Charles Kemp Reserve

EBENEZER

Plan of Management

Adopted by Council: 10 March 2009

prepared by

LandArc Pty Limited

Landscape, Environmental and Heritage Consultants

CONTROLLED DOCUMENT

Adopted by Hawkesbury City Council

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This Plan of Management for
Charles Kemp Reserve, Ebenezer
was prepared by

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1.0 INTRODUCTION

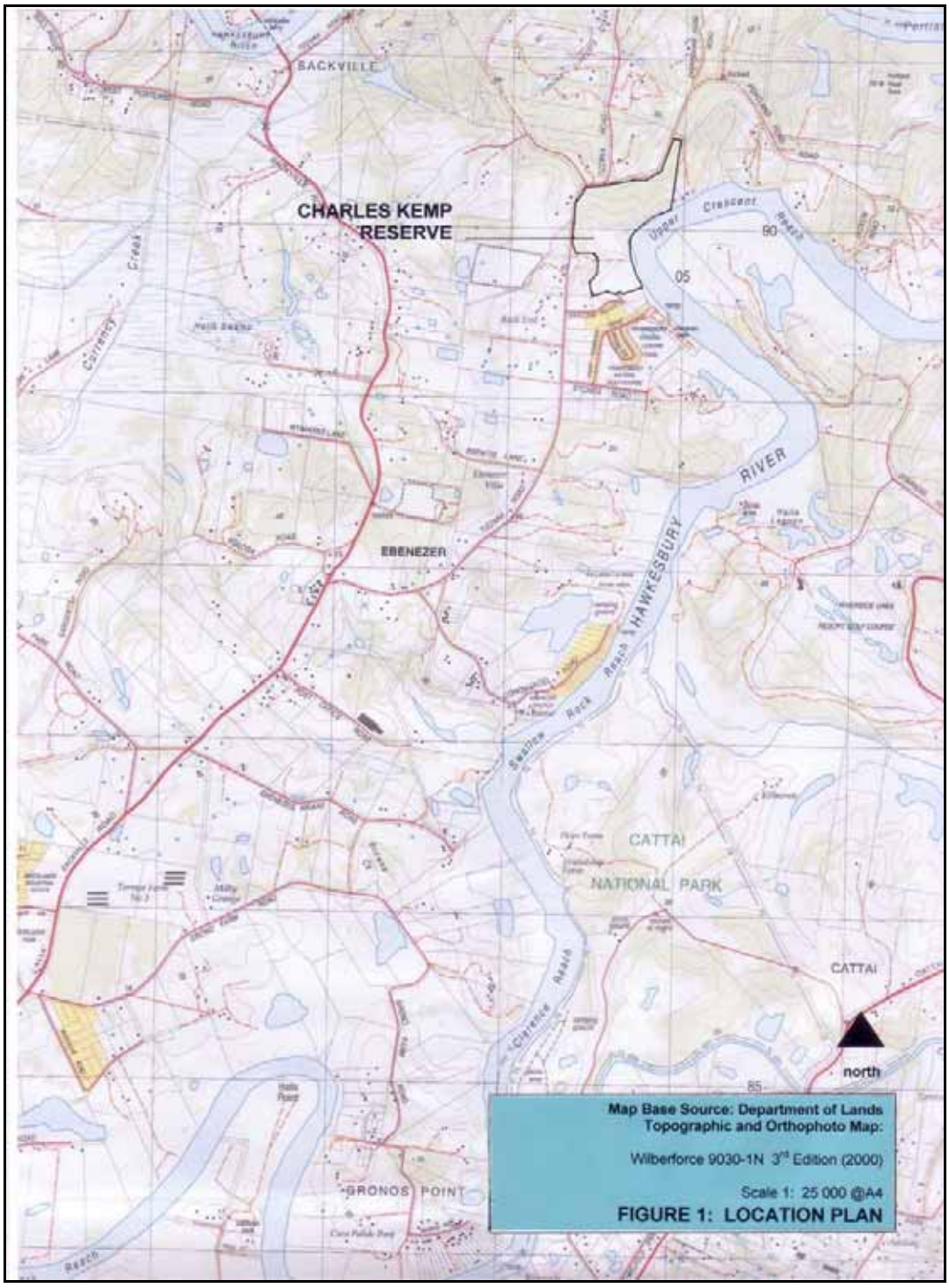
1.1 LOCATION AND CONTEXT

A plan of management provides the framework for managing public land. This plan of management applies to the community land described as Charles Kemp Reserve, Ebenezer. The reserve, covering an area of 26.93 hectares, is located in a scenic bushland and rural locality on the Hawkesbury River. The southern entry point to the reserve is approximately twelve kilometres north of Windsor via Sackville Road and Tizzana Road. Charles Kemp Reserve is bordered by the Hawkesbury River (eastern boundary), Swallow Reach Place (southern boundary), Tizzana Road (western boundary) and Portland Head Road (northern boundary) (refer to *Figure 1: Location Plan).*

Charles Kemp purchased the land in the late 1920s just before the Great Depression. He started a dairy farm and planted citrus trees (his father William Kemp was a local orchardist). The wetlands behind the levee bank were drained and vegetable crops were grown. In 1998, Athol Kemp, son of Charles Kemp, subdivided the property. Most of the land, including a large tract of bushland, was transferred to Council ownership as a public reserve while 20 lots were rezoned for residential development. The family house and gardens dating from the 1950s still remain on the middle ridge overlooking the river. The house has been heavily vandalised since the change-over in ownership and is now in a dilapidated state.

Charles Kemp Reserve has outstanding scenic qualities, varying from steep, rugged topography in the north to undulating hills and gullies in the south. The reserve follows a bend in the Hawkesbury River for approximately 600 metres. The river's edge ranges from steep alluvial riverbanks to dramatic sandstone cliffs. While the southern portion has been largely cleared and modified for agriculture much of the reserve remains as natural bushland. It has significant natural and Aboriginal archaeological heritage, scenic and biodiversity values. It also offers outstanding opportunities for limited passive and nature-based recreation such as bushwalking.

The reserve supports four endangered ecological communities scheduled under the *Threatened Species Conservation Act (1995).* The reserve's natural vegetation communities and habitat range from ridgetop woodland to riparian forest along the river banks and dry rainforest in the sheltered gullies. Prior to draining, clearing and weed invasion, low-lying areas behind the levee bank supported freshwater wetlands of high biodiversity value.


BACKVILLE
CHARLES KEMP RESERVE
Upper Crescent
Currency Creek
RIVER
HAWKESBURY
EBENEZER
Reach
CATTAI
NATIONAL PARK
CATTAI
north
GRONOS POINT
Map Base Source: Department of Lands
Topographic and Orthophoto Map:
Wilberforce 9030-1N 3rd Edition (2000)
Scale 1: 25 000 @A4
FIGURE 1: LOCATION PLAN

Notably, the reserve adjoins contiguous natural bushland extending along the northern sandstone ridges and river environs. The steep foreshores and cliffs provide outstanding vantage points to view the rural landscape of Cattai (to the east) and local reaches of the Hawkesbury River. The reserve's ridges, scarps and rock outcrops retain important evidence of Aboriginal cultural and archaeological heritage.

This section of the river is also a popular location for water sports, particularly speed boats, water skiing and wake-boarding. Hawkesbury Waters Leisure Park and boat ramp is located a short distance to the south. Sackville with its historic cemetery, Tizzana Winery and river-side village atmosphere lies only three kilometres to the north.

The community workshop conducted during preparation of the draft plan of management identified a number of key issues, including protection of the reserve's fragile ecology and archaeological heritage, limitations on public access and potential visitor impacts. These issues are discussed in *3.0 Community Consultation*. Charles Kemp Reserve remains relatively unknown within the Hawkesbury Valley. The reserve has no recreational facilities or infrastructure. The southern half of the reserve retains a network of 4WD vehicular tracks (formerly for farm use). Vehicular and motor-bike access is prohibited in the reserve. Public access is restricted to walking tracks (ie. old 4WD tracks) leading from the cul-de-sac in Swallow Reach Place (southern entry) and a separate entry point leading from the Tizzana Road/ Porters Head Road intersection (northern entry). Existing tracks are not signposted or maintained. Public access from Swallow Reach Place is further restricted by low-lying topography, seasonally inundated wetlands and waterlogged soils. (refer to *Figure 2: Study Area).*

Although open to the public for less than a decade and relatively unknown as a recreational destination, the reserve is already displaying the negative impacts of recreational uses, especially along the steep embankments and cliffs adjoining the river. Water-based activities, including unauthorised uses, are currently concentrated within this sensitive location. Multiple tracking, bank erosion, compaction around roots, rubbish dumping, illegal tree felling, lighting of fires, camping and vandalism are all contributing to a decline in natural heritage values. Public safety issues are a further concern. It will be important to manage these natural resources and recreational opportunities in a sustainable way for existing user groups and for future generations.

Any recreational development or improvements need to consider the sensitive nature and significance of the reserve. Issues such as relative isolation, ecological resilience, protection of natural, cultural and archaeological heritage, flood and bushfire hazards, potential user groups/ demand, availability of resources for management and potential for cumulative impacts are addressed in this plan of management.


HAWKESBURY CITY COUNCIL
KEY:
Charles Kemp Reserve boundary
NOT TO SCALE
RIVER
HAWKESBURY
Study Area
CHARLES KEMP RESERVE
sandstone cliffs
bushland
northern paddock/ wetland
old house site/ garden
beach
southern paddock
CHARLES KEMP RECREATIONAL RESERVE - EBENEZER
FIGURE 2

1.2 AIMS AND OBJECTIVES

A community land plan of management provides the framework for managing community land in accordance with the *Local Government Act 1993* and other relevant legislation and policies. This plan of management has been prepared for Hawkesbury City Council under the direction of Council's Parks & Recreation section. It aims to be performance oriented in order to contribute towards Council achieving its strategic goals, vision and strategic outcomes as identified in the *Hawkesbury City Council Management Plan 2006-2007.*

Charles Kemp Reserve's natural, scenic, cultural, recreational and social values are affected by a range of issues. While preparation of the plan of management has ensured consultation with the local community and key stakeholders it is important to recognise that the approach has been values-based rather than simply issues-driven. Accordingly, this plan of management focuses on the longer term objectives of sustainable management.

This plan of management aims to support the 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. In recent years, Hawkesbury City Council's strategic planning process has identified a number of reserves (including Charles Kemp Reserve) as significant and/ or priority areas for preparation of plans of management. This plan of management for Charles Kemp Reserve supersedes earlier generic plans of management which included this reserve.

The following steps have guided the preparation of this plan of management:-

Section 2.0 Land Description and Planning

- review existing zoning provisions under Hawkesbury City Council's Local Environmental Plan (LEP 1989 as amended);
- identify current uses and condition of the land, and any buildings or other improvements;
- establish community land categories in accordance with the *Local Government (General) Regulation 1999* and identify the core objectives for each of these categories; and
- address future permitted uses and development (including intensity and scale), existing and future leases/ licences.

Section 3.0 Community Consultation

- identify and assess community and stakeholder issues affecting the reserve; and
- determine community goals, values, needs and expectations for the future use and management of the reserve.

Section 4.0 Basis for Management

- define the reserve's role within the local area, broader district and regional context;
- identify and assess key values associated with the reserve including the river/ riparian corridor and it's scenic qualities, Aboriginal, cultural and natural heritage, endangered ecological communities and recreational uses;
- assess the impact of existing uses and management regimes or future development on identified key values; and
- establish the framework for sustainable management strategies.

Section 5.0 Management Strategies

- specify the purposes for which the land, buildings or improvements, will be permitted to be used;
- specify the purposes for which any further development of the land will be permitted, whether under lease or licence or otherwise;
- describe the scale and intensity of such permitted use or development;
- develop appropriate 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's objectives;
- assign directions and priorities (spanning the next 5-years); and
- develop a master plan for implementation of the strategic plan.

1.3 LIST OF ABBREVIATIONS USED IN THIS STUDY

CPEECs	Cumberland Plain Endangered Ecological Communities
DNR	NSW Department of Natural Resources
DofL	NSW Department of Lands
DofP	NSW Department of Planning
DECC	NSW Department of Environment & Climate Change
EPBC Act	Environment Protection & Biodiversity Conservation Act 1999
HRCC	Hawkesbury River County Council
HRFC	Hawkesbury Rural Fire Service
LEP	Hawkesbury City Local Environmental Plan 1989
LGA	Local Government Area (Hawkesbury City Council)
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 AND DESCRIPTION

Charles Kemp Reserve, Ebenezer, is classified as community land and owned in fee simple by Hawkesbury City Council. This public reserve is comprised of a single parcel of land described as Lot 9 in DP 881972 located in the Parish of Wilberforce, County of Cook, City of Hawkesbury. The reserve was created in 1998 following sub-division and rezoning of private property held by the Kemp family. Refer to *Table 1: Land Description* and *Figure 3: Public Reserve: Survey Plan*.

TABLE 1 : LAND DESCRIPTION

Reserve Name:	Charles Kemp Reserve
Land Tenure:	Lot 9 DP 881972
Address:	286 Tizzana Road, Ebenezer NSW 2756
Parish:	Wilberforce
County:	Cook
Area:	26.93 hectares
Owner:	Hawkesbury City Council
Reserve Type:	Public Reserve
Zoning:	6(a) Open Space (Existing Recreation)
Land Classification:	Community Land
Leases/ Licences:	nil

Table 2: Existing Infrastructure & Improvements is divided into four separate columns with the following information provided for each land parcel:-

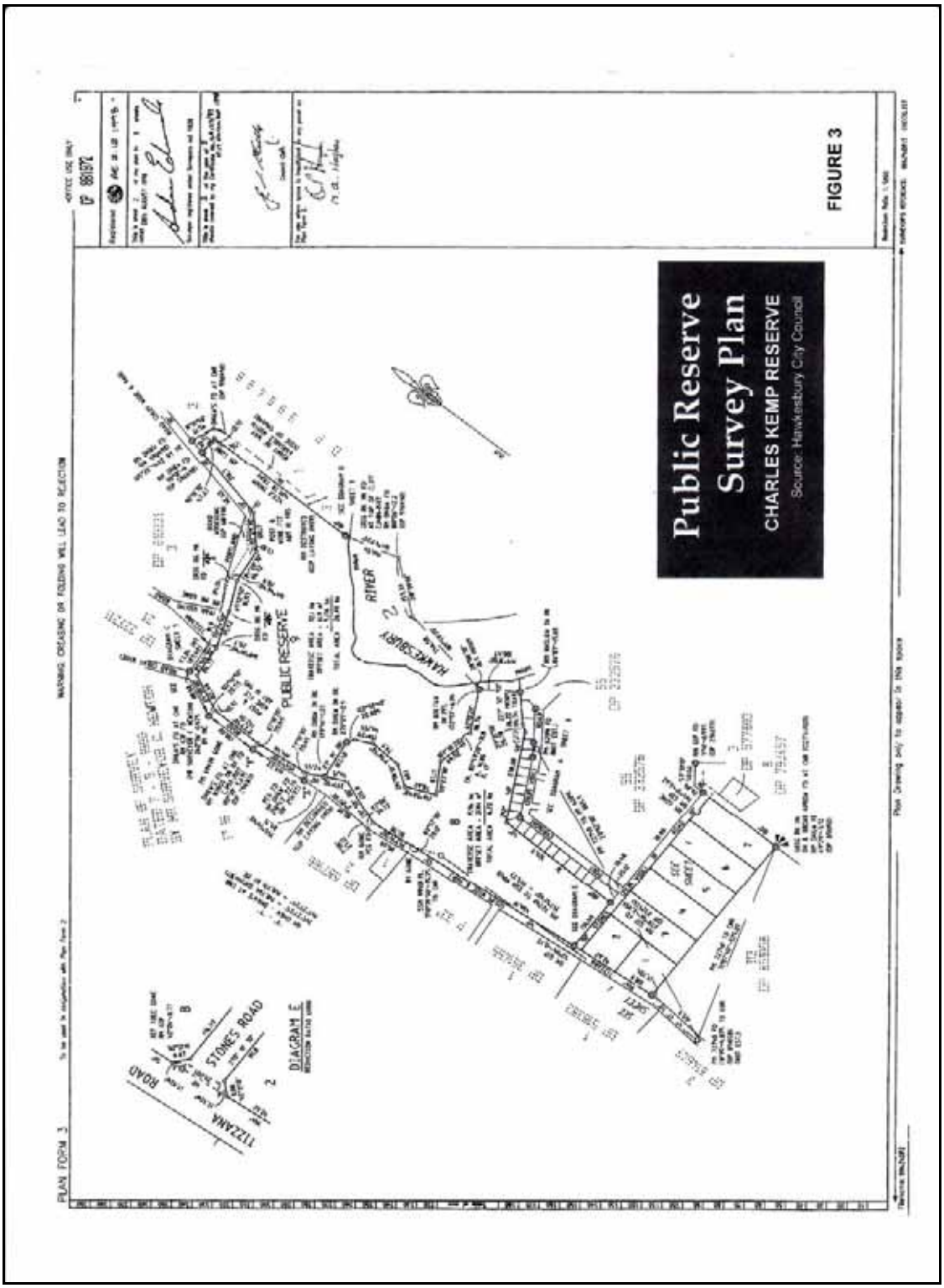
- Lot/ DP number (column 1);
- proposed community land category (column 2);
- description of land parcel and improvements (column 3);
- condition of improvements (column 4).

Lot/ DP number

Lot and DP number provide land tenure information for the land parcel according to Hawkesbury City Council's property records.

Community land category

The proposed community land category is shown in this column (refer to *2.3 Community Land Categorisation*).


Public Reserve
Survey Plan
CHARLES KEMP RESERVE
Source: Hawkesbury City Council
FIGURE 3
PUBLIC RESERVE
RIVER
HAWKESBURY
STONES ROAD
TIZZANA
ROAD
DIAGRAM E
PLAN FORM 3

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

Condition
This column refers to the general condition of any improvements in accordance with the requirements of the *Local Government Act 1993*. The assessment of condition follows directly from the description of improvements (ie. same line) and provides a broad indicator of overall condition 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 poor condition requiring repair, improvements or an increased level of maintenance with some items requiring urgent attention.
poor*	**described item for demolition.**

Charles Kemp Reserve has existing improvements but no recreational infrastructure. The condition assessment refers primarily to improvements. Refer to *4.0 Basis for Management* for a detailed description of environmental condition and status of natural areas and *5.0 Management Strategies* for proposed capital works, maintenance and management with respect to items.

TABLE 2:
EXISTING INFRASTRUCTURE AND IMPROVEMENTS

Land Description	Community Land Category	Existing Improvements	Condition
Lot 9 DP 881972	Natural area: watercourse	steep vegetated riverbank:	
		native riparian vegetation/ regrowth	varies
		unmade walking track [to small beach]	poor
		exotic weeds	poor
		irrigation pump	good
	Natural area: wetland	wetland (northern valley):	
		native wetland/ regrowth (partially drained)	varies
		unmade vehicular service tracks	poor
		unmade walking tracks	poor
		exotic weeds	poor
		no other facilities or improvements	
		cleared paddock/ wetland (southern valley):	
		modified/ drained wetland/ dominant weeds	poor
		unmade vehicular service tracks	poor
		electricity power poles/ overhead lines [easement]	good
		boundary post & wire fencing	fair

Table 2 [continued]

Land Description	Community Land Category	Existing Facilities/ Improvements	Condition
	Natural area: bushland	northern and western ridges:	
		native bushland/ sandstone scarps	good
		unmade walking tracks	poor
		boundary post & wire fencing	fair
		no other facilities or improvements	
		old house and garden (see restoration strategy):	
		boundary post & wire fencing	poor
		exotic/ native garden	fair
		fibro house w. tile roof	poor*
		metal sheds X 2/ shade-house & water tank	poor*
		native remnant vegetation/ regrowth	varies
		exotic weeds	poor

Notes:
* Demolition is recommended for items shown as poor* (ie. old house and ancillary structures].

2.2 COMMUNITY LAND MANAGEMENT

Community land must be managed in accordance with the *Local Government Act 1993* and 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.

2.3 COMMUNITY LAND CATEGORISATION

In accordance with the *Local Government Act 1993* all 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. A further requirement is 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.

The community land categorisation for Charles Kemp Reserve, as identified in this plan of management, is in accordance with the guidelines of the *Local Government (General) Regulation 2005* and supersedes categories identified in the *Draft Hawkesbury Generic Plans of Management 2003* and previous draft mapping of categories.


HAWKESBURY CITY COUNCIL
Community Land Categorisation
CHARLES KEMP RESERVE
Community Land Categorisation
NOT TO SCALE
FIGURE 4

This plan of management categorises Charles Kemp Reserve into the following (see *Figure 4: Community Land Categorisation*):-

- Natural area – watercourse
- Natural area – wetland
- Natural area – escarpment
- Natural area – bushland

Natural Area
"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".

Section 102, Local Government (General) Regulation 2005

Natural Area – watercourse
"Land that is categorised as a natural area should be further categorised as a watercourse under s.36(5) of the Act if the land includes:

(a) any stream of water, whether perennial or intermittent, flowing in a natural channel, or in a natural channel that has been artificially improved, or in an artificial channel that has changed the course of the stream of water, and any other stream of water into or from which the stream of water flows, and
(b) associated riparian land or vegetation, including land that is protected land for the purposes of the *Rivers and Foreshores Improvement Act 1948* or State protected land identified in an order under section 7 of the *Native Vegetation Conservation Act 1997"*.

Section 110, Local Government (General) Regulation 2005

The riparian zone along the steep river bank (southern section) is categorised as natural area – watercourse. This category includes fragmented stands/ regrowth of River-flat Eucalypt Forest, an endangered ecological community (TSC Act 1995) and extensive weed growth. It has high conservation values and is currently under a bush regeneration and restoration program.

Natural Area – wetland
"Land that is categorised as a natural area should be further categorised as wetland under s.36(5) of the Act if the land includes marshes, mangroves, backwaters, billabongs, swamps, sedgelands, wet meadows or wet heathlands that form a waterbody that is inundated cyclically, intermittently or permanently with fresh, brackish or salt water, whether slow moving or stationary".

Section 108, Local Government (General) Regulation 2005

Historically, the freshwater wetlands occurring within the northern and southern valleys were cleared and drained for agriculture. Although affected by these changes and significant weed invasion (particularly within the southern valley), these areas still support freshwater wetlands, an endangered ecological community (TSC Act 1995). Both areas have high conservation values and potential for regeneration and restoration.

Natural Area – escarpment

"Land that is categorised as a natural area should be further categorised as an escarpment under s.36(5) of the Act if:

(a) the land includes such features as a long cliff-like ridge or rock, and
(b) the land includes significant or unusual geological, geomorphological or scenic qualities".

Section 109, Local Government (General) Regulation 2005

This category refers to the natural sandstone scarp along the north-eastern section of the reserve adjoining the Hawkesbury River. These cliffs and rock outcrops support Sydney Sandstone Ridgetop Woodland, Shale Sandstone Transition Forest (SSTF) and some Western Sydney Dry Rainforest (WSDR). SSTF and WSDR are listed as endangered ecological communities (TSC Act 1995). This part of the reserve has outstanding natural heritage values which need to be properly protected and managed.

Natural Area – bushland

"(1) Land that is categorised as a natural area should be further categorised as bushland under s.36(5) of the Act if the land contains primarily native vegetation and that vegetation:

(a) is the natural vegetation or a remainder of the natural vegetation of the land, or
(b) although not the natural vegetation of the land, is still representative of the structure or floristics, of the natural vegetation in the locality.

(2) Such land includes:

(a) bushland that is mostly undisturbed with a good mix of tree ages, and natural regeneration, where the understorey is comprised of native grasses and herbs or native shrubs, and which contains a range of habitats for native fauna (such as logs, shrubs, tree hollows and leaf litter), or
(b) moderately disturbed bushland with some regeneration of trees and shrubs, where there may be a regrowth area with trees of even age, where native shrubs and grasses are present in the understorey even though there may be some weed invasion, or
(c) highly disturbed bushland where the native understorey has been removed, where there may be significant weed invasion and where dead and dying trees are present, where there is no natural regeneration of trees or shrubs, but where the land is still capable of being rehabilitated".

Section 107, Local Government (General) Regulation 2005

Natural area – bushland occurs throughout the northern and western portion of the reserve extending to areas of fragmented regrowth along the middle ridge (old house site) and adjoining slopes. It is by far the largest category by area. The northern and western bushland is generally in good condition and mostly undisturbed with limited weed invasion. Sydney Sandstone Ridgetop Woodland occurs on the upper sandstone ridges while the mid-slopes and upper gullies support Shale Sandstone Transition Forest (SSTF). Western Sydney Dry Rainforest (WSDR) occurs in the south-facing gullies and lower creek-lines of the northern valley. SSTF and WSDR are scheduled as endangered ecological communities (TSC Act 1995) and have very high conservation values.

In accordance with the *Local Government Act 1993* the management of each category and sub-category is guided by a set of core objectives. The reserve's natural area categories have specific requirements in terms of permissible development, leases and licences. Furthermore, the presence of four endangered ecological communities (TSC Act 1995) within the reserve signals the need for establishing an appropriate conservation and management strategy (see *2.5 Other Relevant Legislation and Policies: Threatened Species Legislation*).

2.4 LEASES, LICENCES OR OTHER ESTATE

There are no current leases or licences over this community land. A lease, licence or other estate may be granted, in accordance with an express authorisation by this plan of management, providing the lease, licence or other estate is for a purpose prescribed in s.46 of the *Local Government Act 1993.* The purpose must be consistent with core objectives for the category of community land (refer to *5.0 Management Strategies: Table 5: Schedule of Core Objectives*). For express authorisation of future permitted leases, licences or other estate refer to *Table 6: items A6-A7*.

Council must not grant a lease, licence or other estate for a period (including any period for which the lease could be renewed by the exercise of an option) exceeding 21 years. A lease, licence or other estate may be granted only by tender in accordance with s.46A of the *Local Government Act 1993* and cannot exceed a term of 5 years (including any period for which the lease could be renewed by the exercise of an option), unless it satisfies the requirements as scheduled in s.47, or is otherwise granted to a non-profit organisation (refer to *Leases, licences and other estate in respect of community land – s.46, 46A, 47 and 47A Local Government Act 1993).*

Furthermore, in accordance with *s.47B Local Government Act 1993,* leases, licences or other estate must not be granted in respect of land categorised as a natural area:

(a) to authorise the erection or use of a building or structure that is not prescribed under sub-section 47B (a) (including re-building or replacement). The prescribed buildings or structures include walkways, pathways, bridges, causeways, observation platforms and signs.

(b) to authorise the erection or use of a building or structure that is not for a purpose prescribed under sub-section 47B (b). The prescribed purposes include information kiosks, refreshment kiosks (but not restaurants), work sheds or storage sheds required in connection with the maintenance of the land and toilets or rest rooms.

2.5 OTHER RELEVANT LEGISLATION AND POLICIES

In addition to the requirements of the *Local Government Act 1993* 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
- 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 collaboration with traditional Aboriginal custodians in the future management of the reserve (refer to *5.0 Management Strategies: Table 6: items B2-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.

Rivers and Foreshores Improvements Act 1948

Charles Kemp 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.

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 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.

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).

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.

Charles Kemp Reserve is zoned *6(a) Open Space – Existing Recreation* under *Hawkesbury City Council Local Environmental Plan* (LEP 1989).

Threatened species legislation

Charles Kemp Reserve supports a range of vegetation communities and habitats including four endangered ecological communities scheduled under Part 3 of Schedule 1 of the *Threatened Species Conservation (TSC) Act 1995.* For details of these communities refer to *4.0 Basis for Management*. The TSC Act provides the legislative mechanisms for dealing with 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.

No part of this community land has been declared as “critical habitat” nor is it currently affected by a “recovery plan” or “threat abatement plan”. The NSW Department of Environment & Climate Change (DECC) is currently developing a Draft Recovery Plan for all of the Cumberland Plain Endangered Ecological Communities (CPEECs).

3.0 COMMUNITY CONSULTATION

3.1 INTRODUCTION

Community consultation has been a key component in the preparation of this plan of management. Hawkesbury City Council has promoted an open, transparent approach to community consultation, providing opportunities for stakeholders and members of the community to contribute comments and submissions or to discuss specific issues.

A community workshop was held during preparation of the draft plan of management (refer to *3.2 Community Workshop*). Further consultation continued through to release of the draft plan of management (ie. public exhibition), at which time the community was able 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 *Local Government Act 1993* the draft plan of management must be placed on public exhibition for a period of at least 28 days (ie. four weeks). A further two weeks are provided for completion of written submissions. During the public exhibition period the draft plan of management will be available for viewing 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 Hawkesbury City Council. The draft plan of management, as amended following public submissions and review, will be submitted to Council for adoption.

3.2 COMMUNITY WORKSHOP

A community workshop was held at the Wilberforce School of Arts (located off Singleton Road) at 7:00pm on Thursday 21st March 2008. The workshop was advertised by Hawkesbury City Council in the local press and notices in Council's Administrative Offices and Hawkesbury Central Library. Council also conducted a letter box drop to surrounding residents.

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

- Darug Tribal Aboriginal Corporation
- Darug Custodian Aboriginal Corporation
- Dept. of Environment & Climate Change (DECC) – Richmond Office
- Hawkesbury District Rural Fire Service
- Residents surrounding reserve

A total of thirty-two (32) people attended the workshop. Most of the people in attendance were local residents including members of the Kemp family. Other groups represented included the Darug Custodian Aboriginal Corporation and Hawkesbury District Rural Fire Service. Councillor Neville Wearne also attended the workshop.

Other people telephoned Council to advise their interest in this draft plan of management but were unable to attend on the night. These people have been added to a list for notification by Council of the draft public exhibition. 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 (see *Appendix I: Community Consultation – presentation material and submissions*). This presentation was followed by a discussion of key issues by workshop participants.

Upon closing the workshop further written submissions were requested either by post or e-mail to LandArc. Alternatively, people were advised to telephone to discuss specific issues or to request a Community Issues Questionnaire (pro-forma – refer to *Appendix I).*

Two submissions were received. A two-page submission raised issues with respect to the reserve's significant Aboriginal cultural and archaeological heritage, environmental issues (wetlands/ weed management) and the need for appropriate protection and management. Concerns were also raised over broader public access and the provision of recreational infrastructure. A second submission highlighted the need for local public parkland, a playground and access to the river where families can take their children. The issues raised at the workshop and correspondence are summarised in the following section (*3.3 Key Issues*).

Further consultation has been conducted including a site meeting and investigation with Mr Des Dyer (Darug Custodian Aboriginal Corporation), Michelle Engelhard (Council's Land Management Officer) and Noel Ruting (LandArc) on 29 February 2008. This meeting identified existing and potential Aboriginal cultural and archaeological heritage items/ sites which have not previously been recorded.

Finally, Mr Athol Kemp (owner of the land prior to transfer to public reserve) was contacted by telephone to discuss many of the current issues and history

of the site *(Athol Kemp, pers. comm., 4.09.2006, 12.09.2006 and 1.04.2008).* Mr Kemp kindly provided valuable background information for the preparation of this plan of management.

3.3 KEY ISSUES

Public access into the reserve and potential visitor impacts were key issues discussed at the community workshop. A summary of community and stakeholder issues has been compiled (for further detailed analysis and review see the relevant sections as indicated):-

1. **Natural and cultural environment** (refer to *4.0 Basis for Management – 4.3 Natural and Cultural Riparian Setting, 4.4 Indigenous, Cultural and Archaeological Heritage Values & 4.5 Environment and Biodiversity*):

   - significance of natural riparian corridor/ riverine context, reserve's scenic qualities, unique bushland character and biodiversity;
   - varying topography – steep foreshores/ sandy beach and sandstone cliff-tops;
   - significance of Aboriginal archaeological and cultural heritage which have not been recorded by DECC and other potential archaeological deposits (PAD);
   - need for appropriate consultation with local Aboriginal elders and further investigation and protection of Aboriginal archaeological and cultural heritage;
   - range of endangered ecological communities from woodlands to dry rainforest and freshwater wetlands to riparian forest;
   - protect beauty, peace and tranquillity – "leave it as it is";
   - reserve should be protected and managed as a wildlife sanctuary/ restore degraded natural areas such as the two wetlands including blocking drains with sand bags (A. Kemp 21.02.2008);
   - opportunities for access to river foreshores and scenic vantage points;
   - protect and stabilise eroding river banks (localised erosion);
   - improve management of inappropriate recreational impacts (see below);
   - demolish, remove and clean-up old house site, ancillary structures and garden (including removal of exotic weeds/ garden escapes and implementation of restoration works);
   - selectively remove colonising exotics/ native tree species blocking river views from ridge-top (old house site);
   - protect and restore degraded wetlands (eg. remove/or block sub-surface drainage lines, address weed issues and 4WD access);
   - need for improved weed management/ bush regeneration and restoration strategies (including establishing priority areas, suitable planting stock, bank stabilisation, protective devices, visitor education and management, etc);
   - need 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);
   - climate change and potential impacts on reserve management (increased periods of drought/ increased risk of bush fire hazard, reduced flows in river/ creeks, water quality issues and impacts on habitat values/ biodiversity);
   - adjoining private property issues:-

- maintain reduced fuel zones (buffer) to protect existing residences located close to reserve boundary/ bushland (ie. western and north-eastern boundaries);
- investigate/ survey boundaries along southern and south western portion of reserve (eg. mown grassed area/ private mini-playing field (goal posts) and public access to river bank);
- removal of bushland habitat, buffers and bio-linkages and maintenance of open mown grass and weeds (boundary to wetland) leading to reduced ecological durability and resilience;
- potential impact of restoration strategy on private view corridors and need for a consultative approach;
- existing irrigation pump and pipeline (shared) from river to private properties passes through reserve/ land-owner wants to upgrade capacity for turf farm (refer to LGA Act – specific requirements).

2. **Public access, recreation and public safety issues** (see *4.0 Basis for Management – 4.6 Public access and recreation*):

- ❖ support (re: submission) for creation of local parkland with access to the river and children's playground for local families/ large number of local children and lack of park facilities and opportunities for play;
- ❖ concern over improvements to public access (ie. cul-de-sac in Swallow Reach Place) and visitor impacts on adjoining private properties:-
  - main access into reserve is currently via a residential street (cul-de-sac)/ potential problems with additional traffic and parked cars;
  - uncontrolled vehicular access (eg. unauthorised vehicles entering the reserve from Swallow Reach Place);
  - vehicles getting bogged in wetland (southern paddock) and need for adjoining owners to provide assistance;
  - existing signage restricting vehicle/ motor-bike access but no physical barriers (at Swallow Reach Place);
  - difficulty in providing off-street parking (flooding/ waterlogged soils in wetland)/ would need to raise ground levels for a car parking area;
  - concern over potential social and environmental impacts of more park visitors, user groups, anti-social behaviour, changes to natural character;
  - wetland/ waterlogged soils are potentially unstable (issue of 'sink-holes' raised/ possibly in relation to sub-surface drain).
- ❖ multiple 4WD vehicle tracks (unmade) throughout southern portion of reserve providing opportunities for uncontrolled and unauthorised vehicle access;
- ❖ general consensus by participants that the reserve should be kept in its natural state and that motor vehicles/ motorbike access should be restricted;
- ❖ reserve should be fenced off along line of middle ridge to create a nature reserve/ nature refuge (ie. restricting public access into the northern portion);
- ❖ Athol Kemp wanted the reserve to be a nature refuge following transfer to Council (support by Kemp family);
- ❖ old house/ associated structures should be demolished and removed as soon as possible;
- ❖ concern by Darug Tribal Aboriginal Corporation over protection of Indigenous/ archaeological sites, including rock engravings close to old house site;
- ❖ no existing recreational infrastructure in reserve – preference to keep it this way/ retain only pedestrian access (no recreational facilities);

- a picnic area with seating/ benches 'would attract garbage and loitering';
- need to protect steep cliffs/ riverbanks from concentrated visitor use;
- remove unauthorised structures including platforms and swing ropes on cliffs;
- no current funding for capital works program (ie. to develop recreational infrastructure in reserve);
- concern over potential bushfire hazard/ fuel loads in reserve which may affect neighbouring properties;
- Hawkesbury District RFS representative confirmed program for hazard reduction burning/ mechanical clearing, possibly during 2010-11;
- support for establishing a volunteer BushCare group involved in weed management, bush regeneration and restoration (no existing group);
- existing bush regeneration contract workers in reserve (minimal annual budget/ potential for review);
- concern over potential for future loss/ sell off of a poorly utilised asset (public reserve) and that development (including filling wetlands) is needed to prevent this scenario (issue/ action was unsupported by other participants);
- opportunities to provide low key pedestrian access and nature-based recreational facilities in reserve (vs. option for no recreational improvements – see above comments):
  - provide linkage between Swallow Reach Place (southern access point) to potential picnic area/ scenic rest point (old house site on middle ridge);
  - construct wetland boardwalk (park access) to protect sensitive wetland from multiple tracking and trampling vegetation/ option for interpretive (environmental) signage;
  - locate a low-key picnic area in the old house site (elevated, durable site offers views over river/ minimal potential impact on endangered ecological communities);
  - option to provide some low-key seating (no other infrastructure);
  - need for adequate protection of Aboriginal archaeological sites;
  - link/ upgrade existing unmarked walking track near Tizzana Road/ The Ridgeway intersection (northern access point) to circuit track;
  - establish spur walking track links to 1. small beach/ river foreshores (southern valley); and 2. lookout area (upper north-eastern scarp);
- restrict multiple tracking and provide directional and interpretive signage (Aboriginal/ cultural heritage and natural heritage values);
- consider limitations on public access and recreational infrastructure (eg. wetlands/ flooding, steep riverbank/ cliffs, endangered ecological communities and Aboriginal sites, impact on neighbours);
- protect fragile areas/ restrict public access to wetlands, steep river banks, rock outcrops and overhangs and the 'pinch-point' below the cliff-line adjacent to the river (near northern wetland);
- address public safety and risk management issues relating to ropes on trees/ diving from steep banks;
- address current vandalism, tree removals, rubbish dumping, bank erosion, soil compaction issues;
- maintain emergency vehicular access (between Swallow Reach Place and northern wetland area) and fire-trails along western and north-eastern boundaries (adjoining private properties);
- consider potential negative impacts generated by improved public access and recreational facilities/ sporadic impacts leading to chronic impacts requiring commitment of ongoing resources;

- ❖ consider management/ maintenance issues associated with any upgrade:
  - isolation may encourage anti-social and illegal behaviour (eg. motor-bikes, drug and alcohol use, rubbish dumping, fires, vandalism, camping over weekends, etc);
  - peak visitor loadings for special events (eg. the annual “Bridge to Bridge” water skiing and jet boat races in May and November).

PHOTO 1: View of Hawkesbury River looking south-east from the ‘pinch-point’, northern valley (10.01.2008).

PHOTO 2: View of Hawkesbury River looking north-east from the sandstone scarp (01.02.2008). The river and riparian corridor provided a vast range of resources for the Darug Aboriginal people.
…

4.0 BASIS FOR MANAGEMENT

4.1 OBJECTIVES

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

- *to identify and assess key values associated with the community land;*
- *to define the community land's role within the local area and broader district context;*
- *to assess the impact of existing uses, activities and development on identified key values;*
- *to establish the framework for sustainable management strategies consistent with community land objectives; and*
- *to provide a vision for the future of this community land.*

4.2 DETERMINING KEY VALUES AND SIGNIFICANCE

"Values" can be simply described as the things which make a place important. Management objectives must be based on a sound understanding of the resource base and associated values. The following key values have been developed through community consultation (refer to previous section) and further investigation, analysis and assessment. Key values are divided into four categories which form the basis for further discussion in this section as follows:-

1. Natural/ Cultural Riparian Setting (section 4.3)
2. Indigenous, Cultural & Archaeological Heritage (section 4.4)
3. Environment and Biodiversity (section 4.5)
4. Public Access and Recreation (section 4.6)

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 3: Values and Level of Significance*).

TABLE 3: 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 bushland & cultural riparian setting		regional	
Indigenous, Cultural & Archaeological Heritage Values			
Aboriginal rock engravings/ archaeological sites		regional	
European – historic rural/ agricultural uses (incl. orchard trees/ gardens)	local		
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 values		regional	
Public Access and Recreational Values			
public access/ river access, circulation and linkages	local		
opportunities for low-key passive and nature-based recreation	local		

4.3 NATURAL & CULTURAL RIPARIAN SETTING

Significance of landscape setting

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).* The unique combination of scenic river setting, diversity of natural and cultural landscapes, bushland and rural character and archaeological heritage define Charles Kemp Reserve as a significant asset in the Hawkesbury City local government area. This natural/ cultural setting has the potential to attract visitors seeking passive and nature-based recreational opportunities such as picnicking, fishing, bushwalking, bird watching and quiet relaxation. It is important to recognise the sensitive and fragile nature of these key values and to develop a strategy for ecological sustainability and conservation.

Scenic and aesthetic values

The diversity of natural and cultural riparian landscapes is a key value of regional significance. The topography varies from gentle hills and gullies to rugged sandstone scarps and ridges. The reserve offers outstanding vistas along the river. The riparian bushland setting and tranquillity of the river

further enhance the visual and aesthetic qualities. The scenic values associated with the Hawkesbury River riparian corridor are recognised under SREP No.20 Hawkesbury-Nepean River (No.2 –1997).

Natural landscape values
The reserve supports a mosaic of ecological communities and habitats including ridgetop woodlands, river bank riparian forest, dry rainforest on sheltered slopes and gullies and wetlands in low-lying areas behind the levee. Four of these communities are of State significance and are scheduled as endangered ecological communities under the TSC Act (see *4.5 Environment and Biodiversity – Native Vegetation)*. The contiguous native vegetation along this section of the river and beyond the reserve's boundaries is significant in providing enhanced regional habitat values and bio-linkages.

4.4 INDIGENOUS, CULTURAL AND ARCHAEOLOGICAL HERITAGE VALUES

"Deerubbin" and its significance to Indigenous people
The Hawkesbury River, originally known as "Deerubbin" (or "Venrubben") by the Darug Aboriginal people, is believed to mean "wide, deep water". 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 river and riparian corridor provided a vast range of resources for the Darug Aboriginal people. 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. 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 *(Nichols, M., 2004, p.4* and *Penrith City e-history – Themes: The Early Land Alienation Pattern*).

Archaeological heritage
There are approximately 200 recorded Aboriginal sites in the Hawkesbury area (Aboriginal Sites Register, DECC). It is believed however 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 *(McDonald, 2001).*

There is currently no record of any archaeological relics or deposits in Charles Kemp Reserve however a number of sites and other potential archaeological deposits (PAD) were identified by Mr Des Dyer (Darug Tribal Aboriginal Corporation) during a recent site investigation (29.02.2008). Rock engravings and axe grinding grooves are located on outcrops near the old house and garden (upper middle ridge). Some engravings may be covered by exotic weed growth. The land rising immediately to the west of the old house is believed to have been an important source of traditional ochres. Potential archaeological deposits, including occupation sites and ceremonial grounds are likely to occur in the reserve *(Dyer, D., pers. comm., 2008).*

It is therefore recommended that further investigation be conducted to determine the full extent and scale of these relics or deposits particularly with respect to any proposed site-works in this location (ie. demolition of the old house and landscape restoration). Furthermore, it is recommended that these investigations determine if any other places, relics or potential archaeological deposits (PAD) exist within the reserve 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, Table 6: items B1-B3).*

Local historic context

In 1802 Scottish and English free settlers who arrived on the Coromandel took up land grants in the area. 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)*. The tall riparian forest along the river banks was cleared and the low-lying back-swamps behind the levees drained and converted to farms, orchards and pastures for livestock. Floods had a major impact on these activities. Twenty-seven major floods were recorded during the nineteenth century claiming the lives of many early settlers.

During the early days of European settlement, the broad, deep water of the Hawkesbury River provided access for large boats (up to 100 tons) carrying produce from as far as Windsor Wharf to Sydney. The river also offered recreational opportunities for day trippers and holiday makers from the city as early as the 1830s. By the 1880s the extensive removal of riparian vegetation for agriculture 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 era of the steam ship service to an end. *(Nichols, 2004).*

Kemp family property

Charles Kemp, son of William Kemp (a local orchardist), acquired this parcel of land on the Hawkesbury River just before the Great Depression (1929-32). Unemployment was on the rise and commodity markets were in turmoil. This was a time of extreme hardship for Australian families. Charles Kemp spent his time fishing at night and working the farm by day to sustain his family. During this time the river provided a rich source of fish – "200 fish could be caught in one day" *(Athol Kemp, pers. comm., 4.09.2006).*

A stone house was built in Tizzana Road. While most of the original land parcel (43.15 hectares) was preserved as natural bushland, the more productive southern slopes and valleys (higher shale influence) were cleared for citrus orchards, dairying and livestock production. The wetlands in the valleys were drained and vegetable crops, including watermelons, were grown. The orchards were gradually developed over the years to produce mainly citrus fruit (oranges, mandarins and grapefruit) as well as apples, pears and plums. The produce was taken to the wharf at Port Erringhi for transport by steamship to Sydney markets *(Athol Kemp, pers. comm., 1.04.2008).*

This rural landscape, created since the Great Depression, is gradually reverting to a natural, albeit modified landscape of exotic weeds and native bushland. This historic rural landscape has local cultural and social significance. Remnant orchard trees in the paddocks may also have local botanic/ cultural significance (eg. historic cultivars/ source stock) and should be further investigated.

This property remained in the Kemp family until 1998. Athol Kemp (b.1925-), son of Charles Kemp, subdivided the land and developed a portion following a final ruling delivered by the Land and Environment Court. A total of 26.93 hectares of land was transferred to Hawkesbury City Council. This land became a public reserve (Charles Kemp Reserve). The balance was subdivided into 20 lots and rezoned for residential development. See *Figure 3: Survey Plan (Public Reserve).* An offer was made to Council by the Kemp family to fence the public reserve and establish a wildlife sanctuary *(Athol Kemp, pers. comm., 4.09.2006).*

Athol Kemp's family house (built in 1950) and gardens still remain on the middle ridge. The timber and fibro-cement house has been heavily vandalised since the change-over in ownership and is now in a dilapidated state. The remains of a nursery/ shade house is still evident on the western side of the house (near the driveway). The garden, dating from the Post-War period (1950s-1960s), retains an eclectic mix of exotic and introduced native specimens (refer to *Appendix III: Schedule of Cultivated Exotic Plants and Weed Species*). The garden has not been maintained since the property

transfer and exotic weeds are now dominant. Some weed species are threatening native canopy trees and regrowth.

It is believed that some of the garden elements should be retained as part of the historic and cultural interpretation of the site. It is however important that weed species be selectively removed (see *4.5 Environment and Biodiversity – Weed management and restoration of old house site and garden*). This elevated site offers outstanding vistas over the river, the north-eastern scarp and surrounding bushland. It also has potential as a picnic area for limited passive and nature-based recreation.

4.5 ENVIRONMENT AND BIODIVERSITY

Climate change
The Hawkesbury River Valley has a warm temperate climate (ie. with a summer and winter season). Median annual rainfall is 1000 millimetres. Rain may occur at any time throughout the year. The catchment has recorded significant changing rainfall patterns, oscillating between periods of high and low rainfall *(LandArc, 2007).* Climate change is tending to exacerbate these weather extremes, further affecting flood and drought regimes. Human release of greenhouse gases into the atmosphere has caused, and will continue to cause, global warming for many decades (*IPCC Assessment Report, 2007*). For New South Wales each decade since 1950 has recorded a 0.15°C increase in annual mean maximum temperature and a 14.3mm decrease in annual rainfall (*Water Information System for the Environment, DECC, 2007).*

The latest CSIRO modelling confirms that our climate will continue to change over coming decades producing a range of impacts including the following:-

- increased risk of drought
- increased soil erosion and dry land salinity
- more hot days
- greater bushfire risk.

River catchment, stream condition and water quality
The Hawkesbury – Nepean River catchment has a long history of vegetation clearing, ecosystem disturbance, fragmentation and modification. Agricultural land-uses, dam construction and urban development have placed the catchment under extraordinary pressures. The 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.

Water quality, aquatic biodiversity and recreational opportunities continue to be affected by agricultural land uses, urban run-off, elevated nutrients, restricted flow regimes and exotic weeds. 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 proliferated under the disturbed conditions.

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 shoreline (eg. Hawkesbury Waters Leisure Park to the south of the reserve). For more than a decade other recreational uses such as swimming, water-skiing and wake-boarding have been affected by drought, reduced flow regime, poor water quality, blue-green algal blooms and aquatic water-weeds such as *Egera* and *Salvinia* spp. 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. While mechanical harvesting provided a temporary measure of control, the underlying causes have not yet been properly addressed *(LandArc, 2007).*

The river environs at Charles Kemp Reserve display the following characteristics:

- river subject to varying flows and flood impacts but with an overall reduced flow regime;
- localised bank instability and erosion along steep riverbanks;
- high nutrient loadings, turbidity and reduced oxygen levels in water column;
- infestations of exotic weeds along steep riverbanks including noxious weed species – Black Willow *(Salix nigra);* and
- low levels of natural vegetation/ natural recruitment on disturbed riverbanks (southern portion of reserve).

The *Hawkesbury Lower Nepean Catchment Blueprint (2002)* focuses on tackling these issues at the sub-catchment level by adopting an integrated approach across several local government areas. The *Catchment Blueprint* emphasises new opportunities with partnerships, education, advocacy and community involvement to deliver the desired outcomes including:

- 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.

While many of the *Catchment Blueprint* 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 desired management strategies for this reserve.

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. The catastrophic flood events of the nineteenth century are well documented. The greatest flood ever recorded was in 1867. Since completion of Warragamba Dam in 1960 flood events have occurred in 1961 (largest recorded in twentieth century), 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 *(LandArc, 2007).* Flood planning is 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.

Topography

The reserve's topography varies from a sandstone plateau (northern portion) and scarp adjoining the river (north-east) to gently undulating hills and slopes. There are two small valleys separated by a middle ridge (southern portion). Intermittent creeks flow through the upper gullies before reaching wetlands (lower valleys) behind the levee bank.

The highest part of the reserve is along the northern ridge and boundary to Portland Head Road (up to 50 metres AHD). The highest point on the north-eastern scarp is approximately 30 metres above the river (refer to *Figure 1: Location Plan* for contours shown at 10 metres intervals). The scarp has been formed by the river eroding the Hawkesbury Sandstone bedrock and is characterised by rocky outcrops and ledges with localised steep talus slopes. In places the shear cliff-face drops directly into the river below. Large rock overhangs occur in this location. The river bank (along the southern portion of the reserve) are generally steep with local relief of less than 10 metres AHD. The river bank is comprised of deep sand loams deposited by successive

flood events. These soils are prone to instability and erosion. Sandstone rock outcrops occur near the waterline (southern boundary).

Geology and soil landscapes:
The reserve's geology and soil landscapes are described in accordance with *"Soil Landscapes of the Penrith 1:100 000 Sheet"* (Bannerman and Hazelton, 1990). The northern valley and main creek-line form a boundary between the Mittagong Formation (southern portion) and Hawkesbury Sandstone (northern portion).

River bank and wetlands (southern portion)
The reserve's river bank and low-lying areas (wetlands) are typically alluvium derived from Narrabeen Group, Hawkesbury Sandstone and Wianamatta Group materials. This is a fluvial landscape described as Freemans Reach (fr). 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 Limitations: 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 steep river bank adjacent to the northern valley and sandstone scarp and described in this plan of management as the "pinch-point", is highly vulnerable to erosion due to concentrated recreational activities (eg. unauthorised rope swings/ ladders for diving and swimming).

Middle ridge and adjoining slopes (southern portion)
The geology in this part of the reserve is described as Mittagong Formation which is characterised by alternating bands of shale and fine to medium grained quartz sandstones. Rock outcrops are minimal in this landscape. The soil landscape is classified as Woodlands (wl). The soils tend to be deep (150-300cm) ranging from leached sands (drainage lines) to brown sandy loam, clay loam and yellowish brown clay (slopes and benches). Topsoils are typically stony with a hard setting surface. Soil limitations include:

- Fertility: low to very low nutrient status.
- Erodibility: generally low erodibility.
- Erosion Hazard: low to moderate erosion hazard.
- Landscape Limitations: localised rock outcrops and steep slopes.

- Urban Capability: generally low to moderate, subject to geo-technical engineering input.

The old house and garden are located on this elevated ridge overlooking the river. The site has been largely cleared and is now overgrown with weeds. It is considered to have the highest level of site durability in the reserve.

Northern ridge and adjacent slopes/ river scarp (northern portion)
The geology of the Hawkesbury Sandstone ridge (along Portland Head Road), adjacent slopes and scarp (along the river) is characterised by a medium to coarse-grained quartz sandstone with minor shale and laminite lenses. The soil landscape is described as Gymea (gy). This elevated part of the reserve has slopes of up to 10-25%. The outcropping sandstone rock benches form a series of broken scarps. The ridge area adjacent to Portland Head Road has large areas of exposed bedrock. 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:

- 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.

Native Vegetation
The native vegetation of Charles Kemp Reserve creates a subtle mosaic in its structural complexity, species diversity, level of connectivity and opportunities for genetic exchange. The reserve retains a high level of biodiversity, dynamic ecological processes, ongoing natural evolution and ability for its ecosystems to be self-perpetuating. These are vital criteria defining the reserve's natural heritage values. The reserve supports five distinctive ecological communities, four of which are scheduled as endangered ecological communities in the NSW *Threatened Species Conservation Act 1995*, as follows (refer to *Figure 5: Native Vegetation Map*):-

- River-flat Eucalypt Forest (RFEF)*;
- Freshwater Wetlands (FW)*;
- Shale Sandstone Transition Forest (SSTF)*;
- Western Sydney Dry Rainforest (WSDR)*; and
- Sydney Sandstone Ridgetop Woodland (SSRW).

Note: * denotes endangered ecological community (TSC Act 1995).

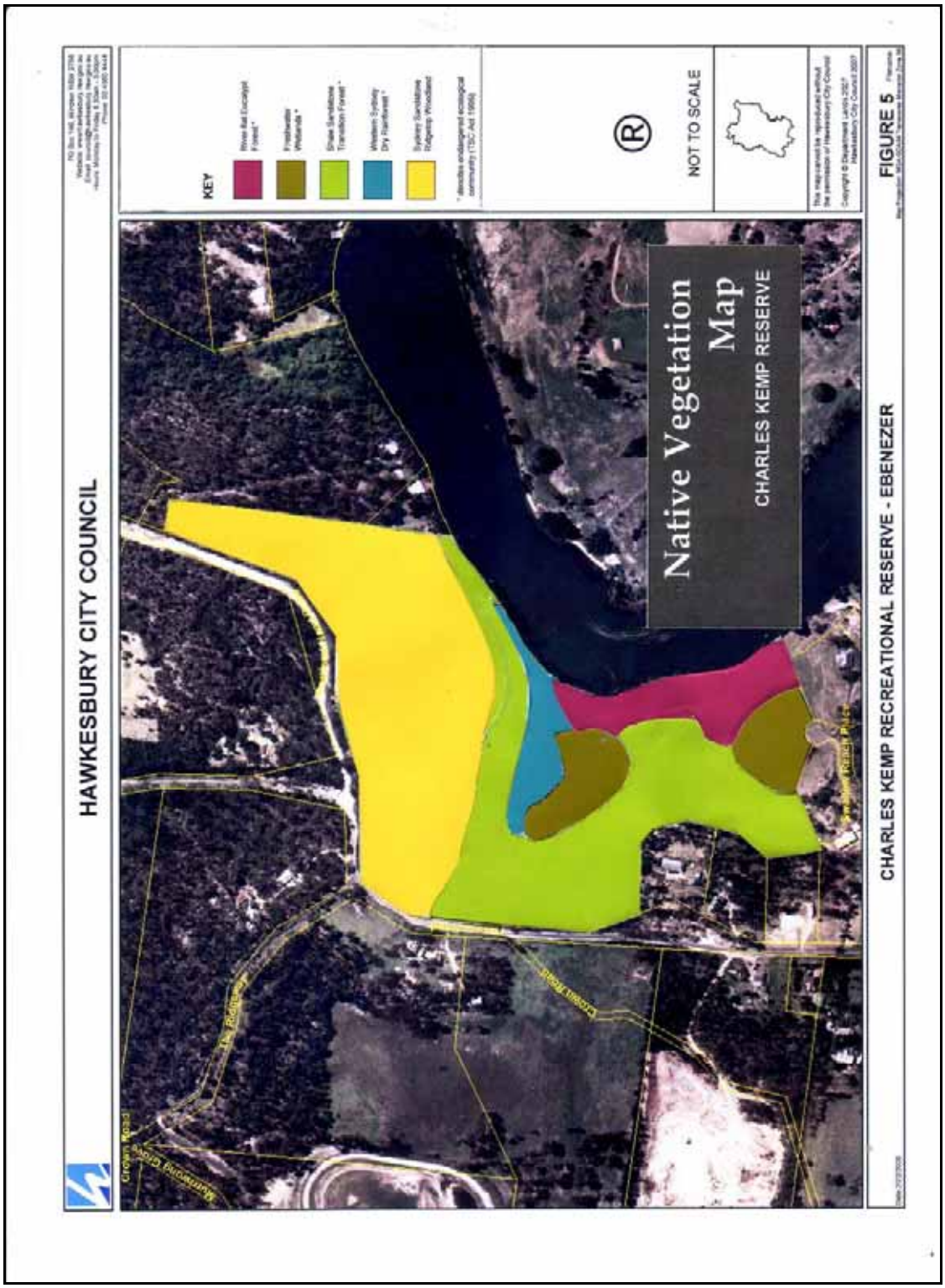

HAWKESBURY CITY COUNCIL
KEY
NOT TO SCALE
Native Vegetation Map
CHARLES KEMP RESERVE
FIGURE 5
CHARLES KEMP RECREATIONAL RESERVE - EBENEZER

PHOTO 3: Small beach (south of old house site) – River-flat Eucalypt Forest on steep riverbanks and extensive weed growth (01.02.2008)

PHOTO 4: Northern valley – Freshwater Wetlands were drained and farmed but still retain a high level of biodiversity (01.02.2008).

PHOTO 5: Shale Sandstone Transition Forest – lower western gully near the walking track to Tizzana Road (01.02.2008).

PHOTO 6: Western Sydney Dry Rainforest with old growth emergent Ironbarks – lower southern slope (northern valley) (01.02.2008).

PHOTO 7: Western Sydney Dry Rainforest with dominant Grey Myrtle *(Backhousia myrtifolia)* (northern valley) (01.02.2008).

PHOTO 8: Sydney Sandstone Ridgetop Woodland along upper track to Tizzana Road – old growth Grey Gum *(Eucalyptus punctata)* (01.02.2008).

PHOTO 9: Sydney Sandstone Ridgetop Woodland near Portland Head Road – Grey Gum and Narrow-leaved Apple (01.02.2008).

PHOTO 10: Sydney Sandstone Ridgetop Woodland along top of sandstone scarp/ lookout (01.02.2008).

PHOTO 11: Shale Sandstone Transition Forest and rock outcrops along lower scarp [looking south] (29.02.2008).

Figure 5: Native Vegetation Map supersedes previous mapping of the reserve by Hawkesbury City Council (2007) and NPWS Native Vegetation Maps of the Cumberland Plain, Western Sydney, (1:25000 Map Series, 2002). Over 170 native plant species have been identified in Charles Kemp Reserve (refer to *Appendix II – Schedule of Existing Native Plant Species)*. The reserve's ecological communities are described as follows:-

A. River-flat Eucalypt Forest on coastal floodplains (RFEF)

Full description:	River-flat eucalypt forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions.
Former descriptions:	Sydney Coastal River-flat Forest (Alluvial Woodland/ Riparian Forest).
Conservation significance:	listed as an endangered ecological community (Part 3 of Schedule 1 TSC Act 1995).
Condition/ status in reserve:	highly fragmented/ modified; generally <10-30% native canopy cover; exotic weeds dominate understorey/ ground stratum.
Current threats:	bank erosion, exotic weeds and recreational impacts.
Canopy species:	River Oak *(Casuarina cunninghamiana),* Forest Red Gum *(Eucalyptus tereticornis),* Rough-barked Apple *(Angophora floribunda) and* White Cedar *(Melia azedarach* var. *australasica).*
Small tree/ shrub stratum:	Green Wattle *(Acacia parramattensis),* Cheese Tree *(Glochidion ferdinandi),* Sandpaper Fig *(Ficus coronata),* Corkwood *(Duboisia myoporoides),* Tree Violet *(Hymenanthera dentata), Clerodendrum tomentosum, Rapanea variabilis, Cassine australis, Notelaea longifolia* var. *longifolia* and *Trema aspera.*
Ground stratum:	*Pteridium esculentum, Oplismenus aemulus, Microlaena stipoides* var. *stipoides, Lomandra longifolia, Einadia* spp., *Entolasia stricta* and *Pratia purpurascens.*
Climbers:	*Eustrephus latifolius, Geitonoplesium cymosum, Pandorea pandorana, Cayratia* sp. *Glycine* spp. and *Desmodium* spp.
Shallow-water & semi-aquatics:	*Phragmites australis, Juncus usitatus, Persicaria decipiens* and *P. hydropiper.*

B. Freshwater Wetlands on coastal floodplains (FW)

Full description:	Freshwater wetlands on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions.
Conservation	listed as an endangered ecological community (Part 3

significance:	of Schedule 1 TSC Act 1995).
Condition/ status in reserve:	highly fragmented/ modified (back swamps); generally <10-30% remnant native herbaceous cover (sedgeland); drained/ converted to pastureland; dominant exotic grasses/ weeds.
Current threats:	sub-surface drainage lines, mowing/ slashing and exotic weeds.
Ground stratum:	Tall Sedge *(Carex appressa),* Common Rush *(Juncus usitatus),* Slender Knotweed *(Persicaria decipiens),* Sedge *(Cyperus polystachyos),* Lesser Joyweed *(Alternanthera denticulata),* Swamp Pennywort *(Centella asiatica),* Mullumbimby Couch *(Cyperus brevifolius)* and *Pratia purpurascens.*

C. Shale Sandstone Transition Forest (SSTF)

Full description:	Shale Sandstone Transition Forest (low sandstone influence – middle ridge); and Shale Sandstone Transition Forest (high sandstone influence – upper western valleys and slopes);
Former descriptions:	Ironbark-Red Gum-Grey Gum Woodland.
Conservation significance:	listed as an endangered ecological community (Part 3 of Schedule 1 TSC Act 1995).
Condition/ status in reserve:	middle ridge – fragmented/ modified; <10-30% native canopy cover; exotic weeds dominate understorey/ ground stratum. upper western valleys and slopes – largely intact/ 70-100% native canopy; some exotic weeds in understorey/ ground stratum.
Current threats:	adjoining residential development – increased nutrients, altered drainage, exotic weeds and die-back (Bell-birds).
Canopy species:	Forest Red Gum *(Eucalyptus tereticornis),* Narrow-leaved Ironbark *(Eucalyptus crebra),* Broad-leaved Ironbark *(Eucalyptus fibrosa),* Grey Gum *(Eucalyptus punctata),* Sydney Peppermint *(Eucalyptus piperita),* Turpentine *(Syncarpia glomulifera),* Rough-barked Apple *(Angophora floribunda)* and Thin-leaved Stringybark *(Eucalyptus eugenioides).*
Small tree/ shrub stratum:	Narrow-leaved Apple *(Angophora bakeri),* Sydney Green Wattle *(Acacia parramattensis),* Sally Wattle *(A. floribunda),* Coast Myall *(A. binervia),* Blackthorn *(Bursaria spinosa),* Tick Bush *(Kunzea ambigua),* Ball Everlasting *(Ozothamnus diosmifolium),* Narrow-leaved Geebung *(Persoonia linearis),* Coastal

	Honeysuckle *(Banksia integrifolia), Dodonaea* spp. and *Leucopogon spp..*
Ground stratum:	*Themeda australis, Imperata cylindrica, Microlaena stipoides, Lomandra longifolia, Pteridium esculentum, Calochlaena dubia, Adiantum aethiopicum, Pratia purpurascens, Entolasia* spp.*, Aristida vagans*, *Einadia* spp. and *Wahlenbergia* spp.
Climbers:	*Eustrephus latifolius, Geitonoplesium cymosum, Pandorea pandorana, Clematis* sp., *Cayratia* sp. and *Glycine* spp.

D. Western Sydney Dry Rainforest (WSDR)

Full description:	Western Sydney Dry Rainforest in the Sydney Basin Bioregion.
Former descriptions:	Dry Rainforest and Vine Thicket.
Conservation significance:	listed as an endangered ecological community (Part 3 of Schedule 1 TSC Act 1995).
Condition/ status in reserve:	generally intact native canopy cover (100%)/ modified ground stratum (past grazing); restricted range/ distribution on sheltered slopes/ gullies; exotic weeds present in ground stratum.
Current threats:	bushfire, exotic weeds, feral animals, recreational impacts/ multiple tracking and climate change.
Emergent canopy species:	Narrow-leaved Ironbark *(Eucalyptus crebra),* Grey Gum *(Eucalyptus punctata),* Rough-barked Apple *(Angophora floribunda)* and Forest Red Gum *(Eucalyptus tereticornis).*
Small tree/ closed canopy:	Grey Myrtle *(Backhousia myrtifolia)* [dom.], Prickly-leaved Paperbark *(Melaleuca styphelioides)*, Whalebone Tree *(Streblus brunonianus),* Cheese Tree *(Glochidion ferdinandi),* Port Jackson Fig *(Ficus rubiginosa), Rhodamnia rubescens, Acmena smithii, Alectryon subcinereus, Clerodendrum tomentosum, Rapanea variabilis, Cassine australis, Notelaea longifolia* var. *longifolia* and *Trema aspera*.
Ground stratum:	*Doodia aspera*, *Adiantum aethiopicum, Blechnum cartilagineum, Microlaena stipoides, Centella asiatica, Pellaea falcata* var. *falcata*, *Oplismenus aemulus* and *Pratia purpurascens.*
Climbers:	*Aphanopetalum resinosum*, *Cayratia clematidea, Eustrephus latifolius, Geitonoplesium cymosum, Morinda jasminoides, Pandorea pandorana, Maclura cochinchinensis, Rubus* spp., *Smilax australis* and *S. glyciphylla, Glycine* and *Desmodium* spp.

E. Sydney Sandstone Ridgetop Woodland (SSRW)

Full description:	Sydney Sandstone Ridgetop Woodland.
Former descriptions:	Ironbark-Red Gum-Grey Gum Woodland.
Conservation significance:	not significant/ widespread; well represented in national parks.
Condition/ status in reserve:	largely undisturbed/ not cleared; native woodland open canopy, mixed understorey low trees/ shrubs and ground layer; minimal weeds (eg. road-side).
Current threats:	recreational impacts/ motor-bikes and multiple tracking, exotic weeds.
Canopy species:	Grey Gum *(Eucalyptus punctata)* [dom.], Narrow-leaved Apple *(Angophora bakeri),* Red Bloodwood *(Corymbia gummifera)* and Sydney Peppermint *(Eucalyptus piperita).*
Small tree/ shrub stratum:	Tick Bush *(Kunzea ambigua),* Flax-leaved Wattle *(Acacia linifolia),* Blueberry Ash *(Elaeocarpus reticulatus),* Hairpin Banksia *(Banksia spinulosa), Leucopogon* spp., Narrow-leaved Geebung *(Persoonia linearis),* Blackthorn *(Bursaria spinosa)* and Ball Everlasting *(Ozothamnus diosmifolium).*
Ground stratum:	*Stypandra glauca, Actinotus helianthi*, *Lepidosperma laterale, Cymbopogon refractus, Entolasia marginata, Lomandra longifolia* and *L. multiflora.*
Climbers:	*Hardenbergia violacea* and *Billardiera scandens.*

Conservation significance

The conservation significance of the reserve's native vegetation and ecological communities can be summarised as follows:-

- four listed endangered ecological communities under the *Threatened Species Conservation Act 1995* (TSC Act);
- these four communities are part of the broader Cumberland Plain Endangered Ecological Communities (CPEECs) – the subject of a future Recovery Plan to be prepared by DECC;
- reserve retains valuable habitat for threatened species and acts as a storehouse of genetic diversity with important ecological, scientific and educational values;
- native riparian vegetation is broadly protected under the *Native Vegetation Conservation Act 2003* and *SREP No. 20 Hawkesbury-Nepean River (No.2 – 1997);*
- reserve's bushland adjoins other large areas of contiguous bushland providing enhanced opportunities for bio-linkages and genetic exchange;

- Western Sydney Dry Rainforest (WSDR) is restricted to very small, highly fragmented remnants with a total area of <2 Ha in the Sydney Basin Bioregion;
- occurrence of regionally significant species within Western Sydney Dry Rainforest including *Streblus brunonianus, Croton verreauxii, Maclura cochinchinensis* and *Aphanopetalum resinosum;*
- potential habitat for threatened fauna species such as the Squirrel Glider, Yellow-bellied Glider, Grey-headed Flying Fox, Eastern Free-tail Bat, Greater Broad-nosed Bat, Swift Parrot, Superb Parrot, Turquoise Parrot, Major Mitchell's Cockatoo, Barking Owl, Powerful Owl, Black-chinned Honeyeater, Regent Honeyeater, Square-tailed Kite, Bush Stone Curlew, Speckled Warbler, Eastern False Pipistrelle and Cumberland Plain Land Snail.
- opportunities to restore degraded bushland, develop enhanced habitat values and bio-linkages.

Fauna habitat

There is currently no detailed assessment of the reserve's biodiversity however the range of ecological communities and linkages with adjoining contiguous bushland provide potential habitat for a wide range of native fauna, particularly species with mobility (eg. birds and bats), reptiles and smaller invertebrates. A faunal assessment would provide important base data for determining conservation significance and appropriate management strategies.

The reserve is believed to support common species such as Swamp Wallaby *(Wallabia bicolor),* Common Brush-tailed Possum *(Trichosurus vulpecula),* Ring-tailed Possum *(Pseudocheirus peregrinus)* and Sugar Glider *(Petaurus breviceps).* The reserve offers potential habitat for threatened fauna species such as the Squirrel Glider, Yellow-bellied Glider, Grey-headed Flying Fox, Eastern Free-tail Bat, Greater Broad-nosed Bat and Eastern False Pipistrelle. Microchiropteran bats may use the small hollows and fissures in older canopy trees, particularly old growth specimens.

The reserve provides habitat for 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 may include the Striped Marsh Frog *(Eimnodynastes perionii),* Common Eastern Froglet *(Crinia signfera)* and Peron's Tree Frog.

The Hawkesbury – Nepean catchment is inhabited by more than 190 species of birds, of which at least 46 are associated with aquatic/ riparian habitats. The reserve's riparian habitat and dense undergrowth 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).* Many common bird species were either observed or calls recorded during the study including Galah, King Parrot, Eastern Rosella, Welcome Swallow, Australian Magpie, Australian Magpie-lark, Crested Pigeon, Masked Lapwing, Noisy Miner, Pied Currawong, Bell Miner and Eastern Whipbird. The river valley 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 has potential habitat for endangered bird species such as the Swift Parrot, Superb Parrot, Turquoise Parrot, Major Mitchell's Cockatoo, Barking Owl, Powerful Owl, Black-chinned Honeyeater, Regent Honeyeater, Square-tailed Kite, Bush Stone Curlew and Speckled Warbler.

Notably, the middle ridge fragmented forest (SSTF community) supports a population of Bell Miners or Bellbirds *(Manoria melanophrys).* The unique high-pitched 'bell-like' call of these birds 'fills the air' around the old house site creating an idyllic atmosphere. These native birds however typically display aggressive territorial behaviour, driving away other native insectivorous birds. Of concern is the level of tree stress and die-back in this particular stand of trees. In recent scientific studies the Bell Miner has been associated with increases in psyllid (and other sap sucking insect) infestations, tree stress/ Eucalypt dieback, clearing, weed invasion (especially Lantana), pasture improvement, drought, loss of biodiversity, changing fire and grazing regimes. Bell Miner Associated Dieback (BMAD) is spreading throughout the forest ecosystems of eastern Australia and has been recognised as having national significance. A NPWS/ DECC working group has been established to further investigate BMAD and to develop an appropriate conservation strategy *(Bell Miner Associated Die-back, DECC, 2008).* These issues will need to be addressed in the restoration strategy.

Feral animal populations including European foxes, cats and rabbits are known to occur in the reserve and surrounding areas. Predation by foxes and cats has a significant impact on the recruitment of native faunal populations, particularly ground-dwelling species. Natural regeneration of native plants species can be adversely affected by rabbit populations and a restoration strategy would need to consider these potential impacts. Control and monitoring programs have been very successful in re-establishing native populations.

Exotic weed invasion

Over ninety (90) exotic plant species (cultivated/ naturalised or weeds) have been recorded in Charles Kemp Reserve (refer to *Appendix III – Schedule of Cultivated Exotic Plants and Weed Species).* All of the weed species are typical of the Hawkesbury Valley floodplain. 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. Community consultation identified weed management as an important issue affecting Charles Kemp Reserve. Hawkesbury City Council has funded a contract weed management/ bush regeneration program in the reserve since 2004 (refer to following details).

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.

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). The more fertile alluvial river banks (River-flat Eucalypt Forest), valleys (Freshwater Wetlands) and middle ridge and adjacent slopes (Shale Sandstone Transition Forest) were cleared and farmed for 70 years. These areas have been highly affected by weed invasion. Exotic pasture grasses were introduced and the wetlands were drained. Cattle grazing, altered fire regime and introduced weed species further modified the structure and floristic composition of these natural communities. Although retaining a closed-canopy structure, the small patch of Western Sydney Dry Rainforest would have been impoverished by these changes, particularly clearing/ edge effects and cattle grazing. By contrast, the shrubby open woodland of the northern upper slopes and ridges (Sydney Sandstone Ridgetop Woodland) has remained largely intact. This portion of the reserve has a relatively low level of weed invasion being largely restricted to the upper road-side boundaries.

Although providing some protection and stability to unstable river banks, wetlands and adjacent slopes, weed species continue to have a negative impact on the reserve's four endangered ecological communities, natural biodiversity, scenic and visual amenity. Dense weed thickets of exotic trees, shrubs and smothering vines crowd the river bank and suppress remnant native riparian species. This weed growth severely inhibits natural recruitment and reduces habitat values for a host of endangered native fauna and flora species. Canopy forming weed tree species include Camphor Laurel *(Cinnamomum camphora),* Coral Tree *(Erythrina X sykesii)* and Black Willow *(Salix nigra/ agg. spp).* The dominant tall shrubby weeds along the river bank

include Lantana *(Lantana camara)*, Privets *(Ligustrum* spp.*)* and Green Cestrum *(Cestrum parqui).* Shrubs such as Castor Oil Plant *(Ricinus communis)*, Wild Tobacco *(Solanum mauritianum),* Mickey Mouse Bush *(Ochna serrulata)* and Paddy's Lucerne *(Sida rhombifolia)* are also present. The most common exotic vines and climbers are Balloon Vine *(Cardiospermum grandiflorum),* Turkey Rhubarb *(Acetosa sagittata),* Moth Vine *(Araujia hortorum),* Madeira Vine *(Anredera cordifolia)* and Bridal Creeper *(Myrsiphyllum asparagoides).* Persistent perennials include Trad *(Tradescantia fluminensis),* Crofton Weed *(Ageratina adenophora)* and Fennel *(Foeniculum vulgare).*

Exotic pasture grasses such as African Love Grass (*Eragrostis curvula),* Paspalum *(Paspalum dilatatum),* Whiskey Grass *(Andropogon virginicus),* Rhodes Grass *(Chloris gayana),* Barnyard Grass *(Echinochloa crus-galli),* Pigeon Grass *(Setaria* sp.*), Ehrharta* sp. and Kikuyu Grass *(Pennisetum clandestinum)* dominate the open grassed areas and drained wetlands. The exotic Box Elder *(Acer negundo)* is colonising the drained wetlands.

Some of the scheduled weeds are declared as noxious under the *Noxious Weeds Act 1993* (Hawkesbury River County Council control area). Refer to *Table 4: Noxious Weed Species – Charles Kemp Reserve* for required action).

TABLE 4:
Noxious Weed Species – Charles Kemp Reserve

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

Aquatic and semi-aquatic weeds

The section of Hawkesbury River adjoining the reserve is subject to infestation by noxious aquatic and semi-aquatic species (not shown in Table 4). 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 concern.

PHOTO 12: View looking south from middle ridge – cleared paddocks dominated by exotic pasture grasses (10.01.2008).

PHOTO 13: View from middle ridge looking north-east – exotic pasture grasses/ garden escapes [left foreground] (11.08.2006).

PHOTO 14: Upper riverbank near old house site is dominated by exotic weeds/ Balloon Vine [background] (01.02.2008).

PHOTO 15: Riverbank near south-eastern boundary – Black Willow *(Salix nigra)* [background] is a notifiable noxious weed (29.02.2008).

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 *(LandArc, 2007).*

Weed management/ bush regeneration strategy
The weed management/ bush regeneration strategy has the following aims:-

- to seek an increased level of funding assistance/ grants;
- to expand and consolidate current program using contract bush regenerators;
- to encourage local community (volunteer) involvement as an integral part of the program; and
- to maintain focus on recovery, recruitment, long term durability, expansion and consolidation of fragmented natural habitat, native populations and species.

Current program (contract bush regeneration)
Over the past four years, Council has funded a program using contract bush regenerators. Further on-going funding should be allocated to develop and expand this program. The strategy has been structured in accordance with specific site conditions, level of disturbance and weed invasion, relative resilience and integrity of the reserve's ecological communities. The existing work has been conducted primarily along the riverbank between the irrigation pump (south of the old house site) and dry rainforest (southern edge). The heavily weed infested area adjoining the old house site has not been included in this work to date. The strategy has focussed on areas with good native

groundcover (including fragmented native understorey and canopy species) which have been affected by invasive weed growth. These areas have been selected as they provide significant opportunities for natural regeneration, consolidation and long term durability. The weed management approach has used a combination of hand weeding, 'rake and rolling' (*Tradescantia* sp.), pile-burning, glyphosate herbicidal 'scrape and paint' (*Cestrum* sp.) and 'cut and paint' (*Cardiospermum* sp.) applications. Some restoration planting using local native plant stock (eg. *Alphitonia excelsa*) has also been undertaken.

It is recommended that the program continues to selectively target weed species, consolidate and expand upon current gains, reduce edge to area ratios of targeted areas and improve the overall quality, resilience and long term durability of the reserve's endangered ecological communities. The River-flat Eucalypt Forest (riverbank) and Western Sydney Dry Rainforest communities should remain the highest priorities for further primary work and secondary consolidation. Restoration planting of native canopy/ sub-canopy species, using only local-provenance sourced genetic stock, should be considered for the riverbank and adjoining areas (ie. old house site, middle ridge and adjacent slopes). This approach would address the high level of canopy/ sub-canopy fragmentation in these areas and further promote bank stability and habitat values. 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.

No restoration planting should be undertaken within or along the edges of the Western Sydney Dry Rainforest to ensure protection of ecological integrity and intactness of this rare community. Natural regeneration should be promoted and assisted as outlined above. Edge effects (eg. bushfire and adjoining recreational uses) and trampling (eg. multiple tracking) should be restricted and managed in this sensitive ecological area.

Following the proposed blocking/ removal of sub-surface drains within the two wetland areas, selective targeting of weed species should be implemented to encourage native regeneration. Broad-scale mowing practices and encroachment issues affecting the southern wetland (adjacent to Swallow Reach Place) also need to be addressed. Although some native wetland plant species may be encouraged by these changes to periodic flood regime, restoration planting using local wetland species would help to accelerate this process. The restoration of periodic flooding of these wetlands is likely to enhance the reserve's biodiversity and provide further opportunities for passive/ nature-based recreational activities.

PHOTO 16: Remnant wetland (southern valley), dominated by exotic weeds, should be restored following blocking/ removal of sub-surface drainage line (01.02.2008).

Weed management and restoration of old house site and garden
It is recommended that the old house and adjacent structures be demolished and removed, subject to Australian building and safety standards. The 'built footprint' and adjoining areas should be restored in accordance with the weed management and restoration strategy. The aim should be 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 II: Schedule of Existing Native Species.*

The garden surrounding the old house site contains a large number of exotic trees, shrubs and climbers (refer to *Appendix III*). It is recommended that most of these be retained as components of the site's cultural landscape heritage. Some undesirable tree species however should be removed under a staged program of restoration and enhancement. These trees for removal include all of the Coral Trees *(Erythrina X sykesii)* and Lemon-scented Gums *(Corymbia citriodora).* The Coral Tree is a fast-growing, colonising weed species with a reputation for shedding large branches, splitting and toppling without any apparent cause (eg. storm event) or evidence of physical damage. The seasonally dense canopies of these trees also suppress opportunities for natural regeneration (ie. restricting light levels and promoting conditions for weed growth).

The Lemon-scented Gums, native to Queensland, have matured and naturalised in this location. They are now regenerating with prolific seedlings evident in the unmown lawns around the house. Without phased removal, these trees will continue to consolidate and exclude regeneration of native (RFEF and SSTF) canopy species. Exotic climbers should also be removed

from native canopy trees. The weed management and regeneration/ restoration strategy should be integrated with proposed passive recreational uses/ development (ie. walking tracks and picnic area – refer to *4.6 Public access and recreation*). It should also be monitored in relation to changes in the Bell Miner population and localised dieback of native canopy species (BMAD – see previous discussion).

PHOTO 17: Old house and garden – dense cover of exotic weeds. Die-back is occurring in remnant native canopy trees (BMAD) [background] (01.02.2008).

PHOTO 18: Scenic vistas from old house and garden are obscured by dense weed growth (*Lantana* sp.) [foreground]. Lemon-scented Gums [right foreground], planted as garden specimens, are seeding prolifically (01.02.2008).

Community volunteer involvement
The local community has identified the need for volunteer involvement (see *3.0 Community consultation – 3.3 Key Issues).* This plan of management supports the establishment of a community-based volunteer BushCare group to assist in the management and rehabilitation of the reserve's bushland. It is envisaged that a BushCare group would help to promote a greater sense of community ownership of the reserve as well as creating opportunities for better management, monitoring and regulation of inappropriate visitor behaviour and illegal uses.

A Bushcare program would be coordinated through Council staff. 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. The program is an integral part of managing Hawkesbury City's bushland. NSW government youth training initiatives and natural heritage grant funding provide further opportunities for implementing the program.

Bushfire management
The community workshop was attended by a representative of Hawkesbury District Rural Fire Service (RFS). It was confirmed that there has been hazard reduction exercises carried out in the reserve in recent years however any further hazard reduction would not be initiated before 2011-12.

Fire will continue to be an important factor shaping the structural character, species diversity and sustainability of the reserve's ecological communities. Conservation management of the reserve's ecological communities, including four EECs, needs to be integrated with the objectives of fire management policy (ie. protection of life and property). Accordingly, fire management should be coordinated with the Hawkesbury District Rural Fire Service (RFS) and DEC (formerly 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.

4.6 PUBLIC ACCESS AND RECREATION

Recreational setting
Charles Kemp Reserve's unique combination of scenic river setting, natural bushland and cultural rural landscapes, Aboriginal archaeological heritage and endangered biodiversity are key values of local, regional and state significance. These values and the issues affecting them have been discussed in previous sections. Recreational values are closely linked with environmental quality and opportunities provided by the setting. Charles Kemp Reserve provides the following key recreational values and opportunities:

- public access/ river and foreshore accessibility;
- natural riparian bushland and cultural/ rural setting;
- tranquillity, beauty and quiet solitude;
- elevated scenic vistas and overall visual quality;
- opportunities for low-key passive and nature-based recreation;
- opportunities for day-use activities (ie. picnicking, fishing, bushwalking);
- opportunities for observing wildlife/ bird watching; and
- interpretation of natural, cultural and archaeological heritage.

The old house site, located on the reserve's middle ridge, offers special recreational opportunities for quiet relaxation and enjoyment of the reserve and river environs. This elevated and relatively durable site has the potential to offer magnificent views along the river. These views are currently impeded by the level of weed growth and colonisation by garden escapes (refer to weed management and restoration strategy in previous section).

While there is potential to attract regional visitors seeking passive recreational opportunities, the reserve presents serious limitations and constraints with respect to public access, carrying capacity and types of activities and uses. It is important to recognise the sensitive and fragile nature of the reserve's key values. The community consultation process highlighted the need to protect and conserve the reserve's natural and cultural assets and to address potential issues relating to any proposed improvements to public access and recreational facilities.

Existing public access and recreational uses

As discussed in previous sections, Charles Kemp Reserve has no existing recreational facilities or infrastructure. The main point for pedestrian access into the reserve is via the cul-de-sac at the bottom of Swallow Reach Place. Access across the adjoining low-lying wetlands tends to be wet and boggy throughout the year. Too frequently local neighbours are called upon to tow unauthorised vehicles out of this location. Although regulatory signage states that vehicular and motor-bike access is prohibited in the reserve there is currently no vehicular barriers or bollards to physically restrict access. The southern half of the reserve retains a network of 4WD vehicular tracks (formerly for farm use). Sandstone boulders have been recently placed along the western side of the cul-de-sac to restrict vehicular access onto private property adjoining the reserve. A privately-owned mown playing field appears to be partly located within the southern boundary of the reserve. These improvements and current management regime (separate to the adjoining paddock/ wetlands) tends to imply private ownership and potentially restrict public access to this part of the river foreshore. This reserve boundary should be further investigated.

The restricted public access from the cul-de-sac and limited opportunities for parking raise significant issues for future management of the reserve. Pedestrian access along the southern 'wetland' track can be very difficult, particularly after rain periods. An alternative exists along the south-western boundary adjacent to private property. The mown grass in this location provides the best all weather pedestrian access into the reserve.

The reserve can also be accessed via a walking track leading from the Tizzana Road/ Porters Head Road intersection to the northern valley. Other walking tracks are spread throughout much of the upper northern part of the reserve. Some of these link to Porters Head Road. A number of tracks radiate from the northern valley and wetland area. Many tracks are concentrated within the location described in this plan of management as the 'pinch-point' between the steep sandy river banks and the sandstone scarp. Unformed tracks lead to favoured locations for jumping/ diving below the cliffs and scenic vantage points along the upper scarp area.

Over the past decade since transfer of the land from private ownership, the reserve has remained relatively unknown outside the local area. There is no road-side directional signage or reserve identification signage at any of the entry points to attract visitors. Nevertheless, the reserve is already affected by a range of negative recreational impacts. The old house has been vandalised beyond repair restricting any opportunities for adaptive re-use. Off-road vehicles and motor-bike riders ignore regulatory signage and continue to use the reserve's network of tracks. Subject to weather conditions (eg. rain periods), these illegal activities can create significant environmental issues with multiple tracking, damage to native vegetation, erosion/ compaction of soils, noise pollution and vehicles becoming bogged. These impacts are largely dispersed within the reserve's open paddocks and cleared areas.

Notably, the most significant negative impacts are concentrated within one of the most ecologically sensitive and fragile natural areas of the reserve – the steep embankments and cliffs adjoining the river and northern valley. The 'pinch-point' is a transitional or ecotonal area for three out of four of the reserve's listed endangered ecological communities. This location supports at least four (4) regionally rare and significant native plant species associated with the Western Sydney Dry Rainforest community. It also offers potential habitat for at least eighteen (18) threatened fauna species (refer to previous discussion in *Conservation Significance*).

Recreational activities such as fishing, swimming, diving/ jumping and illegal camping are all having a significant impact on the integrity of this location. The unauthorised construction of multiple rope swings, ladders and elevated platforms for jumping/ diving are a key issue for management. These activities are leading to cumulative negative impacts on the reserve's environmental quality and are unsustainable. These impacts include clearing of native

vegetation, tree felling and damage to trunks/ branches, multiple tracking and riverbank erosion, littering and rubbish dumping, lighting of fires and vandalism. The natural rock outcrops/ overhangs and riverbanks in this location are being littered with discarded building materials, paper, plastics, magazines, bottles and cans.

Scenic quality and natural bushland character, key values identified in this study, are being significantly compromised by these activities. Public safety and risk management issues need to be addressed, particularly with respect to constructed diving platforms, rope swings and ladders on extremely steep terrain. The consumption of alcohol appears to be an important part of these activities. The site's relative isolation (at least 10-15 minutes walk to Tizzana Road/ Porters Head Road intersection) raises further issues in relation to public safety. Peak visitor loadings during events such as the "Bridge to Bridge" water skiing and jet boat races in May and November each year have the potential to create further management issues for this sensitive ecological area.

Managing recreational impacts

Over time these creeping or incremental impacts gradually lead to natural resource degradation, loss of experiential quality and displacement or exclusion of other user groups. An understanding of this process has important implications for the management of the reserve. Improvements to accessibility and provision of recreational infrastructure (eg. car parking and a picnic area) have the potential to increase negative impacts. These may be environmental and social. Increased visitor loadings may increase the level of natural resource degradation. Larger numbers of weekend visitors could impact on the tranquillity and solitude of the reserve, important values expressed in community consultation. Social impacts may include parking issues, perceived crowding (eg. picnic area), conflict between adjoining residents or user groups over incompatible activities and dissatisfaction with the overall experience.

These issues need to be considered in light of potential positive benefits in raising the reserve's profile which may include increased state and federal government funding for improvements, improved management and broader conservation measures. The strategy should seek to reduce recreational impacts in fragile and environmentally sensitive areas. It should provide enhanced opportunities for visitors to enjoy the reserve's scenic qualities (eg. picnic area/ lookout) and natural environment. The reserve also offers special opportunities for interpretation and education. It is essential that all environmental and social impacts are managed on a sustainable basis.

PHOTO 19: Main entry point from Swallow Reach Place cul-de-sac – private playing field and broad-scale mowing within reserve (29.02.2008).

PHOTO 20: Signage restricting unauthorised vehicular access via 4WD track – no existing physical barriers or controls (29.02.2008).

PHOTO 21: Vandalised old house on middle ridge – proposed for demolition and site restoration (01.02.2008).

PHOTO 22: The 'pinch-point' – unauthorised structures/ platforms for rope swings, tree felling, soil compaction and erosion (10.01.2008).

PHOTO 23: Rope swing, multiple tracking, trampling/ removal of vegetation cover and soil erosion at the 'pinch-point' (10.01.2008).

PHOTO 24: Vandalism to rock outcrops and overhangs. Extensive multiple tracking to rope ladders and swings (11.08.2006).

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;
- provide and maintain safe, easy access into the reserve and to the river having regard for environmental constraints and protection of natural, cultural and Aboriginal heritage values;
- establish low-key, passive and nature-based recreational facilities within the most durable sites;
- implement measures to improve visitor management and education in low-impact activities;
- restrict visitor dispersal within fragile ecological areas and regulate inappropriate high-impact recreational activities;
- 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, cultural and Aboriginal heritage values.

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

4.7 VISION STATEMENT

The following statement provides a vision for Charles Kemp Reserve which forms the basis for the following management strategies:-

"To ensure appropriate protection, management and enhancement of the reserve's unique natural, scenic, cultural, archaeological, environmental and recreational values in accordance with the objectives of community land management for the benefit of the broader community and for future generations".

...

5.0 MANAGEMENT STRATEGIES

5.1 OVERVIEW

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

- *to establish core objectives for each of the community land categories;*
- *to develop an action plan for implementation of core objectives and management strategies (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 masterplan for implementation of the strategic plan.*

5.2 COMMUNITY LAND – CORE OBJECTIVES

In accordance with the *Local Government Act 1993,* each category and sub-category are provided with a set of core objectives. Refer to *Table 5: Schedule of Core Objectives.*

5.3 ACTION PLAN

The following Action Plan (refer to *Table 6: Sheets 1-8*) is divided into four separate sections based on desired outcomes and core objectives for this community land (see column 1). Each section includes the following:-

- *performance targets* or *management objectives* (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)
The sections are divided into the following headings in accordance with the desired outcomes and core objectives as shown:-

1. **Community land management – development, land uses, activities, leases, licences and other estate**
   To establish an appropriate management framework and guidelines for assessing development, land uses, activities,

leases, licences and other estate in compliance with requirements for community land categorised as natural area – watercourse, natural area – wetland, natural area – escarpment and natural area – bushland.

2. **Aboriginal, archaeological and cultural heritage**
   To provide appropriate protection and management of 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 provide and maintain appropriate recreational infrastructure including low-key public access/ linkages and opportunities for passive/ nature-based recreation.

Performance targets (column 2)
The *desired outcomes* and *core objectives* (refer to *2.3 Community Land Categorisation and Table 5: Schedule of Core objectives)* have guided the development of *performance targets* in the Action Plan.

Item no./ Management actions (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: Community Land – development guidelines **A1** to **A9**, followed by Sec. 2 – **B1 to B6**, 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 (column 6)
The priority for each management action is 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

5.4 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.

5.5 LANDSCAPE MASTERPLAN

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

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TABLE 5
SCHEDULE OF CORE OBJECTIVES

	core objectives
community land management	Management strategies must be consistent with community land categories and their respective core objectives as identified in this plan of management.

Core Objectives: Management of community land categorised as a Natural Area (36E)

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

a) to conserve biodiversity and maintain ecosystem function in respect of the land, or the feature or habitat in respect of which the land is categorised as a natural area, and;
b) to maintain the land, or that feature or habitat, in its natural state and setting, and;
c) to provide for the restoration and regeneration of the land, and;
d) to provide for community use of and access to the land in such a manner as will minimise and mitigate any disturbance caused by human intrusion, and;
e) to assist in and facilitate the implementation of any provisions restricting the use and management of the land that are set out in a recovery plan or threat abatement plan prepared under the Threatened Species Conservation Act 1995 or the Fisheries Management Act 1994."

Core Objectives: Management of community land categorised as a Natural Area: Watercourse (36M)

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

a) to manage watercourses so as to protect the biodiversity and ecological values of the instream environment, particularly in relation to water quality and water flows, and
b) to manage watercourses so as to protect the riparian environment, particularly in relation to riparian vegetation and habitats and bank stability, and
c) to restore degraded watercourses, and
d) to promote community education, and community access to and use of the watercourse, without compromising the other core objectives of the category".

Core Objectives: Management of community land categorised as a Natural Area: Wetland (36K)

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

a) to protect the biodiversity and ecological values of wetlands, with particular reference to their hydrological environment (including water quality and water flow), and to the flora, fauna and habitat values of the wetlands, and
b) to restore and regenerate degraded wetlands, and;
c) to facilitate community education in relation to wetlands, and the community use of wetlands, without compromising the ecological values of wetlands".

Core Objectives: Management of community land categorised as a Natural Area: Escarpment (36L)

"The core objectives for management of community land categorised as an escarpment are:

a) to protect any important geological, geomorphological or scenic features of the escarpment, and
b) to facilitate safe community use and enjoyment of the escarpment".

Core Objectives: Management of community land categorised as a Natural Area: Bushland (36J)

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

a) to ensure the ongoing ecological viability of the land by protecting the ecological biodiversity and habitat values of the land, and flora and fauna (including invertebrates, fungi and micro-organisms) of the land and other ecological values of the land, and;
b) to protect the aesthetic, heritage, recreational, educational and scientific values of the land, and;
c) to promote the management of the land in a manner that protects and enhances the values and quality of the land and facilitates public enjoyment of the land, and to implement measures directed to minimising or mitigating any disturbance caused by human intrusion, and;
d) to restore degraded bushland, and;
e) to protect existing landforms such as natural drainage lines, watercourses and foreshores, and;
f) to retain bushland in parcels of a size and configuration that will enable the existing plant and animal communities to survive in the long term, and;
g) to protect bushland as a natural stabiliser of the soil surface".

1 of 1

TABLE 6
ACTION PLAN

	Performance Target (Management objectives)	Item	Means of Achievement (Management Actions)	Means of Assessment (of the actions)	Priority
community land management	**Broad Outcome: To establish an appropriate management framework and guidelines for assessing development, land uses, activities, leases, licences and other estate.** **Core Objectives: Management of community land categorised as natural areas: watercourse (s36N), wetland (s36N), escarpment (s36L) and bushland (s36L).**				
	Guiding legislation: To ensure the reserve's planning and management are in accordance with relevant legislation and policy. **Future development, land uses and activities:** To ensure consistency with community land categories and core objectives for natural areas: watercourse, wetland, escarpment and bushland To protect the reserve's values and its passive recreational setting from inappropriate uses, activities and development. To provide a balanced and appropriate level of passive/ nature-based recreational infrastructure. To implement actions which will prevent incremental impacts and address threatening processes. To address public safety and security issues. To improve visitor education and interpretation. To ensure adjoining land uses, activities or development do not adversely impact on reserve. To ensure that development proposals will have a net positive impact in relation to identified values. To restrict harvesting processes and ensure protection of any threatened species. To permit the use of the land for sustainable development of appropriate low impact recreational facilities in accordance with natural area categories and core objectives. **Leases, licences and other estate:** To provide express authorisation for appropriate leases, licences or other estate over community land. To ensure consistency with relevant legislation affecting the uses and activities on community land. To permit the granting of leases, licences or other estate which are consistent with community needs and the community land core objectives.	A1 A2 A3 A4 A5 A6	implement actions identified in this Plan of Management in accordance with Local Government Act 1993 and all other relevant legislation and policy. Development proposals, land uses, activities, leases, licences and management practices must be consistent with the following requirements: - demonstrate consistency with community land core objectives - protect and enhance natural/ cultural 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 bushland and riparian habitat, bank stability and bio-linkages; - promote balanced, sustainable management and development of minimal, passive recreational infrastructure and opportunities for low-impact/ nature-based activities; - restrict inappropriate uses and activities, particularly high impact activities; - adequately provide for public access, equity and broad community use; - maintain and improve public safety and security; - facilitate programs in community education and interpretation of identified values; - ensure that reserve's identified values are not adversely affected, alienated or fragmented in any way by adjoining land uses or activities. Development proposals which may directly or indirectly threaten the natural/ cultural setting, scenic, heritage and/ or biodiversity values are not permissible. Proposed development, activities and uses must be consistent with threatened species legislation - Threatened Species Conservation Act 1995 and Environment Protection and Biodiversity Conservation Act 1999. This Plan of Management expressly authorises the development of proposed public access and minimal passive/ nature-based recreational facilities (as shown in Figure 6: Landscape Masterplan) subject to compliance with core objectives for the community land category and development guidelines (see items A2-A4 and D1-D18). This Plan of Management expressly authorises the granting of leases, licences or other estate over the community land for the purposes of providing goods, services and facilities, and the carrying out of activities, appropriate to current and future needs within the local community and of the wider public in relation to any of the following: - public recreation, social and educational activities; - the physical, cultural, social and intellectual welfare or development of persons; and - only if the purpose for which it is granted is consistent with the core objectives of its categorisation as natural area [see s.47J lease or licence in respect of natural area].	Adoption of plan of management. Level of implementation over 5 years. Number and % of proposed developments that address and adhere to development guidelines. Measure trends over time. as above Number and % of proposed developments that address and adhere to development guidelines Proposed staged development/ capital works items completed subject to available funding and priorities. Leases/ licences granted in accordance with Local Government Act 1993 and this Plan of Management. Assess against Council policies, principles and permitted uses consistent with community land categories and core objectives.	high ongoing ongoing ongoing ongoing

TABLE 6 [cont'd]
ACTION PLAN

	Performance Target (Management objectives)	Item	Means of Achievement (Management Actions)	Means of Assessment (of the actions)	Priority
community land management	**Desired Outcome:** To establish an appropriate management framework and guidelines for assessing development, land uses, activities, leases, licences and other estate. **Core Objectives:** Management of community land categorised as natural area, watercourse (SRM), wetland (SRM), escarpment (SRL) and bushland (SRL).				
	Leases and licences [cont'd]: To permit the granting of short-term and casual licences consistent with the relevant legislation.	A7	In accordance with Pt 1, Div 3 Cl.117 of the Local Government (General) Regulation 2005, leases, licences and other estates granted for the following purposes are exempt from the provisions of s.47A of the Local Government Act 1993:- (1) the provision of pipes, conduits or other connections under the surface of the ground for the connection of premises adjoining the community land to a facility of the council or other public utility provider that is situated on the community land; (2) use and occupation of the community land for events such as: - a public performance (ie. a theatrical, musical or other entertainment for the amusement of the public); - the playing of a musical instrument, or singing for a fee or reward; - engaging in a trade or business; - playing of any lawful game or sport; - delivering a public address; - conducting a commercial photographic session; - picnics and private celebrations such as weddings and family gatherings; - filming. The use or occupation of community land for such short term or casual events listed is exempt only if the use or occupation does not involve the erection of any building or structure of a permanent nature.	Short-term and casual licences granted in accordance with relevant legislation and this Plan of Management. Measure trends over time.	ongoing
	Easements: To permit the granting of easements which are consistent with the Local Government Act 1993.	A8	This Plan of Management expressly authorises the granting of easements over the community land for the purpose of providing pipes, conduit or other connections under the surface of the ground. This is limited to easements that connect land adjoining community land to an existing water, sewer, drainage or electrical facility of council or other public utility provider that is situated on community land. The granting of easements on community land must be consistent with community land categories, their core objectives and the development guidelines in this Plan of Management.	Easements granted in accordance with relevant legislation and this Plan of Management.	ongoing
	Reserve boundaries: To clarify reserve boundaries and management.	A9	Survey southern and south-western boundaries of reserve [ie. open mown grassed areas adjoining private land] to establish appropriate management regimes [see items C23-C24].	Investigation completed and recommendations implemented.	very high
heritage	**Desired Outcome:** To provide appropriate protection and management of Aboriginal archaeological and cultural heritage values. **Core Objectives:** Management of community land categorised as natural area, watercourse (SRM), wetland (SRM), escarpment (SRL) and bushland (SRL).				
	To ensure improved protection and management of identified and potential archaeological sites.	B1	Existing archaeological sites and relics and potential archaeological deposits (PAD) 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 further research, investigation and interpretation of archaeological sites and relics within the reserve and to ensure appropriate protection and management.	B2	In consultation with traditional Aboriginal custodians, conduct further investigation and research of Aboriginal and archaeological heritage within the reserve to determine the extent and scale of these relics or deposits, particularly with respect to proposed site-works (ie. demolition of old house and landscape restoration). Refer to items D13-D14.	Investigations undertaken and recommendations implemented for protection and management of archaeological sites and relics prior to commencement of site-works.	very high

TABLE 6 [cont'd]
ACTION PLAN

	Performance Target (Management objectives)	Item	Means of Achievement (Management Actions)	Means of Assessment (of the actions)	Priority
heritage	Derived Outcome: To provide appropriate protection and management of Aboriginal, archaeological and cultural heritage values. Core Objectives: Management of community land categorised as natural area, watercourse (S36A), wetland (S36A), escarpment (S36A) and bushland (S36A).				
	To promote dialogue with traditional custodians and interpretation of Aboriginal cultural heritage.	B3	Install generic signage describing the role of "Dewubbin" in the lives of the Darug people [eg. water, fishing, hunting and plants for food, fibres, tools, bark canoe-making, medicine and transportation]. Develop text and graphics in consultation with traditional custodians.	Research undertaken and recommendations implemented. Interpretive signage developed and installed.	high
	To promote research and interpretation of cultural heritage and social values associated with early agricultural development of the site.	B4	Continue to research and expand upon the community's understanding of the reserve's local history [ie. associations with early European settlement in the area, agricultural development and river transportation of produce]. Install interpretive signage. Develop text and graphics in consultation with Kemp family.	Research undertaken and recommendations implemented. Interpretive signage developed and installed.	high
	To investigate cultural significance of old orchard trees and to ensure appropriate protection and management.	B5	Retain and protect remnant orchard trees in cleared paddocks and investigate botanic/ cultural significance (ie. possibility of historic cultivars/ source stock).	Research undertaken and recommendations implemented.	high
	To protect and enhance historic and cultural interpretation of early rural development.	B6	Retain selected cultural garden elements (ie. planted exotic trees, shrubs and climbers) as part of the historic and cultural interpretation of old house site and garden. Ensure removal of all weed species [see items C21-C22].	Historic and cultural landscape elements protected and integrated within restoration strategy.	high
environment and biodiversity	Derived Outcome: To protect, manage and enhance environment quality, scenic character, stream health and biodiversity values. Core Objectives: Management of community land categorised as natural area, watercourse (S36A), wetland (S36A), escarpment (S36A) and bushland (S36A).				
	Water quality, stream condition and hydrology: 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.	high ongoing
	To monitor and control noxious aquatic and semi-aquatic weed species and to provide support for targeted programs along the river.	C2	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.	Targeted noxious aquatic, semi-aquatic and riparian weeds controlled in accordance with legislation.	very high ongoing
	To improve water-holding capacity of modified wetlands and enhance opportunities for restoration.	C3	Block sub-surface drains at the riverbank or preferably break-out and remove sections of pipe in northern and southern valleys [originally installed to drain wetlands for agricultural purposes]. Backfill to pre-existing levels for restoration [see item C18].	Works implemented in accordance with this Plan of Management and subject to available funding	very high
	Protecting scenic character: To protect visual and environmental quality through appropriate conservation strategies.	C4	Provide appropriate resources for upgrading/ enhancing weed management and bush regeneration/ restoration strategy [see item C18]. Protect, enhance and manage scenic vistas and view corridors [see items C5 and C22].	Works implemented in accordance with this Plan of Management and subject to available funding	high ongoing
	To establish appropriate buffers to reserve and enhance scenic and environmental quality.	C5	Establish vegetative buffers along open southern and south-western boundaries to reduce visual impact of expansive mown lawns and create expanded habitat and bio-linkages.	Works implemented in accordance with this Plan of Management and subject to available funding	low
	Protecting threatened biodiversity: To address key threatening processes.	C6	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].	No. of targeted/ funded programs and results. Measure trends over time.	very high ongoing
	To control pest species and to enhance biodiversity and habitat values.	C7	Implement a program to control feral animals [eg. European fox, rabbits] as declared under the Rural Lands Protection Act 1998.	Control of pest animals in accordance with legislation.	medium ongoing
	To monitor changes in Bell Miner Associated Dieback [BMAD].	C8	Monitor changes to population dynamics and BMAD in relation to restoration works around the old house site. Liaise with DECC working group [BMAD].	Research conducted and recommendations implemented. Measure trends over time.	high ongoing

TABLE 6 [cont'd]
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.** **Core Objectives: Management of community land categorised as natural area: watercourse (36M), wetland (36K), escarpment (36L) and bushland (36J).**				
	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.	C9	Ensure that all of the reserve's community land categorised as natural area is managed in accordance with the prescribed best-practice standards of the following:- - *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]; and - 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.	C10	Continue to implement an integrated weed management and targeted restoration strategy with the following objectives: 1. seek an increased level of funding assistance/ grants for the program; 2. expand and consolidate current program using contract bush regenerators; 3. encourage local community (volunteer) involvement; and 4. maintain focus on recovery, recruitment, long term durability, expansion and consolidation of fragmented natural habitat, native populations and species.	see below Level of funding per annum linked to positive net gains. Area/ % of reserve under restoration [over 5 years]. Number of hours undertaken [on-site]. Number of volunteers involved in program. Relative condition/ resilience of bushland [over 5 years].	very high ongoing
	To promote partnerships with state government agencies, industry and local land holders to secure sustainable environmental outcomes.	C11	Continue to seek an improved level of 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].	Level of funding per annum. Measure trends over time.	very high ongoing
	To ensure a high level of expertise in implementing the strategy.	C12	Continue to use skilled contract labour [ie. qualified and experienced contract bush regenerators] to implement the broader objectives of the restoration strategy.	Level of funding for contract bush regeneration per annum. Annual/ quarterly progress reports.	ongoing
	To involve local volunteers in weed management and stewardship in restoring the reserve's natural and scenic values.	C13	Seek to establish a volunteer BushCare group as a key strategy of the program to assist in weed management/ restoration, rubbish removal, monitoring unauthorised activities and community education in appropriate visitor behaviour.	Numbers of volunteers/ groups actively involved in the environmental program. Measure trends over time.	high ongoing
	To provide appropriate assistance and support for community volunteers.	C14	Provide assistance and support in grant applications by volunteer groups. Ensure that volunteers are adequately supported and monitored [eg. leadership/ education, supply of materials, staging, removal of stockpiled weeds, etc].	Number of applications per annum. Measure success rate. Annual/ quarterly progress reports.	high 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.	C15	Continue to protect, maintain and consolidate regeneration/ restoration areas currently targeted in the program. For a detailed discussion of condition, status and conservation strategies refer to *4.0 Basis for Management: Weed management strategy*:- - River-flat Eucalypt Forest [RFEF] on riverbank between irrigation pump [south of old house site] and dry rainforest, excluding embankment adjacent to old house site; and - Western Sydney Dry Rainforest [WSDR incl. buffers/ edges].	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

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TABLE 6 [cont'd]
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.** Core Objectives: Management of community land categorised as natural area: watercourse (36M), wetland (36K), escarpment (36L) and bushland (36J).				
	Weed management/ restoration strategy [cont'd]: To expand the current weed management/ restoration strategy subject to appropriate funding.	C16	Subject to appropriate funding the program should be expanded to the following areas: - Shale Sandstone Transition Forest [SSTF] on middle ridge/ old house site, garden and adjoining embankment; - Freshwater wetlands [modified] in northern and southern valleys [see item C3]; and - Supplementary buffers/ screening to adjacent private properties [see item C5].	as above Measure trends over time.	high ongoing
	To consolidate existing net gains and promote long-term sustainability.	C17	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.	C18	Continue restoration, enhancement and reinstatement strategies for areas which display a high level of soil disturbance, fragmentation and weed invasion [eg. River-flat Eucalypt Forest and Freshwater Wetlands]. Use local native, provenance-sourced species [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. Relative condition/ resilience of RFEF [over 5 years]. Measure trends over time.	high ongoing
	To protect floristic and structural integrity of rare and threatened ecological community.	C19	Ensure that no supplementary restoration or enhancement planting is conducted within or along the edges of the small remnant patch of Western Sydney Dry Rainforest [WSDR]. Use only minimal disturbance bush regeneration techniques. Continue to remove weeds and consolidate buffers/ edges. Ensure bushfire reduction measures [eg. 'burn-offs'] are excluded from WSDR. Restrict opportunities for multiple tracking [see item C20].	Relative condition/ status of WSDR [over 5 years]. Measure trends over time.	high ongoing
	To upgrade protective measures for areas under bush regeneration/ restoration. To manage passive recreational activities and protect natural areas from cumulative negative impacts.	C20	Clearly delineate management zones [eg. threatened fragile habitat and/ or areas under regeneration/ restoration strategy]. Rationalise walking track system [see items D15-D18]. Utilise fallen logs/ branches to construct barriers. Provide signage to help protect fragile natural areas from inappropriate uses and trampling. 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. Monitor level of vandalism to fencing/ signage and compliance [see item D4].	Works implemented in accordance with this Plan of Management and subject to available funding. Number of incidences of vandalism per annum. Measure trends over time.	high ongoing
	To restore old house site and garden. To protect and enhance historic and cultural interpretation of early rural development. To establish strategies for consolidation of natural areas, regeneration/ recruitment. To manage opportunities for public access and enjoyment.	C21	Following demolition of the old house and associated structures [see item D13], restore built footprint and adjoining areas in accordance with weed management/ restoration strategy. Retain selected cultural planting [see items B5-B6].	Works implemented in accordance with this Plan of Management and subject to available funding. Measure trends over time.	very high ongoing
		C22	Under a staged restoration program, remove invasive weed species including generic natives [eg. *Corymbia citriodora*] and exotic canopy species [eg. *Erythrina X sykesii*], selected shrubs, climbers and groundcovers. Re-establish scenic vistas along the river. Establish an open lawn area/ proposed picnic area [see Figure 6: Landscape Masterplan].	Area under restoration/ enhancement per annum. Relative condition/ resilience of SSTF/ RFEF [over 5 years]. Views established and maintained [over 5 years].	high ongoing

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TABLE 6 [cont'd]
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, riparian health, and biodiversity values. Core Objectives: Management of community land categorised as natural area, watercourse (RBM), wetland (RBK), escarpment (RBL) and bushland (RBJ).				
	Managing edge effects/ impacts: To promote dialogue and partnerships with adjoining land owners. To address management and conservation issues affecting reserve's natural areas. To establish strategies for consolidation of natural areas, regeneration/ recruitment. To address negative impacts associated with current management regimes. **Bushfire and flood management:** To promote cooperative partnerships with adjoining land owners, community volunteers and environmental agencies. To address ecological fire management issues affecting the reserve's EECs. To address flood planning, public safety and risk management.	C25 C24 C25 C26 C27	Liaise with adjoining land owners to address environmental issues affecting the reserve. Establish opportunities/ partnerships for enhancing conservation values [ie. improving quality and extent of wetlands, weed management, enhancing buffers/ bio-linkages on adjoining private land, managing view corridors, bush fire management/ reduced fuel zones, conservation agreements and incentives to private land holders]. Restrict extent of mowing/ slashing of open lawns and private playing fields along southern and south-western reserve boundaries [see items A8, C5 and D11]. Encourage natural regeneration/ recruitment of wetland species in low-lying areas. Protect reserve from further clearing, drainage works or soil disturbance. Liaise with Hawkesbury Rural Fire Service and DECC to establish an appropriate fire management regime incl. no fuel and reduced fuel zones to adjoining property [see items D1-D3]. 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]. Seek necessary approvals for ecological burn-offs during weed management/ restoration works. Ensure protection of fragile ecological communities [see item C19]. Ensure that flood planning, management and provision of public access and recreational infrastructure are consistent with relevant strategies and plans [see items D2-D3].	Number of meetings held with land owners. Number of programs initiated/ level of involvement. Measure trends over time. Area under regeneration/ restoration strategy per annum. % native species/ weed species over 5 years. Appropriate fire regimes implemented in accordance with cooperative plans. Approvals granted for ecological fire management. Planning and procedures implemented in accordance with relevant plans.	high ongoing high ongoing high ongoing high ongoing ongoing
recreation, access and facilities	Desired Outcome: To provide and maintain appropriate recreational infrastructure including low-key public access/ linkages and opportunities for passive/ nature based recreation. Core Objectives: Management of community land categorised as natural area, watercourse (RBM), wetland (RBK), escarpment (RBL) and bushland (RBJ).				
	Public safety/ emergency services: To provide and maintain emergency access. To rationalise existing 4WD tracks system. To protect life, property and the environment. To address post fire or flood recovery procedures. **Restricting unauthorised activities:** To promote appropriate uses and activities consistent with natural setting. To improve regulatory control and monitoring of high-impact and unauthorised uses. To restrict concentrated recreational impacts within ecologically sensitive natural areas.	D1 D2 D3 D4	Maintain access for emergency services and maintenance vehicles using a rationalised system of 4WD vehicular tracks linking Swallow Reach Place [southern valley] to middle ridge [proposed picnic area] and northern valley [see item D1]. 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. Maintain existing regulatory signage. *No unauthorised vehicles [including motorbikes] in this reserve. Council and emergency vehicles excepted. Minimum penalty $110.00*. Seek to improve community education in low-impact activities in fragile natural areas. Provide improved regulatory control [incl. ranger inspections] and monitoring by Bushcare group [see item C13]. Target high-impact and unauthorised activities incl. use of 4WD vehicles and motorbikes, camping, lighting of fires, rubbish dumping, vandalism, etc. in reserve.	Emergency vehicular access/ fire trails maintained. Procedures implemented in accordance with Plans. Post fire/ flood inventory prepared. Regular compliance inspections implemented. Monitoring and reporting of unauthorised uses. Measure trends over time.	ongoing ongoing ongoing high ongoing

TABLE 6 [cont'd]
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 provide and maintain appropriate recreational infrastructure including low-key public access/ linkages and opportunities for passive/ nature-based recreation.** Core Objectives: Management of community land categorised as natural area: watercourse (36M), wetland (36K), escarpment (36L) and bushland (36J).				
	Restricting unauthorised activities [cont'd]: To address public safety and risk management issues.	D5	Remove all platforms/ structures, rope ladders, swings and bolts in rocks to restrict unauthorised diving and associated activities. Conduct regular inspections and monitoring to ensure that structures are not replaced.	Works implemented in accordance with this Plan. Number of inspections/ monitoring (seasonal). Measure trends over time.	very high ongoing
	To manage cumulative negative impacts including soil compaction, erosion and removal/ trampling of natural vegetation.	D6	Restrict opportunities for multiple tracking [see item C20]. Remove accumulated rubbish from steep embankments, rock overhangs and caves. Restore clearings and camp-sites in conjunction with the weed management and restoration strategy.	Monitoring, maintenance and remedial works implemented in accordance with this Plan of Management.	high ongoing
	Public access and parking: To improve public access into the reserve. To clarify open boundaries of public reserve and visually soften intrusive elements.	D7	**Swallow Reach Place - main entry/ access point (Stage 1)** Construct a small car parking area in compacted decomposed granite finish/ max. 10 car spaces] on north-western side of the cul-de-sac [same elevation]. Protect adjoining wetland/ hydrology. Restoration/ supplementary planting to be in accordance with weed management strategy. Clarify reserve boundary and reduce area of mown lawn.	Works implemented in accordance with this Plan of Management and subject to available funding.	high
	To improve control over vehicular access and provide limited off-street parking.	D8	Install large-dimension sawn hwd. vehicular barriers or bollards and lockable steel boom-gates [for emergency and service vehicle access] to perimeter of cul-de-sac and proposed car parking area.	Works implemented in accordance with this Plan of Management and subject to available funding.	high
	To improve visitor orientation, recreational experience, awareness of heritage items and appropriate low-impact behaviour.	D9	Install reserve identification signage 'Charles Kemp Reserve' and directional signage/ map of reserve showing track system and proposed picnic area, regulatory and interpretive information. Signs should be durable, easy to read and vandal-resistant.	Signage installed in accordance with this Plan of Management and subject to available funding.	high
	To improve opportunities for safe, all-weather pedestrian access into reserve.	D10	Construct graded access from car parking area to an all-weather walking track along the reserve's south-western boundary [DDG finish/ 1.8m width] linking to proposed picnic area/ scenic rest point [old house site on middle ridge].	Works implemented in accordance with this Plan of Management and subject to available funding.	high
	To clearly delineate reserve boundaries and protect natural/ rural character of the reserve. To restrict the visual impact of intrusive elements and address any encroachments.	D11	Clearly identify the reserve's southern and south-western boundaries adjoining private land subject to boundary survey [see item A5]. Install low-key boundary fencing [ie. tensioned post and wire fencing consistent with rural character] and supplementary buffer planting [see items C16 and C23-C24]. Review options for all-weather pedestrian access to river along southern reserve boundary.	Works implemented in accordance with this Plan of Management and subject to available funding.	medium
	To improve circuit options for visitors and protect sensitive freshwater wetlands. To enhance visitor experience.	D12	**Swallow Reach Place/ southern valley - wetlands boardwalk (Stage 2)** Construct alternate pedestrian access/ wetland boardwalk (Stage 2) from car parking area to lower slopes of southern valley connecting to circuit walking track and picnic area. Protect sensitive wetland from multiple tracking and trampling. Provide interpretive signage [traditional Aboriginal uses, biodiversity, etc.] [see items B3 and D6].	Works implemented in accordance with this Plan of Management and subject to available funding.	medium
	Passive open space/ proposed picnic area: To promote opportunities for passive, low-impact, nature-based recreation. To improve visitor access for a broader range of user groups.	D13	**Demolish and remove old house and associated structures and rehabilitate site (Stage 1):** Demolish and remove old house and associated garden structures in accordance with relevant building, safety and environmental standards and heritage requirements [see item B2]. Restore old house site in accordance with weed management and restoration strategy [see item C21], ensuring approximately 250-300 m² is retained as open mown grass for a picnic area [refer to *Figure 6: Landscape Masterplan*].	Works implemented in accordance with this Plan of Management and subject to available funding.	very high

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TABLE 6 [cont'd]
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 provide and maintain appropriate recreational infrastructure including low-key public access/ linkages and opportunities for passive/ nature-based recreation.** **Core Objectives: Management of community land categorised as natural area: watercourse (36M), wetland (36K), escarpment (36L) and bushland (36J).**				
	Passive open space/ proposed picnic area [cont'd]: To develop appropriate low-key facilities in the most durable location. To restore scenic quality of natural/ cultural setting and provide interpretive facilities.	D14	**Demolish and remove old house and associated structures and rehabilitate site (Stage 1) [continued]:** Install flat-top timber table setting (1) or picnic table with seating (1); and timber bench seating (1) to take advantage of river views [see item C22]. No litter bins are to be provided. Install potable water point [using existing service]. Install interpretive signage [natural, cultural and Aboriginal heritage - see items B3-B4] and directional signage/ map of reserve showing walking track system and points of interest.	Works implemented in accordance with this Plan of Management and subject to available funding.	high
	Reserve circuit walking track: To establish a circuit walking track system and restrict multiple tracking and associated environmental impacts.	D15	**Rationalise multiple 4WD tracks and walking tracks and provide a dedicated circuit track with compacted decomposed granite topping (Stages 2 and 3):** Rationalise multiple 4WD tracks and walking tracks, including blocking/ restricting multiple tracking and upgrading dedicated walking tracks. Establish an integrated circuit track in CDG finish [1.8m width] linking southern and northern valleys and picnic area. Maintain access [2.4m width clearance] for emergency and service vehicles [see item D1].	Works implemented in accordance with this Plan of Management and subject to available funding.	high
	To improve pedestrian access to the reserve and provide all-weather linkages/ circulation. To improve visitor management and control multiple-tracking.	D16	Upgrade existing unmarked walking track between Tizzana Road/ The Ridgeway intersection and northern valley [1.2m width]. Install reserve identification signage and directional signage/ map of reserve showing track system at entry point (Stage 2). Upgrade walking track linkage to proposed picnic area [1.8m width] (Stage 3).	as above	medium
	To provide safe, easy access to river. To protect and stabilise eroding riverbanks. To enhance visitor experience and environmental quality.	D17	Construct spur walking track/ timber steps to small beach/ river foreshores to the south of proposed picnic area [CDG finish/ 1.2m width]. Stabilise steep bank and edges to steps using coir logs/ jute mesh weed-mat and planting in accordance with weed management and restoration strategy [see Figure 6: Landscape Masterplan].	as above	low
	To provide safe, environmentally sensitive pedestrian access to points of interest.	D18	Rationalise multiple tracks to provide a dedicated walking track [CDG finish/ 1.2m width] to lookout area [upper north-eastern scarp] (Stage 3). Restrict opportunities for multiple tracking [see item C28]. Ensure that all public safety issues are addressed in relation to track location.	as above	low

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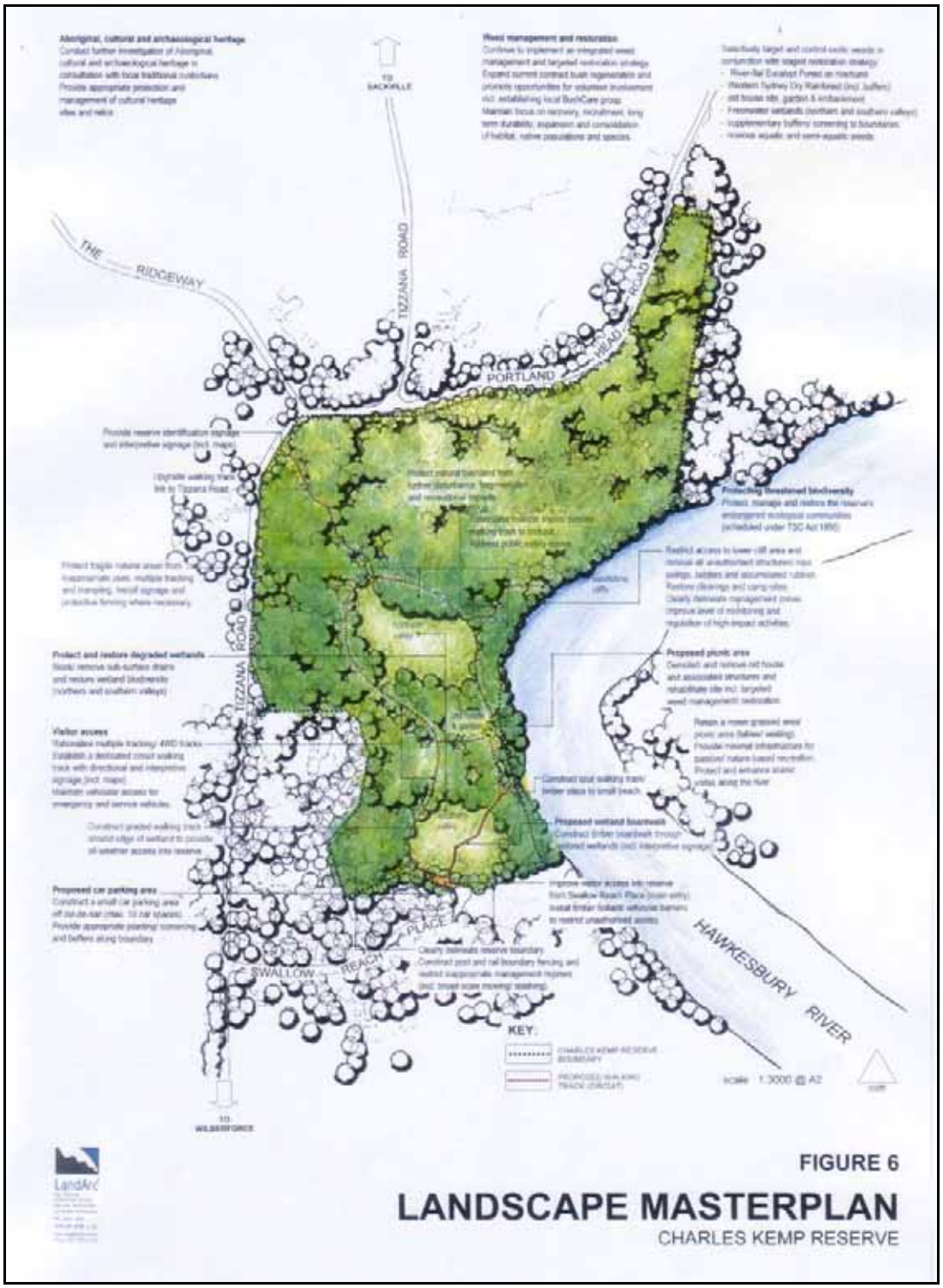
TABLE 7:
CAPITAL WORKS PROGRAM

ITEM	ACTION	CAPITAL COST ($)	IMPLEMENTATION 2009	2010	2011	2012	2013
A1-A9	Community land management						
A1	see following items for details	see below					
A2-A4	no capital works component	not costed					
A5	see following items for details	see below					
A6-A8	no capital works component	not costed					
A9	investigate/ survey reserve boundaries [southern portion]	$3,000.00					
B1-B6	Heritage						
B1	protection and management of archaeological sites and relics	see below					
B2	continue investigations/ consultation with Aboriginal custodians	not costed					
B3-B4	develop and install signage/ consultation [Aboriginal and cultural heritage]	$8,000.00					
B5-B6	retain cultural landscape heritage items/ further research [orchard trees]	$3,000.00					
C1-C27	Environment and biodiversity						
C1	no capital works component	not costed					
C2	targeted noxious aquatic and semi-aquatic weeds program	not costed					
C3	wetlands: block sub-surface drains/ break-out & restore levels	$5,000.00					
C4	see following items for details	see below					
C5	establish supplementary buffers/ screening to boundaries	$2,000.00					
C6-C8	monitor threatening processes/ implement feral animal control program	$3,000.00					
C9-C19	consolidate & expand targeted weed management/ restoration strategy	$100,000.00					
C20	delineate management zones/ temporary fencing and signage	$18,000.00					
C21	restoration of old house site/ retain selected cultural planting [see following]	see below					
C22	staged removal of weed trees [arboricultural component only]	$10,000.00					
C23-C24	liaise with adjoining land owners/ modifying management regimes	not costed					
C25-C27	cooperative planning/ liaison - fire and flood management	not costed					
D1-D18	Recreation, access and facilities						
D1-D3	maintain emergency vehicle access [see below]/ emergency procedures	see below					
D4	improve regulatory control and monitoring of unauthorised activities	not costed					
D5-D6	remove unauthorised structures/ restrict multiple tracking [see item C20]	see above					
D7-D8	construct car parking area [260m2]/ CDG finish & install vehicular barriers	$60,000.00					
D9	install identification, directional and interpretive signage [excl. items B3-B4]	$15,000.00					
D10	see following items [D15-D18] for details						
D11	install boundary fencing/ supplementary planting [see item C5]	$2,000.00					
D12	wetland boardwalk [southern valley]/ interpretive signage [see item D9]	$40,000.00					
D13	demolish & remove old house/ site remediation	$35,000.00					
D14	establish picnic area/ minimal facilities & restoration [signage: see item D9]	$12,000.00					
D15-D16	rationalise & upgrade walking [circuit] track/ CDG finish [1.2-1.8m width]	$30,000.00					
D17-D18	construct walking tracks to beach [incl. steps] and lookout area [1.2m width]	$12,000.00					
	TOTALS	$358,000.00					

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 ($)
2009	$75,000.00
2010	$95,000.00
2011	$98,000.00
2012	$57,000.00
2013	$33,000.00
TOTALS	$358,000.00


TO SACKVILLE
THE RIDGEWAY
TIZZANA ROAD
PORTLAND HEAD ROAD
TIZZANA ROAD
SWALLOW BEACH PLACE
HAWKESBURY RIVER
KEY:
TO WILBERFORCE
FIGURE 6
LANDSCAPE MASTERPLAN
CHARLES KEMP RESERVE

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APPENDICES

I: Community Consultation – presentation material and submissions
II: Schedule of Existing Native Plant Species
III: Schedule of Cultivated Exotic Plants and Weed Species

Charles Kemp Reserve

- EBENEZER -

Community Workshop

raft Plan of anagement

Date: Thursday 21st February 2008
Time: 7.00pm – 8.30pm
Venue: Wilberforce School of Arts,
Singleton Road, Wilberforce

Why do we need a plan of management?

A community land plan of management provides the framework for managing community land. A draft plan of management must be prepared in accordance with the *Local Government Act 1993*. Community consultation is an important part of this process.

Charles Kemp Reserve is community land owned by Hawkesbury City Council. It is an area of exceptional natural and scenic qualities located on a bend in the Hawkesbury River approximately 12 kilometres north of Windsor. Charles Kemp Reserve has been identified by Hawkesbury City Council as a significant and/ or priority area for preparation of a plan of management.

Sustainability is a key principle guiding this process. The draft plan of management aims to contribute to an ecologically sustainable city and region and add to the quality of life within the Hawkesbury City LGA. Charles Kemp Reserve's natural, scenic, cultural, recreational, and social 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.

What is the purpose of a community workshop?

The main purpose of the community workshop is to discuss the way the community values the reserve and to identify important issues affecting these values and opportunities for future sustainable management. The workshop aims to provide a transparent and equitable forum for all user groups, stakeholders and individuals.

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 questionnaires within seven (7) 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.

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 *Local Government Act 1993* and other relevant legislation. The following will be addressed:-

- establish the reserve's role in the Hawkesbury City Council LGA;
- identify existing uses, improvements and condition of facilities and buildings;
- categorise the community land in accordance with relevant legislation;
- identify and assess the reserve's values (ie. environmental, scenic, recreational, cultural, social, etc);
- identify and assess key issues affecting the reserve's values;
- establish future permitted uses, activities and development (including intensity and scale);
- develop appropriate management strategies and actions based on a balanced, sustainable approach to resource management;
- assign 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 the end of March 2008.

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.
…

Charles Kemp Reserve

Community Workshop
Draft Plan of Management

7.00pm – Thursday 21st February 2008
Wilberforce School of Arts
Singleton Road, Wilberforce

1. Welcome & introductions

2. Brief overview of plan of management process

3. Discussion

- ❖ Planning & environmental context:
  - Hawkesbury River/ regional open space
  - location/ reserve boundaries
  - community land (legislative requirements)

- ❖ Community land – reserve's values:
  - natural riparian/ bushland and cultural setting
  - scenic qualities/ vistas
  - environmental and biodiversity values
  - public access, recreational and social values
  - passive recreational opportunities
  - categorisation of community land

- ❖ Management issues:
  - protection, management and rehabilitation of natural areas (endangered ecological communities)
  - history of agricultural use
  - old house site/ garden
  - introduced exotic weeds
  - flooding and bushfire hazards/ management
  - accessibility (river/ open space/ bushland)
  - opportunities for improved public access
  - day-use capabilities/ limited recreational facilities
  - passive recreational user groups (bushwalking, swimming, relaxation and exercise)
  - upgraded walking track/ circuit trail and picnic area
  - recreational impacts (eg. multiple tracking, trampling, bank erosion, tree removal, fires, vandalism, rubbish dumping and motor-bikes)
  - public safety/ risk management (incl. emergency access)
  - interpretation/ environmental education
  - supply and demand issues
  - planning issues and relevant legislation

4. Conclusion

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

Community Issues

Draft Plan of Management
Charles Kemp Reserve, Ebenezer

A draft plan of management is being prepared for Charles Kemp Reserve. 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)*

a. AGE

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

b. 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)

summer 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 7 days to:

LandArc Pty Limited
PO Box 304
Avalon NSW 2107

APPENDIX II:

Schedule of Existing Native Plant Species

Charles Kemp Reserve retains a mosaic of vegetation communities and habitats. The reserve supports five distinctive ecological communities, four of which are scheduled as endangered ecological communities in the NSW *Threatened Species Conservation Act 1995*, as follows:-

- River-flat Eucalypt Forest (RFEF)*;
- Freshwater Wetlands (FW)*;
- Shale Sandstone Transition Forest (SSTF)*;
- Western Sydney Dry Rainforest (WSDR)*; and
- Sydney Sandstone Ridgetop Woodland (SSRW).

Note: * denotes endangered ecological community (TSC Act 1995).

Figure 5: Native Vegetation Map supersedes previous mapping of the reserve by Hawkesbury City Council (2007) and NPWS Native Vegetation Maps of the Cumberland Plain, Western Sydney, (1:25000 Map Series, 2002).

Native plant species are listed in alphabetical order and based on an initial field survey by Michelle Engelhard (Hawkesbury City Council) & D. Hicks (15 April 2001) and later surveys by Noel Ruting (LandArc Pty Limited) and Michelle Engelhard during February – March 2007 and January – February 2008.

KEY TO ECOLOGICAL COMMUNITIES IN RESERVE:

SSTF	=	Shale Sandstone Transition Forest
RFEF	=	River-flat Eucalypt Forest
FW	=	Freshwater Wetlands
WSDR	=	Western Sydney Dry Rainforest
SSRW	=	Sydney Sandstone Ridgetop Woodland
ALL	=	occurs in all ecological communities in reserve

KEY TO LOCATION WITHIN RESERVE:

N	=	northern sandstone ridge, slopes and cliffs
G	=	gullies/ creek-lines and sheltered slopes
W	=	wetlands (modified)/ water's edge and aquatic
M	=	middle ridge (including old house site and garden)
R	=	riverbank (sandy soils)
P	=	cleared open paddocks

BOTANICAL NAME	COMMON NAME	LOCATION
TREES (8+ metres in height)		
Angophora floribunda	Rough-barked Apple	RFEF/ WSDR/ RGM
Brachychiton populneus	Kurrajong	WSDR/ RFEF/ GR
Banksia integrifolia	Coastal Honeysuckle	SSTF/ GM
Casuarina cunninghamiana	River Oak	RFEF/ R
Corymbia gummifera	Red Bloodwood	SSRW/ SSTF/ N
Eucalyptus crebra	Narrow-leaved Ironbark	SSTF/ WSDR/ NG
Eucalyptus eugenioides	Thin-leaved Stringybark	SSRW/ SSTF/ NGM
Eucalyptus fibrosa	Broad-leaved Ironbark	SSRW/ SSTF/ N
Eucalyptus piperita	Sydney Peppermint	SSRW/ SSTF/ NG
Eucalyptus punctata	Grey Gum	SSRW/ SSTF/ NG
Eucalyptus sclerophylla	Scribbly Gum	SSRW/ N
Eucalyptus tereticornis	Forest Red Gum	SSTF/ RFEF/ RGM
Ficus rubiginosa	Port Jackson Fig	SSTF/ WSDR/ NGR
Melaleuca styphelioides	Prickly-leaved Paperbark	WSDR/ G
Melia azedarach var. *australasica*	White Cedar	RFEF/ R
Syncarpia glomulifera	Turpentine	SSTF/ WSDR/ NG
SMALL TREES/ SHRUBS (up to 7 metres in height)		
Acacia binervia	Coast Myall	SSTF/ NG
Acacia floribunda	Sally Wattle	SSTF/ RFEF/ MR
Acacia linifolia	Flax Wattle	SSRW/ N
Acacia longifolia	Sydney Golden Wattle	RFEF/ R
Acacia parramattensis	Sydney Green Wattle	SSTF/ RFEF/ MRP
Acacia suaveolens	Sweet-scented Wattle	SSRW/ SSTF/ N
Acacia terminalis	Sunshine Wattle	SSRW/ SSTF/ N
Acmena smithii	Lilly Pilly	WSDR/ RFEF/ GR
Alectryon subcinereus	Native Quince	WSDR/ G
Allocasuarina torulosa	Forest Oak	SSTF/ NR
*Alphitonia excelsa**	Red Ash	RFEF/ R
Allocasuarina littoralis	Black She-oak	SSRW/ SSTF/ N
Angophora bakeri	Narrow-leaved Apple	SSRW/ SSTF/ N
Backhousia myrtifolia	Grey Myrtle	WSDR/ RFEF/ NGR
Banksia spinulosa	Hairpin Banksia	SSRW/ SSTF/ N
Breynia oblongifolia	Common Breynia	ALL (except FW)
Bursaria spinosa	Blackthorn	ALL (except FW)
Cassine australis var. *australis*	Red-fruited Olive Plum	WSDR/ G
Ceratopetalum gummiferum	Christmas Bush	SSRW/ SSTF/ NG
Citriobatus pauciflorus	Orange Thorn	WSDR/ G
Clerodendrum tomentosum	Hairy Clerodendrum	WSDR/ RFEF/ GR
Croton verreauxii	Native Cascarilla	WSDR/ G
Dodonea pinnata	Hop Bush	SSRW/ SSTF/ NG
Dodonea triquetra	Common Hop Bush	ALL (except FW)
Duboisia myoporoides	Corkwood	RFEF/ R
Ehretia acuminata	Koda	WSDR/ G
Elaeocarpus reticulatus	Blueberry Ash	SSRW/ SSTF/ NG
Epacris pulchella	NSW Coral Heath	SSRW/ SSTF/ N
Exocarpus cupressiformis	Cherry Ballart	SSTF/ N
Ficus coronata	Creek Sandpaper Fig	RFEF/ R

BOTANICAL NAME	COMMON NAME	LOCATION
[continued]		
SMALL TREES/ SHRUBS (up to 7 metres in height)		
Glochidion ferdinandi	Cheese Tree	RFEF/ WSDR/ GR
Goodenia ovata	Hop Goodenia	SSTF/ RFEF/ NGR
Grevillea mucronulata	Green Spider Flower	SSRW/ SSTF/ N
Hymenanthera dentata	Tree Violet	RFEF/ WSDR/ GR
Jacksonia scoparia	Dogwood	SSRW/ SSTF/ N
Kunzea ambigua	Tick Bush	SSRW/ SSTF/ N
Kunzea ericoides		SSTF/ N
Leptospermum polygalifolium	Lemon-scented Tea-tree	SSTF/ RFEF/ NG
Leptospermum trinervium	Paperbark Tea-tree	SSTF/ RFEF/ NG
Leucopogon lanceolatus	Lance Beard-heath	SSTF/ RFEF/ NG
Leucopogon muticus		SSRW/ SSTF/ N
Leucopogon setiger		SSRW/ SSTF/ N
Lomatia silaifolia	Crinkle Bush	SSRW/ SSTF/ N
Micromyrtus ciliata		SSRW/ SSTF/ N
Notelaea longifolia	Large Mock Olive	ALL (except FW)
Ozothamnus diosmifolium	Ball Everlasting	ALL (except FW)
Persoonia linearis	Narrow-leaf Geebung	SSRW/ SSTF/ MN
Persoonia oblongata	Geebung	SSRW/ SSTF/ N
Pimelea linifolia ssp. *linifolia*	Slender Rice-flower	ALL (except FW)
Pittosporum revolutum	Rough Fruit Pittosporum	ALL (except FW)
Platysace lanceolata	Native Parsnip	SSRW/ SSTF/ N
Polyscias sambucifolia	Elderberry Panax	ALL (except FW)
Rapanea variablis	Muttonwood	RFEF/ WSDR/ GR
Rhodamnia rubescens	Scrub Turpentine	RFEF/ WSDR/ GR
Solanum prinophyllum	Forest Nightshade	RFEF/ WSDR/ GR
Streblus brunonianus	Whalebone Tree	WSDR/ G
Tristaniopsis laurina	Water Gum	SSTF/ RFEF/ NR
Trema aspera	Native Poison Peach	RFEF/ WSDR/ GR
Xanthorrhoea sp.	Grass Tree	SSRW/ N
Xylomelum pyriforme	Woody Pear	SSRW/ N
GROUNDCOVERS (incl. GRASSES, SEDGES, FORBS & FERNS) & EPIPHYTES		
Actinotus helianthi	Flannel Flower	SSRW/ N
Adiantum aethiopicum	Common Maidenhair Fern	WSDR/ RFEF/ NGR
Adiantum flabellifolium	Necklace Fern	WSDR/ RFEF/ NGR
Alternanthera denticulata	Lesser Joyweed	ALL
Aristida vagans	Wire Grass	SSRW/ SSTF/ N
Austrostipa ramosissima	Stout Bamboo Grass	WSDR/ RFEF/ GR
Blechnum cartilagineum	Gristle Fern	WSDR/ RFEF/ NGR
Brachycome sp.		ALL (except FW)
Caladenia catenata	White Fingers	WSDR/ RFEF/ GR
Calandrinia pickeringii	Pink Purslane	WSDR/ RFEF/ GR
Calochlaena dubia	False Bracken Fern	ALL (except FW)
Carex appressa	Tall Sedge	FW/ RFEF/ WSDR
Centella asiatica	Swamp Pennywort	FW/ RFEF/ WSDR
Cheilanthes sieberi subsp. *sieberi*	Poison Rock Fern	ALL
Chiloglottis reflexa	Ant Orchid	WSDR/ RFEF/ GR
Commelina cyanea	Scurvy Weed	ALL
Crasula sieberiana	Austral Stonecrop	SSRW/ SSTF/ N
Cryptostylis subulata	Large Tongue Orchid	SSRW/ SSTF/ N

BOTANICAL NAME	COMMON NAME	LOCATION
[continued]		
GROUNDCOVERS (incl. GRASSES, SEDGES, FORBS & FERNS) & EPIPHYTES		
Cymbopogon refractus	Barbed-wire Grass	SSRW/ SSTF/ N
Cynodon dactylon	Common Couch	ALL
Cyperus polystachyos	Sedge	WSDR/ FW/ GWP
Danthonia tenuior	Wallaby Grass	SSTF/ RFEF/ MRP
Dianella caerulea var. *producta*	Blue Flax Lily	SSRW/ SSTF/ N
Dianella sp.	Flax Lily	SSRW/ SSTF/ N
Dichondra repens	Kidney Weed	ALL
Digitaria parviflora	Small-flower Finger-grass	SSTF/ RFEF/ MRP
Dockrillia linguiforme	Tongue Orchid	SSRW/ SSTF/ N
Dockrillia speciosum	Rock Orchid	SSRW/ SSTF/ N
Doodia aspera	Prickly Rasp Fern	WSDR/ RFEF/ GR
Echinopogon caespitosus	Tufted Hedgehog Grass	SSRW/ SSTF/ N
Einadia hastata	Berry Saltbush	ALL
Einadia trigonos		ALL
Entolasia marginata	Wiry Panic	SSRW/ SSTF/ N
Entolasia stricta	Wiry Panic	SSTF/ RFEF/ MRP
Eragrostis brownii	Brown's Love Grass	SSRW/ SSTF/ N
Eragrostis leptostachya	Love Grass	SSRW/ N
Gahnia aspera	Rough Saw-sedge	WSDR/ RFEF/ GR
Gahnia sieberiana	Red-fruited Saw-sedge	FW/ SSRW/ WPN
Geranium homeanum	Northern Cranesbill	ALL
Geranium solanderi	Cutleaf Cranesbill	WSDR/ G
Goodenia hederacea	Violet-leaved Goodenia	SSTF/ RFEF/ NGR
Hydrocotyle peduncularis		RFEF/ P
Imperata cylindrica var. *major*	Blady Grass	ALL (except FW)
Lagenifera stipitata		SSRW/ SSTF/ N
Lepidosperma laterale	Variable Sword-sedge	SSRW/ SSTF/ N
Lepidosperma sp.	Sword-sedge	SSRW/ SSTF/ N
Lindsaea linearis	Screw Fern	SSRW/ SSTF/ N
Lindsaea linearis	Lacy Wedge Fern	SSRW/ SSTF/ N
Liparis reflexa	Yellow Rock Orchid	SSRW/ SSTF/ N
Lomandra confertifolia	Mat Rush	SSRW/ SSTF/ N
Lomandra longifolia	Spiny-headed Mat-rush	ALL (except FW)
Lomandra multiflora	Many-flowered Mat-rush	SSRW/ SSTF/ N
Lomandra obliqua	Fish Bones	SSRW/ SSTF/ N
Lomandra sp.		SSRW/ SSTF/ N
Microlaena stipoides	Weeping Meadow Grass	WSDR/ RFEF/ GR
Oplismenus aemulus	Basket Grass	WSDR/ RFEF/ GR
Oplismenus imbecillis	Basket Grass	WSDR/ RFEF/ GR
Panicum simile	Two-colour Panic	SSRW/ SSTF/ N
Pellaea falcata	Sickle Fern	WSDR/ RFEF/ GR
Phyllanthus gunnii		ALL (except FW)
Phyllanthus hirtellus	Thyme Spurge	ALL (except FW)
Platycerium bifurcatum	Elkhorn	WSDR/ RFEF/ GR
Plectranthus parviflorus	Cockspur Flower	WSDR/ RFEF/ GR
Pomax umbellata	Pomax	SSRW/ SSTF/ N
Pratia purpurascens	White Root	ALL
Pseuderanthemum variabile	Pastel Flower	ALL (except FW)
Pteridium esculentum	Common Bracken	ALL (except FW)
Pterostylis curta?	Blunt Greenhood	SSTF/ WSDR/ N

BOTANICAL NAME	COMMON NAME	LOCATION
[continued]		
GROUNDCOVERS (incl. GRASSES, SEDGES, FORBS & FERNS) & EPIPHYTES		
Pyrrosia rupestris	Rock Felt-fern	SSTF/ WSDR/ N
Senecio hispidulus var. *hispidulus*	Rough Groundsel	RFEF/ R
Stylidium graminifolium	Trigger Plant	SSRW/ SSTF/ N
Stypandra glauca	Nodding Blue Lily	SSRW/ N
Themeda australis	Kangaroo Grass	ALL (except FW)
Trachymene incisa		SSRW/ SSTF/ N
Wahlenbergia gracilis	Australian Bluebell	ALL
CLIMBERS & TWINERS		
Aphanopetalum resinosum	Gum vine	WSDR/ G
Billardiera scandens	Apple Berry	SSRW/ SSTF/ N
Cassythia sp.	Devil's Twine	ALL (except FW)
Cayratia clematidea	Slender Grape	ALL (except FW)
Clematis sp.	Old Man's Beard	WSDR/ RFEF/ GR
Desmodium sp.	Tick-trefoil	ALL (except FW)
Eustrephus latifolius	Wombat Berry	ALL (except FW)
Geitonoplesium cymosum	Scrambling Lily	SSTF/ WSDR/ NG
Glycine clandestina	Love Creeper	ALL (except FW)
Glycine tabacina	Love Creeper	WSDR/ G
Hardenbergia violacea	Purple Twining-pea	SSTF/ RFEF/ NGR
Maclura cochinchinensis	Cockspur Thorn	WSDR/ G
Morinda jasminoides	Morinda	WSDR/ RFEF/ GR
Pandorea pandorana	Wonga Wonga Vine	WSDR/ RFEF/ GR
Parsonsia straminea	Common Silkpod	WSDR/ RFEF/ GR
Passiflora herbertiana subsp. *herbertiana*	Native Passion-flower	WSDR/ G
Rubus hillii	Broad-leaf Bramble	WSDR/ G
Rubus parvifolius	Native Raspberry	SSTF/ WSDR/ NGP
Smilax australis	Austral Sarsaparilla	WSDR/ G
Smilax glyciphylla	Sweet Sarsaparilla	RFEF/ WSDR/ GR
Stephania japonica var. *discolor*	Snake Vine	WSDR/ G
Tylophora barbata	Bearded Tylophora	WSDR/ G
SHALLOW-WATER/ SEMI-AQUATICS & AQUATICS		
Juncus usitatus	Common Rush	FW/ RFEF/ WPR
Persicaria decipiens	Slender Knotweed	FW/ RFEF/ WPR
Persicaria hydropiper	Water Pepper	FW/ RFEF/ WPR
Persicaria sp.	Knotweed	FW/ RFEF/ WPR
Phragmites australis	Common Reed	RFEF/ R
Schoenus melanostachys	Black Bog Rush	FW/ RFEF/ WPR
Typha orientalis	Broad-leaved Cumbungi	RFEF/ R

* Local native species (RFEF) believed to be planted (restoration work).

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APPENDIX III:

Schedule of Cultivated Exotic Plants and Weed Species

KEY:
The following cultivated exotic plants and weed species were identified during site investigations. The species are scheduled in alphabetical order.

1. NOXIOUS WEED SPECIES (WEED CLASS)

Species declared noxious within the Hawkesbury River County Council area under the *Noxious Weeds Act 1993* are shown with a Weed Class as applicable:

N1 The plant must be eradicated from the land and must be kept free of the plant.
N2 The plant must be eradicated from the land and must be kept free of the plant.
N3 The plant must be fully and continuously suppressed and destroyed.
N4 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.
N5 Compliance with requirements in the *Noxious Weeds Act 1993* for a notifiable weed.

2. ENVIRONMENTAL WEED SPECIES

E The plant has been declared as an environmental weed species (ie. invasive) within the Sydney West – Blue Mountains Region.

3. CULTIVATED/ ORNAMENTAL SPECIES & GARDEN ESCAPES

C Cultivated/ ornamental species within old house/ garden site (non-invasive)
C* Cultivated/ naturalised species including Australian natives (ie. not local genotype or unknown provenance) or exotic garden escapes which are either known to be invasive or potentially invasive.

BOTANICAL NAME	COMMON NAME	CLASS
TREES & PALMS (8+ metres in height)		
Acer negundo	Box Elder	E
Archontophoenix cunninghamiana	Bangalow Palm	C
Brachychiton acerifolius	Illawarra Flame Tree	C*
Cedrus atlantica var. *glauca*	Atlantic Cedar	C
Cinnamomum camphora	Camphor Laurel	E
Corymbia citriodora	Lemon-scented Gum	C*
Cupressus spp.	Cypress	C
Eucalyptus elata	River Peppermint	C
Erythrina X sykesii	Coral Tree	C*
Gleditsia triacanthos	Honey Locust	E
Grevillea robusta	Silky Oak	C
Jacaranda mimosifolia	Jacaranda	C*
Phoenix canariensis	Canary Island Date Palm	C*
Populus nigra var. *Italica*	Lombardy Poplars	C
Salix nigra	Black Willow	N5
Syagrus romanzoffianum	Queen Palm	C

BOTANICAL NAME	COMMON NAME	CLASS
SMALL TREES, PALMS & SHRUBS (up to 7 metres in height)		
Ailanthus altissima	Tree of Heaven	E
Buckinghamia celsissima	Ivory Curl Tree	C
Calodendron capense	Cape Chestnut	C
Cestrum parqui	Green Cestrum	N3
Citrus spp.	Citrus	C
Cotoneaster glaucophyllus	Cotoneaster	N3
Genista monspessulana	Cape Broom	E
Lagerstroemia indica	Crepe Myrtle	C
Lantana camara	Lantana	E
Ligustrum lucidum	Large-leaved Privet	N4
Ligustrum sinense	Small-leaved Privet	N4
Monstera deliciosa	Fruit-salad Plant	C
Morus alba	Mulberry	C
Nerium oleander	Oleander	C
Ochna serrulata	Ochna	E
Olea europaea subsp. *cuspidata*	African Olive	E
Opuntia sp.	Prickly Pear	N4
Pavonia hastata	Pavonia	E
Philodendron selloum	Philodendron	C
Plumbago auriculata	Cape Plumbago	C
Ricinus communis	Castor Oil Plant	E
Schefflera actinophylla	Umbrella Tree	C
Senna pendula var. *glabrata*	Cassia	E
Sida rhombifolia	Paddy's Lucerne	E
Solanum mauritianum	Wild Tobacco Tree	E
Solanum pseudocapsicum	Jerusalum Cherry	E
Sorbus aucuparia	Rowan Tree	C*
Verbena bonariensis	Purpletop	E
GROUNDCOVERS (incl. GRASSES, SEDGES, FERNS & FORBS)		
Ageratina adenophora	Crofton Weed	N4
Ageratina riparia	Mist Flower	N4
Andropogon virginicus	Whiskey Grass	-
Asparagus aethiopicus (syn. *Protasparagus aethiopicus)*	Ground Asparagus	E
Axonopus affinis	Carpet Grass	-
Bidens pilosa	Cobbler's Peg	-
Bryophyllum delagoense	Mother of Millions	-
Bryophyllum pinnatum	Resurrection Plant	-
Cerastium glomeratum	Chick Weed	-
Conyza bonariensis	Fleabane	N3
Cyrtomium falcatum	Holly Fern	C*
Drejerella guttata	Shrimp Plant	C
Ehrharta sp.		-
Echinochloa crus-galli	Barnyard Grass	-
Eragrostis curvula	African Love Grass	-
Foeniculum vulgare	Fennel	E
Hypochoeris radicata	Catsear	-
Kalanchoe sp.	Succulent	C*

BOTANICAL NAME	COMMON NAME	CLASS
[continued]		
GROUNDCOVERS (incl. GRASSES, SEDGES, FERNS & FORBS)		
Nephrolepis cordifolia	Fishbone Fern	C*
Paspalum dilatatum	Paspalum	-
Paspalum urvillei	Tall Paspalum	-
Pennisetum clandestinum	Kikuyu Grass	-
Poa annua	Winter Grass	-
Prunella vulgaris	Self-heal	-
Senecio madagascariensis	Fireweed	-
Setaria parviflora	Slender Pigeon Grass	E
Sonchus oleraceus	Common Sowthistle	-
Sporobolus indica	Parramatta Grass	-
Tagetes minuta	Stinking Roger	E
Taraxacum officinale	Dandelion	-
Tradescantia fluminensis	Trad	E
Trifolium repens	White Clover	-
Verbena rigida	Verbena	-
CLIMBERS & TWINERS		
Acetosa sagittata	Turkey Rhubarb	E
Anredera cordifolia	Madeira Vine	E
Araujia sericiflora (syn. *A. hortorum)*	Moth Vine	E
Asparagus asparagoides (syn. *Myrsiphyllum asparagoides)*	Bridal Creeper	E
Cardiospermum grandiflorum	Balloon Vine	E
Hylocereus undatus	Dragon Fruit	C
Tecomaria capensis	Cape Fire-flower	C
Thunbergia alata	Black-eyed Susan	E
SHALLOW-WATER/ SEMI-AQUATICS & AQUATICS		
Alternanthera philoxeroides	Alligator Weed	N3
Cyperus sesquiflorus	Mullumbimby Couch	-
Egera densa	Ribbon Waterweed	-
Eichhornia crassipes	Water Hyacinth	N3
Ludwigia peruviana	Ludwigia	N3
Salvinia molesta	Salvinia	N3

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