR
Adiantum aethiopicum	Maidenhair Fern	SCRFF/ WSDR
Adiantum flabellifolium[1]	Necklace Fern	SCRFF/ WSDR
Agrostis avenacea	Blown Grass	SCRFF/ SSTF
Alternanthera denticulata	Lesser Joyweed	SCRFF
Alectryon subcinereus	Native Quince	SCRFF/ WSDR
Angophora bakeri	Narrow-leaved Apple	SSTF
Angophora floribunda	Rough-barked Apple	SCRFF/ SSTF
Angophora subvelutina	Broad-leaved Apple	SCRFF
Aphanopetalum resinosum[1]	Gum vine	SCRFF/ WSDR
Aristida ramosa	Wire Grass	SCRFF/ SSTF
Aristida vagans	Wire Grass	SCRFF/ SSTF
Arthropodium milleflorum	Pale Vanilla Lily	SSTF
Backhousia myrtifolia	Grey Myrtle	SCRFF/ WSDR
Brachychiton populneus[1]	Kurrajong	WSDR
Breynia oblongifolia[1]	Common Breynia	ALL
Bursaria spinosa[1]	Blackthorn	ALL
Carex appressa	Tall Sedge	SCRFF
Callistemon salignus[1]	Willow Bottlebrush	SCRFF/ WSDR
Casuarina cunninghamiana	River Oak	SCRFF
Cayratia clematidea	Slender Grape	SCRFF/ WSDR
Cheilanthes sieberi	Poison Rock Fern	ALL
Chloris ventricosa		SSTF
Cissus antarctica[1]	Water Vine	SCRFF/ WSDR
Clematis aristata	Old Man's Beard	ALL

BOTANICAL NAME	COMMON NAME	HABITAT
[continued]		
Clematis glycinoides	Old Man's Beard	ALL
Clerodendrum tomentosum	Hairy Clerodendrum	SCRFF/ WSDR
Commelina cyanea	Scurvy Weed	SCRFF/ WSDR
Convolvulus erubescens[1]	Bindweed	SCRFF
Cymbopogon refractus		SSTF
Cyperus difformis	Sedge	SCRFF
Danthonia tenuior	Wallaby Grass	SSTF
Daviesia ulicifolia	Gorse Bitter-pea	SSTF
Desmodium brachypodum	Tick-trefoil	ALL
Desmodium rhytidophyllum	Tick-trefoil	ALL
Desmodium varians	Tick-trefoil	ALL
Dianella caerulea	Flax Lily	ALL
Dianella revoluta	Flax Lily	ALL
Dichondra repens	Kidney Weed	ALL
Digitaria spp.		SSTF
Dillwynia juniperina	Prickly Parrot-pea	SSTF
Dodonea triquetra	Common Hop Bush	ALL
*Doodia aspera**	Prickly Rasp Fern	SCRFF/ WSDR
Doodia media?	Rasp Fern	SCRFF/ WSDR
Duboisia myoporoides[1]	Corkwood	SCRFF/ WSDR
Echinopogon caespitosus	Tufted Hedgehog Grass	SSTF/ WSDR
Einadia hastata[1]	Berry Saltbush	ALL
Einadia trigonos?		WSDR
Eleocharis sphacelata	Tall Spike-rush	SCRFF
Entolasia marginata	Wiry Panic	ALL
Entolasia stricta	Wiry Panic	ALL
Eragrostis brownii	Brown's Love Grass	SCRFF/ SSTF
Eragrostis leptostachya	Love Grass	SCRFF/ SSTF
Eucalyptus amplifolia	Cabbage Gum	SCRFF
Eucalyptus crebra	Narrow-leaved Ironbark	SSTF/ WSDR
Eucalyptus eugenioides	Thin-leaved Stringybark	SSTF
Eucalyptus globoidea	White Stringybark	SSTF
Eucalyptus moluccana	Grey Box	SSTF/ WSDR
Eucalyptus oblonga	Sandstone Stringybark	SSTF
Eucalyptus punctata	Grey Gum	SCRFF/ SSTF
Eucalyptus tereticornis	Forest Red Gum	ALL
Eustrephus latifolius	Wombat Berry	SCRFF/ WSDR
Exocarpus cuppressiformis	Cherry Ballart	SSTF/ WSDR
Ficus coronata	Creek Sandpaper Fig	SCRFF/ WSDR
Geitonoplesium cymosum	Scrambling Lily	SCRFF/ WSDR
Geranium homeanum	Northern Cranesbill	SCRFF/ WSDR
Geranium solanderi	Cutleaf Cranesbill	WSDR
Glochidion ferdinandi	Cheese Tree	SCRFF/ WSDR
Glycine clandestina	Love Creeper	ALL
Glycine tabacina	Love Creeper	SCRFF/ WSDR
Gompholobium glabratum	Golden Glory Pea	SSTF
Gompholobium grandiflorum	Golden Glory Pea	SSTF
Goodenia bellidifolia	Daisy-leaved Goodenia	SSTF
Goodenia hederacea	Violet-leaved Goodenia	ALL
Goodenia ovata	Hop Goodenia	SCRFF/ WSDR
Goodenia paniculata	Swamp Goodenia	SCRFF
Goodenia stelligera	Star-haired Goodenia	SSTF

BOTANICAL NAME	COMMON NAME	HABITAT
[continued]		
Hardenbergia violacea	Purple Twining-pea	ALL
Hibbertia dentata[1]	Twining Guinea Flower	WSDR
Hymenanthera dentata	Tree Violet	SCRFF/ WSDR
Hypericum gramineum	St John's Wort	ALL
Imperata cylindrica var. *major*	Blady Grass	ALL
Indigofera australis	Native Indigo	SSTF
Jacksonia scoparia	Dogwood	SSTF
Juncus continuus	Rush	SCRFF
Juncus usitatus	Common Rush	SCRFF
Kennedia rubicunda	Dusk Coral-pea	ALL
Kunzea ambigua	Tick Bush	SSTF
Lagenifera stipitata		
Lepidosperma laterale	Variable Sword-sedge	SSTF
Leptospermum parvifolium	Small-leaf Tea-tree	SSTF
Leptospermum polygalifolium	Yellow Tea-tree	SCRFF
Leptospermum trinervium	Paperbark Tea-tree	SSTF
Lobelia gracilis		SSTF
Logania albiflora		SCRFF
Lomandra longifolia	Spiny-headed Mat-rush	SCRFF/ SSTF
Lomandra multiflora	Many-flowered Mat-rush	SSTF
Maclura cochinchinensis[1]	Cockspur Thorn	WSDR
Melaleuca decora	White-feather Honey-myrtle	SCRFF
Melaleuca linearifolia	Snow-in-summer	SCRFF
Melaleuca nodosa	Ball Honey-myrtle	SSTF
Melaleuca styphelioides	Prickly-leaved Paperbark	SCRFF/ WSDR
Melia azedarach[1]	White Cedar	SCRFF/ WSDR
Microlaena stipoides	Weeping Grass	ALL
Morinda jasminoides	Morinda	SCRFF/ WSDR
Notelaea longifolia	Large Mock Olive	SCRFF/ WSDR
Notelaea ovata?		SCRFF
Oplismenus imbecillis	Basket Grass	SCRFF/ WSDR
Oxallis sp.	Wood-sorrel	SCRFF
Ozothamnus diosmifolium[1]	Ball Everlasting	SSTF
Pandorea pandorana	Wonga Wonga Vine	SCRFF/ WSDR
Parsonsia straminea	Common Silkpod	SCRFF/ WSDR
Patersonia sericea	Silky Purple Flag	SSTF
Pellaea falcata[1]	Sickle Fern	SCRFF/ WSDR
Persicaria decipiens[1]	Slender Knotweed	SCRFF
Persicaria hydropiper[1]	Water Pepper	SCRFF
Persicaria sp.	Knotweed	SCRFF
Persoonia levis	Broad-leaf Geebung	SSTF
Persoonia linearis	Narrow-leaf Geebung	ALL
Phragmites australis	Common Reed	SCRFF
Pimelea linifolia ssp. linifolia[1]	Slender Rice-flower	SSTF
Plectranthus parviflorus[1]	Cockspur Flower	WSDR
Pratia purpurascens	White Root	SCRFF/ WSDR
Pteridium esculentum[1]	Common Bracken	SCRFF/ WSDR
Pteris tremula[1]	Tender Brake	SCRFF/ WSDR
Pyrrosia rupestris[1]	Rock Felt-fern	WSDR
Rapanea variablis[1]	Muttonwood	WSDR
Senecio spp.	Groundsel	SCRFF/ WSDR
Sigesbeckia orientalis	Indian-weed	ALL

BOTANICAL NAME	COMMON NAME	HABITAT
[continued]		
Smilax australis	Austral Sarsaparilla	SCRFF/ WSDR
Stipa ramosissima[1]	Stout Bamboo Grass	SCRFF
Stipa verticillata[1]	Stout Bamboo Grass	SCRFF
Solanum prinophyllum	Forest Nightshade	SCRFF
Stypandra glauca	Nodding Blue Lily	SCRFF
Themeda australis	Kangaroo Grass	SCRFF/ SSTF
Todea barbara?	King Fern	
Trema aspera	Native Poison Peach	SCRFF/ WSDR
Tristaniopsis laurina	Water Gum	SCRFF
Tylophora barbata	Bearded Tylophora	WSDR
Typha orientalis	Broad-leaved Cumbungi	SCRFF
Urtica incisa	Scrub Nettle	SCRFF/ WSDR
Vernonia cinerea		SSTF
Viola betonicifolia	Showy Violet	SSTF
Viola hederacea	Ivy-leaved Violet	SCRFF
Wahlenbergia communis	Tufted Bluebell	SCRFF/ SSTF
Wahlenbergia gracilis	Australian Bluebell	ALL
Wahlenbergia stricta	Tall Bluebell	SCRFF/ SSTF

…

APPENDIX IV:

Schedule of Existing Weed Species

KEY:
The following exotic weed species were identified during site investigations. The species are scheduled in alphabetical order. Species declared noxious within the Hawkesbury River County Council area, under the *Noxious Weeds Act 1993,* are shown with a Weed Class as applicable.

1 The plant must be eradicated from the land must be kept free of the plant.
2 The plant must be eradicated from the land must be kept free of the plant.
3 The plant must be fully and continuously suppressed and destroyed.
4 The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority.
5 The requirements in the *Noxious Weeds Act 1993* for a notifiable weed must be complied with.

BOTANICAL NAME	COMMON NAME	CLASS
Acer negundo	Box Elder	-
Acetosa sagittata	Turkey Rhubarb	-
Ageratina adenophora	Crofton Weed	4
Ageratina riparia	Crofton Weed	4
Alternanthera philoxeroides	Alligator Weed	3
Anredera cordifolia	Madeira Vine	-
Araujia hortorum	Moth Vine	-
Bidens pilosa	Cobbler's Peg	-
Brassica sp.		-
Briza maxima	Quaking Grass	-
Briza minor	Shivery Grass	-
Bromus catharticus	Prairie Grass	-
Bromus diandrus	Prairie Grass	-
Cardiospermum grandiflorum	Balloon Vine	-
Cerastium glomeratum	Chick Weed	-
Cestrum parqui	Green Cestrum	3
Cirsium vulgare	Spear Thistle	-
Conyza bonariensis	Fleabane	-
Cotoneaster glaucophyllus	Cotoneaster	3
Cyperus eragrostis	Umbrella Sedge	-
Egera densa	Ribbon Waterweed	-
Echinochloa crus-galli	Barnyard Grass	-
Eichhornia crassipes	Water Hyacinth	3
Eragrostis spp.	African Love Grass	-
Foeniculum vulgare	Fennel	-
Fumaria spp.	Fumitory	-

BOTANICAL NAME	COMMON NAME	CLASS
[continued]		
Hypochoeris radicata	Catsear	-
Lantana camara	Lantana	-
Ligustrum lucidum	Large-leaved Privet	4
Ludwigia peruviana	Ludwigia	3
Malva spp.	Mallow	-
Nothoscordum gracilis	Onion Weed	-
Olea africana	Wild Olive	-
Opuntia sp.	Prickly Pear	4
Myrsiphyllum asparagoides	Bridal Creeper	-
Paspalum dilatatum	Paspalum	-
Paspalum urvillei	Tall Paspalum	-
Pavonia hastata		-
Pennisetum clandestinum	Kikuyu Grass	-
Phalaris minor	Lesser Canary Grass	-
Plantago lanceolata	Lamb's Tongue	-
Poa annua	Winter Grass	-
Raphanus raphanistrum	Wild Radish	-
Ricinus communis	Castor Oil Plant	-
Rubus fruticosus	Blackberry	4
Salix babylonica	Weeping Willow	-
Salix fragilis	Crack Willow	5
Salix matsudana X alba	New Zealand Hybrid Willow	5
Salix nigra	Black Willow	5
Salvinia molesta	Salvinia	3
Setaria spp.	Pigeon Grass	-
Sida rhombifolia	Paddy's Lucerne	-
Solanum mauritianum	Wild Tobacco Tree	-
Sporobolus africanus	Parramatta Grass	-
Taraxacum officinale	Dandelion	-
Tradescantia albiflora	Trad	-
Trifolium repens	White Clover	-
Verbena officinalis	Verbena	-

…