
EXECUTIVE SUMMARY

INTRODUCTION

A linear corridor of bushland and open space of approximately 60 hectares along Wollie Creek in Canterbury LGA has been identified for establishment as a Regional Park. This Park will provide an important bushland open space in the urban environment of Sydney. It is a vital recreational and educational source for local and regional users containing important flora and fauna habitat and features of cultural and historical significance.

The National Parks and Wildlife Service (NPWS) is co-ordinating the consolidation of this land currently in a variety of ownerships to create a reserve for the establishment of the proposed Regional Park.

The Plan of Management for the Wollie Creek Regional Park examines and resolves many issues facing the Park to enhance and promote its recreational opportunities, cultural and natural resources for the regional community.

**PROCESS**

The process of this study has included site appraisal and analysis, consultation with community groups and various stakeholders, identification of issues and the establishment of an inspiring vision and concept and strategies for the planning and management of the Park.

Site Appraisal and Analysis

This phase included the following tasks:

- Comprehensive review of the flora and fauna in the area.
- Extensive photographic coverage.
- Existing document collation and review.
- Interviews with stakeholders and community groups.

Consultation

Extensive community consultation was a key aspect of the preparation of the Plan and included:

- Completion of a randomly selected 300 household telephone survey within a 15 minute drive of the Park.
- Regular consultation with a Steering Group of key community representatives and other major stakeholders.
- Two community workshops to discuss issues and opportunities and review draft strategies.
- Meetings with NESB groups

- One on one interviews with major stakeholders and interested parties.
- Public exhibition of the Plan and Masterplan.

(Refer to Community Consultation Report in Supporting Documents).

ISSUES & STAKEHOLDER PERCEPTIONS

Through the above mentioned processes a number of important issues and opportunities have arisen. The following is a summary of the issues.

Environment and Conservation

- Need for linkage with Bardwell Valley, Cooks River and Stotts Reserve.
- Need to manage weeds with appropriate methods.
- Co-ordination and prioritising of ongoing bush regeneration.
- Importance of selection of appropriate species for revegetation.
- Importance of conservation of flora and fauna habitats (The site contains rare and threatened species).
- Importance of stormwater management within the catchment on Park values.
- Need to manage litter and other stormwater discharges.
- Requirement opportunity for protection of existing wetlands (eg. at Hartill-Law Avenue)
- Need for regional fire management.
- Concerns regarding future air quality in the Park (M5 east ventilation shaft).

Natural and Cultural Heritage

- Importance of protection and interpretation of Aboriginal sites.
- Importance of interpretation of other heritage items and social history.
- Need to manage cultural plantings to minimise environmental visual impacts (eg. willows etc.).
- Importance of the protection, interpretation and management of significant geological features (eg. recumbent cross-bedding, Wave Rock and sandstone escarpments).



Recreation and Leisure

- Need for greater accessibility to the Creek edge.
- Support for cycling but need to determine appropriate type of cycle paths in the Park.
- Importance of bushland associated activities, walking, picnic etc.
- Support for promotion of regional activities within the Park (events, family facilities, education etc.).
- Opportunity for more comprehensive and imaginative play for children.
- Opportunity to hold community / arts events in the Park.
- Importance of cultural and educational focus of the park based on its bushland qualities.

Circulation and Access

- Opportunity for promotion of public transport to the Park (Four stations adjoin the Park).
- Promotion of local and regional links to the Park (Cooks River, Bardwell Valley).
- Importance of cycle links into the Park from the regional cycle path (RTA proposed construction of cycleway as condition of consent on M5 east).
- Need to strategically formalise access to and within the Park.
- Consideration of boat access to the creek.
- Importance of improved access to vantage points and the creek edge.
- Need for connections to other recreational walking networks.



Buildings and Infrastructure

- Need to confirm status of all service corridors.
- Need to assess environmental impacts of existing and future infrastructure (i.e. proposed rail amplification) and concern over visual and environment impacts on Park and Creek.
- Importance of ongoing liaison with adjacent land holders (reduction off neighbourhood impacts etc.).
- Need to upgrade the quality and extend opportunity of all existing park infrastructure i.e. playgrounds, BBQs, signage etc.

Promotion, Interpretation and Education

- Need for improved directional and interpretive signage;
- Importance of the wider promotion of the Park as a regional attraction.
- Value of the Park as an educational resource. Importance of the incorporation of educational facilities (outdoor learning, education resource).
- Opportunity for a program of guided tours and events focusing on urban bushland, cultural and natural heritage.
- Value of good views
- Weed & litter
- Recognition of varied landscape types
- Detracting proposals
 - stack
 - rail walls

Planning and Management

- Need for definition of Park boundaries requirement to clarify roles and responsibilities in care, control and management (i.e.. Council, NPWS)
- Need for co-ordinated long term bushland management.
- Need to include and define roles for community organisations in long term consultation.
- Importance of staging and prioritising development works to match progressive budget.



- Importance of defining the Park's regional role within the Sydney metropolitan open space system.
- Need for ongoing co-ordination with adjoining stakeholders and landholders.
- Potential for cross marketing with other regional parks.
- Importance of a defined design vocabulary for all park elements to promote the sense of a unified Park.

OBJECTIVES AND VISION

As part of the process objectives were determined that met the values the community and key stakeholders placed on the Park. The key objectives were:

Context

- Ensure that all aspects of the site's design and management addresses the wider context of the Wolli Creek Valley.
- Ensure that the Park's design and facilities reflect the needs of the diverse local and regional community.



Recreation and Leisure

- Promote and encourage a diverse range of regional and local recreational opportunities.
- Ensure uses of the Park are compatible with the amenity of its neighbours.
- Ensure uses of the Park are compatible with the natural systems in the Park.



Access and Circulation

- Encourage uses that promote collective / public transport access to the site.
- Provide parking on-site and in the street compatible with the suburban context.
- Provide cycle and pedestrian links into the Park.
- Provide positive and equal access into the Park.



Cultural and Natural Heritage

- Conserve and interpret the Park's rich Aboriginal and European cultural heritage.
- Ensure that the significance of this site is conserved and interpreted in both buildings and open space.

Site Character and Visual Quality

- Seek opportunities to conserve and enhance views within and through the site.
- Establish a visible identity to the Park throughout its length.
- Ensure that the Reserve is well maintained.
- Ensure that the site and its open spaces are evidently for public use and enjoyment.

Environment and Conservation

- Ensure that all uses on site maintain best practice in environmental sustainability, including improving water quality, noise minimisation and air pollution reduction (cars etc.).
- Conserve and interpret the Park's significant bushland and wetland flora and fauna.
- Promote uses within and adjoining the Park that improve water quality in Wolli Creek.

Management and Planning

- Develop a co-ordinated implementation program that reflects community priorities and available funding.
- Encourage and organise the role of the community in management, promotion and interpretation of the Park.

Interpretation, Promotion and Education

- Promote and interpret the Park's facilities and cultural / natural heritage to the local and regional community.
- Promote the Park's value as an educational asset to the community.



VISION

Participants in community workshops were asked to offer key words and phrases that best encompassed the values and future aspirations for the Park. Some of the consistent words and phrases included:

tranquility
uniqueness
oasis
regeneration
community
precious
nature
continuity of heritage
learning

These key words have been used to derive a short statement that encapsulates a vision for Wolli Creek Regional Park.

Wolli Creek Regional Park will be a place of recreation and conservation value for people of all ages and backgrounds.

With its principal characteristic of a healthy and regenerating urban bushland, the Park will provide recreational opportunities for everyone from families on a day out for a picnic or barbeque to bushwalkers, birdwatchers, children at play or those attending a community festival or event.

The Park will reflect its rich cultural and natural heritage offering opportunities for school children or the casual visitor alike to learn about its evolution and the role of the community in saving the Park for its recreational, scenic and environmental values.



STRATEGIES

The Plan of Management identifies a range of long and short term strategies detailed under eight headings of consideration to meet the needs raised in the issues evaluation. The major strategies may be summarised as follows:

Environment and Conservation

Bushland and Creek Regeneration

- Maintain, protect and enhance existing diversity of the vegetation communities.
- Continue and implement new regeneration programmes in concert with community inputs.
- Preservation and consolidation of high quality bushland, working outwards to more degraded bush to achieve long term connections.
- Reduction of fragmentation of bushland and degrading influences.
- Regeneration to occur in sequence from existing native vegetation down to creek line; effort along the creek line will target the removal of weeds which are most threatening to native plants.
- Reinforce corridor bushland connections through the Park and to adjacent areas.
- Develop vegetation management along the rail corridor in liaison with RAC
- Establish planned ecological burn programmes for specific vegetation communities.
- Conserve and enhance and interpret importance of bushland and wetlands.

Weed Management

- Implement procedures to protect bushland on interfaces.

Fauna

- Establish long term animal control for the Park.
- Establish management guidelines for dog control within the Park (Companion Animals Act).
- Reinforce corridor connections through the linear nature of the Park and to adjacent areas to preserve and enhance movement corridors for animals and birds.



Air Quality

- Continue liaison with EPA to ensure there are no adverse impacts on Park users of the ventilation outlet associated with the M5 East Motorway.
- Promote the use of public transport to the Park to minimise the visual, noise and air quality impacts of private vehicles.

Water Quality and Management

- Optimise water quality monitoring based on long term needs and use of available resources (including school and community programs with Sydney Water and DLWC).
- Undertake continuing community education with the objective of reducing litter and improving water quality within the Creek.

**Natural and Cultural Heritage***Natural Heritage*

- Identify, protect and interpret all features of natural heritage within and adjacent to the Park (eg. wetlands, diverse bushland communities).
- Establish a programme for the regeneration and conservation of the sensitive natural heritage items (Fern Gulley, freshwater wetland at Hartill-Law Avenue, mangroves).

Cultural Heritage

- Identify all Aboriginal and European heritage items within and adjacent to the Park for protection, management and interpretation (eg. Stone Quarry, rock shelters, past-use farming relics associated with King and Parry Farms etc.)
- Compile a written and oral record to incorporate appropriate elements into the interpretation programme.

Recreation and Leisure

- Focus on bushland associated activities.
- Recognise varied opportunities provided by open grass areas and bushland.
- Review existing facilities and develop multi-use facilities for use by families, youth and older persons (seating, amenities).
- Develop principal visitor focus at Girrawheen Park and Turrella Reserve (Girrawheen as bushland focus, Turrella as family/event invitation).
- Actively promote awareness of regional recreation activities and facilities.

- Establish a hierarchy and series of graded paths based generally on a tiered system in accordance with the Access for All Strategy.
- Establish a children's recreational cycle path at Turrella Reserve.

Circulation and Access

Entrances

- Formulate a hierarchy of entries to the Park to reflect the character and natural and cultural attributes of the site.

Public Transport

- Promote access by public collective transport (minibus) and cycle.

Vehicles and Parking

- Establish access and parking requirements and develop designs based on meeting needs adequately without impinging on the Park itself (Aside from Girrawheen Park, and event mode in Turrella Reserve, car parking is generally street based).
- Determine principal access points for emergency services and routes.

Pedestrian and Cycle

- Establish and formalise a plan for a path network which circulates through the Park with specific destinations and links both locally and regionally (System recognises need for remote and quieter areas as well as popular locations and walks).
- Improve access to the Creek and vantage points.
- Provide a connection at Turrella Reserve with the proposed regional commuter cycleway adjacent to the Park in liaison with RAC, RTA and Bicycle New South Wales.
- Negotiate with the appropriate authorities to improve pedestrian safety at all road crossings linking the Park to railway stations (eg. Bardwell Park North, Bexley North etc.).

Visual Quality and Landscape Character

Visual Quality

- Protect and enhance key vantage points and views within and into the site (eg. Harthill Laws Avenue, Henderson St bridge).
- Negotiate with appropriate authorities to improve the views into the site such as from the rail corridor and roads and bridges.
- Develop a programme for weed and litter removal.

Landscape Character

- Promote the regional 'urban bushland' as the Park's identity and
- Establish a programme and brief for all built elements and signage within the Park maintaining a common theme and character for the Park.
- Establish a programme and brief to provide a coherent palette of design elements based on a common theme relating to the urban bushland character of the site.

Buildings and Infrastructure

- Review opportunities for improvements to existing facilities and amenities.
- Review service needs associated with strategies such as for water, and three phase power for park use.

Promotion, Interpretation and Education

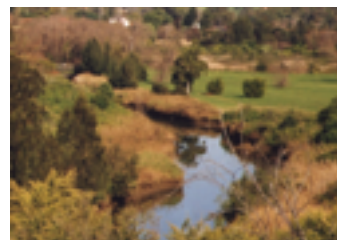
- Develop an integrated programme of signage, information leaflets, interpretation signs, media releases, education packs to inform and educate the regional community on numerous aspects of the Park.

Interpretation

- Implement an integrated signage system to identify walking trails, facilities and heritage items.
- Establish opportunities for guided tours and activity programs.
- Establish key arrival points for user orientation and interpretation.

Promotion

- Increase awareness of the Park through cross promotion with other regional parks and State Rail (railway platform signage and transport during event periods).



Education

- Actively promote learning as the Park's major regional specialisation.
- Develop a field study / education resource at Girrahween Park in combination with visitor information and orientation.
- Undertake community education with the objective of improving bushland and water quality in the Park and adjoining properties
- Liaise with education groups for discussions regarding the Park as part of their educational resource for water testing and monitoring and bush regeneration.

**Planning and Management**

- Determine long term planning, design and funding program that addresses staging and priorities identified in the plan.
- Liaise closely with Canterbury Council to determine long term administrative and management arrangements for the Parks care and control (zoning, local open space, drainage etc.).
- Implement a programme for ongoing liaison and negotiation with key stakeholders and statutory bodies.
- Establish basis of continued participation of community organisations in park care and consultation on planning and design issues.
- Undertake a research / review of State and Federal grant opportunities to be directed to Wollie Creek Regional Park.
- Seek partnership funding for specific elements within the Park (eg. education focus).
- Undertake surveys and questionnaires in the Park over the years to establish user needs and visitor satisfaction levels.

IMPLEMENTATION

The Plan sets out a range of details on the proposed implementation of the proposals including:

- **Targets and Performance Indicators:** these establish the goals to be set for each strategy and the means by which their achievement is measured.
- **Priorities programme:** divided into phases from short to long term. The programme suggests early priority be given to bush regeneration programs and the establishment of paths and interpretation and promotion.
- **Design and Planning Principles:** these provide simple guidelines for construction works in the park.
- **Costing:** the Plan sets out opinions of probable cost for the major works and general rates for typical items.
- **Reviewing the Plan:** a simple chronology for short and long term review of elements of the plan.



I.0 INTRODUCTION

I.1 PURPOSE OF THIS DOCUMENT

Wolli Creek Regional Park provides an important bushland open space in the urban environment of Sydney. The Park is a vital recreational and educational resource for local and regional users as it contains important flora and fauna habitat and has cultural and historical significance.

The site has been identified for establishment as a Regional Park for the National Parks and Wildlife Service. The impacts of both current and past landuses on the enduring qualities of Wolli Creek as well as the lack of any park infrastructure require that a planning and design phase will be essential to the Park's development as a Regional identity.

In order to examine and resolve the many issues facing the Park the Wolli Creek Regional Park Plan of Management was commissioned by the National Parks and Wildlife Service (NPWS).

The Plan of Management and Masterplan is an important first step in revitalising the recreational opportunities, cultural and natural resources for the enjoyment and appreciation of the community and future generations.

I.2 THE NEED FOR A PLAN OF MANAGEMENT

The area designated for the Wolli Creek Regional Park is approximately a 60 hectare linear corridor of bushland and open space. It currently has little formal open space or recreational development. The Park is bordered by Wolli Creek and a major rail line running east west and comprises remnant but unmanaged bushland, open reserves and numerous cultural and environmental heritage items. A co-ordinated approach is required to integrate these elements in the creation of a Regional Park.

A Plan of Management is the appropriate mechanism for such an approach, determining the values of the site and bringing together the substantial body of information and local knowledge that already exists on the natural systems, historical and cultural background, such a Plan can also assess the inter-relationship of contributing impacts and recreation opportunities, evaluating community attitudes and setting out clearly enunciated strategies and priorities for action, identifying their implicit costs.

In undertaking this Study and preparing the Plan, the specific objectives

set by NPWS have been central considerations. The objectives summarised in the brief require the Plan of Management process

- To identify and understand how the community values Wolli Creek.
- To establish management objectives that identify: a vision for the park, values of the park, issues associated with the park.
- Investigate the history and analyse the natural attributes of the site.
- Investigate the aboriginal significance of the site.
- Prepare a Masterplan for Wolli Creek which strategically positions the park within the regional open space network, creating a unique and identifiable image for the park.
- Develop a masterplan that responds to the multi-cultural context of the park within the regional area.
- To increase the public's awareness, enjoyment and participation, cultural and social dimensions and to ensure the park is accessible to all users equally.
- To provide environmental sustainable park design, facilities and surface treatments.
- To develop management strategies for bushland areas.
- To provide durable and safe facilities and features which can be economically and effectively maintained.
- Enhance the aesthetic qualities of Wolli Creek.

This Plan of Management provides a practical working tool for the future planning within the site by NPWS. It also provides guidelines for community involvement and the approaches to be adopted in implementing strategies within the study area.

This document is accompanied by an illustrative Masterplan.

1.3 SITE DESCRIPTION

Wolli Creek Regional Park is a large linear area of land within the Canterbury Local Government Area situated on the north side of Wolli Creek (see Fig 1).

Occupying approximately 60 hectares, Wolli Creek Regional Park is bounded by Wolli Creek, in the south (the creek is not included in the Park) and residential area in the north. The topography is steep in much of the Park, characterised by a steep south facing sandstone escarpment. The Park runs from Bexley Road North at its western end to Unwins Street to the east.

The majority of the Park comprises remnant bushland with sandstone plant communities including Sydney Sandstone Gully Complex and Closed-forest. Mangroves and associated saltmarshes fringe the creek in the estuarine stretch of the creek up to the Henderson Street weir. Off-stream wetlands adjoin the creek close to Henderson Street and west at Hartill-Law avenue. The site is well known locally for its rich and diverse birdlife.

The East Hills Railway line runs parallel to the site immediately south of Wolli Creek. Few formal walking paths or tracks exist in the Park. The principal recreational focus of the Park is found at Girrahween Park which provides an amenities block, picnic tables and BBQs in a bushland setting. Small local playgrounds exist at several locations on the edge of the Park. A number of infrastructure services cross parts of the site including:

- sewer pipeline
- AGL gas line
- stormwater pipelines

Allied to the virtues of the history of the site is the remnant urban bushland that provides a substantial contrast to the developed urban nature of its surroundings.



I.4 A SHORT HISTORY OF THE SITE

I.4.1 Aboriginal Occupation of the Wolli Valley

Wolli Creek Valley lies within the country of the Darug and Kameygal clans. There is little written historical documentation about Aboriginal culture and occupation of the area, however the presence of middens at the north-eastern end of Wolli Creek suggests the area was occupied by Aborigines.

The mangroves and creek and sandstone outcrops would have provided them sources for food and shelter. It is understood that the word 'Wolli' has the Aboriginal meaning of 'camping place' (Wolli Creek Preservation Society, 1994, *The Story of Stone*, Wolli Creek Preservation Society Inc, Earlwood). The first major confrontation with the Aboriginal people in the area occurred in December 1790 with European settlement forcing the Aboriginal people from the Valley.

I.4.2 Early European Settlers

It was not until 1804 that the first land in the area was granted to Hannah Laycock which she named 'King's Grove' and used as a grazing property. Between 1812 and 1821 all the productive land along the creek was promised to small farmers.

By 1839 the heights above Wolli Creek had been partially cleared of its timber. In 1840 the dam of Cooks River at Tempe was completed, causing problems in the flow of Cooks River and Wolli Creek but providing a crossing of the River and opening up a new line of road.

From 1850 to 1880 the area around Wolli Creek remained on the fringe of the Sydney suburban area. The area consisted of orchards, market gardens, dairies and poultry and pig farming with the abundant water supply from Wolli and Bardwell Creeks. Many of the market gardeners remained in the area until after the turn of the century, the Chinese market gardens remained as late as 1929. Archeological studies in the area found remnants of the market garden at Turrella Reserve and in a bend of the creek below Jackson Place (Madden and Muir, 1996, *The Wolli Creek Valley, A History of Survival*, Wolli Creek Preservation Society, Earlwood).

I.4.3 Further Development of the Valley

There was little additional subdivision and settlement in the 1850s and 1860s with the opening of new roads west of the Parish of St George. In the 1880s Wolli Creek became the prime site for small industry such as woolwashes and boiling-down works.

The construction of the Illawara railway between 1882 and 1884 altered the flow of Wolli Creek with floodwater now draining into Wolli Creek. In order to manage the drainage of Sydney's suburbs the government in 1890 commenced construction of a network of sewers which incorporated the Southern and Western Suburbs Ocean Outfall Sewer aqueduct crossing Wolli Creek.

Small scale stone quarrying on the Turrella side of Wolli Creek occurred during the 19th Century and in the early part of the 20th Century with much of the sandstone used for local buildings. It was during this time that the William Jackson quarry was in operation and the sandstone cottages in Jackson Place constructed. The old quarry is located in the bushland below Highcliff Road, east of Turrella Reserve. The last major project on which the stone from this area was used was the runway at Mascot Airport during the 1940s. At one stage a proposal existed to quarry Nanny Goat Hill for that purpose (Madden and Muir, 1996, *The Wolli Creek Valley, A History of Survival*, Wolli Creek Preservation Society, Earlwood).

Railway Line

The Tempe to East Hills railway line was completed and began running in 1931. It was not until 1988 that a train service commenced between Campbelltown and the city with the construction of the new line between Kingsgrove and East Hills. Despite the construction of the rail line, development in the area was slow mainly due to the Depression's adverse effect on home building.

It was during this time that Andrew Bowen erected a small stone building and raised his family. Remnants of the house can be found in the western area of the Park.

The main period of development along the rail line occurred in the early 1940s and 1950s. Development consisted of shopping centres, schools and churches and the road bridge, Hartill-Law Avenue over Wolli Creek. The industrial area in Turrella developed in the 1950s and 1960s (Madden and Muir, 1996, *The Wolli Creek Valley, A History of Survival*, Wolli Creek Preservation Society, Earlwood).

M5 Motorway

There have been several plans for a road through the Valley since the post war period. In 1948 a traffic study provided for six major expressways, ring roads and other major road works. One of these expressways was the South-Western Expressway, through Alexandria and the Wolli Creek Valley.

In the 1970s the road corridor became known as the M5 Motorway. Community opposition to the construction of the M5 Motorway through the Valley finally led to the recent realignment of the road, of tunnelling most of the motorway from Bexley Road to Arncliffe and thereby preserving the entire length of the Wolli Creek Valley (Madden and Muir, 1996, *The Wolli Creek Valley, A History of Survival*, Wolli Creek Preservation Society, Earlwood).

1.4.4 Wollie Creek Today

The linear corridor has been identified for the establishment as a Regional Park by NSW National Parks and Wildlife Service. Whilst parts of the land, particularly in the east of the site are held by private landholders the NPWS does not have a policy of compulsory acquisition. Where necessary NPWS will seek to agree rights of access across land with the owners.

1.5 THE STATUTORY AND STRATEGIC PLANNING FRAMEWORK

The following statutory instruments and documents have practical relevance to this study and have informed the analysis of issues and development of strategies:

- National Parks and Wildlife Act 1974
- SEPP 19 Urban Bushland
- EP and A Act 1979
- Canterbury Planning Scheme Ordinance 1970

For full list of all relevant references refer to Bibliography.

The Park has been identified as one of the Regional Parks throughout Metropolitan Sydney for enhancement over the coming years. These Parks will be managed by the National Parks and Wildlife Service.

1.6 ZONING, OWNERSHIP OF THE PARK

Given the land use of much of the Park is as a road reservation it has not had a formal park zoning.

The proposed zoning of the Park will be an 8(a) zone under Canterbury Council's LEP.

The majority of the proposed Park is zoned County Road with some smaller areas such as Girrahween Park and Turrella Reserve zoned Open Space under the Canterbury Planning Scheme Ordinance. The adjoining land, south of the Creek is zoned Open Space under the Rockdale Planning Scheme Ordinance.

The area has the following landuses:

- Roads and Traffic Authority Open Space Road Reserve
- State Rail Authority Railway Reserve
- Local Government Ownership Open Space Reserves

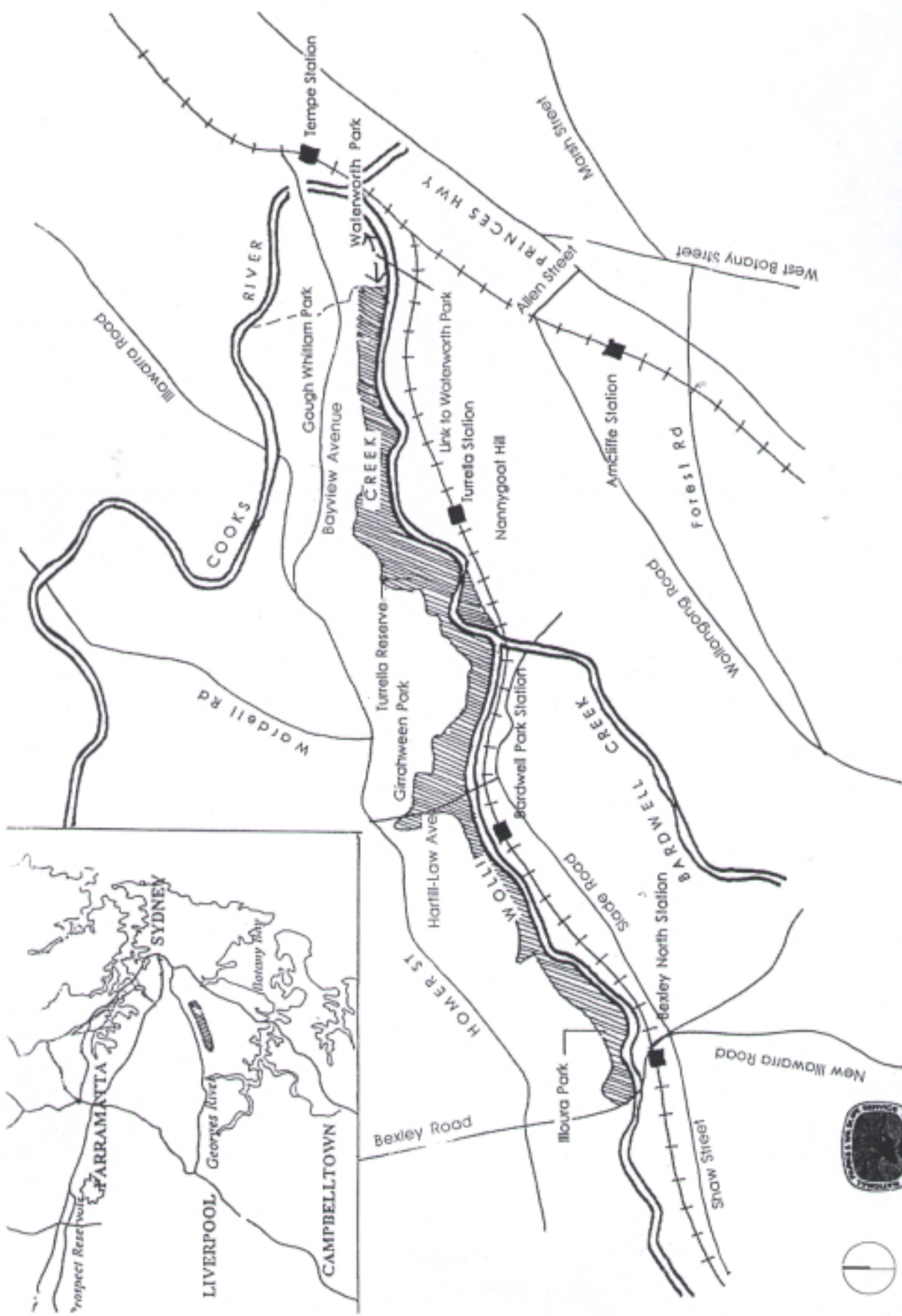
The Park is currently owned by some eight landholders of whom the major landholders are:

- Council
- Roads and Traffic Authority
- Crown
- Department of Urban Affairs and Planning (DUAP)
- State Rail Authority
- Private owners

The care and control of most of the site now designated has rested with Canterbury Council. Members of the community, Friends of Wollie Creek, have been involved in bushland management particularly the section of Park south of the creek. National Parks and Wildlife Service are presently co-ordinating the consolidation of land currently in State government ownership to create a contiguous reserve for the establishment of the Regional Park.

NPWS are currently in preliminary negotiations with Canterbury Council to establish whether parts of the Park may remain in Council's care/control where appropriate.





wollongong regional park • issues paper
SITE CONTEXT PLAN
 FIG. 1