



WOLLI CREEK REGIONAL PARK PLAN OF MANAGEMENT

PLAN OF MANAGEMENT AND MASTERPLAN

FINAL

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prepared for

NSW National Parks and Wildlife Service.

by

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TABLE OF CONTENTS

Title/heading	page
EXECUTIVE SUMMARY	vi
1.0 INTRODUCTION	1
1.1 PURPOSE OF THIS DOCUMENT	1
1.2 THE NEED FOR A PLAN OF MANAGEMENT	1
1.3 SITE DESCRIPTION	3
1.4 A SHORT HISTORY OF THE SITE	4
1.4.1 Aboriginal Occupation of the Wollli Valley	4
1.4.2 Early European Settlers	4
1.4.3 Further Development of the Valley	4
1.4.4 Wollli Creek Today	6
1.5 THE STATUTORY AND STRATEGIC PLANNING FRAMEWORK	6
1.6 ZONING, OWNERSHIP OF THE PARK	6
2.0 METHODOLOGY AND FORMAT	8
2.1 DATA COLLECTION AND SURVEY	8
2.2 COMMUNITY CONSULTATION	8
2.3 BASIS FOR MANAGEMENT	8
2.4 STRATEGY DEVELOPMENT AND PREFERRED CONCEPTS	9
2.5 PRIORITIES	9
2.6 FORMAT OF THE REPORT	10
2.6.1 Major Topic (eg. Environment and conservation)	10
2.6.2 Terms and Definitions	11
3.0 ISSUES AND OPPORTUNITIES	12
3.1 URBAN CONTEXT	12
3.1.1 Existing Status	12
3.1.2 Community Perceptions and Issues	13
3.1.3 Discussion	14

Title/heading	page
3.2 ENVIRONMENT AND CONSERVATION	15
3.2.1 Existing Status	15
3.2.2 Community Perceptions and Issues	18
3.2.3 Discussion	19
3.3. NATURAL AND CULTURAL HERITAGE	20
3.3.1 Existing Status	20
3.3.2 Community Perceptions and Issues	22
3.3.3 Discussion	23
3.4 RECREATION AND LEISURE	24
3.4.1 Existing Status	24
3.4.2 Community Perceptions and Issues	24
3.4.3 Discussion	26
3.5 CIRCULATION AND ACCESS	27
3.5.1 Existing Status	27
3.5.2 Community Perceptions and Issues	28
3.5.3 Discussion	29
3.6 VISUAL QUALITY AND LANDSCAPE CHARACTER	31
3.6.1 Existing Status	31
3.6.2 Community Perceptions and Issues	32
3.6.3 Discussion	33
3.7 BUILDINGS AND INFRASTRUCTURE	34
3.7.1 Existing Status	34
3.7.2 Community Perceptions and Issues	34
3.7.3 Discussion	35
3.8 PROMOTION, INTERPRETATION AND EDUCATION	36
3.8.1 Existing Status	36
3.8.2 Community Perceptions and Issues	36
3.8.3 Discussion	37
3.9. PLANNING AND MANAGEMENT	38
3.9.1 Existing Status	38

Title/heading	page
3.9.2 Leases and Licences	38
3.9.3 Community Perceptions and Issues	39
3.9.4 Discussion	40
4.0 OBJECTIVES AND VISION	41
4.1 OBJECTIVES	41
4.1.1 Context	41
4.1.2 Recreation and Leisure	41
4.1.3 Access and Circulation	41
4.1.4 Cultural and Natural Heritage	41
4.1.5 Site Character and Visual Quality	42
4.1.6 Environment and Conservation	42
4.1.7 Management and Planning	42
4.1.8 Interpretation, Promotion and Education	42
4.2 VISION	43
5.0 STRATEGIES	44
5.1 ENVIRONMENT AND CONSERVATION	47
5.2 NATURAL AND CULTURAL HERITAGE	52
5.3 RECREATION AND LEISURE	54
5.4 CIRCULATION AND ACCESS	57
5.5 VISUAL QUALITY AND LANDSCAPE CHARACTER	62
5.6 BUILDINGS AND INFRASTRUCTURE	64
5.7 PROMOTION, INTERPRETATION AND EDUCATION	66
5.8 PLANNING AND MANAGEMENT	68
6.0 IMPLEMENTATION	73
6.1 TARGETS AND PERFORMANCE INDICATORS	74
6.1.1 Environment and Conservation	76
6.1.2 Natural and Cultural Heritage	78
6.1.3 Circulation and Access	78

Title/heading	page
6.1.4 Recreation and Leisure	78
6.1.5 Promotion, Interpretation and Education	79
6.1.6 Planning and Management	79
6.1.7 Buildings and Infrastructure	80
6.2 FUNDING	81
6.3 REVIEWING THE PLAN	82
7.0 MASTERPLAN	83
7.1 PLANNING AND DESIGN PRINCIPLES	86
8.0 BIBLIOGRAPHY	91

SUPPORTING DOCUMENTS (SEE SEPARATE DOCUMENT)

- A SUB-CONSULTANTS REPORTS**
- B PUBLIC EXHIBITION MATERIAL**
- C MEDIA RELEASES / FLIERS / NEWSLETTERS**
- D STEERING COMMITTEE MEETINGS**
- E COMMUNITY WORKSHOPS**
- G CONSULTATION CONTACT LIST**

LIST OF FIGURES

FIG. 1 SITE CONTEXT PLAN

FIG. 2 ENVIRONMENT AND CONSERVATION

FIG. 3 PROMOTION, INTERPRETATION AND EDUCATION

NATURAL AND CULTURAL HERITAGE

FIG. 4 EXISTING RECREATION AND LEISURE

FIG. 5 EXISTING CIRCULATION AND ACCESS

FIG. 6 VISUAL QUALITY AND LANDSCAPE CHARACTER

FIG. 7 EXISTING BUILDING AND INFRASTRUCTURE

FIG. 8 ENVIRONMENT AND CONSERVATION / BUSHLAND MANAGEMENT

FIG. 9 PROMOTION, INTERPRETATION AND EDUCATION

NATURAL AND CULTURAL HERITAGE FEATURES

FIG. 10 RECREATION AND LEISURE

FIG. 11 CIRCULATION AND ACCESS

FIG. 12 VISUAL QUALITY / LANDSCAPE CHARACTER

FIG. 13 GIRRAHWEEN PARK DETAIL AREA

FIG. 14 TURRELLA DETAIL AREA

FIG. 15 PRINCIPLES FOR CONSOLIDATING NATIVE BUSHLAND

FIG. 16 PRINCIPLES OF STORMWATER DIVERSION FROM NATIVE BUSHLAND

FIG. 17 STABILISATION TREATMENT OF CREEK BANKS, VEGETATION MANAGEMENT

FIG. 18 DESIGN CONCEPT FOR STABILISED PATH IN AREAS PRONE TO EROSION

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

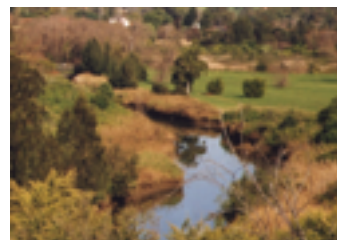
- Develop an integrated programme of signage, information leaflets, interpretation signs, media releases, education packs to inform and educate the regional community on numerous aspects of the Park.

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

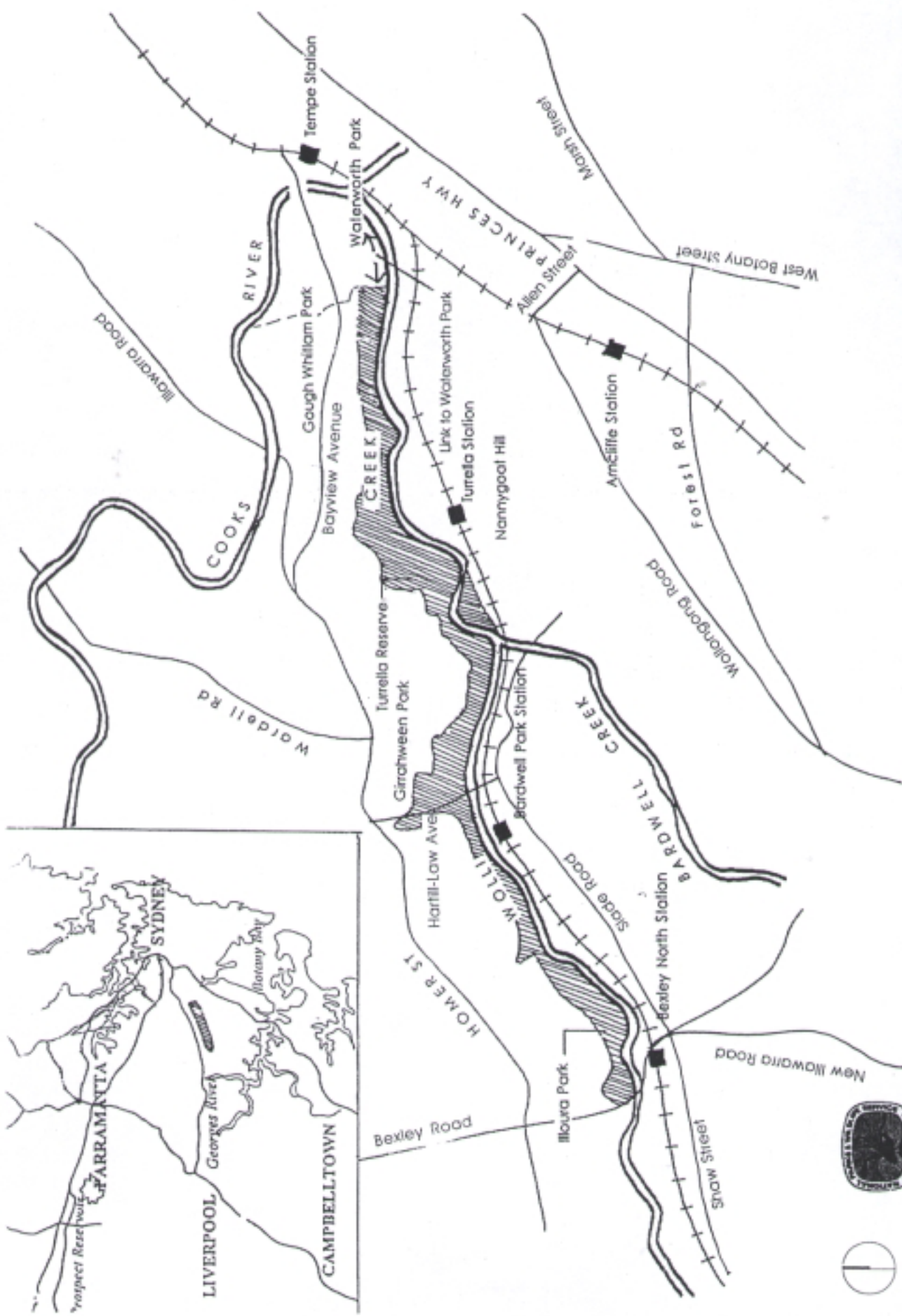
The Park is currently owned by some eight landholders of whom the major landholders are:

- 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.





wollie creek regional park • issues paper
SITE CONTEXT PLAN
 FIG. 1

2.0 METHODOLOGY AND FORMAT

The following brief summary sets out the approach and methodology adopted in achieving the objectives of the Plan and describes the chosen format. This process has involved key stages as follows:

2.1 DATA COLLECTION AND SURVEY

This has involved the consultant team in site specific document research on flora and fauna data, historical development of the area, water quality, landuse practices, service locations, pedestrian, cycle and vehicle traffic and parking management. This information has been supported by field checks and discussions with Council officers, other Government instrumentalities, stakeholders, and local and regional community liaison.

2.2 COMMUNITY CONSULTATION

This element is considered by NPWS and the consultant team to be a key component in the development of the Plan of Management and Masterplan. It is a process intended to provide opportunities for information exchange, raising of concerns, opinions and ideas.

The development of the Plan has taken a comprehensive and integrated approach to community consultation with local and regional interest given considerable emphasis.

Key elements in the consultation process have included:

- telephone survey
- community workshops
- steering group of key stakeholders
- one on one interviews
- newsletters, minutes

A full description of the consultation process and outcomes is contained in the Appendices in Volume Two.

2.3 BASIS FOR MANAGEMENT

Following detailed site analysis, document review, consultation and evaluation of key values of the Park the results are summarised in Part A of the Plan of Management and this forms the basis for management.

2.4 STRATEGY DEVELOPMENT AND PREFERRED CONCEPTS

In analysing the numerous issues that affect the site and after evaluation of NPWS objectives and community concerns, the team has reviewed a range of concept options and subsequently defined a series of detailed strategies that address the key issues, providing clear guidelines for the future design, implementation and management of the site. The strategies are provided in a combined written and illustrated form where appropriate.

2.5 PRIORITIES

In arriving at final strategies the Plan will set out and identify priorities for staging the works.

A suite of targets is established for those strategies and performance indicators identified by which implementation progress may be measured.

The Plan provides outline costs for key elements of the strategies proposed.

2.6 FORMAT OF THE REPORT

Section 3 of Part A explores all of the relevant issues raised under 9 major headings. Each issue under these headings is discussed in the following format:

2.6.1 Major Topic (eg. Environment and conservation)

Introduction

An introduction is provided for each of the major headings giving a general background to the principal matter under consideration.

Existing Status

This section provides factual background on the topic at issue.

Community Perceptions and Issues

This section provides a brief summary of the key concerns raised in discussion with stakeholders. The principal source of such material is from the discussions in the community workshops, steering committee meetings, and telephone survey. The issues raised under this heading are not purported to be a quantitative representation of the broader community, but rather identify the range of concerns raised by individuals or groups that may require consideration and further analysis.

Discussion

This section provides a brief discussion of all the implications of the above, concluding where applicable with broad implications as to the options that might be considered in developing strategies to address the issues.

2.6.2 Terms and Definitions

For the purpose of clarity some abbreviations are referred to in the report and are defined as follows:

NPWS	National Parks and Wildlife Service
The Park	Wolli Creek Regional Park
The site or study area	Wolli Creek Regional Park
The Creek	Wolli Creek
Respondents	participants in the telephone survey and community workshops
SEPP	State Environmental Planning Policy
LEP	Local Environment Plan
RTA	Roads and Traffic Authority
DUAP	Department of Urban Affairs and Planning
RIC	Rail Infrastructure Corporation
SR	NSW State Rail

Access terminology as stated in NSW NPWS *Access for All*

Barrier Free	Designed for wheelchair access (including paths, toilets, picnic facilities, benches and tables)
Rough	Surface of paths have potholes, tree roots, rocks and/or similar obstacles
Easy	Access is free of obstacles such as steps, rough terrain or significant slopes, and may have ramps or boardwalks
Medium	Access presents some minor difficulties, such as grassy surface, but is considered negotiable without assistance
Difficult	Access is over rough terrain or via steps or steep slope - help is necessary

3.0 ISSUES AND OPPORTUNITIES

3.1 URBAN CONTEXT

The proposed Wolli Creek Regional Park lies in the highly urbanised southern districts of Sydney not far from Sydney Airport. This bushland corridor currently acts as a distinct linear transition between the more elevated suburbs of Earlwood, Turrella and Undercliffe and the creek side suburbs of Bardwell Park and Arncliffe (refer Fig. 1).



3.1.1 Existing Status

- The Park lies in a long established suburban part of Sydney, an area of medium to low density housing mixed with industrial and commercial landholding within the Canterbury Local Government Area.
- On the northern side the Park is almost totally bordered by established housing, with some consequent impacts of stormwater run off, domestic animals, garden waste and weed invasion.
- Sydney Airport is located approximately 1km to the south-east of the Park. Aircraft are visible from the ridgelines and aircraft noise is often audible within the Park.
- Turrella industrial area is to the south of the Park, bordering Wolli Creek.
- Principal urban centres adjoining the Park are Earlwood and Bexley North.
- The site is readily accessed by public and private transport. Influence of the various transport modes is evident with the close proximity of the East Hills Railway line and major arterial roads.

The rail corridor runs parallel with the Park on the south side of Wolli Creek. Stations adjacent to the Park running east to west include Turrella, Bardwell Park and Bexley North. The future Wolli Creek station will increase this number of stations adjacent to the Park.

The proposed amplification of the rail corridor includes two additional tracks and new bridges at Hartill-Law Avenue and the confluence of Wolli and Bardwell Creeks.

The major arterial roads to the west and east are Bexley Road and Princes Highway.

- The construction of the M5 East freeway, a four lane linking the M5 at Beverly Hills to General Holmes Drive at Sydney Airport, is currently underway. It comprises a tunnel from Bexley Road to Marsh Street, south of the Park and associated infrastructure including several air intakes and a ventilation outlet to be located in the Turrella industrial area adjacent to the Park. As part of the M5 East development the RTA has made a commitment to provide a regional cycleway linking to existing bicycle networks.
- Road and vehicle movements are mostly suburban in the immediate locality of the Park.
- Cross connecting roads, Hartill-Law Avenue and Bexley Road are the two significant roads from which the Park can be viewed. Views of the western end of the Park can also be had from Slade Road (refer Fig.6).
- The Park has a strong east west orientation with few cross links or substantial downstream access links to the Cooks River or the adjoining Bardwell Valley.
- Views to and from the Park are extensive within the district from ridgelines, key lookout points and train line (refer Fig.6).
- Approximately 46% of the regional population are overseas-born of non-english speaking backgrounds. Of the sample area covered by the telephone survey the majority of respondents:
 - had no children
 - were in paid employment
 - were long term residents
- A number of prominent buildings in the locality are also visible from the Park including those of the Turella Industrial Estate and the local Catholic School at Our Lady of Lourdes.

3.1.2 Community Perceptions and Issues

- The telephone survey indicates that 82% of those living within 15 minutes drive to the Park see it as a district / regional destination.
- There was much community support in the workshops for the Park to be seen as a tranquil location within its busy urban location.
- Whilst the M5 East has been re-aligned to avoid the valley much concern still exists that the associated ventilation outlet (the stack) to be located outside the Park, will have major bearing on the enjoyment and use of the Park, particularly in visual and air quality terms.

- Some community members have also expressed concern at the impact of the proposed rail amplification on Wolli Creek itself.

3.1.3 Discussion

It is evident from visiting the site and from frequently expressed community attitudes that the proposed Park, now saved from the future M5 East construction, will play a critical local and regional role in the recreational, educational and environmental values and resources of south west Sydney.

With respect of the Park's urban context the critical principles for future planning and management will include:

- Improved visibility of the Park to the passer by from rail and road.
- Improved environmental and recreational links to adjoining urban areas.
- Expectation that the Park will be safe and enjoyable to use without polluting impacts from the ventilation outlet.
- Potential for wider regional access and use of the Park via public transport, particularly by rail.
- Reduced impacts on the Park of activities on neighbouring properties.

3.2 ENVIRONMENT AND CONSERVATION

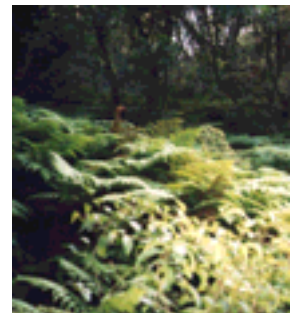
The greatest proportion of the Wollie Creek Regional Park is comprised of bushland, which although affected by previous activity within the site and surrounding landuse, remains broadly intact. The combination of bushland, creek, mangroves and wetlands provides a valuable natural environment in an urban context.

3.2.1 Existing Status

Native Vegetation (Refer to Fig. 2)

- The regional park site supports several remnant plant communities including:
 - *Sydney Sandstone Gully Complex community 10ag*: (Benson, 1994) characterised by Smooth-barked Apple (*Angophora costata*), Blackbutt (*Eucalyptus pilularis*), Sydney Peppermint (*Eucalyptus piperita*), Red Bloodwood (*Eucalyptus gummifera*) and Turpentine (*Syncarpia glomulifera*).

On shallow rock outcrops and ridgelines, thickets of Tick Bush (*Kunzea ambigua*) are also dominant.
 - *Closed-forest community*: a small remnant of this community (a sub category of the Sydney Sandstone Gully Complex 10ag) occurs adjacent to Wollie Creek in the western end of the park. This remnant is characterised by Coachwood (*Ceratopetalum apetalum*) and Water Gum (*Tristaniaopsis laurina*).
 - *Mangroves and associated saltmarsh communities*: (Estuarine Complex 4a (Benson, 1994) occur on the banks of Wollie Creek downstream of Turella, Henderson Weir.
 - *Freshwater wetland*: one remnant wetland (offstream) survives upstream of Hartill Law Avenue although is threatened by active weed invasion. The remaining creekline vegetation within the freshwater sections of Wollie Creek is dominated by exotic species.
- There are limited direct corridor connections to Bardwell Valley, Stotts Reserve and Cooks River as these points are obstructed by existing infrastructure (eg. roads and rail links).
- Numerous ecological and archaeological studies have been carried out throughout the site particularly covering flora and fauna, waterways, Aboriginal and European history of the valley and bush management.



- Regeneration of bushland has been carried out in the site since 1984 by various groups such as National Trust and community groups.

The most active regeneration work undertaken by the National Trust has focussed on the terrestrial plant communities between (and including) Girrahween Park and Nanny Goat Hill.

Some community based regeneration work has been recently undertaken in the vicinity of Illoura Reserve. Revegetation and bird habitat reconstruction work is being undertaken within the NSW State Rail easement leased to the Friends of Wolli Creek.

- Bushland regeneration works (particularly those undertaken by the National Trust between Girrahween Park and Nanny Goat Hill) have improved the condition of the core bushland remnants relative to their assessed condition in 1984 (National Trust Bushland Survey). In other areas of the park, the condition of bushland has generally declined below that assessed by the National Trust in 1984. This is primarily due to an absence of any active bushland regeneration works and the presence of unmitigated degrading influences.
- Council weed control practices (spray control) are active along most street frontages to the park and the boundary recreation areas. Slashing practices on some bushland boundaries are encroaching into remnant bushland.
- No active vegetation management (apart from some joint plantings in selected locations) is being undertaken along the southern boundary of the park (Rail Easement) although opportunities for developing longterm co-operative vegetation management exists.

Introduced Vegetation

- Introduced species or cultural plantings are evident in areas adjacent to the Creek around Turrella Reserve. Species include Willows (*Salix* sp), Poplars (*Populus* sp.) and Coral Tree (*Erythrina* sp.).
- Introduced native species, non-endemic to the region, occur in areas of recent bush regeneration in the eastern section of the Park and around the recreation facilities in Girrahween Park.
- Weeds are a large problem in the bushland, creekline, railway corridor and ridges. Dominant invading species include Privet, Lantana, Blackberry, Crofton Weed, Wandering Jew, Morning Glory.



- Introduced species also impact from surrounding residential areas due to garden escapes and the disposal of garden cuttings occur where residential properties adjoin the open space.

Some noxious weed species occur with the park such as *Ludwigia peruviana*.

- The most problematic areas for weed management include:
 - the immediate banks of Wolli Creek due to nutrient enrichment, sediment loadings and the uncontrollable nature of material transported by the creekline
 - stormwater discharges due to nutrient enrichment and elevated soil moisture levels
 - residential and park boundaries due to diffuse source nutrient enrichment and poor vegetation management practices ie. broadscale spraying
- Within the wetland, mangrove and saltmarsh communities, the main threat from exotic species is from the vine species (threat to canopy), grasses such as Kikuyu (*Pennisetum clandestinum*) which can smother saltmarshes, and invasion of saline areas and reedbeds by spiny rush (*Juncus acutus*).



Fauna

- The bushland supports a wide variety of native bird species, and some migratory species which are protected by the Japan-Australia Migratory Birds Agreement (JAMBA).
- Records for native birds are the most comprehensive fauna records available for the park and the Wolli Valley.
- The bushland within the park provides food, shelter, nesting sites and migration routes for more than 25% of the bird species recorded in NSW (Neil Rankin, 1989).
- The most common mammals recorded in the region (catchment of Cooks River) includes Common Brushtail Possums and Grey Headed Flying Foxes. Microbats are occasionally recorded and Bush Rats may still occur in site adjoining the park.
- Domestic and feral animals can be found within the Park. Local residents currently use the bushland and reserves for dog walking.

Air Quality

- There are no major arterial roads adjacent to the Park and few residential roads border the Park boundaries, therefore the levels of road pollution do not appear to be high.
- There is minimal impact from Sydney Airport.
- There have not been recent bushfires in the Valley.
- The proposed future M5 Motorway ventilation outlet is located in the Turrella industrial area adjacent to the Park and the impact on air quality is subject to its development.

**Water Quality**

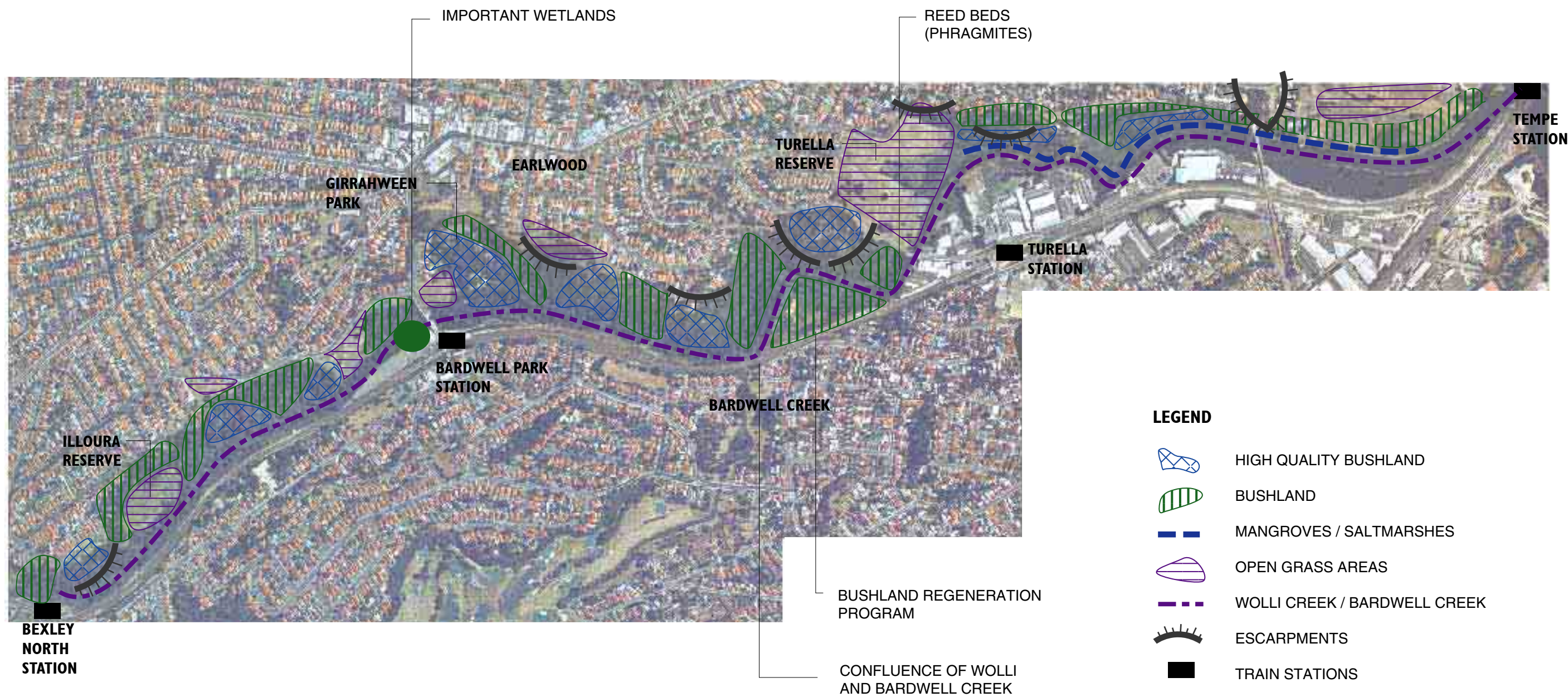
- The Henderson Street weir separates the salt water regime from the fresh water. This possibly promotes the establishment of mangroves on the banks of the Creek downstream from the weir.
- The surrounding residential and industrial areas are major diffuse sources of stormwater which affect the creek.
- Diffuse sources and point sources upstream bring an influx of rubbish and weed invasion.

Previous Land Uses

- Past uses of the site such as Chinese market gardens, piggeries may have resulted in changes to soils, vegetation and grades.

3.2.2 Community Perceptions and Issues

- The community believes it is a priority for the protection and restoration of the natural qualities of the site.
- Important for existing wetlands and saltmarshes to be protected.
- Management of regeneration works to provide correct regeneration practices.
- Bushland focus such as walks are recognised as a need for the Park.
- Concern that domestic and feral animals such as dogs and cats could be a problem for the native fauna and flora. There appears to be mixed views in the community on unleashed dog areas, both from the survey and amongst local residents.
- There is concern within the community that the future M5 East ventilation outlet will have an adverse impact on air quality within the Park.



wollibardi creek regional park
ENVIRONMENT AND CONSERVATION
 FIG.2

3.2.3 Discussion

Unquestionably the most evident values of the Park are its natural attributes. Whilst many of the flora and fauna habitats and communities remain largely intact, the focus of the future management of the Park must necessarily place a strong emphasis on regeneration and enhancement of the Park's natural systems.

With respect to the Park's environment and conservation the critical principles for future planning and management will include:

- Need to consolidate and conserve existing quality habitats and communities particularly bushland.
- Opportunity to work progressively from best quality to worst.
- Importance of connections to wider web of natural environments, especially canopy connections.
- Provide refuges for fauna in undisturbed areas of Park.
- Ensure longterm maintenance and enhancement (where appropriate) of the Park's biodiversity.
- Ensure that bushland and park management activities minimise impact on fauna habitat.
- Co-operative vegetation management is critical with adjoining property managers (Council, Private, Rail, Sydney Water).
- Air quality, need for assurances not affecting park uses.
- Opportunities for non-government agencies to continue work in the area.



3.3. NATURAL AND CULTURAL HERITAGE

The site now occupied by the proposed Wollie Creek Regional Park has had a long and intriguing history dating back to Aboriginal occupation, through early European settlement of the area to more recent events.

Whilst the site has seen many significant threats during the 20th Century, paradoxically, the Park may have been saved from residential development by the very nature of the long standing road easement. As the area is now to be conserved its rich natural and cultural heritage can be acknowledged.



3.3.1 Existing Status

Refer to Figure 3.

Natural Heritage

- There are several examples of recumbent cross-bedding throughout the Park, one of the largest examples is located in the eastern end below Highcliff Road.
- Sites and features of natural heritage and interest include:
 - extent of urban bushland
 - fern gully east of Girrahween Park
 - spectacular sandstone outcrop and associated vegetation of Nanny Goat Hill located at Turrella Reserve
 - mangroves along the creek downstream of Henderson Street weir
 - remnant stands of Blackbutt forest (*Eucalyptus pilularis*) in Girrahween Park
 - remnant freshwater wetland upstream of Hartill-Law Avenue
 - Wave Rock



Aboriginal Heritage

- Aboriginal heritage items include numerous rock shelters and two middens. Many of these rock shelters have been identified in the sandstone cliffs.
- It is possible that a number of Aboriginal items or sites are yet undiscovered or masked due to past activities such as land filling which was undertaken in the Valley at irregular intervals between 1950 and the present.

European Heritage

- Numerous investigations have been conducted in the area by Wollli Creek Preservation Society to locate the physical remains of sites associated with the European occupation of the area.
- The region has a history of stone quarrying, market gardens, grazing, timber, light industry and farming. There are numerous items reflecting these past uses. Key items of local or regional significance include:
 - *Stone Quarry*: located east of Turrella Reserve and below Highcliff Road was operational in the early 1900s and has resulted in an excavated area of approximately 4000m².
 - *Jackson Place Stone Cottages*: The cottages, located adjacent to the Park were built in the early 1900s by William Jackson.
 - *Pool*: located between Girrahween Park and Turrella Reserve, the cement lined pool constructed in the 1920s is partly excavated into a sandstone outcrop overlooking the Creek and valley.
 - *Drainage pools*: located in Girrahween Park were constructed in the 1920s.
- Minor historic items of note within the Park include:
 - a dry stone wall in the eastern section of the Park which may have separated the Campbell and Jackson properties in the 1800s
 - remains of an earth jetty through the mangroves east of Turrella Reserve
 - Henderson Street Weir
 - various remnants from King and Parry Farms such as building foundations, iron plated, brick and cement tanks, and troughs cut into bedrock
 - the adit is a tunnel cut into the sandstone on the western side of the sewage pumping station near Unwin Street, Undercliffe and may have provided access to the sewer lines
- Past uses of Turrella Reserve include market gardens. Remnants of a market garden include a dipping well, coral tree plantings and evidence of field boundaries (Madden and Muir, 1996, *The Wollli Creek Valley, A History of Survival*, Wollli Creek Preservation Society, Earlwood).



National Significance

- *South Western Suburbs Sewer Aqueduct*: located at Unwin Road, Undercliffe at the far eastern end of the Park, it was constructed in the 1890s across Wolli Creek and is included in the Register of the National Estate for its significance in engineering.

**3.3.2 Community Perceptions and Issues**

Generally there is extensive knowledge of the history of the site within the local community but its wider recognition and understanding in the area is limited.

- Workshop and steering committee participants agreed that discretion needed to be applied to some heritage sites.

Natural Heritage

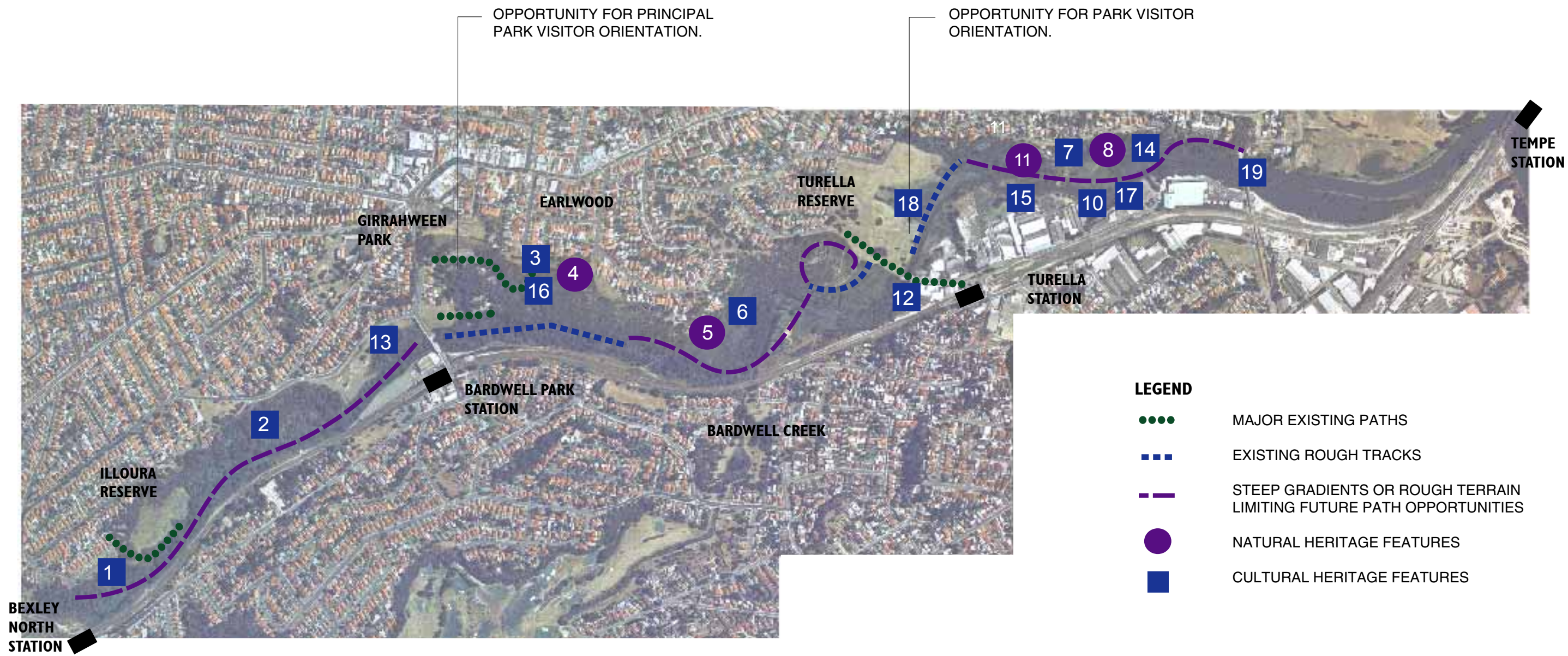
- Strong consensus in the community that all natural heritage items should be managed, protected, conserved and interpreted.
















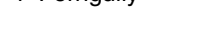
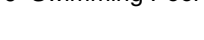
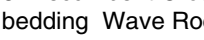

Aboriginal Heritage

- The Aboriginal heritage was acknowledged by the local and regional communities as extremely important to the area and an understanding of its origins; it should be protected and interpreted.
- There was strong emphasis from the community workshops that the interpretation of Aboriginal heritage should include input from the traditional owners of the land, the Darug people and the Metropolitan Lands Council.

European Heritage

- All agreed that heritage items are a significant and positive attribute of the site and need to be protected and interpreted.
- Many participants agreed heritage items adjacent to the Park should be acknowledged and included in the interpretation strategy.



-  1 Bowen's Camp
-  3 Entrance to Girrahween Park
-  5 Sandstone Outcrop
-  7 Jackson Place Stone Cottages
-  9 Drystone Wall
-  11 Jackson Quarry
-  18 Turrella Market Gardens
-  2 King's Farm
-  4 Ferngully
-  6 Swimming Pool
-  8 Recumbent Cross-bedding Wave Rock
-  10 Jetty
-  12 Henderson Street We
-  13 Parry Farm
-  14 Adit Tunnel
-  15 Market Gardens
-  16 Drainage Pools
-  17 Shelter
-  19 South Western Suburbs Sewer Acqueduct

3.3.3 Discussion

Major elements within and adjacent to the Park have the potential to create an important regional heritage and visual focus.

With respect to the Parks natural and cultural heritage the critical principles for future planning and management will include:

- Conservation, management and protection of significant geological features, natural systems and cultural heritage relics.
- Improved visibility to many heritage items from adjacent areas.
- Potential for the Park to have a strong educational and interpretation role.



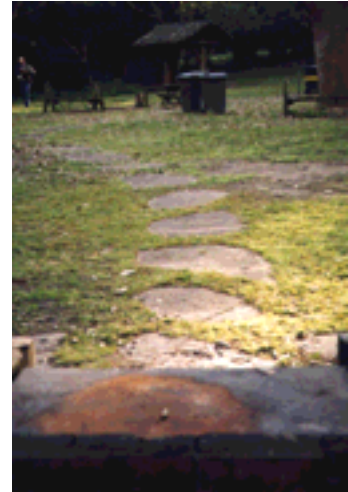
3.4 RECREATION AND LEISURE

Although not formally designated as a park Wollie Creek has enjoyed high levels of recreational use from local and regional users.

Currently the site has little formal open space or recreation development. However there is a diversity of recreational areas and uses within the linear park including enclosed and open bushland, open reserves and council managed and maintained play areas (refer Fig.4).

3.4.1 Existing Status

- As a large part of the Park is urban bushland a recreation focus in bushland experience exists such as bush walking and birdwatching.
- There are two existing recreational focuses in the Park, at Girrahween Park and Turrella Reserve.
 - *Girrahween Park* incorporates an access road, an amenities building, picnic and BBQ facilities in a bushland setting.
 - *Turrella Reserve*, located at Turrella Station is currently used for unstructured recreation and some local community events. It includes play equipment and BBQ and picnic facilities.
- Few formal footpaths exist throughout the site and therefore the area is generally underutilised or rarely visited by the regional community.
- There are several areas of council managed play equipment located at Turrella Reserve, SJ Harrison Reserve and north of Girrahween Park.
- Sandstone escarpments between Girrahween Park and Turrella Reserve are presently being used for rock climbing.



3.4.2 Community Perceptions and Issues

- Respondents of the telephone survey indicated the main activities in the Park consisted of:
 - walking 73%
 - passing through on foot 31%
 - bird watching 23%
 - picnicking 19%
 - children's play 19%

- Workshop participants indicated the major issues and opportunities related to recreation and leisure consisted of:
 - high support on a natural focus for recreation
 - hierarchy of paths and accessibility through the site
 - retain unstructured nature for Turrella
 - need to provide information and orientation signage as there is presently a lack of signage at entrances and through the Park

- Workshop participants suggested that future play equipment should be new and creative rather than the standard plastic equipment used throughout council parks.

- A few participants considered there was a potential for structured recreation facilities such as tennis courts at Turrella Reserve. Other participants considered there were adequate facilities within the area. 63% of the telephone survey respondents supported the use of the park by organised sport and 31% disagreed. This was generally one of the lowest priorities for the Park.

- 81% of the regional community, represented through the telephone survey, supported a cycle path. The community believes cycle facilities within the Park must consider the potential clash between pedestrians and cyclists and the impact on bushland and sensitive landscape areas.

- Many participants supported an area and a regular program for community arts/ social and cultural events.

- There was support within the community for possible recreational water opportunities such as boating and swimming.

- A recreation management plan should be a focus for the planning process.

- As indicated by the respondents of the telephone survey main priorities for recreation to be considered in future planning were:

- children's play areas	87%
- walking trails	85%
- cycle paths	81%
- bird watching facilities	78%
- picnic areas	78%
- Study Centre	83%
- adequate car parking	79%



- The qualities or characteristics which were strongly supported by participants of the telephone survey included a place to appreciate the beauty of nature, relax, get some physical exercise, a place with historic value, for community gatherings and for scientific education or study.
- Workshop participants indicated that the infrastructure for rock climbing was damaging the sandstone escarpments.

3.4.3 Discussion

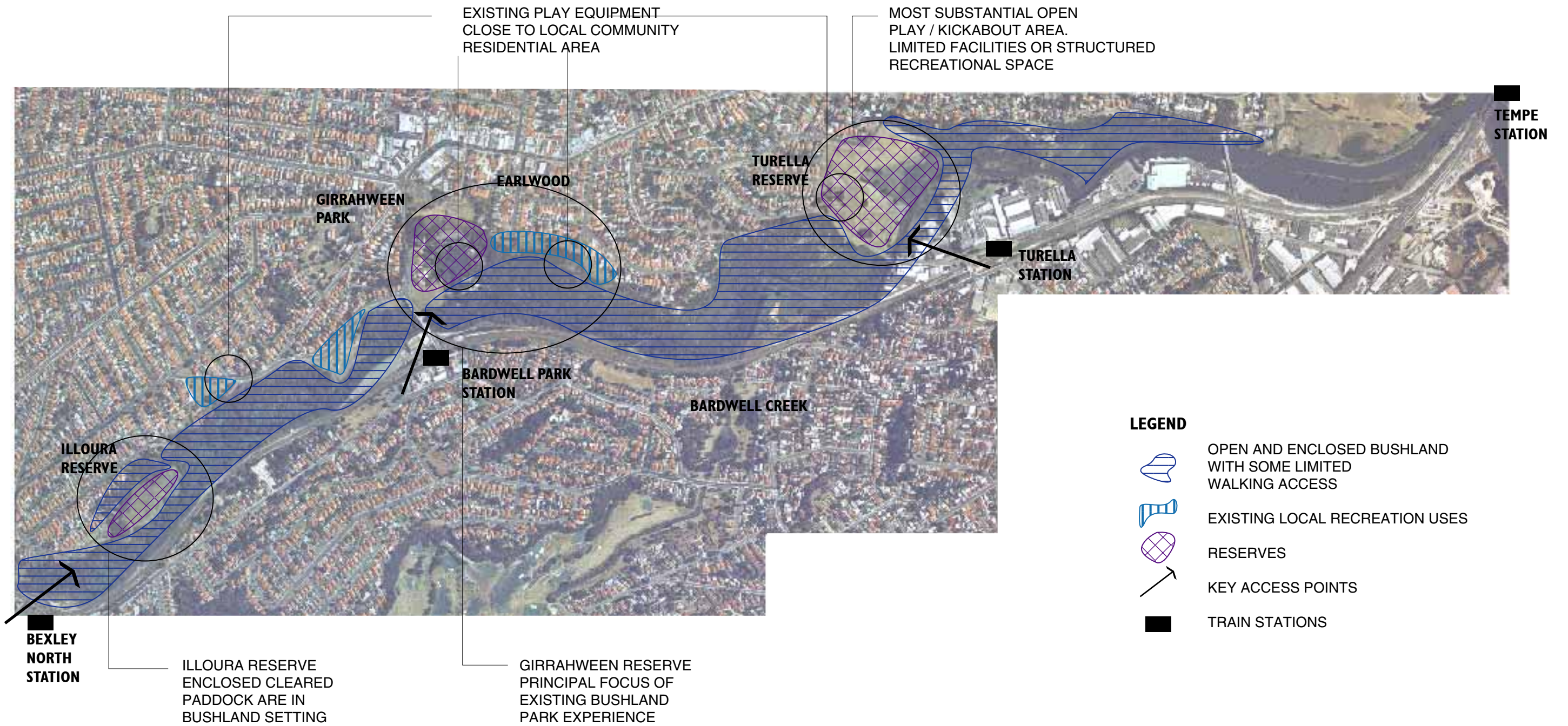
Given the regional nature of the Park it is critical to define an appropriate recreation focus that meets both local and regional needs.

There would appear to be an opportunity for an improved balance of movement oriented and destination-based recreation within the Park.

The principles for future planning and management with respect to recreation and leisure will include:

- Creating a recreational focus for the Park that has at its core the enjoyment and educational benefits of the site's natural values.
- Importance of linear movement through the Park but acknowledging the existing constraints of the site and its sensitive environments which may determine a variety of approaches and opportunities.
- Promotion of activities within the Park that meet the diverse needs of the community and are appropriate to the bushland and creek setting.
- Increased focus on access to and enjoyment of the creek itself through paths, informal canoe launching sites etc.
- Ensuring that recreation facilities are sited in appropriate settings within the Park.





wolli creek regional park
EXISTING RECREATION AND LEISURE

FIG. 4

3.5 CIRCULATION AND ACCESS

In a highly urban setting, a very linear park necessarily attracts high levels of use, both as a destination and as a crossing route. Whilst the extensive boundary length of the Park generates impacts on its natural system it does however provide extended local and regional access opportunities where these are carefully planned and managed.

3.5.1 Existing Status

Public Transport

- There are several train stations within walking distance of the Park and will provide the major public transport links. These include:
 - Tempe Station
 - Turrella Station has direct access to Turrella Reserve
 - Bardwell Park Station has close access to Girrahween Park
 - Bexley North Station
- Central Station is a twenty minute train trip from Wolli Creek Valley.
- The proposed Wolli Creek Station located between Turrella and Tempe stations will provide a direct link to Sydney Airport and further increase the number of stations adjacent to the Park.



Private Vehicles and Parking

- Vehicle access to the park is limited to the surrounding residential streets with only one formal vehicle entrance at Girrahween Park.
- No formal parking exists within the Park.
- There are several existing parking areas in close proximity to the Park. Parking areas at Bardwell Park Station and the Bardwell Earlwood RSL and Earlwood shops are in walking distance to Girrahween Park.
- Wide verges along Bray Avenue and Johnston Street also provide informal parking.

Pedestrian and Cycle

- Local and regional links and connections are not generally formalised within the Park. Extensive use of Girrahween Park has defined popular routes within the bushland.

- Footpath access is limited through the entire Park due to a number of issues including:
 - limited formalised entry or access points
 - steep topography
 - barriers, such as impenetrable bushland or weeds, train line corridor, proposed sound attenuation walls
- There is limited creek crossings with only two small pedestrian bridges between Turrella Reserve and Henderson Street and at Girrahween Park.
- There is limited access to the creek and key vantage points.
- The RTA has made a commitment to provide a regional cycleway as part of the M5 East development. The proposal includes a regional off-road cycleway. The generally preferred route for the off-road cycleway is adjacent to the Park, north of the rail corridor and south of the Creek. This route requires further investigation at Turrella Industrial area due to existing constraints particularly given land ownership and the limited space to the west of Turrella Station.
- There is no existing strategy or hierarchy of entrances, paths or signage.

Service and Emergency Access

- There are no formal or extensive emergency access routes through the Park.
- There are existing service easements through the Park, however there are no formal service access routes.

3.5.2 Community Perceptions and Issues

Public Transport

- Workshop participants considered the promotion of public transport access to the park is crucial, particularly given the limited provision for parking.

Pedestrian and Cycle

With respect to cycle and pedestrian paths key issues raised included:

- Need to create local links between Bardwell Valley and Stotts Reserve.
- Need to provide disabled access paths and facilities such as accessible toilets, BBQs, tables and seats and key areas of the Park.

- Need to improve safety within the Park for those entering and moving around the Park.
- Need to formalise walking trails for education and interpretation purposes.
- Importance of limiting access to some areas of the Park to protect existing natural and cultural heritage items.
- Consideration of new access opportunities such as boardwalks through mangroves.
- Need for improved water access for viewing and boats.
- Transit links for cycling should be provided, but many concerned at potential impacts of cycling in sensitive parts of the Park.
- The wider community surveyed through the telephone survey, 81% supported the option for a cycle path within the Park although the type was not specified.

Private Vehicles and Parking

Key perceptions raised in the community workshops included:

- Consideration of multiple access points to the Park, rather than major entrances to disperse parking.
- Important that future parking does not impinge on the Park itself.

3.5.3 Discussion

Given the context and linear nature of the Park there are ideal opportunities to exploit public transport and, through its promotion, minimise the need for car access.

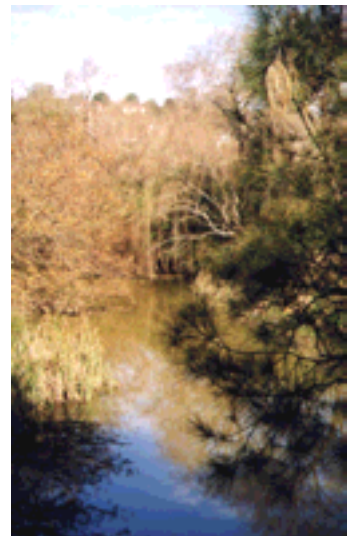
Likewise, from a local perspective a network of footpaths linked to the adjoining street system and regional cycleways will greatly improve access to and enjoyment of the Park.

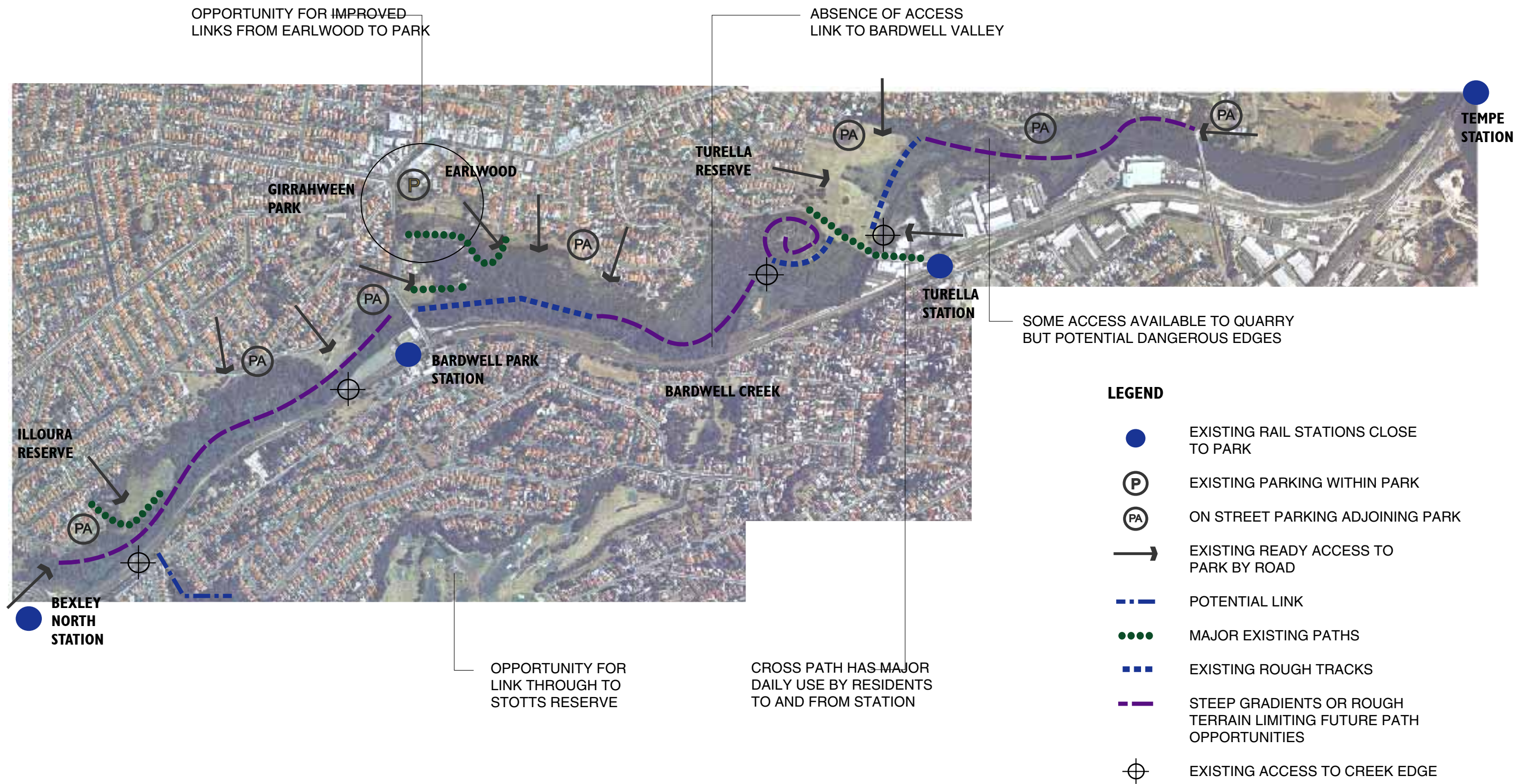
The steep topography and nature of bushland precludes extensive barrier free access through the entire length of the Park and up and down the escarpment without compromise to the environment. In such instances a practical approach to limitations is essential.

Short and long term cycle routes will need to be considered with emphasis on the protection of key vegetation areas; this may mean that much of the RTA cycle route lies outside, but close to the Park.

With respect to the Park's circulation and access the critical principles for future planning and management will include:

- Promote / cross promote public transport to the site.
- Establishment of a range of path types and loops, particularly orientated to access from and to the train stations.
- Maintain emergency and service access without extensive construction within the Park.
- Ensure that cycle path types, sizes and locations are compatible with the Park.
- Improvement of access to the water.
- Cater for events and activities with service temporary parking and access
- Access for disabled should wherever possible be designed to be evidently for that purpose to improve visual aspects and engender a sense of common need and use.





wollie creek regional park
EXISTING CIRCULATION AND ACCESS
 FIG. 5

3.6 VISUAL QUALITY AND LANDSCAPE CHARACTER

The highly elevated nature and dramatic topography of the Park provides many local residents and Park visitors with extraordinary views of the creek and the Park with its extensive bushland. The opportunity to conserve and enhance both the viewpoints and the view seen will do much to promote and define the Park to its wider community.



3.6.1 Existing Status

Visual Quality

- The landscape is defined by the sandstone escarpments and vegetation associations.
- Visual experiences within the Park vary from enclosed rainforest gallery and limited views to the Creek, through to open bushland and expansive views from the ridgeline and high points such as Nanny Goat Hill.
- Visual features of particular qualities may be summarised as:
 - excellent distant views (especially from Nanny Goat Hill, Rocky Knoll at Unwin Street, end of Wavell Parade, the old stone quarry and the bridge at Henderson Street weir)
 - sandstone rock escarpment between Girrahween Park and Turrella Reserve
 - recumbent cross-bedding, for example Wave Rock
 - mangroves and saltmarshes in the eastern section of the Park
 - fern gully east of Girrahween Park
 - high quality bushland between Girrahween Park and Turrella Reserve
 - historic features such as stone quarry, entrance to Girrahween Park, aboriginal shelters, swimming pool
- Visual detractors requiring attention include:
 - weeds obscuring much of the Creek and bushland areas
 - dumping of rubbish in the bushland and open reserves
 - rubbish in the creek
 - Henderson Street weir
- Nanny Goat Hill and particular areas along the ridgeline provide panoramic views over the Park, creek and to the city skyline and Botany Bay.
- The Park incorporates an area of special qualities and a wide variety of landscape characters.



- There are good visual connections to adjacent open spaces such as Bardwell Valley and Stotts Reserve from the ridgeline.
- Close proximity of the rail corridor provides opportunity for visual access to the Park and Creek.
- Opportunities exist for high public exposure to the Park from Turrella Reserve, Bray Avenue, Slade Road Reserve, and Bardwell Valley.
- Limiting existing visual access to the site from the roads, and rail corridor

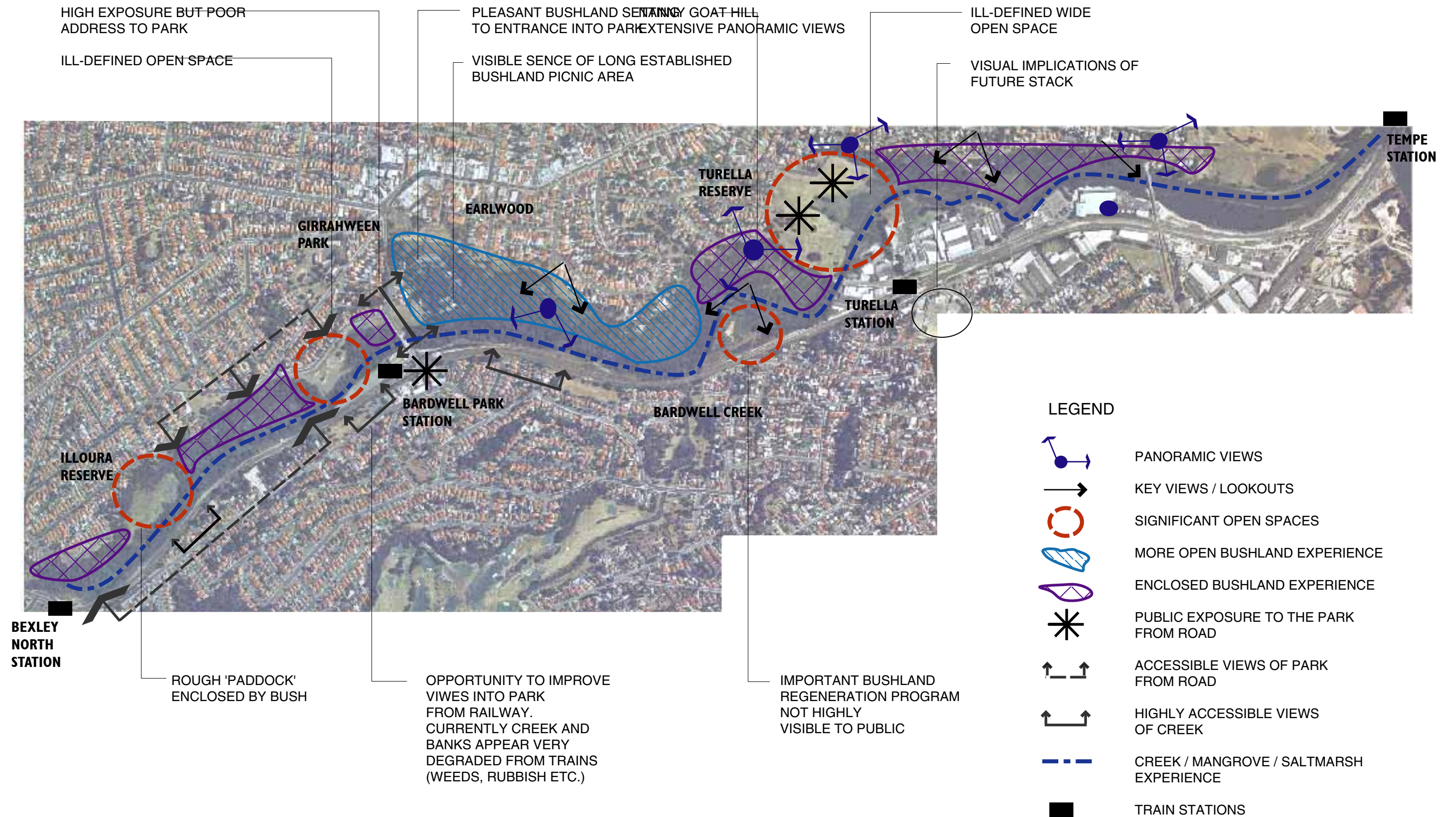
Landscape Character

- Landscape types within the Park are shown in Figure 6 and include:
 - significant open spaces at Turrella Reserve, Illoura Reserve and Harrison Reserve
 - open and enclosed bushland experience
 - creek experience
 - mangroves and saltmarshes

3.6.2 Community Perceptions and Issues

Words used by many in workshops indicate the strong scenic qualities of the Park.

- Future M5 ventilation outlet will have a visual impact on the Park and surrounding area and is a cause of much concern in the community who sees this as a blight on a landscape they have saved from the freeway.
- The visible profile of the Park should be extended to passers by on road and rail.
- There is no exclusive support for a major entry statement for the Park.
- There is a negative visible profile of the Park from the rail corridor as the weed and rubbish invasion of the Creek is apparent.
- There is an absence of a visual integration of disparate settings to create a single Park.



wolli creek regional park
VISUAL QUALITY AND LANDSCAPE CHARACTER
 FIG. 6

3.6.3 Discussion

The site already offers many diverse natural and man-made features of great value for a Regional Park.

It is crucial to maintain a high visual quality to the Park and the protection of the panoramic views over the valley from the higher points in the Park will greatly enhance the visitor experience.

With respect to the Park's visual quality and landscape character context the critical principles for future planning and management will include:

- Conserve and enhance key views.
- Improve visual profile to the passer-by and the regional community.
- Reinforce a strong visual image for the Park within the wider community.
- Maintain views from rail corridor, roads and bridges.
- Enhance visual connections to surrounding open spaces such as Bardwell Valley and Stotts Reserve.
- Ensure any construction of elements within the Park (paths, facilities etc) are in keeping with its setting.



3.7 BUILDINGS AND INFRASTRUCTURE

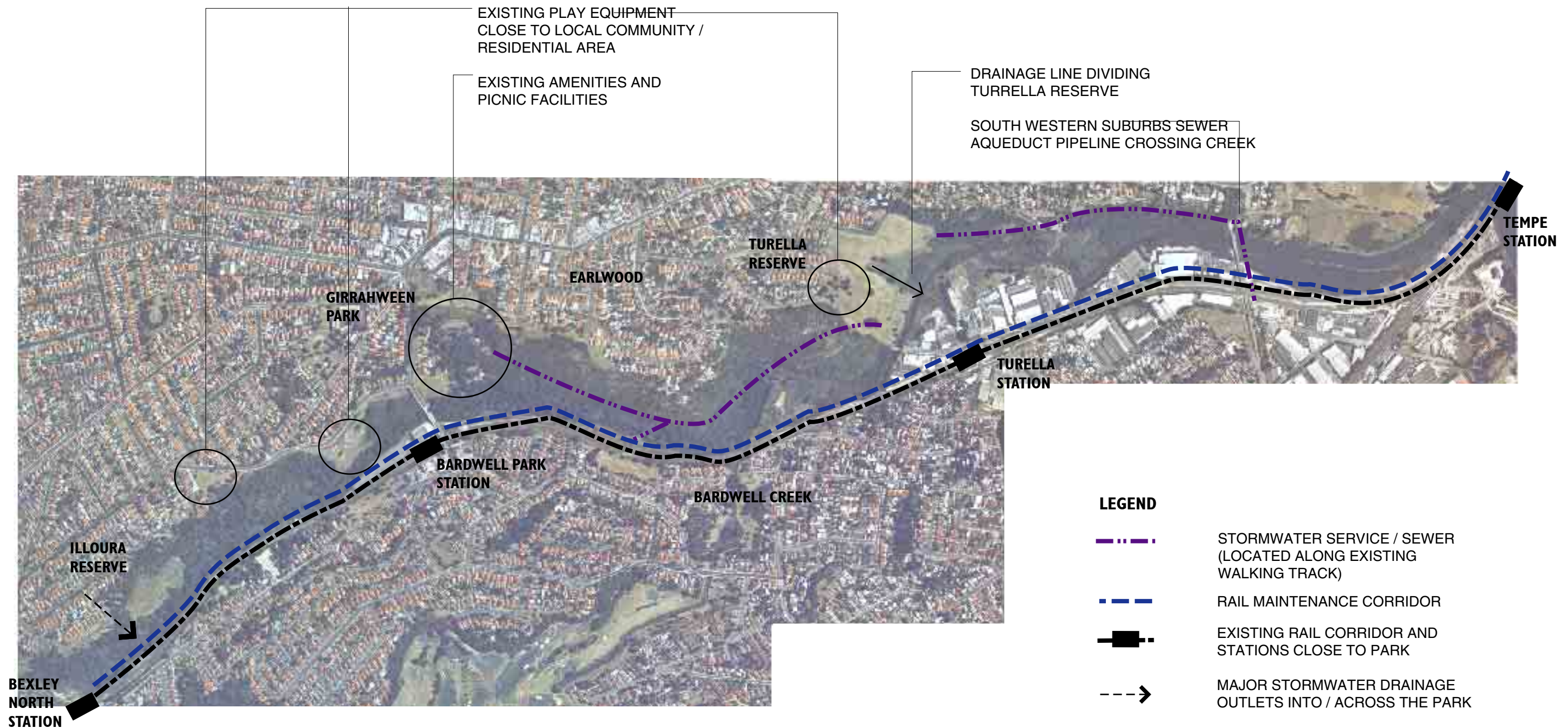
3.7.1 Existing Status

- A number of major services run through or are adjacent to the site and are identified on Figure 7. These services include:
 - Sewage including South Western Suburbs Sewer Aqueduct
 - sewer lines extend from Girrahween Park east through Turrella Reserve to Unwin Road
 - railway corridor and several stations and future-VFT
 - Stormwater pipes
- The site is readily accessible by public transport with the East Hills Railway Line running parallel to the Park on the southern boundary. Several stations are adjacent to the site (refer Circulation and Access) and provide key opportunities for the development of focal and activity areas in the Park.
- In association with the amplification of the railway line is the proposed use of sound attenuation walls. The amplification of the railway includes two additional tracks alternating on the north and south side of the corridor and new bridges at Hartill-Law Avenue and the confluence of Wolli and Bardwell Creeks.
- There is a range of existing infrastructure and facilities within the site and include BBQ, picnic, amenity and play facilities in several locations. Key locations include Girrahween Park (amenities, car access, picnic, BBQs), Turrella Reserve (play facilities, picnic and BBQ) and SJ Harrison Reserve (play) (See Fig.7).



3.7.2 Community Perceptions and Issues

- Importance of ensuring all construction / maintenance of service infrastructure does not damage the Park and its values.
- General preference that building infrastructure is kept to a minimum footprint, but there was strong support within the telephone survey and the community workshops for infrastructure associated with education and promotion of the Park.
- Strong support in the community workshops of the retention of views from the train line. The majority of participants believed the impact of the existing train line was minimal.



wolli creek regional park
EXISTING BUILDING AND INFRASTRUCTURE
 FIG. 7

3.7.3 Discussion

The provision of building facilities such as picnic shelters, toilets and community/ information centre that meet appropriate location, built form and character requirements can do much to enhance the visitors experience.

Any future proposals for the Park must be mindful of the major services in the area and their implications for Park development options. Of particular concern is the potential impact of the proposed AGL gas service line.

The principles for future planning and management in respect to the Park's building and infrastructure will include:

- Assessment of environmental impacts of existing infrastructure.
- Importance of ongoing liaison with statutory authorities to minimise impacts, but ensure necessary access.
- Review of the quality and location of all existing park infrastructure such as furniture, playgrounds, BBQs and signage.
- Exploring options for the use / re-use of existing amenities in areas already provided for or in non-bushland environments.
- Review of service needs of the Park (eg. water, three phase power etc).



3.8 PROMOTION, INTERPRETATION AND EDUCATION

There are many features of this site that give it a regional value that are not currently well presented or interpreted to a wider community.

As a new Park there is a need for visitors to be able to find their way around and importantly to understand its origins and history.



3.8.1 Existing Status

- Amongst the regional community surveyed by telephone, two-thirds were aware of the bushland which makes up the Regional Park. Nonetheless many of the residents within the regional community are unaware of the quality of this resource in terms of natural and cultural heritage and recreational values.
- The Park has a rich and vibrant history from earlier Aboriginal associations through to recent community action, yet there is no existing interpretation of natural or cultural heritage items within the Park.
- There is limited co-ordinated entry, direction and information signage within the Park. Nor is the Park location indicated anywhere locally (on street signs or at train stations or urban centres).
- The remnant bushland and creek, geology, and cultural heritage within the Park provides an invaluable educational resource. There are up to 120 schools within the local and regional area some of whom currently use the Park.

3.8.2 Community Perceptions and Issues

- Community and telephone survey participants were in agreement of the need for information throughout the Park which directs people through the Park, identifies what recreation opportunities are available and tells the story of the place.
- Within the community workshops and telephone survey (95% of participants were in agreement) there was strong agreement for an educational role within the Park such as school field studies.
- The community strongly supported the need for improved entry, directional and interpretive signage in the Park. Key interpretive focus encouraged include:
 - natural environment for school groups and the general public
 - interactive play
 - Aboriginal and European history of the site
 - cultural heritage items

- Most of those consulted envisaged opportunities for a program of events in the Park. At present Turrella Reserve is used occasionally for community events, such as festivals of the wind and art events.
- There is opportunity for wider promotion and cross promotion of the Park.
- Opportunity for a program of guided walks. Presently community groups provide guided tours through the valley.
- There is an opportunity for the incorporation of educational guided walks, education facilities such as a field study centre within the Park. Presently community groups provide guided tours through the valley.

3.8.3 Discussion

There is a strong sense of ownership of the Park within the local community. With improved promotion and interpretation that sense of ownership can be readily broadened to a wider catchment.

Presently the total absence of a co-ordinated orientation, interpretation or promotion strategy needs to be addressed.

The long and illustrious history of the area is not currently interpreted for the community in any form on the site. A carefully developed interpretation strategy will be essential to a successful outcome for the Park.

The regional quality of the natural, cultural and historical dimensions of the Park are significant values in the Park's development and would greatly expand the Park experience, helping to create a memorable visit and a place of value and pride for the community.

With respect to the Park's promotion, interpretation and education the critical principles for future planning and management will include:

- Wider regional promotion with links to cross promotion.
- Resource for schools and community centres with better facilities.
- Cross promotion opportunities with other community recreation organisations such as Centennial Park or the Zoo.
- A carefully developed interpretation strategy and a coordinated hierarchical signage strategy.
- Program of events and art / cultural programs.

3.9. PLANNING AND MANAGEMENT

As a new Park under new ownership there are many aspects of the site's planning and management that require re-organisation and co-ordination.

Management and planning of resources is integral to the success of the Plan of Management and the strategies developed.

As with many such Plans of Management there is a need for a critical review of all parties to the management of open space, recreation, natural systems, infrastructure and cultural heritage of the area.

Such a review must consider not only the physical management of the resource but as importantly the administrative structures and their respective working relationships. The role of the community interests will also be an important consideration in this respect.

3.9.1 Existing Status

- The majority of land is currently owned by Council, State Rail Authority and DUAP with the intention that all land will fall within the overall control of NPWS. The exact extent of ownership transfers and division of care, control and management are the subject of ongoing negotiations between NPWS and Canterbury Council, amongst other parties.
- Presently the care, control and management of the area is largely by Canterbury Council.
- Management of the area of bushland in the area has been carried out by various groups under the control of Councils with groups such as the National Trust and community groups such as Wollie Creek Preservation Society and Friends of Wollie Creek.
- There are numerous State Government Departments and authorities with interests in the area, however no formal liaison structure currently exists to co-ordinate such interests.

3.9.2 Leases and Licences

Currently only one lease lies within the park boundaries. This is a lease between the Friends of Wollie Creek and the SRA for bushland management for bird habitat protection on the triangle of land between the creek and the rail line West of Turella Station.

The lease for a peppercorn fee is on a simple reciprocal annual review by either party and has no formal expiry date.

The Friends have indicated that they would be happy to rescind the lease if the land is to be part of the Park with the understanding that they could continue to assist NPWS in bushland management.

Where future uses of the Park may require leases or licences these must conform with the regulations of the National Parks and Wildlife Act 1974 and its regulations.

3.9.3 Community Perceptions and Issues

- There is concern within the community in regards to the boundaries of the future Regional Park. Some believe that Wollie Creek should be included in the Park and the boundaries should be extended to include Stott's Reserve and Bardwell Valley.
- There is support in the community for the future involvement of community groups with the National Parks and Wildlife Service and Council in the future planning and management of the Park.
- Participants of the community workshops indicated strong support for education in bushland management for neighbouring residents.
- There were mixed views within the community workshops for the management of dogs within the Park in respect to on or off leash in open areas. All agreed it was not appropriate for dogs to be off-leash in bushland.



3.9.4 Discussion

Given the local and regional interest and involvement with the area at present there is possible opportunity for shared management of the Park.

It would be critical for the community to be involved in future planning and implementation of future strategies and this should be managed to capitalise on the extensive work already carried out by many groups over the years.

With respect to the planning and management of the Park, the critical future principles will include:

- Co-ordinated long term bushland management.
- Definition of roles for community organisations in ongoing liaison with NPWS.
- Improved definition of the Park's regional role within the Sydney Metropolitan Open Space System.
- Potential for cross-marketing with other regional parks.
- Continuation of structured liaison with Government and statutory authorities during the Park's development.
- Co-ordination with local Council's to develop guidelines on dog management within the Park.
- Need for guidelines on leases and licences.

4.0 OBJECTIVES AND VISION

4.1 OBJECTIVES

During the process of this Plan a number of simple objectives for the Park's future were tested with various stakeholders.

There was general consensus amongst the stakeholders that these objectives met the values that they placed on the Park. These objectives were:

4.1.1 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.

4.1.2 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.

4.1.3 Access and Circulation

- Encourage uses that promote collective / public transport access to the site.
- Establish access and parking requirements and meet needs adequately but at a minimum inconvenience to the local community.
- Provide cycle and pedestrian links into and along the length of the Park.
- Provide positive and equal access into and along the length of the Park.
- Provide pedestrian pathway along the length of the Park.

4.1.4 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.

4.1.5 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.

4.1.6 Environment and Conservation

- Ensure that all uses on site maintain best practice in environmental sustainability, including improved 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.

4.1.7 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.

4.1.8 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.

The objectives were further reviewed by the Consultant Team in evaluating the foregoing issues and opportunities. Consequently, the objectives form the basis of the preferred concept and strategies outlined in Section B.

4.2 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 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.

5.0 STRATEGIES

INTRODUCTION

This section sets out proposed strategies for achieving the long term planning and management of Wolli Creek Regional Park. The strategies have been established as a development of the objectives determined and are set out as unambiguous statements of proposed action. Each strategy should be pursued in conjunction with all other strategies and not in isolation of each other.

FORMAT

This section identifies the principal strategies under each heading, also identifying the parties involved in each action, the level of priority. A range of collective performance indicators are detailed in a later section to establish if the objectives have been met. A short description of targets and indicators accompanies each strategy also.

STRATEGIES

The strategies are collated under eight topic headings and should be read in conjunction with the corresponding figures, each topic heading has an umbrella management policy as a framework within which the strategies are to be implemented and from which they were derived. The strategy headings are:

- Environment and Conservation
- Natural and Cultural Heritage
- Recreation and Leisure
- Circulation and Access
- Visual Quality and Landscape Character
- Buildings and Infrastructure
- Promotion, Interpretation and Education
- Planning and Management

COSTING

At the time of drafting this plan, Wolli Creek Regional Park was one of eight parks that the Regional Parks Unit will manage. Funding has been committed by the State Government for the Wolli Creek Regional Park for the next four years, although exact allocations have yet to be determined. The first year of expenditure will cover such early works as weed management, signage and an initial focus point to the Park.

PRIORITIES AND OPPORTUNITIES

Against each strategy in the table a column is provided with an abbreviation indicating the priority and opportunities for implementation.

This is based on a combination of the urgency of implementing a strategy and the degree of opportunity and or constraints to do so. Whilst an action may be urgent, the opportunity to implement it immediately may be limited by other factors, such as funding allocation or the successful implementation of a previous strategy.

There have been three levels of **priorities** indicated:

- H** High: requires action as soon as possible (usually 0-2 years)
- M** Medium: requires action in the short to medium term (usually 2-5 years)
- L** Low: not urgent but should be undertaken once constraint removed (usually after 5 years)

There are three levels of **opportunities**:

- N** Now: achievable immediately can / should be undertaken
- S** Soon: can / should be undertaken in say the next two years
- E** Achievable in the long term: can / should be undertaken in say years 5-10 or later

Thus by way of example:

- H/N High priority with no constraints, action can and should be undertaken within the next 2 years
- H/E High priority, however, if dependent on another factor, action should be taken as soon as the constraint is removed
- M/S Medium priority, undertake as resources are achievable, action should be taken in before and end of timeframe allocation.
- L/N Low priority with no constraints, action can be taken now but is not a high priority

Where at any time the implementation program requires revision, the priorities and opportunities can be used to re-establish a revised program chronology for the Plan of Management.

ROLES AND RESPONSIBILITIES

Against each strategy the parties with a role or responsibility for evaluation and implementation are nominated. Other stakeholders should be consulted have also been included where relevant. The following abbreviations are used:

ACF	Australian Conservation Foundation
AGL	Australian Gas Limited
ATCV	Australian Trust for Conservation Volunteers
BR	Bushland Regeneration
CC	Canterbury Council
CF	NSW Canoe Federation
COMM	Local community representatives or interest groups
DF	Department of Fisheries
DLWC	NSW Department Land Water and Conservation
DUAP	NSW Department of Urban Affairs and Planning
EPA	NSW Environmental Protection Authority
FS	Department of Bushfire Services
FWC	Friends of Wolli Creek
LALC	Local Aboriginal Lands Council
LS	Local Schools
MC	Marrickville Council
MFB	Metropolitan Fire Brigade
OPT	Optus
RIC	Rail Infrastructure Corporation
RC	Rockdale City Council
NPWS	National Parks and Wildlife Service
RTA	NSW Roads and Traffic Authority
SR	NSW State Rail
STA	State Transit Authority
SW	Sydney Water/Australian Water Technologies
TAFE	TAFE
TEC	Total Environment Centre
TEL	Telstra
TS	Transgrid
UNI	Universities

TARGETS AND OPERATIONAL INDICATORS

In Section 6.1 a detailed evaluation of *targets* and *performance indicators* is provided.

The targets are the short and long term goals to be achieved for that particular strategy and the performance indicators provide a measure by which it can be established that the target has or has not been achieved.

5.1 ENVIRONMENT AND CONSERVATION

STRATEGY

REFER FIGURE 8

NATIVE VEGETATION

Bushland and Riparian Regeneration

Maintain, protect and enhance existing diversity of the vegetation communities.

Regeneration Programs: Continue and implement new regeneration programs for Bushland Regeneration contractors and voluntary groups.

Staging: Work is to be consistent with the following principles:

1. Consolidate remnants to reduce fragmentation and degrading influences
2. Connect consolidated remnants
3. Restore and reconstruct bushland down to the creek
4. Restore vegetation along the creek, progressively treating upstream and upperslope sections prior to downstream and down slope sections unless downstream remnants display significant potential for rapid regeneration responses; treating small areas at one time due to the potential for significant adverse affect on fauna and the accelerated reinfestation of the disturbed area by weed species.
5. Concurrent activities relating to boundary / interface management with urban / industrial and rail corridor.

Refer Fig 8 for overview of bushland regeneration staging. Additional information on bushland regeneration principles, practices and priorities is provided in the Flora and Fauna Appendix within the supporting documents to the Plan of Management

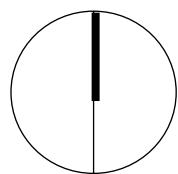
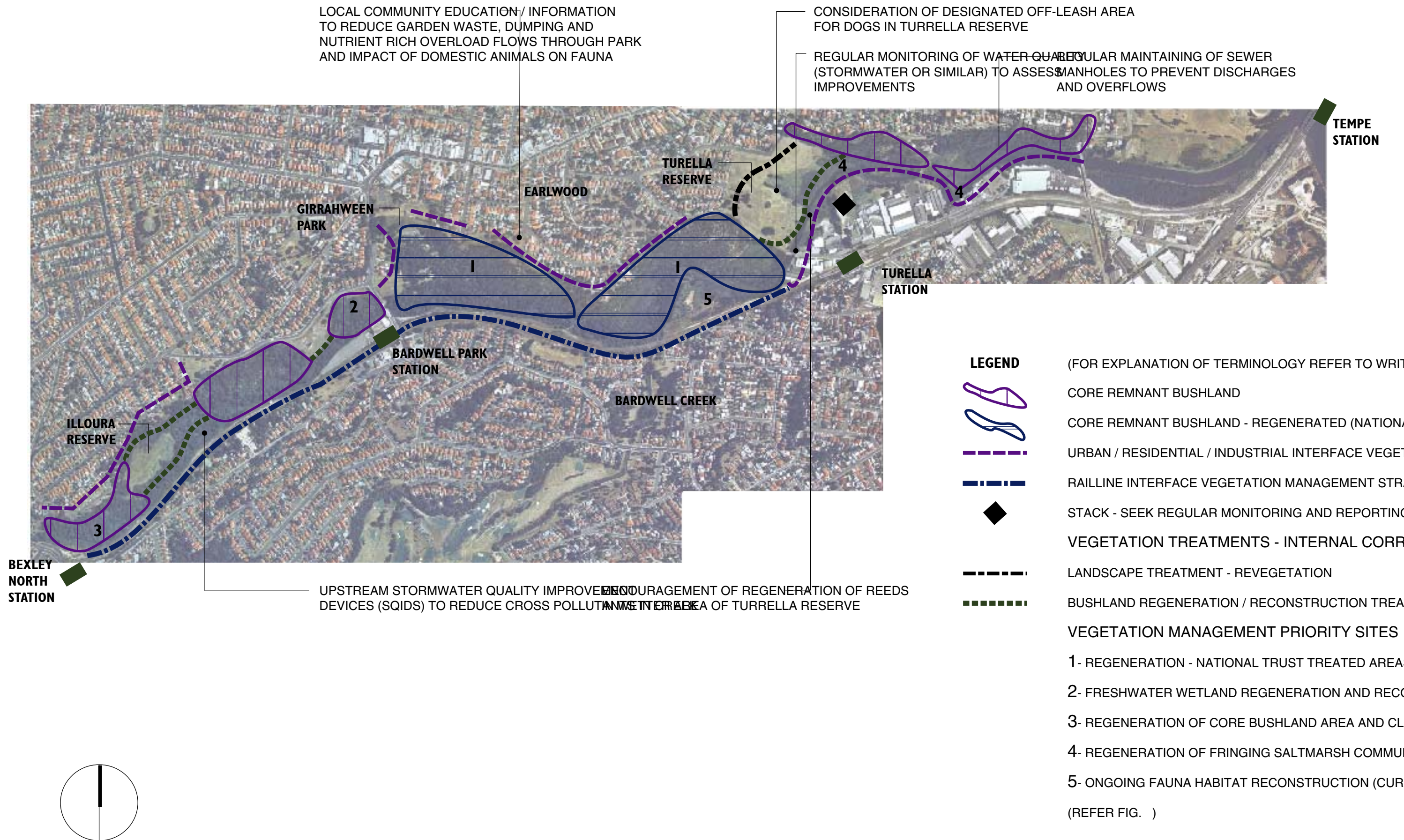
Adjoining Property Managers: Liaise with adjoining property managers in vegetation management according to the priorities and recommended treatments outlined in the Appendix; Flora and Fauna.

STRATEGY	ROLE / RESPONSIBILITY	PRIORITY / OPPORTUNITY	TARGETS OPERATIONAL INDICATORS
<p>REFER FIGURE 8</p> <p>NATIVE VEGETATION</p> <p>Bushland and Riparian Regeneration Maintain, protect and enhance existing diversity of the vegetation communities.</p> <p>Regeneration Programs: Continue and implement new regeneration programs for Bushland Regeneration contractors and voluntary groups.</p> <p>Staging: Work is to be consistent with the following principles:</p> <ol style="list-style-type: none"> 1. Consolidate remnants to reduce fragmentation and degrading influences 2. Connect consolidated remnants 3. Restore and reconstruct bushland down to the creek 4. Restore vegetation along the creek, progressively treating upstream and upperslope sections prior to downstream and down slope sections unless downstream remnants display significant potential for rapid regeneration responses; treating small areas at one time due to the potential for significant adverse affect on fauna and the accelerated reinfestation of the disturbed area by weed species. 5. Concurrent activities relating to boundary / interface management with urban / industrial and rail corridor. <p>Refer Fig 8 for overview of bushland regeneration staging. Additional information on bushland regeneration principles, practices and priorities is provided in the Flora and Fauna Appendix within the supporting documents to the Plan of Management</p> <p>Adjoining Property Managers: Liaise with adjoining property managers in vegetation management according to the priorities and recommended treatments outlined in the Appendix; Flora and Fauna.</p>	NPWS	H, N	T High biodiversity maintained PI As regularly surveyed on site
	NPWS CC BR FWC	H, N	T Regular program in place PI records kept in accordance with bush regeneration program.
	NPWS	H, N HN HS LE LE MS	T Consistent adherence to principles PI Surveyed works demonstrate principles achieved
	NPWS CC RTA RIC SW	M, S	T Regular liaison with property managers PI Communicaiton evident and logged and outcomes achieved on neighbouring properties

STRATEGY	ROLE / RESPONSIBILITY	PRIORITY/ OPPORTUNITY	TARGETS/ INDICATORS
<p>Corridor Connection: Reinforce vegetation corridor connections through the Park. Liase with adjoining landowners to create connections to the adjacent areas of Bardwell Valley and Stotts Reserve.</p>	NPWS RIC CC	L, N	T Vegetation connections established PI As implemented mapped and surveyed
<p>Rail Corridor: Negotiate with RIC to develop vegetation management along the rail corridor, the southern boundary of the Park where the opportunity exists for longterm co-operative vegetation management. This work should be undertaken as per stage 4 vegetation management (see Fig. 29 and Flora and Fauna Appendix for specific details), apart from concurrent control of target weed species in creekline.</p>	NPWS RIC RTA CC	H, N	T High quality native bushland along corridor PI Works implemented as surveyed/mapped
<p>Fire: Establish planned ecological burn programs for the Sandstone Complex vegetation community.</p>	NPWS CC	H, N	T Fire management strategy completed PI Burns completed in accordance with strategy
<p>Fire Management Monitoring Program: Establish a monitoring program for all areas burnt for feedback into the review process. The monitoring process should include, but not be restricted to, the following:</p> <ul style="list-style-type: none"> • Maintain a fire history record for all bushland in the LGA • Permanent photographic points for long term comparison of the site. • Vegetation sampling for species and densities using quadrants. This is to be done at regular intervals before and after the fire. Ideally post fire sampling at 6 months, 1 year, 2 years, 3 years, 5 years and 10 years. • Fuel levels before and at regular intervals after the fire. <p>Additional recommendations for fire monitoring are contained within the Flora and Fauna Appendix.</p>	NPWS EPA CC	H, N	T Record complete PI Review of results
<p>Fire Planning: Prepare & review fire plans to ensure they clearly demonstrate a strategy for effectively minimising the potential for erosion and sedimentation.</p>	NPWS FS	H, N	T Review of fire plans in place PI Regular audit

STRATEGY	ROLE / RESPONSIBILITY	PRIORITY/ OPPORTUNITY	TARGETS/ INDICATORS
INTRODUCED VEGETATION			
Weed Management			
<p>Interfaces: Protect bushland on urban, residential, industrial and rail line interfaces.</p> <p>Review weed control practices on boundary and shift emphasis from broadscale herbicide applications to the establishment of a plant community with greater resilience to recurring weed invasion.</p>	NPWS CC RIC RTA	H, N	<p>T Protection of boundary vegetation</p> <p>PI Works completed as surveyed and mapped</p>
<p>Mowing: Review mowing practices to prevent continuing encroachment from slashers into bushland areas.</p>	NPWS CC	H, N	<p>T Reduced mowing impacts</p> <p>PI Regular survey of bushland edges</p>
Weed Control			
<p>Implement targeted weed control treatment to areas identified as the most threatening to the canopy and sensitive areas. For example vine species and grasses which smother the bushland, mangroves and saltmarshes along the banks of Wolli Creek.</p>	NPWS CC RIC	H, N	<p>T Reduced weed impacts</p> <p>PI Survey and mapping of weed coverage</p>
<p>Encroachments: Implement a program to manage garden encroachments into the Park's remnant bushland. Advertise NPWS intention to take action against encroachments where persistent and repeated notice has not been effective.</p>	NPWS	H, N	<p>T No encroachments</p> <p>PI Review of mapped boundaries</p>
<p>Rubbish Dumping: Enforcement of park regulations to reduce dumping. Implement education program over the longterm.</p>	NPWS	H, N	<p>T Reduced dumping</p> <p>PI Annual survey of hot spots</p>
<p>Cultural Plantings: Maintain mature cultural plantings (trees) within established areas (eg. plantings within Girrahween Park). Longterm replacement with locally indigenous species recommended when cultural plantings reach senescence.</p>	NPWS	L, E	<p>T Predominantly indigenous vegetation</p> <p>PI Survey of vegetation</p>
FAUNA			
<p>Feral Animal control: Establish longterm feral animal control for the Park</p>	NPWS	H, N	<p>T Policy in place</p> <p>PI Reduced incidence of impacts</p>
<p>Dogs: Establish management guidelines for dog control within the Park consistent with the Companion Animal Act 1998 & Regional Park Regulations. Consider the establishment of designated and fenced leash-free areas for domestic dogs at Turrella Reserve following further community consultation. Dogs on leads are permitted in the rest of the regional park.</p>	NPWS CC	H, N	<p>T Policy implemented</p> <p>PI Absence of complaints</p>

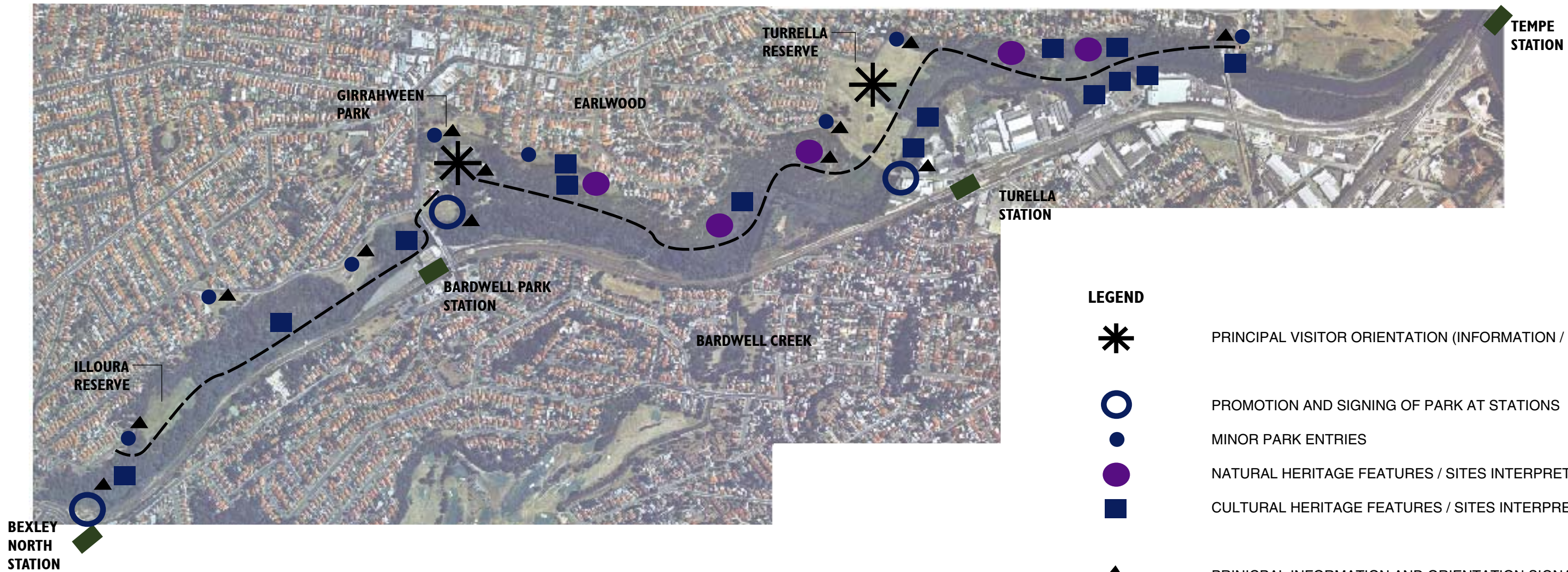
STRATEGY	ROLE / RESPONSIBILITY	PRIORITY / OPPORTUNITY	TARGETS/ INDICATORS
AIR QUALITY			
<i>M5 East Ventilation Outlet:</i> Continue liaison with EPA to ensure that there are no adverse impacts on Park users of the ventilation outlet associated with the M5 East Motorway. Request from EPA results of regular testing of air quality within the Park in the vicinity of the ventilation outlet.	RTA NPWS CC EPA	H, N	T Air Quality to WHO and EPA standards PI Results comply with above standards
<i>Vehicles:</i> Promote the use of public transport to the Park to minimise the impact of private vehicles on air quality.	NPWS CC SR	H, N	T Minimised private transport to park PI High use of public transport as surveyed
WATER QUALITY AND MANAGEMENT			
<i>Liaison:</i> Establish liaison with adjoining councils, stakeholders and interest groups to agree common strategies on integrated water management planning and design. Concentrate on upstream influences and downstream effects.	NPWS CC MC RC EPA, DLWC	H, N	T Co-ordinated water management PI Agreements on outcomes with all parties
Quality <i>Monitoring:</i> Optimise water quality monitoring within the Park, based on long term needs and use of available resources. Consider opportunities for local school involvement (refer Promotion, Interpretation and Education).	NPWS CC LS DLWC	M, S	T Data available PI Long term records in place
<i>Monitoring System:</i> Encourage the setting up of a monitoring system for Wolli and Bardwell Creeks	NPWS CC SW EPA DLWC	M, S	T Data available PI Other authorities action in place
<i>Implementation:</i> Establish program to implement strategies to improve water quality to Wolli Creek through the Park. Maintain liaison with the local councils to assist in implementation of structural and non-structural proposals arising from the Stormwater Management Plans.	NPWS CC MC RC EPA DLWC DF	H, N	T Improved water quality PI As monitored regularly (Streamwatch)



STRATEGY	ROLE / RESPONSIBILITY	PRIORITY/ OPPORTUNITY	TARGETS/ INDICATORS
<p>Community Education: Assist in continuing community education in liaison with Council involving residents, local schools and community groups within the catchment with the objective of reducing litter and improving water quality within Wolli Creek and in particular in relation to impacts of gross pollutants on creek banks and Park vegetation.</p>	NPWS	H, N	T Reduction in gross pollutants. PI Reduction surveyed annually
<p>Stormwater: Manage diffuse and point sources upstream to reduce the influx of rubbish and weed invasion. Liaise with Councils on management of stormwater pipes discharging into the Park from local streets.</p>	NPWS CC RC	H, N	T Reduced spread of impacts PI As surveyed
<p>Sewer: Undertake regular monitoring of sewer manholes in the Park to assess discharges and overflows. Liaise with SW to establish program for upgrades following their 1998 EIS program.</p>	NPWS SW	H, N	T Reduced sewer impacts PI SW remedial works in place
<p>Streetsweeping: Liaise with Council to extend the program of sweeping street gutters to include all streets in the catchment so that accumulated nutrient rich material is removed before entering the natural drainage system. Liaise with adjoining Councils that lie within the catchment to agree common practices and strategies.</p>	NPWS CC MC RC	H, N	T Reduced Street drainage impacts PI Monitoring of water entering park
<p>Erosion and Bank Stability</p> <p>Erosion Control: Undertake erosion control measures in conjunction with bushland management techniques to stabilise banks, escarpments and slopes.</p>	NPWS	H, N	T Stable creek and gully banks PI Absence of weed through remedial works
<p>Henderson St Weir: Liaise with relevant authorities to seek opportunity to upgrade and improve visitor access to the park..</p>	NPWS DLWC DF CC	H, N	T Upgraded weir/ bridge to improve public access across bridge. PI Works completed by others
<p>Flooding</p> <p>Flooding: Explore the opportunity for permitting natural flooding of larger parts of Turrella Reserve currently as boggy grass area to encourage reed bed establishment.</p>	NPWS	L, E	T Extension of reed beds PI Survey of reed establishments overtime

5.2 NATURAL AND CULTURAL HERITAGE

STRATEGY	ROLE / RESPONSIBILITY	PRIORITY / OPPORTUNITY	TARGETS/ INDICATORS
REFER FIGURE 9			
NATURAL HERITAGE			
Identify all features of natural heritage within and adjacent to the Park for protection, management and interpretation.	NPWS NT	H, N	T Full inventory and Heritage Conservation Plan in place PI Review records at intervals
Establish a program for the regeneration and conservation of sensitive natural heritage items.	NPWS NT	H, N	T Program established PI Program monitored
Ensure items of existing natural heritage are maintained and protected during implementation of siteworks.	NPWS NT	H, N - L, E	T Items undamaged PI Monitor works
ABORIGINAL HERITAGE			
Identify all Aboriginal heritage items in conjunction with local Aboriginal Lands Councils, Metropolitan Lands Council and local aboriginal communities within and adjacent to the Park and take measures to protect, maintain and interpret within the requirements of the National Parks and Wildlife Act 1974.	NPWS LALC MLC	H, N	T Complete inventory & Archaeology study PI Sites in good condition and AHC satisfied with protective measures
Ensure items of Aboriginal heritage are maintained and protected during implementation of siteworks.	NPWS LALC	H, N	T Total protection Sites maintained intact as regularly monitored PI
EUROPEAN HERITAGE			
Identify all European heritage items within and adjacent to the Park for protection, management and interpretation (refer Fig.10 for significant features).	NPWS COMM	H, N	T Complete inventory PI Sites in good condition
Compile a record of all books, articles and interviews currently written and incorporate appropriate elements in to the public interpretation program.	NPWS	M, S	T Log all publications PI Review data list
Maintain and interpret cultural plantings associated with past uses of the site (eg Chinese Market Gardens, farming etc.).	NPWS	M, S	T Complete Interpretation PI Increased awareness achieved as surveyed



LEGEND



PRINCIPAL VISITOR ORIENTATION (INFORMATION / EDUCATION)



PROMOTION AND SIGNING OF PARK AT STATIONS



MINOR PARK ENTRIES



NATURAL HERITAGE FEATURES / SITES INTERPRETED



CULTURAL HERITAGE FEATURES / SITES INTERPRETED



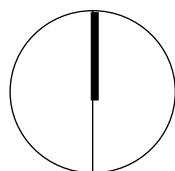
PRINCIPAL INFORMATION AND ORIENTATION SIGNAGE



PATHS (INCLUDED HERITAGE WALK)



TRAIN STATIONS

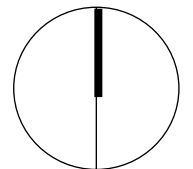
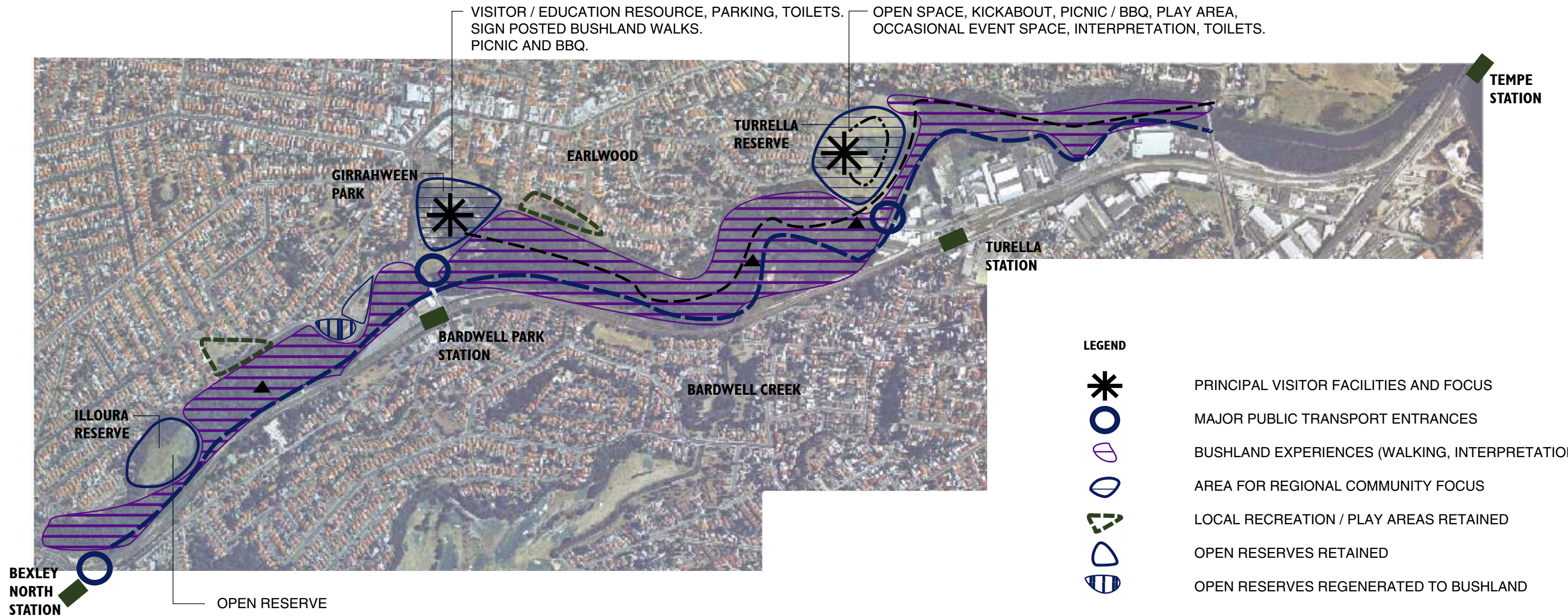


wolli creek regional park
PROMOTION / INTERPRETATION / EDUCATION
NATURAL AND CULTURAL HERITAGE FEATURES
 FIG. 9

STRATEGY	ROLE / RESPONSIBILITY	PRIORITY / OPPORTUNITY	TARGETS/ INDICATORS
Consider compilation of an oral record of history and reminiscences of the Creek by longstanding residents of the area or those associated with community action.	NPWS COMM	M, S	T Complete oral records PI Record completed and used in interpretation
Ensure items of European heritage are maintained and protected during implementation of siteworks.	NPWS	H, N	T total protection PI Items undamaged
Liaise with Council to add all heritage items to Council LEP Heritage Register. Liaise with Council Heritage groups to encourage heritage walks throughout the site.	NPWS CC	H, N	T Completed LEP PI Review LEP
<p>NATIONAL SIGNIFICANCE</p> <p>Interpret items of national significance (in conjunction with NSW Heritage Office guidelines).</p>	NPWS HO	H, N	T Full protection PI Protection listed with Heritage Office

5.3 RECREATION AND LEISURE

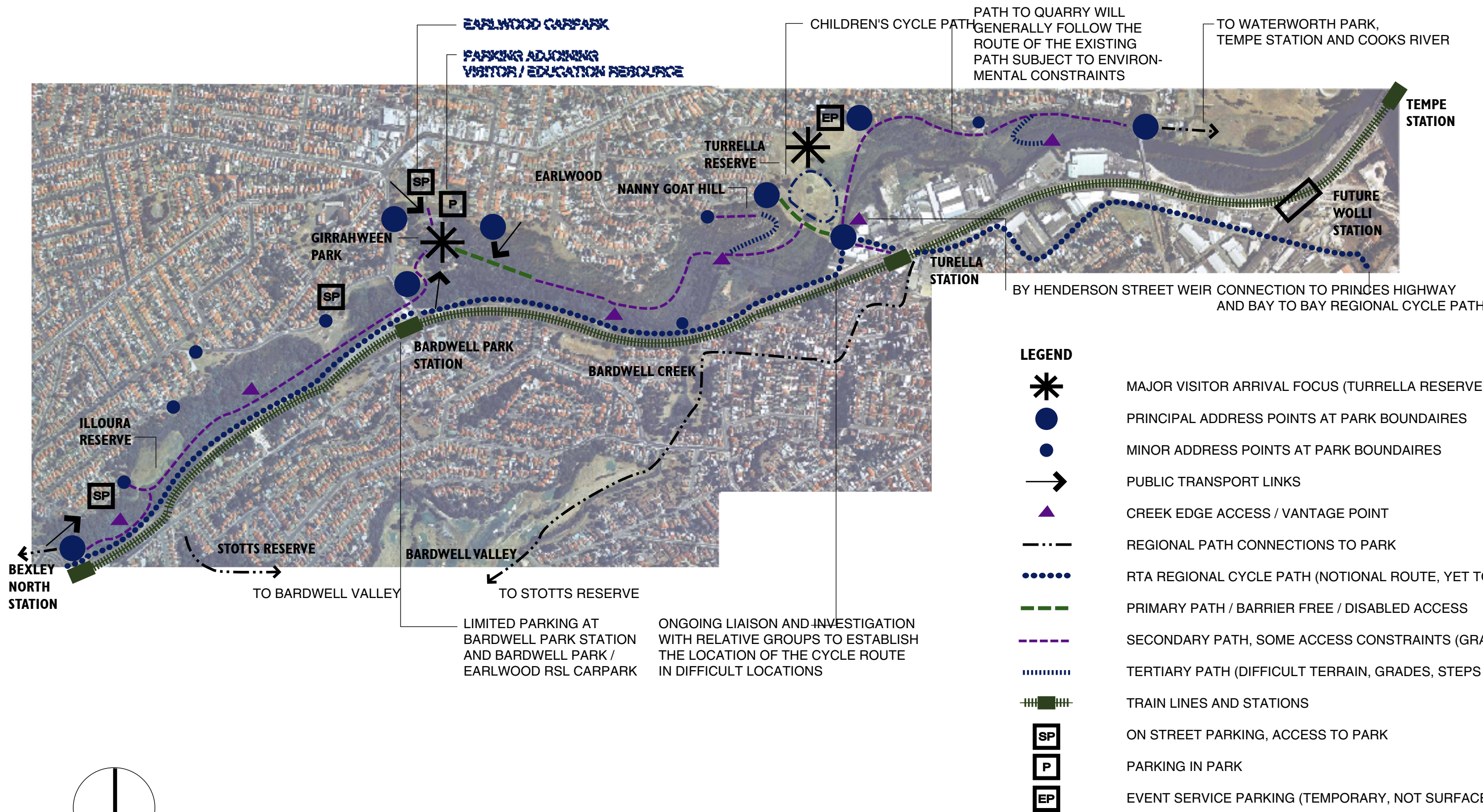
STRATEGY	ROLE / RESPONSIBILITY	PRIORITY / OPPORTUNITY	TARGET/ INDICATORS
REFER FIGURE 10			
Upgrade and enhance the Wolli Creek Regional Park environment to encourage the greater use and enjoyment of the Regional Park for compatible activities.	NPWS	H, N	T Increased use PI Exit survey
Ensure that uses reflect the concept of the 'Regional Urban Bushland Park' as outlined in this plan.	NPWS	H, N	T Consistent uses PI Questionnaire
Developed Designs: Prepare conceptual and developed designs for the Park taking the following issues into consideration:	NPWS	M, S	T Complete Concepts PI Plans completed and implementation programmed
Events: Liaise with Council and community groups to prepare a program for community events (refer Promotion, Interpretation and Education).	NPWS CC COMM	M, S	T Regular events program PI Calendar booked
Visitor Focus: Develop areas of regional and community focus at Girrahween Park and Turrella Reserve. These focus areas are to reflect the character and natural and cultural attributes of the site. The areas may contain elements such as:	NPWS	H, N	T Developed facilities PI Facilities in place and usage surveyed regularly
Girrahween Park			
<ul style="list-style-type: none"> • Recreation facilities such as BBQ, picnic areas, links to walking and cycling paths. • Major directional signage for pedestrians and vehicles. • Interpretation signage. • Visitor and orientation centre. • Associated car parking (refer Circulation and Access Fig 11). 			
Turrella Reserve			
<ul style="list-style-type: none"> • Recreation facilities such as BBQ, picnic areas, play equipment, links to walking and cycling paths and toilets. • Major directional signage for pedestrians and vehicles. • Interpretation signage. • Informal areas for kickabout and event space • Amphitheatre • Associated car parking (refer Circulation and Access Fig.11) • Children's recreational cycle path • Potential dog off-leash area 			
Refer to the Supporting Document - Masterplan for Wolli Creek Regional Park			
Bushland			
Establish a recreation focus in bushland experiences to include graded walking trails (refer Circulation and Access Fig. 11), birdwatching, guided tours and interpretation trails (refer Promotion, Interpretation and Education). Refer to Fig. 8 for details of appropriate use and management of bushland.	NPWS	H, N	T Increased bushland recreation uses PI Exit survey



**wollongong regional park
RECREATION AND LEISURE
FIG. 10**

STRATEGY	ROLE / RESPONSIBILITY	PRIORITY / OPPORTUNITY	TARGET/ INDICATORS
<p>Walking and Cycle Paths (see also Circulation and Access)</p> <p>Path systems: Establish a hierarchy and series of graded paths based generally on a tiered system of accessibility.</p> <ul style="list-style-type: none"> • Primary Path: Barrier Free,designed for wheelchair access, . access is free of obstacles such as steps, rough terrain or significant slopes, and may have ramps or boardwalks. • Secondary Path: Access presents some minor difficulties but is considered negotiable without assistance. • Tertiary Path Access is over rough terrain or via steps or steep slope - help is necessary. <p>Interpretation: Establish an interpretation strategy for walks through the Park (refer Promotion, Interpretation and Education).</p> <p>Children's Cycle Path: Establish a children's recreational cycle path loop in Turrella Reserve readily visible and super visible by accompanying adults.</p>	NPWS	H, N	T Comprehensive path systems PI Paths constructed to program
	NPWS	H, N	T Full interpretation program PI: Questionnaire to gauge awareness
	NPWS	L, E	T Completed Path PI Survey children's use annually
<p>Facilities and Amenities</p> <p>Existing Facilities: Assess existing BBQ, picnic and play facilities within the Park.</p> <p>Rationalise locations, improve and upgrade facilities to compliment the character of the Regional Park and meet disabled access and safety requirements.</p> <p>Kickabout Areas: Define boundaries of small level areas for informal kickabout and events in Turrella Reserve.</p> <p>Rockclimbing: Assess present activities such as rockclimbing to ensure they have minimal impact on the natural elements of the Park. Confine such activities to appropriate locations only.</p>	NPWS CC	H, N	T Full inventory PI Review asset register
	NPWS	M, S	
	NPWS	L, E	T Facility complete PI Area defined
	NPWS CC	H, N	T Facility available PI No damage to escarpments

STRATEGY	ROLE / RESPONSIBILITY	PRIORITY / OPPORTUNITY	TARGET/ INDICATORS
Water Access: Provide opportunities for informal canoe launching sites along the creek bank.	NPWS DLWC SW CC RC CF	L, E	T Launching locations provided PI Launch sites well used as surveyed
Provide opportunities for Park visitors to gain access to the waters edge at appropriate locations (refer Fig. 11).	NPWS	M, S	T Access to water edge PI Sites well used as surveyed
Children's Play Review all existing sites and if predominantly local use seek Council's care control and management	NPWS CC	M, S	T All play appropriately maintained PI Care & Control authority designated
Explore opportunities for sensory play within the bushland setting (say at Girrahween Park).	NPWS	M, S	T Facility available PI Facility completed



wollie creek regional park
CIRCULATION AND ACCESS
FIG. 11

5.4 CIRCULATION AND ACCESS

STRATEGY	ROLE / RESPONSIBILITY	PRIORITY / OPPORTUNITY	TARGETS/ INDICATORS
REFER FIGURE 11			
<p>ACCESS Provide a range of opportunities for access to and circulation within the Park.</p> <p>Entrances & Address Points <i>Entrances:</i> Define a hierarchy of entries to the Park and establish appropriate signage design that reflects their place in the hierarchy (refer Circulation and Access and Promotion, Interpretation and Education). These address points are to reflect the character and natural and cultural attributes of the site. Ensure that historic entrances such as at Girrahween Park are maintained and retain locality names as a secondary title.</p> <p>Principal Address Points (Focal Areas) These are located at Girrahween Park and Turrella Reserve. Design elements include:</p> <ul style="list-style-type: none"> • entrance feature • directional and interpretive signage • tree planting • parking • path linkages <p>Minor Address Points These are located at SJ Harrison Reserve, Johnston Street to Illoura Park, Jackson Place and Unwin Street. Design elements include:</p> <ul style="list-style-type: none"> • directional signage • identity planting • path linkages <p>PUBLIC TRANSPORT Promote access to Park by public transport. Liaise with RTA, SRA and local councils to form a promotion strategy during non-event and event periods (refer Promotion, Interpretation and Education strategy).</p> <p>Identify links with stations to create circulation loops along the length of the Park. Incorporate into promotion and directional sign strategies. An appropriate catchword may be ‘Parklink’ or similar.</p>	<p>NPWS</p> <p>NPWS</p> <p>NPWS</p> <p>NPWS</p> <p>NPWS SRA / STA RTA CC MC RC</p> <p>NPWS SRA CC MC RC</p>	<p>H, N</p> <p>H, N</p> <p></p> <p></p> <p>H, N</p> <p>H, N</p>	<p>T Increased accessibility PI Survey of usage</p> <p>T Hierarchy complete PI Entrances implemented</p> <p></p> <p></p> <p>T Increased use of public transport PI Exit survey and questionnaire</p> <p>T Circulation loops available PI Exit survey to measure use</p>

STRATEGY	ROLE / RESPONSIBILITY	PRIORITY / OPPORTUNITY	TARGETS/ INDICATORS
<p>VEHICLE AND PARKING</p> <p>Establish access and parking requirements and develop designs based on meeting needs adequately but at a minimum inconvenience to the local community.</p>	NPWS	H, N - L, E	T Access established PI Infrastructure needs met and review of complaints register User survey feedback
<p>Maintenance Service Access</p> <p>Ensure access is readily and easily available for maintenance vehicles to access service corridors and easements etc and public reserves generally.</p>	NPWS CC FS MFB	H, N	T Service and Emergency access available PI No hindrance to access as monitored
<p>Carparking</p> <p>Carpark locations:</p> <ul style="list-style-type: none"> Girrahween Park – parking and access to accommodate drop off vehicles, bus setdown and disabled parking, service and maintenance vehicles. <p>Consider liaison with Council regarding weekend use of Earlwood car park.</p> <ul style="list-style-type: none"> Turrella Reserve – service and emergency vehicles, overflow parking. Negotiate with Council to acquire the road nature strip fronting Turrella Reserve to accommodate front to kerb parking <p>Provide disabled carparking in Girrahween Park.</p> <p>Carparks to have low key visual and environmental impact (ie. porous surfaces) in design and materials.</p>	NPWS CC RC NPWS RC / CC MFB / FS NPWS MFB / FS NPWS	H, N H, N M ,S M, S H, N	T Parking available PI Parking used regularly as surveyed T-Nature strip area acquired. T Disabled parking available PI Parking used T Appropriate design implemented PI Low impact achieved measured through visual survey
<p>PEDESTRIAN AND CYCLE</p> <p>Pedestrian</p> <p>Establish and formalise a plan for a path network which circulates through the Park with specific destinations and links both locally and regionally. This network will encourage the exploration and enjoyment of the cultural and bushland experience within the Park and create links with the surrounding urban areas.</p>	NPWS RTA CC RC / MC BNSW	H, N	T Increased park use of paths and tracks PI Awareness and satisfaction levels by exit survey

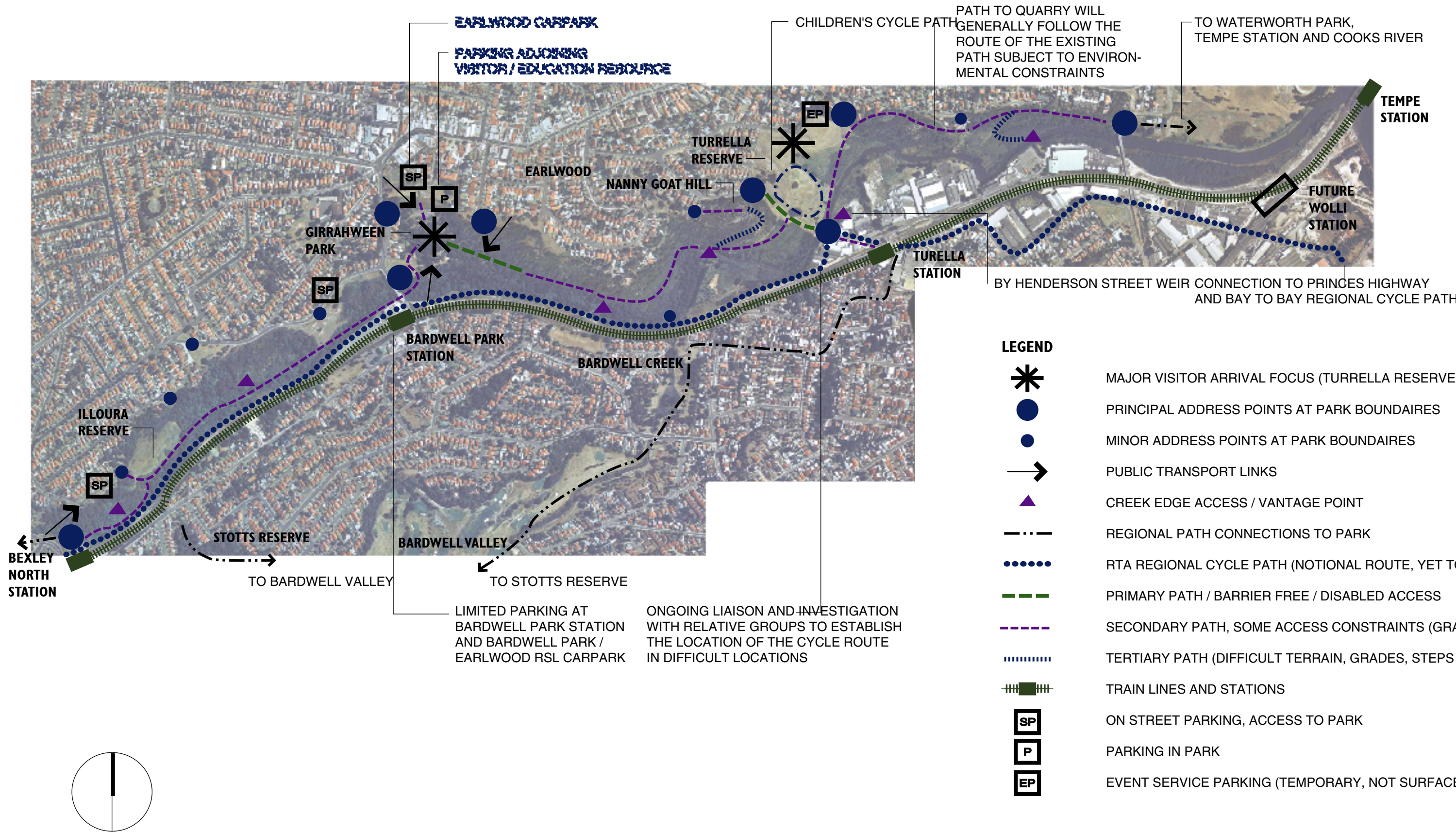
STRATEGY	ROLE / RESPONSIBILITY	PRIORITY / OPPORTUNITY	TARGETS/ INDICATORS
<p><i>Hierarchical Path System:</i> Establish a hierarchy of paths based on topography and natural aspects of the Park (see also Recreation and Leisure for accessibility of paths). The hierarchical path system consists of the following path types:</p>	NPWS RTA RIC BNSW CC RC	H, N	T Hierarchy of paths in place PI Satisfactory hierarchy achieved as surveyed through user/exit survey
<p><i>Regional Path</i></p> <ul style="list-style-type: none"> • Liaise with other agencies to provide regional connections to Cooks River, Bardwell Valley and Stotts Reserve. Such as CC, RC, RTA RAC. • Liaise with RTA, Rail Access Corporation, Canterbury Council and Bicycle NSW for opportunity to improve links to Bardwell Valley in long term. 			
<p><i>Primary and Secondary Paths</i></p> <ul style="list-style-type: none"> • Connect the facilities within the Park and provide a cross route in association with secondary paths which is frequently used by pedestrians. • Paths are directly linked with principal address points and facilities. • Major cross link paths from Turrella Station to Turrella Reserve, Bardwell Park Station to Girrahween Park and Bexley North Station to Illoura Reserve. • Barrier free / disabled access where topography and gradients allow. • Easy grades in close proximity to principal address points. • Provide high level of directional signage and interpretive signs (refer Fig. 10). • Seating in shade at regular intervals. • <i>Connect the facilities within the Park and provide a through route along the linear corridor.</i> • Easy to medium grades. 			
<p><i>Tertiary Path</i></p> <ul style="list-style-type: none"> • Provides limited access to some areas of the Park to protect sensitive, natural and cultural areas. • Designated low key. • Provide access to sensitive areas of mangroves, saltmarshes and bushland. • Access opportunities may consist of boardwalks through to mangroves and saltmarshes. • protection of key natural and cultural. • May consist of difficult grades due to topography. • Pathway to Quarry St and Nannygoat Hill. • 			

STRATEGY	ROLE/RESPONSIBILITY	PRIORITY / OPPORTUNITY	TARGETS/ INDICATORS
<p>Surplus Pathways</p> <p>Identify informal and little used paths in the bushland and creek areas. Close off such paths to protect bushland from fragmentation by informal pathways.</p>	NPWS	H, N	<p>T Path system retained</p> <p>PI Absence of informal tRICKs and improved bushland quality</p>
<p>Creek Access</p> <p>Improve pedestrian access to Wolli Creek at appropriate locations.</p>	NPWS	L, E	<p>T Controlled accessibility to creek</p> <p>PI Access points used</p>
<p>Creek Crossings: Liaise with relevant authorities to seek upgrade of creek crossings to increase recreation opportunity within the open space reserves, especially the bridge at Henderson Street weir.</p>	NPWS RC / CC LWC / SW	H, N	<p>T Improved crossings</p> <p>PI Authorities responsible have implemented works</p>
<p>Construction: Carry out all construction and repair of paths, structures, using design and materials appropriate to the context (timber and local stone) and compatible with maintaining unhindered flow of the creek at all times.</p>	NPWS LWC / SW RC / CC	H, N	<p>T Appropriate construction style achieved</p> <p>PI Clear creek flow</p>
<p>Boardwalks: Provide access and protection of mangroves and saltmarshes with the implementation of designated paths in the form of boardwalks.</p>	NPWS	L, E	<p>T Controlled access through mangroves</p> <p>PI Healthy mangroves and boardwalks in place</p>
<p>Cycle Paths</p> <p>Regional cycleway</p> <p>Liaise with RTA, RIC and Bicycle NSW to establish appropriate location of Regional Cycle route outside but adjoining the Park with a link into Turrella Reserve</p>	NPWS CC RTA RIC BNSW	H, N	<p>T Route determined</p> <p>PI Agreed route implemented and use surveyed</p>
<p>Cycle path links: Establish cycle links from the Regional cycleway into the Park at appropriate and key locations such as:</p> <ul style="list-style-type: none"> • Harthill-Law Avenue to Girrahween Park. • Henderson Street through Turrella Reserve. 	NPWS BNSW CC RTA	M, S	<p>T Links established</p> <p>PI usage of links determined through survey</p>
<p>Children's cycle path: Establish a recreational cycle path for children at Turrella Reserve.</p>	NPWS NPWS	L, E	<p>T Path available</p> <p>PI usage assessed through survey</p>

STRATEGY	ROLE / RESPONSIBILITY	PRIORITY / OPPORTUNITY	TARGETS/ INDICATORS
<p>Lighting Improve visibility and safety for pedestrians with a hierarchical lighting strategy to include:</p> <ul style="list-style-type: none"> • Lighting at key areas: priority locations only such as major entry points on the edge of the Park or at facilities / buildings. • All lighting should have minimal impact on animal habitats. • Design and character should be compatible with other furniture elements and the character of the Park • All lighting should minimise inconvenience to residents. • Pedestrian access paths between rail stations and residential areas. 	NPWS	M ,S	<p>T Safe and secure access through park</p> <p>PI Suitable lighting in place. User and neighbour satisfaction determined through survey</p> <p>T Maintained residential amenity</p> <p>PI Absence of complaints on complaints register</p>
<p>SERVICE AND EMERGENCY ACCESS Services Liaise with service authorities to:</p> <ul style="list-style-type: none"> • confirm locations of all services in the Park • negotiate appropriate access requirements for maintenance 	NPWS SW AGL CC TG	H, N	<p>T All services locations known</p> <p>PI: Full record of as - built drawings established and held by NPWS</p> <p>PI Absence of conflict for access to properties/services etc and absence of damage to bushland and park</p>
<p>Emergency Access Liaise with Emergency Services to determine principal access points for firefighting, locations of hydrants and fire tracks.</p> <p>Ensure all such access points are functional.</p>	NPWS CC MFB FS AS	H, N	<p>T Access points mapped/agreed</p> <p>PI Unhindered access by emergency vehicles</p>

5.5 VISUAL QUALITY AND LANDSCAPE CHARACTER

STRATEGY	ROLE / RESPONSIBILITY	PRIORITY/ OPPORTUNITY	TARGETS/ INDICATORS
REFERENCE FIG 12			
<p>VISUAL QUALITY Provide ready visual appreciation of all aspects of the Park, its context and environmental dynamics.</p>	NPWS	H, N	<p>T Increased appreciation of park's scenic qualities</p> <p>PI As measured by questionnaire and letters of appreciation</p>
<p>Views and Vistas <i>Existing Views and Vistas:</i> Utilise all existing views and vistas into and within the site, particularly:</p> <ul style="list-style-type: none"> • Panoramic views from Nanny Goat Hill. • Views to the Creek. • Views into the site from Harthill-Law Avenue and Wavell Parade. • Views from adjacent reserves such as Bardwell Creek, Stotts Reserve, Slade Street Reserve and May Street Reserve. • Views from the train corridor. • Panoramic views into the site from Rocky Knoll. 	NPWS CC RC	H, N	<p>T Views and vistas protected</p> <p>PI Regular photo survey</p>
<p>Maintain and create strong visual connections to adjacent open spaces of Bardwell Valley, Stotts Reserve, Waterworth Park and Gough Whitlam Park.</p>	NPWS CC RC	H, N	<p>T Views maintained</p> <p>PI Photo survey</p>
<p>Maintain and create views to natural and cultural heritage items (refer Fig. 4 and 10) which are not at odds with bushland management.</p>	NPWS	M, S	<p>T Views evident</p> <p>PI Photo survey & site review/monitor</p>
<p>Vegetation <i>Rail Corridor:</i> Negotiate to ensure proposed planting to the rail corridor maintains views to Wollie Creek and the Park from trains and reinforces the character of the Creek and the bushland Park. Planting should endeavour to obscure sound attenuation walls associated with rail amplification.</p>	NPWS RIC RC	H, N	<p>T Views available from train</p> <p>PI Awareness of park. survey at station</p>
<p><i>Turrella Industrial Area:</i> Implement screening of Turrella Industrial area from the creek, mangroves and Turrella Reserve as practical.</p>	NPWS	L, E	<p>T Light industrial area visual impact minimised</p> <p>PI Photo survey over years</p>
<p><i>M5 East Ventilation Outlet:</i> Ameliorate where possible the visual impact of the ventilation outlet from key views within the Park. eg: (creating structured canopy areas within Turrella Reserve to form intimate scaled spaces and reduce open views to Turrella industrial area and ventilation outlet).</p>	NPWS	M, S	<p>T Minimised impact of stack</p> <p>PI Awareness as measured by exit survey</p>



wollie creek regional park
CIRCULATION AND ACCESS
FIG. 11

STRATEGY	ROLE / RESPONSIBILITY	PRIORITY/ OPPORTUNITY	TARGETS / INDICATORS
<p>Weed and Litter</p> <p><i>Weed and Litter Removal Program:</i> Develop a program for weed and litter removal to reduce visual impacts.</p>	NPWS CC	H, N	T Minimal visual impact PI Awareness as surveyed/absence of complaints
<p><i>Education:</i> Enforcement of park regulations to deter rubbish dumping and education of the community in regards to dumping, garden refuse and stormwater management to reduce visual impacts of dumping and litter.</p>	NPWS COMM CC	H, N	T Education & regulatory controls in place PI Monitor sites & survey awareness
<p>LANDSCAPE CHARACTER</p> <p><i>Identity of the Regional Park:</i> Promote the Regional Park's identity and character as urban bushland.</p>	NPWS	H, N	T Consistent identity evident to visitors PI Awareness of visitor as surveyed
<p><i>Design Elements:</i> Establish a program and brief for all built elements and signage within the Park maintaining a common theme and character for the Park (refer Building and Infrastructure and Promotion, Interpretation and Education).</p>	NPWS	H, N	T High quality design achieved PI Design manual in place and in regular use
<p><i>Landscape Types</i></p> <p>Create path links between various landscape types:</p> <ul style="list-style-type: none"> • open grasslands • open bushland • enclosed bushland • creek • mangroves and saltmarshes • gullies <p>(Refer Fig. 11 for path system.)</p>	NPWS	from H, N to L, E	T Range of landscape types maintained PI Visibly distinguishable landscape types evident in park
<p><i>Identity Planting:</i> Promote the urban bushland character of the Park and the sense of its linear nature with the use of identity planting.</p> <p>Utilise identity planting to highlight landmarks, principal address points, minor address points and entrances. Ensure identity planting has the following characteristics:</p> <ul style="list-style-type: none"> • Species are generally indigenous to the area (are not weed source) • Differs from screen planting. • Acts as a feature to the Park. • Allows views into the Park by motorists, pedestrians and train commuters to increase community awareness of the area. 	NPWS	M, S	T Presence of identity planting PI Visual assessment
<p>All introduced design elements to have common character which fits in with character of the Regional Park.</p>	NPWS	H, N	T Consistent design PI Design manual in place and regular site reviews

5.6 BUILDINGS AND INFRASTRUCTURE

STRATEGY	ROLE / RESPONSIBILITY	PRIORITY / OPPORTUNITY	TARGETS/ INDICATORS
<p>DESIGN ELEMENTS</p> <p>Facilities and Amenities</p> <p>Review opportunities for improvements to existing facilities and amenities within the Park.</p> <p>Rationalise locations and upgrade facilities to meet the following requirements:</p> <ul style="list-style-type: none"> located in areas of high amenity such as principal address points or focal areas compliment the urban bushland character of the Park meet safety requirements addresses common needs (toilets etc) meet disabled access requirements compliment design palette for proposed elements <p>Palette of Design Elements: Establish a program and brief to provide a coherent palette of design elements within the Park, maintaining a common theme relating to the urban bushland character of the site and using appropriate materials. Elements to include:</p> <ul style="list-style-type: none"> Directional signs Structures (interpretive shelters, picnic shelters, shade structures) Interpretation panels Play equipment Lighting <p>Image of the Park: Develop a media and promotional program and brief to establish an image for the Park for all promotional communications tools.</p> <p>Materials</p> <p>Create a coherent design palette for materials relating to the following:</p> <ul style="list-style-type: none"> Overall character of the Park and specific areas Function and hierarchy of spaces and path system ESD principles Strength and durability <p>Elements to include:</p> <ul style="list-style-type: none"> Path pavements Boardwalks Viewing platforms and lookouts Paving <p>Future Tenants or Users: Provide all future tenants or users of buildings with clear guidelines on acceptable adaptations to buildings. Require approvals of such adaptations by the NPWS, prior to submission to for information to Council by the tenant / lessee.</p>	<p>NPWS CC</p> <p>NPWS</p> <p>NPWS</p> <p>NPWS</p> <p>NPWS CC</p>	<p>M, S</p> <p>H, N</p> <p>H, N</p> <p>H, N</p> <p>H, N L, E L, E H, N</p> <p>L, E</p>	<p>T High quality facilities</p> <p>PI Improvements implemented and visitor satisfaction as surveyed</p> <p>T Co-ordinated design</p> <p>PI Appreciation as measured by visitor survey</p> <p>T As for palette of Design Elements</p> <p>T Guidelines available</p> <p>PI Lessees apply guidelines as regularly monitored</p>

STRATEGY	ROLE / RESPONSIBILITY	PRIORITY / OPPORTUNITY	TARGETS/ INDICATORS
<p>Seating Develop a program for seating throughout the Park which addresses the following:</p> <ul style="list-style-type: none"> • Located; <ul style="list-style-type: none"> - generally in shade - close to entrances and path junctions - associated with major paths - near all play equipment, BBQ and picnic facilities - close to views - at steps and inclines • Design and character compatible with other furniture elements and character of the Park. • Cater for elderly and disabled in seating style and design. 	NPWS	H, N	<p>T Seating readily available</p> <p>PI Visitor satisfaction as surveyed</p>
<p>Services Proposed services & service easements will be subject to the provisions of the NP&W Act 1974 (see also Emergency and Service Access).</p>	NPWS CC / RC AGL SW TG	H, N	<p>T Services not evident</p> <p>PI Absence of visual impact</p>
<p>Review service needs for the park associated with strategies such as water, three phase power, sewer etc.</p>	NPWS SW TEL	M, S	<p>T Availability of services</p> <p>PI Supply adequate to needs</p>
<p>Rail Corridor Liaise with stakeholders regarding the amplification of the train corridor (refer Planning and Management).</p>	NPWS RIC RC CC		<p>T Co-ordinated strategy for park boundaries</p> <p>PI Improvement work: satisfactory as surveyed when complete</p>

5.7 PROMOTION, INTERPRETATION AND EDUCATION

STRATEGY	ROLE / RESPONSIBILITY	PRIORITY / OPPORTUNITY	TARGETS/ INDICATORS
PROMOTION			
Interpretation, Education and Promotion Program: Develop an integrated program of signage, information leaflets, interpretation signs, media releases, education packs to inform and educate the regional community on numerous aspects of the Park.	NPWS CC / RC / MC COMM	H, N	T Full program implemented PI Increased awareness as surveyed
Recognise the multi-cultural diversity of the regional community in park promotion, signage, facilities etc.	NPWS CC / RC / MC	H, N	T Access to all PI Understanding as surveyed for NESB groups
Cross promotion: Formulate a program of cross marketing with other regional parks and other parks in the district such as Rockdale Wetlands and Recreation Corridor, Cook Park and parks along Cooks River.	NPWS BPT CC	M, S	T Cross promotion implemented PI Visitor awareness as surveyed
Rail Promotion: Establish a program for ongoing liaison with STA and SRA for the establishment of train platform signage and promotion of public transport to the Park during events.	NPWS STA SRA CC / RC / MC	H, N	As above
Logo: Consider the opportunity for a logo to represent Wollie Creek Regional Park on all signs and brochures.	NPWS	H, N	T Logo completed PI Visitor awareness as surveyed
INTERPRETATION			
Interpretive Strategy: Establish an interpretive strategy for the Park to guide the planning of Park infrastructure.	NPWS	H, N	T Interpretation strategy in place PI Strategy completed
Signage System: Implement an integrated signage system including interpretive material and directional signs to identify walking trails, facilities and heritage items.	NPWS	H, N	T Signage in place PI Visitor awareness as surveyed
Arrival Points: Establish key arrival points for user orientation and interpretation.	NPWS	H, N	T Arrival points in place PI Visitor orientation as surveyed
Art: Consider possibility of arts promotions within the Park, particularly where these are of relevance to urban bushland, waterways and wetlands (eg. Centennial Park's Art in the Park).	NPWS COMM CC	M, S	T Art program in place PI Visitor appreciation as surveyed
Self Guided Access: Establish opportunities for self guided access and tours. This may be achieved through interpretive panels within the Park, audio cassette tours and brochures and maps located at local and regional community facilities and the education / visitor centre.	NPWS CC MC RC	M, S	T Self guidance available PI Visitor appreciation as surveyed
Guided Walks: Review opportunities for guided tours in partnership with interested groups in the corridor. Consider training for guided walks by representatives from non-english speaking backgrounds.	NPWS COMM	H, N	As above

STRATEGY	ROLE / RESPONSIBILITY	PRIORITY / OPPORTUNITY	TARGETS/ INDICATORS
<p>Interpretation Themes: Establish Interpretation themes based on the area's history, social, cultural and natural elements and the implementation of works within the Park.</p>	NPWS	M, S	T Themes determined PI Themes evident on site and used in interpretation
<p>Bushland Regeneration and Management Works: Program may consist of signs erected and leaflets distributed in conjunction with restoration activity. Signs to be either permanent or relocated to new works as appropriate.</p>	NPWS NT CC	H, N	T Works evident PI Surveyed awareness
<p>EDUCATION</p> <p>Regional Specialisation: Actively promote education and learning as the Park's major regional specialisation. The focus to be 'Regional Urban Bushland'.</p>	NPWS CC / RC / MC	H, N	T Program in place PI Survey of school use/appreciation
<p>Visitor / education Resource: Establish an education / resource at Girrahween Park as the primary address point.</p>	NPWS	L, E	T Progressive implementation PI Monitor development and usage
<p>Bushland Management</p> <p>Neighbourhood Education: Promote neighbourhood education of bushland management covering aspects such as stormwater, rubbish and garden clippings, dumping etc. Prepare brochures / leaflets for distribution.</p>	NPWS COMM	H, N	T Increased bushland on park boundaries PI Reduced weed invasion
<p>Undertake local community education of the use of native species in gardens of properties adjoining the Park.</p>	NPWS COMM CC	H, N	
<p>Schools: Establish links with local schools to determine the best opportunities for the Park as an educational resource.</p>	NPWS LS	H, N	T High level of school use PI Increased use as surveyed
<p>Bushland Management</p> <p>Student Involvement: Explore opportunities for school student and tertiary involvement in water management studies and monitoring in the Park include programs such as:</p> <ul style="list-style-type: none"> • Streamwatch (Sydney Water) • Solutions to Pollution (Sydney Water) • Streets to Rivers (Marrickville Council) 	NPWS LS SW MC	M, N	T High level of school involvement PI Increased data available to NPWS and Sydney Water

5.8 PLANNING AND MANAGEMENT

STRATEGY	ROLE / RESPONSIBILITY	PRIORITY / OPPORTUNITY	TARGETS/ INDICATORS
<p>Principles: Planning, design and management of the Park to follow the principles of:</p> <ul style="list-style-type: none"> Guidelines for the Regional Parks Ecologically Sustainable Development Local, State and Federal Legislation 	NPWS	H, N	T Integrated Planning PI Evidence of policy consistency on the ground
<p>Care, Control and Management</p> <p>Council roles and responsibilities: Continue negotiations with Council and others to determine respective roles and responsibilities for care and control matters to be considered include:</p> <ul style="list-style-type: none"> drainage play equipment road boundaries 	NPWS CC MC RC COMM	H, N	T Co-ordinated with Council PI Agreements on shared roles
<p>Boundaries</p> <p>Survey and define the final boundaries of the Park.</p>	NPWS		T Defined boundaries PI boundaries mapped and surveyed
<p>Liaison and negotiation</p> <p>Stakeholders Liaison Implement program for ongoing liaison and negotiation with the following stakeholders and statutory bodies</p>	NPWS	H, N	T Co-ordinated approach PI Absence of corrective actions
<p>Canterbury Council:</p> <p>Implement program for ongoing liaison on the following issues:</p> <ul style="list-style-type: none"> Public or collective transport issues including services for events Maintaining longterm community roles and participation Maintaining and upgrading play facilities in reserves Development of a media / education package to inform the community of the need to control invasive exotic species and rubbish. Zoning and controls of the Plan of Management are considered in preparation of the LEP. Establish ongoing liaison program with other stakeholders and statutory bodies identified. 	NPWS CC		

STRATEGY	ROLE / RESPONSIBILITY	PRIORITY / OPPORTUNITY	TARGETS/ INDICATORS
<p><i>Council Departments</i> Request that Council circulate the Plan of Management to all Council Departments for their information, drawing attention to specific issues of interest or liaison matters.</p>	NPWS CC MC RC	H, N	T Awareness throughout Council PI Co-ordinated outcomes on the ground
<p><i>Road and Traffic Authority</i> Implement program for ongoing liaison on the following issues:</p> <ul style="list-style-type: none"> Liaison with RIC, SRA and Bicycle NSW for the implementation of a regional cycle path in the rail corridor. Safe access into the Park crossing major roads. 	NPWS RTA SRA RIC BNSW		T Co-ordinated works PI Works implemented
<p><i>Rail Access Corporation</i> Implement program for ongoing liaison on the following issues:</p> <ul style="list-style-type: none"> Liaison with RTA, SRA and Bicycle NSW for the implementation of a regional cycle path in the rail corridor. 	NPWS RIC RTA SRA BNSW	H, N	As above
<p><i>State Rail Authority</i> Implement program for ongoing liaison on the following issues:</p> <ul style="list-style-type: none"> Program and implementation of rail corridor amplification including additional tracks and associated retaining walls on the banks of Wollie Creek, bridge upgrade and sound attenuation walls. Planting and screening near to rail corridor. Liaison with RTA, RIC and Bicycle NSW for the implementation of a regional cycle path in the rail corridor. Weed management 	NPWS SRA RTA RIC BNSW	H, N	As above
<p><i>Service Authorities</i> Implement program for ongoing liaison on the following issues:</p> <ul style="list-style-type: none"> Seek a program for the maintenance of services & service easements within the Park . Sewer (refer Environment and Conservation; Water Quality) 	NPWS CC AGC SW TEL OPT	H, N	T Upgrades without disturbance to park PI Minimal visual evidence or visitor impacts
<p><i>Our Lady of Lourdes School, Earlwood</i> Implement program for ongoing liaison on the following issues:</p> <ul style="list-style-type: none"> Rehabilitation of grass bank south of the property. 	CC NPWS	M, S	T Upgrade bank PI Works in place

STRATEGY	ROLE / RESPONSIBILITY	PRIORITY / OPPORTUNITY	TARGETS/ INDICATORS
<p><i>Community Groups</i> Implement program for ongoing liaison on the following issues:</p> <ul style="list-style-type: none"> • Possible involvement within the Park. • Assistance in the production of interpretation material. • Co-ordination and liaison for those groups with existing leases within the Park. • Neighbourhood education program on domestic threats to bushland such as: <ul style="list-style-type: none"> - garden weeds - dumping - domestic animals - drainage 	NPWS CC COMM	H, S	T Regular/community involvement PI Regular works as logged annually
<p><i>Statutory Authorities</i> Circulate a copy of the adopted Plan of Management to all Statutory Authorities to co-ordinate agreed responsibility and work practices on site.</p>	NPWS	H, N	T Wide authority awareness PI Co-ordinated action evident on the ground
<p><i>Friends of Wolli Creek</i> Ongoing vegetation management of existing lease area in the Park, south of the creek.</p>	NPWS FWC	H, N	T Ongoing involvement PI Agreements in place
<p><i>Community</i> Ensure nearby residents, adjoining landholders and frequent users of the Park are encouraged to take responsibility for monitoring the Park.</p> <p>Promote education and ways the community can provide assistance in bushland management such as:</p> <ul style="list-style-type: none"> • Increasing habitat by planting appropriate native species. • Appropriate methods for fire hazard reduction around houses. • Weed control in private property adjoining the Park with appropriate techniques. • Reduce the detrimental effects of increased nutrients, excess water, encroachments and garden dumping on bushland • Minimising the effect of uncontrolled domestic animals on native fauna. <p>Investigate various initiatives to assist NPWS and council / community liaison.</p>	NPWS CC COMM	H, N	T Increased monitoring PI Regular involvement monitoring and reporting
<p><i>Local Area Command</i> Consult with the Local Area command during the preparation of detailed design and documentation of park improvements.</p> <p>Ordnance and Surveillance: Encourage frequent use and casual surveillance of the site by users through the strategies outlined in the Plan of Management and encourage reporting of ordnance violations to NPWS or Council. Ensure signage in the Park identifies the relevant authority.</p>	NPWS COMM	H, N	T Increased monitoring PI Reduction of ordnance issues

STRATEGY	ROLE / RESPONSIBILITY	PRIORITY / OPPORTUNITY	TARGETS/ INDICATORS
<p>Performance Targets: Rangers to determine site based performance targets and program of implementation</p>	NPWS	H, N	T Program running PI Annual log of works implemented
<p>Ensure all users are aware of the appropriate forms of recreation permissible within the Park, offer alternatives to the locations where uses are not permitted (refer Promotion, Interpretation and Education).</p>	NPWS CC	H, N	T User awareness PI Absence of inappropriate uses/behaviour
<p>Bushland Management Continue co-ordination and liaison with existing groups carrying out bushland management and regeneration practices such as National Trust and community groups (refer Environment and Conservation).</p>	NPWS NT COMM	H, N	T Regular involvement of groups PI Log of works
<p>Media Establish regular communication and issue regular media releases to the local media and interested groups (such as ACF, ATCV, Total Environment Centre etc) about new works, issues and programs of activities and events within the Park. Ensure through these processes that there is a clear understanding in the community of the safe and important use of controlled patchwork burns in bushland management.</p>	NPWS CC ACF ATCV TEC	H, N	T Media profile established PI Regular presence of media coverage
<p>Other Bodies Establish links with adjoining councils, relevant authorities, interested groups to integrate strategies.</p>	NPWS	H, N	T Increased awareness in region PI Regular communication with NPWS
<p>Partnerships Explore opportunities for partnership with relevant interest groups or stakeholders to assist in the provision of resources or facilities for the Park. Examples might include:</p> <ul style="list-style-type: none"> • Department of Education / Universities for promotion of education. • Sponsorship of events or improvements to the Park. • Arts or cultural groups for events, performances or artworks. 	NPWS	M, S	T Partnership optimised PI Appropriate joint ventures successful
<p>FUNDING Grant opportunities: Undertake a research / review of State and Federal grant opportunities to be directed to Wollie Creek Regional Park.</p>	NPWS	H, N	T External funding optimised PI Successful response to grant applications

STRATEGY	ROLE / RESPONSIBILITY	PRIORITY/ OPPORTUNITY	TARGETS/ INDICATORS
<p>LEASES AND LICENSES</p>			
<p>Existing Leases: Commence negotiations with Friends of Wolli Creek (FWC) and SRA to rescind the existing lease on the SRA triangle of land and incorporate land into the Park. Establish agreement with FWC on their future role in ongoing bushland conservation on this land.</p>	NPWS SRA FWC	H, N	<p>T Land incorporated into the Park</p> <p>PI Lease rescinded and future FWC roles agreed</p>
<p>Future Leases and Licences Ensure that all future Leases and Licenses within the Park conform to the National Parks and Wildlife Act 1974 and its regulations.</p>	NPWS, Lessees	H, N	<p>T License and Lease conditions drafted and implemented</p> <p>PI All lessees and licensees conform to conditions. No complaints on complaints register</p>
<p>Booking Opportunities Establish and publicise those facilities or areas within the Park that may be booked by the public (such as major picnic shelters, etc.).</p>	NPWS	H, N	<p>T Facilities established</p> <p>I Facilities or area in regular use</p>
<p>Consultative group: Establish a consultative group consisting of the major stakeholders in the Park and local community representatives. The focus of the group will relate directly to the objectives and policies specific to the Plan of Management, progress and monitoring of the landuses in and close to the Park and consultation with community regarding local issues. The group may be drawn from members of the steering committee setup for the preparation of this Plan (refer Appendix - data base within Supporting Documents).</p>	NPWS	M, S	<p>T Consultative group established</p> <p>PI Regular consultation and agreed outcomes</p>
<p>If considered appropriate by the advisory group establish consultative sub-groups to resolve technical issues for:</p> <ul style="list-style-type: none"> • bushland planning and management • water management • event programming 			
<p>Ensure that there is a clearly defined scope and limits of responsibilities of this group.</p>			
<p>ESD</p>			
<p>ESD principles: All planning design and management to follow principles of ESD including:</p> <ul style="list-style-type: none"> • low energy maintenance regimes • use of physical or biological rather than chemical controls • use of low embodied energy materials etc. 	NPWS	H, N	<p>T ESD principles applied</p> <p>PI Minimal energy requirements evident</p>

6.0 IMPLEMENTATION

This section sets out a range of ways and means for pursuing the strategies for the study area's development and management. The section contains the following:

Targets and Performance Indicators

Means for assessing the progress of implementation of the Plan (refer also to 5.0 for specific targets/indicators used in Strategy tables).

Funding

An outline of additional funding sources external to NPWS.

Reviewing the Plan

A recommended methodology and program for reviewing the Plan of Management.

6.1 TARGETS AND OPERATIONAL PERFORMANCE INDICATORS

In establishing a programme of implementation for this Plan NPWS should determine a means by which they can demonstrate that the strategies outlined have or have not been achieved over time; the two key measures are commonly termed *targets* and *performance indicators*.

Some strategies are more readily measured in tangible ways than others, but all must be measured by some means if performance is to be gauged.

A number targets and of performance indicators that follow in this section have a common basis and require co-ordination across the heads of consideration; for example an exit survey may be simply designed that covers quantitative measures of use and recreation but also establishes qualitative measures of awareness of natural and cultural significance.

In particular, the following processes are considered practical and useful survey methods that may cover a number of targets and performance measures. It is recommended that any such survey methods should be consistent for all of the proposed Regional Parks; by this means comparative analysis can be achieved and measured on a regular basis.

Care must be exercised when determining targets for particular strategies to ensure that the targets are balanced against those of other strategies.

For instance, a target for a recreation strategy might be given percentage increase in visitor numbers as measured by a site survey of footpath users. Without some degree of qualification to this target it may be possible that this increase in numbers has a negative impact on environmental values of a remote part of the Park.

User Survey

Questionnaire carried out at 5 year intervals; qualitative and quantitative in nature. The survey / questionnaire would cover such diverse matters as measures of changes in Park usage, visitor experience and perceptions etc. This will be especially important as the Park develops and evolves.

The questionnaires target local and regional community users and potential users by the way of exit surveys and counts.

A re-run of the 1999 telephone survey (perhaps also addressing other Regional Parks) would assess changes in use and perceptions.

Photographic Survey

Photographs to be taken at key and consistent locations within and outside the Park every few years to establish degrees of change.

This should also be compared with aerial photographs reviewed every 5 years. This is a simple field and desktop exercise that is especially useful for monitoring vegetation and scenic quality changes.

Log of Letters

Review letters received each year (positive and negative) on various subjects in the Park indicating changes in praise and criticism of the Park's management according to performance. Some care must be exercised in specific interpretation if such letters of such letters and this method should be used to measure general trends and common topics rather than letter by letter.

Monitoring

Scientific monitoring at specific sites over a period of time eg bushland quality and water quality.

Whilst such monitoring may be carried out by RPU staff, much of this work may be carried out by external agencies or interest groups, particularly in the area of water quality. Providing a consistent format for such information will assist in comparative analysis.

As-built Plans and Log of Works

Drafting and updating plans of all works actually implemented in the Park will provide a basis for monitoring progress and change over time. It is essential that as-built plans are accompanied by design plans to ensure that such change is...

A Log of Works for those items of completed tasks that are not easily mapped, such as bushland weeding programs or interpretive work will perform a similar and important measure of progress.

Financial Records and Annual Reports

An annual review of these records can establish such trends as:

- changes in time or expenditure required for key maintenance tasks such as:
 - litter collection
 - vegetation management
 - facility maintenance
- Visitor management: day to day ranger contact time with visitors
- Neighbourhood issues: changes in maintenance required to address residential neighbour impacts (dumping, weeds, stormwater etc.)

The involvement of community groups should be seen as integral to the above processes.

Based on the topic headings adopted in the Plan the following are a recommended range of targets and performance indicators.

6.1.1 Environment and Conservation

Generic Plan Community Targets

Ecological goals (eg. the form and nature of the plant community to be regenerated / reconstructed / fabricated) need to be clearly identified to objectively assess the success of the restoration and management strategies for plant communities in the long term. These goals are needed for two reasons:

- Establish performance targets and measures for work
- Provide essential feedback on the success or otherwise of applied restoration techniques.

The establishment of performance targets and measures for bushland measurement work is broached with considerable angst in the bushland management profession. It is important to recognise that applying performance targets and measures to the management of these natural systems is effectively making an educated guess (based on the information available / collected) on the achievability (and desirability) of our management activities. The eventual outcome can be swayed by many influences during the course of management (eg. occurrences of drought, flood, fire, lack of anticipated seed bank etc.).

The implication of not achieving a performance target in most industries is viewed unfavourably. Applying this same implication to most bushland management activities is not appropriate due to the unpredictable and dynamic nature of the system bushland managers are working with (much of which is out of the landowner's control). The context in which performance targets and measures are set for bushland management should be positive - providing important feedback which enables modification (or re-enforcement) of applied management practices / principles. In this way, they can form an important part of improving the understanding of the natural systems being managed and the management practices applied.

Performance measures for plant communities need to be developed to reflect desired plant community structure, species diversity and resilience to degrading influences.

Significant degrading influences on plant communities present in the catchment include:

- Presence of highly invasive weeds within and adjoining the Park.
- Stormwater discharges; point sources and diffuse sources form residential areas.
- Altered fire regime in non-riparian plant communities.

Bushland Restoration

Target

Implementation of restoration work in accordance with generic targets, management principles and techniques outlined in this Plan of Management.

Operational Performance Indicators

Progressive increase in resilience of native plant communities to further weed invasion. Monitor generic community targets.

Target

Establish clear regional conservation and management priorities for bushland areas in the Park.

Operational Performance Indicators

Park and resource allocation priorities established and adopted.

Public Awareness of Environmental Values

Target

Greater appreciation of environmental values of the catchment and particularly the reduction of impacts from landuses adjoining bushland.

Operational Performance Indicators

Measured by mapping and annual survey of 'blackspots' where garden encroachment, vandalism, dumping and so forth have regularly occurred.

Review log of complaints on key problem sites.

Weed and Litter Reduction and Water Quality

Target

Aim for 50% reduction in major identified litter groups (ie plastic, glass, paper) in a five year period.

Operational Performance Indicators

Annual litter survey to ascertain types, quantities and locations of litter in bushland and Wollie Creek. This could be undertaken by local school children as part of their environmental studies, providing a simple tabular report.

Water Quality

Target

Aim towards achieving ultimate flows of low toxicity, odour and colour which are capable of supporting a diverse aquatic eco-system.

Operational Performance Indicators

Scientific testing of the Creek to assess improvements in water quality. This could be undertaken by University and TAFE students or local school children.

Air Quality

Target

An air quality within all areas of the Park that meets World Health Organisation targets.

Operational Performance Indicators

Request regular read outs on tests from the RTA relating to the M5 East exhaust outlet.

6.1.2 Natural and Cultural Heritage

This aspect of the experience of the Park has the capacity to increase markedly the appreciation of an evolving cultural and natural landscape for the local and regional visitor. Interpretive designs and sign information are key contributors to a greater understanding.

Target

Increased appreciation and knowledge of the site and its natural, cultural and historical significance to the area.

Operational Performance Indicators

Measured by a quantitative exit survey every 5 years establishing visitor experience that identifies increased knowledge and appreciation of natural and cultural features of the Park.

6.1.3 Circulation and Access

Much of the Park is currently relatively inaccessible due to the absence of a path system and the presence of dense weed growth. Whilst controlled access to sensitive environments within the Park such as high quality bushland and mangroves is essential to its health and vitality, the provision of a proposed linking path system should see an increase in regular use of the Park improving appreciation and assisting casual surveillance and security of the area. The test for increase use must however must be mindful of the carrying capacity of that particular area or element of the Park.

Target

Increased daily destination use of path system. Seek to achieve say 30% increase in first 5 years.

Operational Performance Indicator

As measured by user survey at consistent locations at start and end of school / commuter day. This could be readily measured at Girrahween Park or Turrella Reserve as part of the wider exit / site survey.

6.1.4 Recreation and Leisure

The carrying capacity of the Park must necessarily dictate the ability for any area to sustain a given level of use. Accordingly simple increases in visitor numbers may not be appropriate across the board. The ideal measure may better be related to establishing the widest appeal of the Park's focus areas and open spaces.

Target

Increased diversity in user type and frequency of visit. Increased visits to the visitor / education centre (when established).

Operational Performance Indicators

Measured by exit survey / questionnaire every 5 years.

Re-run of the telephone survey to access regional community assessing wider use.

Maintain a visitors log at the visitor / information centre and review changes in user numbers and types as well as comments.

6.1.5 Promotion, Interpretation and Education**Public Awareness***Target*

Significant increase in knowledge of the Park's existence and awareness of its key values by local and regional community.

Operational Performance Indicator

As measured by exit survey / questionnaire every 5 years.

Re-run of the telephone survey to access wider regional knowledge and perception.

6.1.6 Planning and Management

The degree to which a Park of this nature is cared for and appreciated is in large part a measure of how much the local people and visitors believe that it is genuinely a shared public resource. Where neighbours protect the bushland by good-neighbour practices and regional community groups gain equal opportunity to Park resource use and so forth then there is a tendency to take pride in the open space and their future.

Target

Improved quality and efficiency in maintenance of the Park with establishment and adaptation of environmentally appropriate techniques that suit the particular location and landscape type.

Operational Performance Indicator

As measured by improvements identified in five yearly user satisfaction survey and photographic survey.

6.1.7 Buildings and Infrastructure

Target

Improved quality and use of BBQ, picnic and play facilities, toilets etc.

Operational Performance Indicator

Measured by user survey to determine increase in frequency of use and diversity in user types (ie. family, school or community use). Exit survey used to determine visitor satisfaction level.

Target

Improved quality and durability of facilities.

Operational Performance Indicator

Review of financial and operational records to establish facility maintenance.

6.2 FUNDING

A general assumption frequently resides within the communities that all funding sources for works in the Parks lies solely with the management agency. Whilst the NPWS already has funding committed to the Wollie Creek Regional Park initially much of this budget will go to preliminary bushland regeneration and early path and signage works.

Alternative funding sources can and should be sought to assist in the progressive upgrading of the Park. Given that the final management structure of all or parts of the Park are yet to be confirmed additional grant sources may be available to Council or community groups for works within the Park where or if they hold principal care and control of any part of the Park.

Areas and elements for some of this external funding might include:

- Local play area improvements (Section 94)
- Events in the Park
- Cultural / art exhibitions in the Park (Arts Council etc)
- Education / Visitors centre (funding partnership or sponsors etc.)
- Sponsorship of conservation works
- Federal Government Grants

It is recommended that the NPWS actively pursue some of these opportunities early in the Park's development, to enhance the sense of establishment of the Park and to engender community interest.

6.3 REVIEWING THE PLAN

If this Plan is to retain currency and relevancy over the coming years its will be essential that some degree of consistent review be carried out in a logical chronology.

The Plan has been drafted in such a manner that the separate elements can be readily reviewed and updated on differing time spans.

In essence the earlier sections of the Plan require review less frequently than do the later action-orientated sections.

In line with the targets and performance indicators set out in a previous section it is recommended that the Plan be reviewed in the following sequences and time spans, starting from the most frequent review requirement.

Every Year

- Review progress of programme prepared after this Plan
- Monitor performance Indicators

Every Two Years

- Review progress on all strategies
- Review Management and Administration structures
- Review priorities, staging and funding

Every Five Years

- Major review of all strategies
- Review of all objectives
- Review and update Resource and Issues
- Review / update Statutory Controls
- Review Targets and Performance Indicators

Every Ten Years

- Review of Strategies and Objectives
- Review and update all background issues
- Review and update the Values and Significance if external circumstances require or community values change markedly.

7.0 MASTERPLAN

The following masterplan provides a concept of the possible longterm layout and design of the Park.

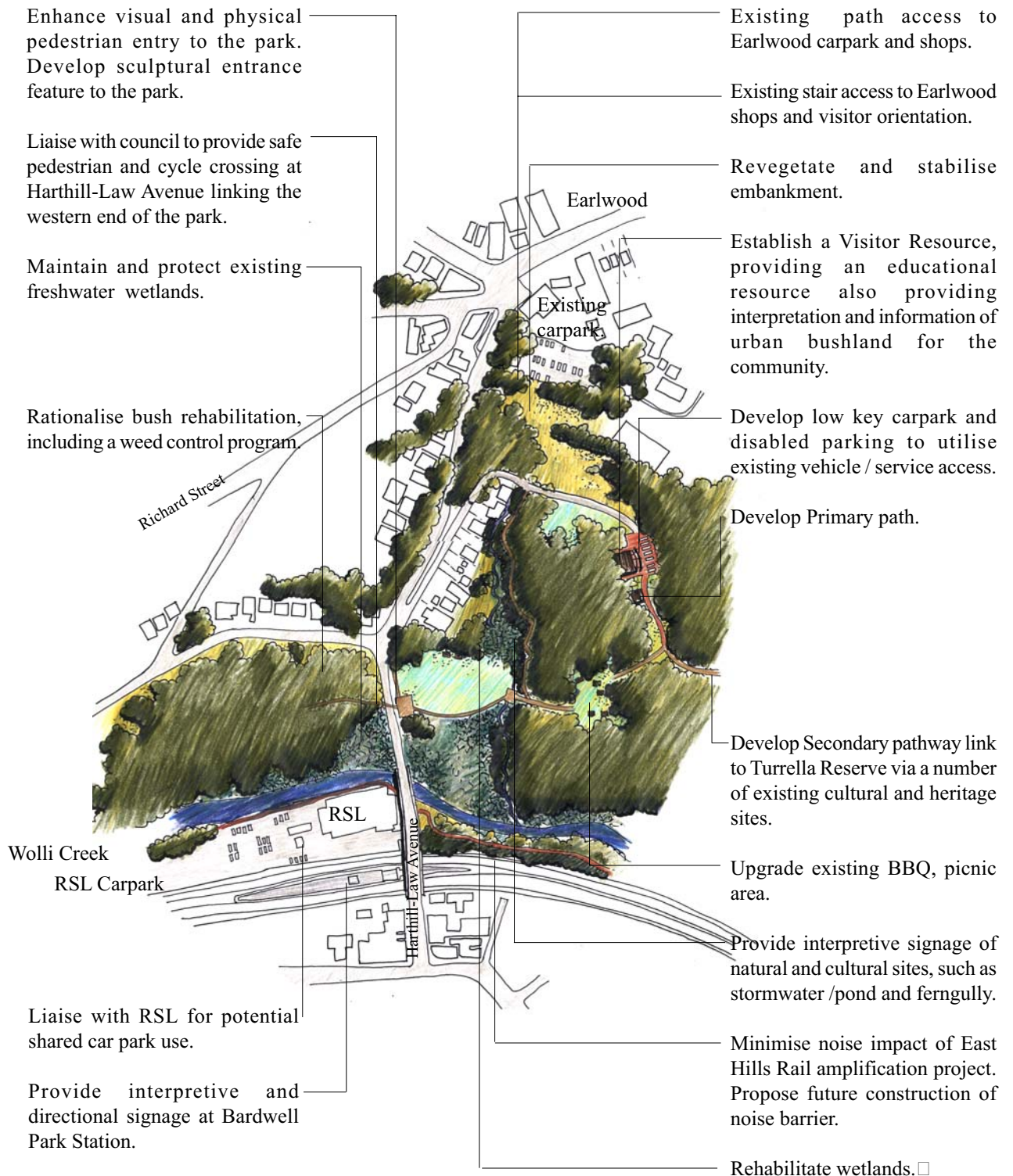
The concept is principally intended to enhance the appreciation of the opportunities that the area can afford and provides one illustration of a long term scenario for the Park, illustrating many of the strategies outlined in this Plan.

The concepts will require further refinement through design development as part of the implementation phases, if sanctioned by NPWS and the various stakeholders.

Two detailed areas are also illustrated (Refer Figs. 13 and 14) providing a preliminary concept of the possible layout and design of two key sites within the Park including:

- Girrahween Park
- Turrella Reserve

The design areas encompass particular locations in the Park where many of the strategies outlined in this Plan are integrated.



**FIGURE 13
GIRRAHWEEN PARK DETAIL
AREA**

ELDON RESERVE

Maintain and establish as an open reserve for activities such as birdwatching and informal picnicking.
Regenerate the edge of the bushland vegetation. Establish informal pathways through native grasses.

HERITAGE SITE

Improve heritage sites, such as Stewart's Camp and Kings Farm.

S. J. HARRISON RESERVE

Enhance visitor's enjoyment with the natural bushland setting.

PUR DENTHAM

Enhance entry to strengthen the image of the valley as an integrated regional park, through planting and signage.

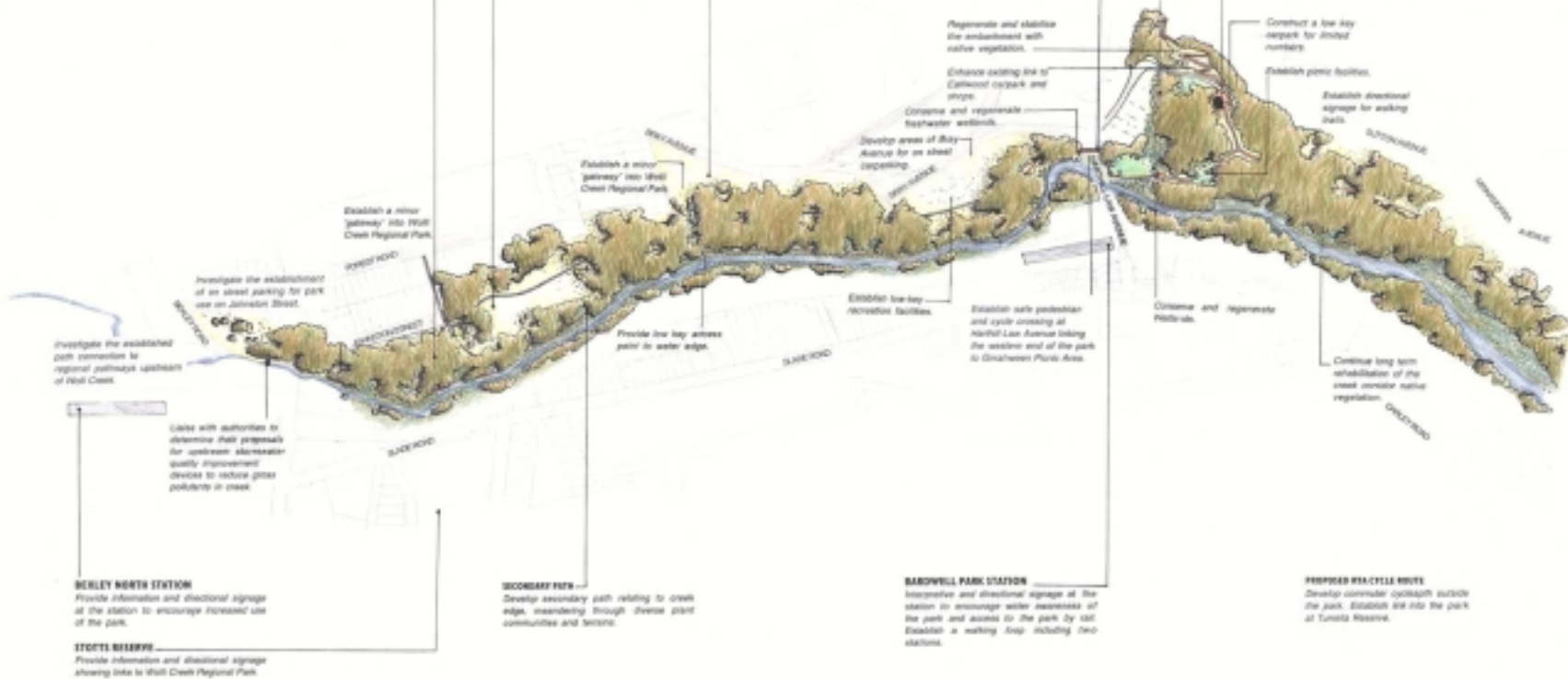
CHICKEN PARK

Utilise the natural setting to establish the principal urban bushland visitor focus for the park.

VISITOR RESOURCE

Expand Visitor Education Resource over time providing an educational resource for primary, secondary and tertiary students, as well as providing information and interpretation of urban bushland for the community. Provide amenities including toilets.

Develop interpretive signage of the history of the area and cultural and natural heritage of the park.

**BERLEY NORTH STATION**

Provide information and directional signage at the station to encourage increased use of the park.

STOUTS RESERVE

Provide information and directional signage showing links to Mill Creek Regional Park.

SECONDARY PATH

Develop secondary path relating to creek edge, meandering through diverse plant communities and forests.

BARROW HILL PARK STATION

Investigate and directional signage at the station to encourage wider awareness of the park and access to the park by rail. Establish a walking loop including two stations.

PROPOSED BI-CYCLE ROUTE

Develop connector cyclepaths outside the park. Establish link into the park at Tunata Reserve.



LEGEND

-  CONTOURS
-  WOOLLY CREEK
-  PRINCIPAL ENTRANCE / VISITOR CENTRE FACILITIES AND FOCUS INCLUDING ORIENTATION / INFORMATION / INTERPRETATION
-  MINOR PARK ENTRANCES INCLUDING ORIENTATION / INFORMATION / INTERPRETATION
-  PICNIC & BBQ SHELTERS / TOILET FACILITIES / PLAY AREAS
-  PROPOSED BUILDINGS
-  IMPROVED BUSHLAND AREAS
-  CREEK VEGETATION / REED BEDS / WETLANDS / RIPARIAN
-  OPEN GRASSLAND AREAS
-  IDENTITY PLANTING
-  PEDESTRIAN PATH SYSTEM
-  BOARDWALK

RABBIT GOAT HILL
Maintain and enhance panoramic views across park valley and greater western Sydney suburbs.

TERTIARY PATH
Establish a rough bushtrack, offroad grade path on the existing maintained and established track.

LINE WITH BIRCHILL CREEK VALLEY
Provide information and directional signage showing links to Wall Creek Regional Park.

TURRELLA RESERVE
Improve the existing open space area through tree planting. Encourage recreational activities including bushwalk, kite flying and picnicking.

MAJOR VISITOR FOCUS TURRELLA RESERVE
Develop as a recreational parkland focusing on family events and activities. Planting areas with diverse landscape opportunities. BGC's picnic shelter and picnic areas, amenities, solar facilities, and interpretive signage.
Provide improved natural habitat including:
- Structural tree planting
- Increased reed beds
- Native grasses
- Differential mowing regime
- Signage to encourage visitors to explore bushland

PRIMARY PATH
Establish easy grade path for disabled access.
Provide service vehicle and potential event parking for events in the reserve.
Area for consolidation at top of bush area.
The path to the quarry will generally follow the route of the existing path subject to environmental constraints.

TURRELLA STATION
Provide interpretive and directional signage at the station to encourage increased use. Improve quality of street access to Turrella Reserve.

HEARTLAND FEATURES
Incorporate cultural and natural heritage features, such as Farnquhar, Henderson Street Wall, the Sandstone Outcrop and "Swimming Pool".

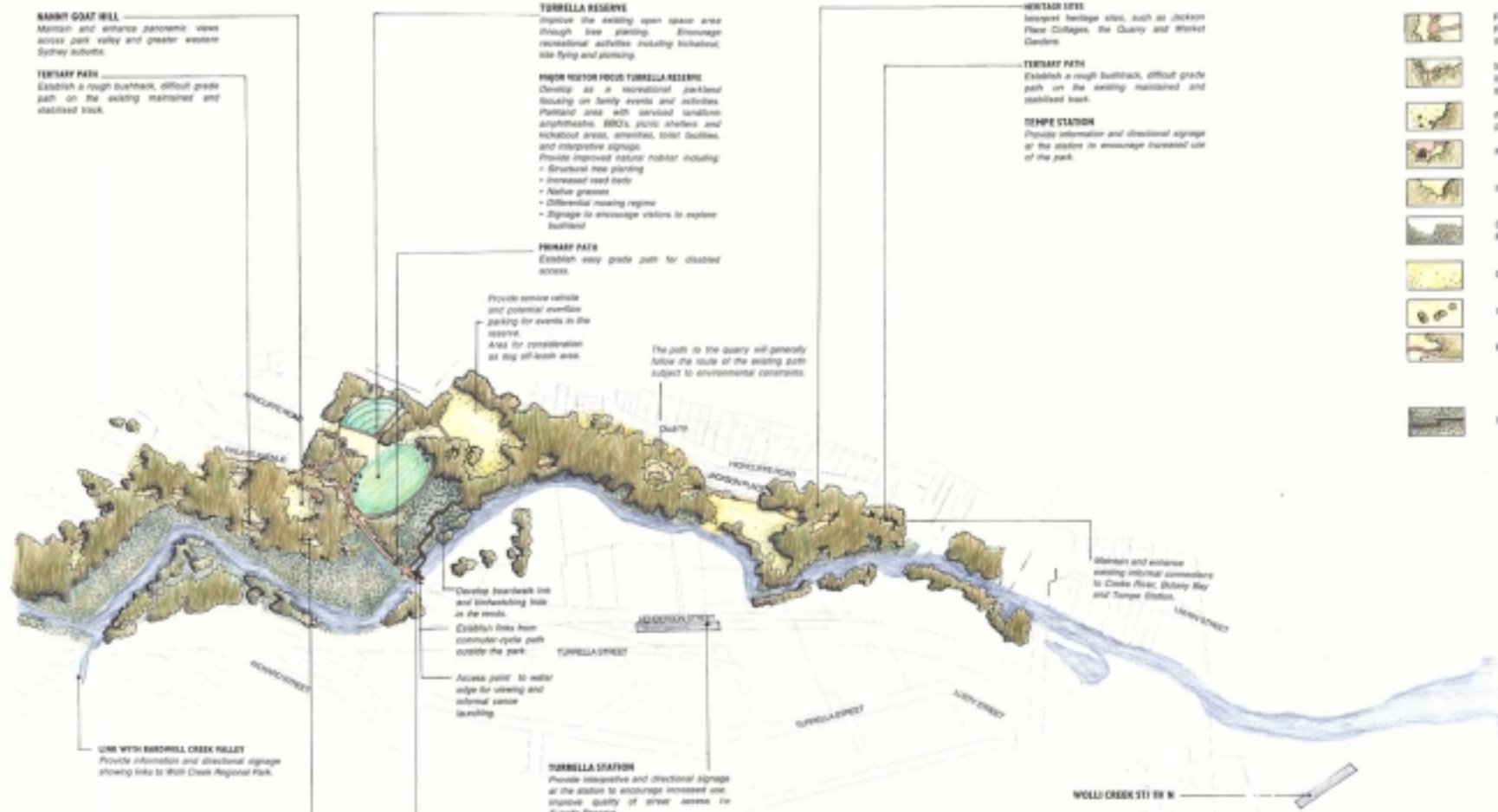
SECONDARY PATH
Establish easy to maintain grade path using diverse plant communities and cultural and natural heritage sites.

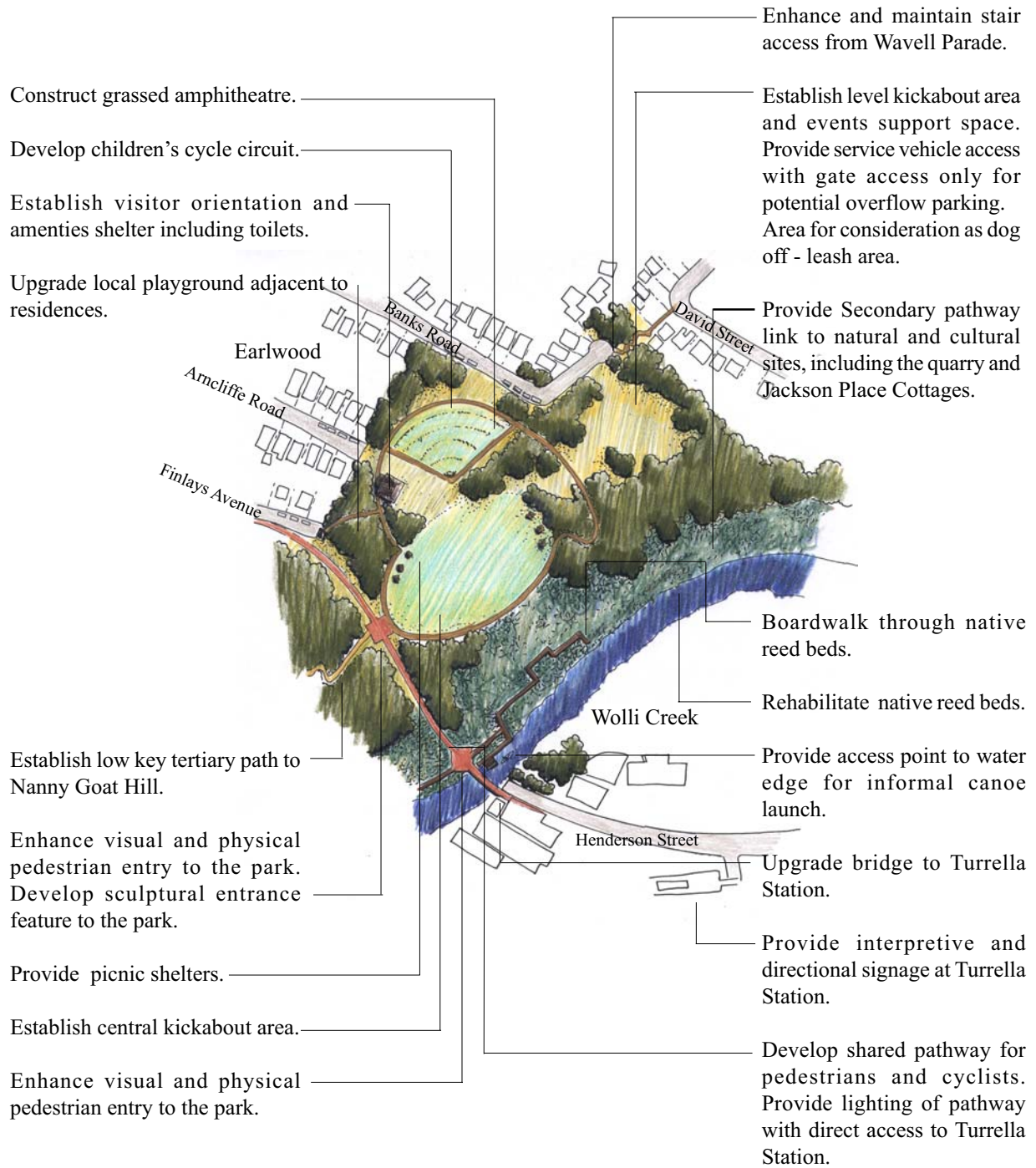
HERITAGE SITES
Incorporate heritage sites, such as Jackson Floor Cottages, the Quarry and Market Gardens.

TERTIARY PATH
Establish a rough bushtrack, offroad grade path on the existing maintained and established track.

TEMPLE STATION
Provide information and directional signage at the station to encourage increased use of the park.

Station and entrance relating internal connections to Clarke River, Quary Bay and Temple Station.





**FIGURE 14
TURRELLA DETAILED AREA**

7.1 PLANNING AND DESIGN PRINCIPLES

Masterplan

A concept design to illustrate many of the key proposals in the Plan of Management.

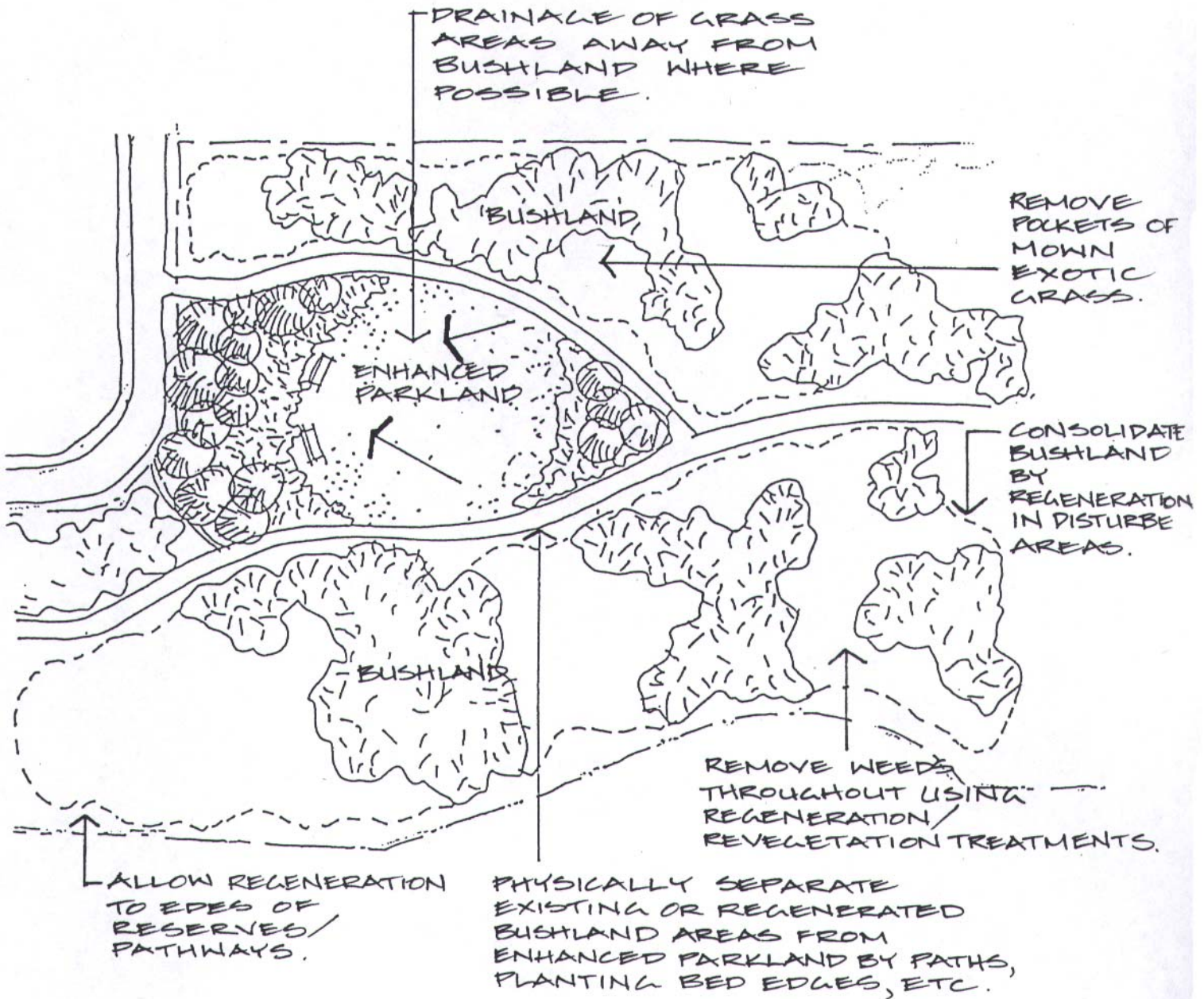
Planning and Design Principles

An outline of some planning and design guidelines applicable to specific locations or situations within the Park.

Continuing management and development of the site should aim for a high standard of appearance and aesthetic control in all construction. To this end, the following guidelines suggest materials, techniques and details that are suitable for Wolli Creek Regional Park and include structures, planting and pollution control measures.

The following details are guidelines only and cannot be applied without specific site investigation and detailed design. They are intended to demonstrate the scale, character and relative impacts of appropriate treatments.

Refer also to Planning and Management strategies for relevant ESD principles in design development and construction.



**FIGURE 15
PRINCIPLES FOR
CONSOLIDATING NATIVE
BUSHLAND**

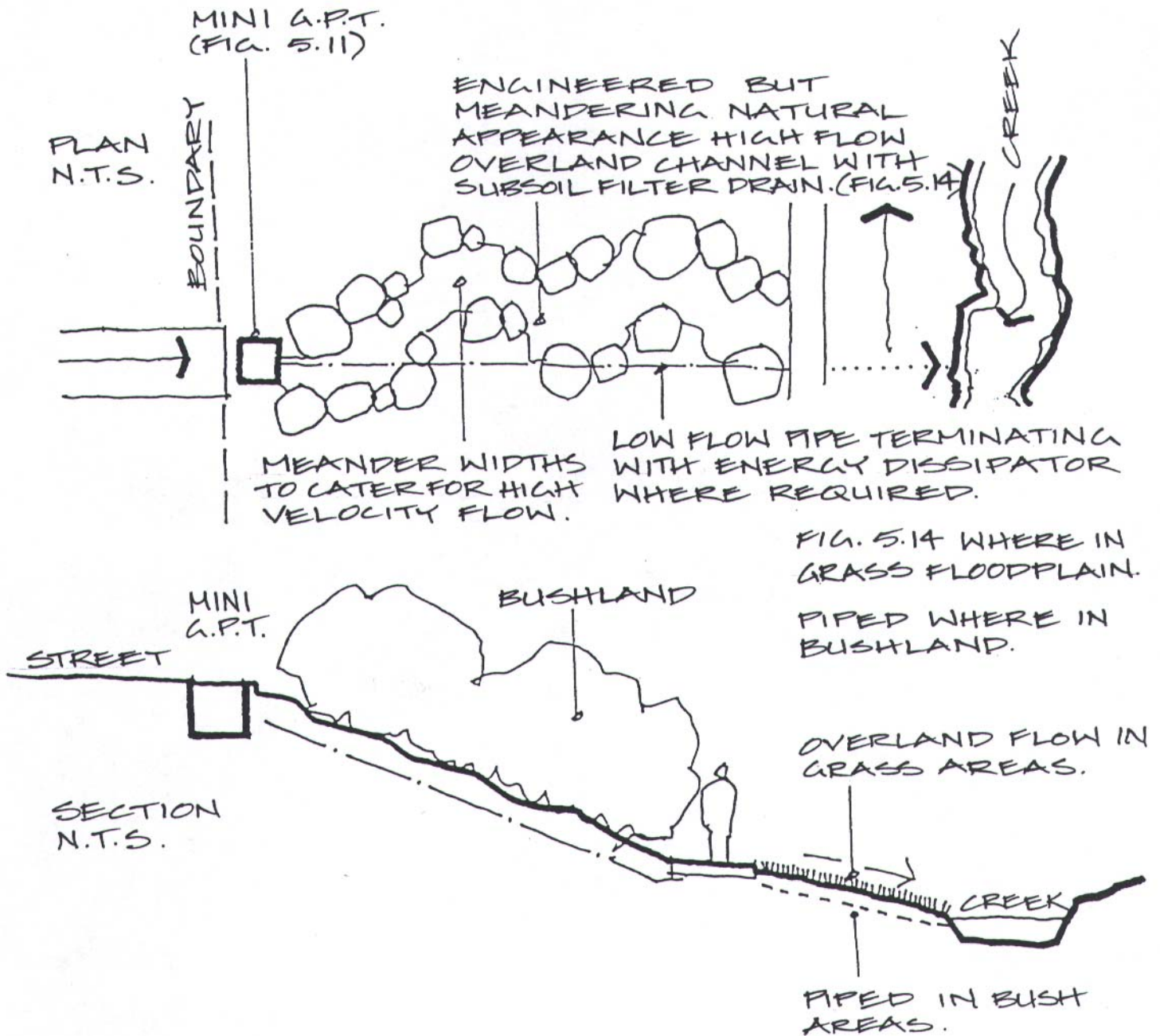
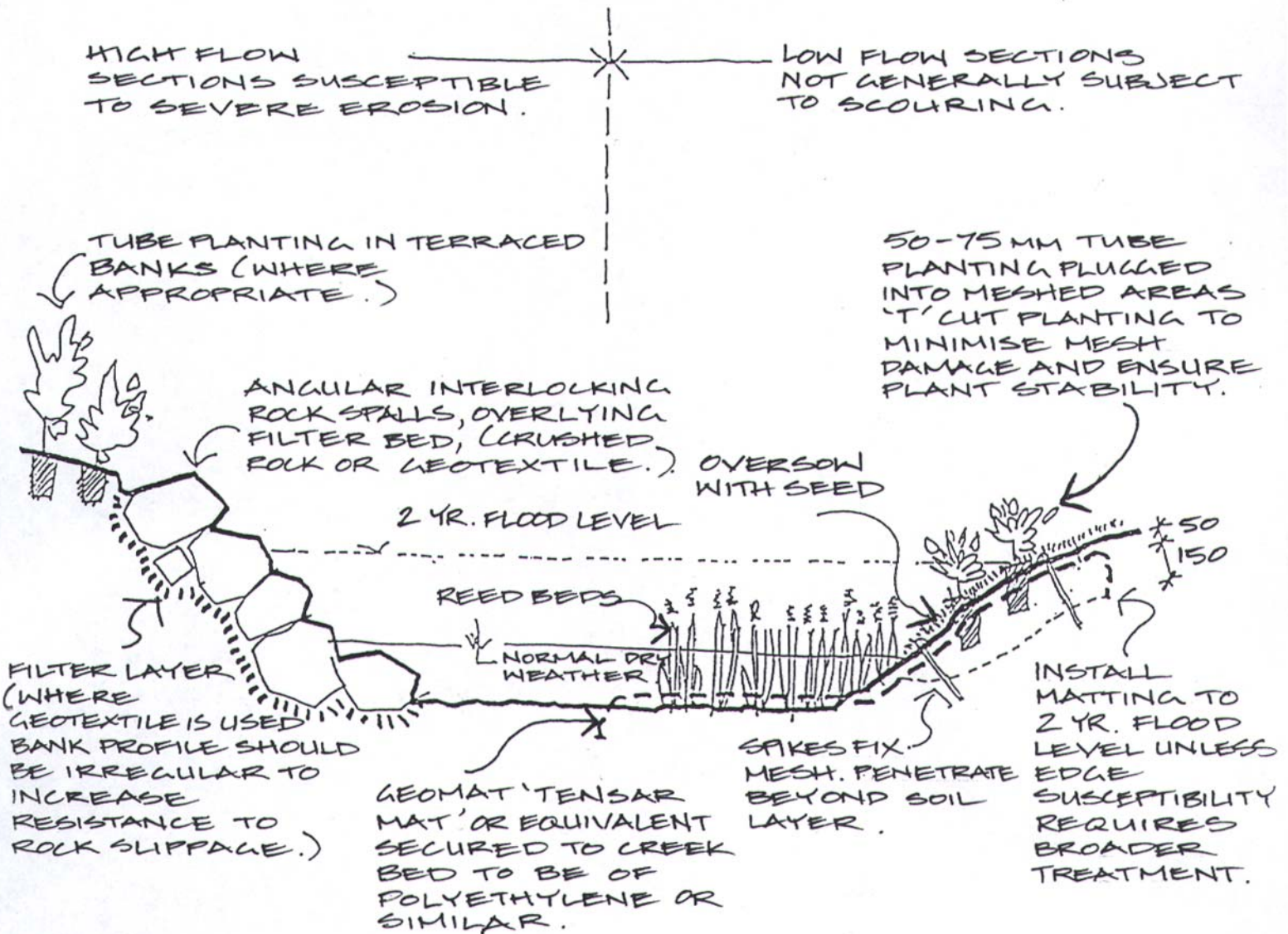
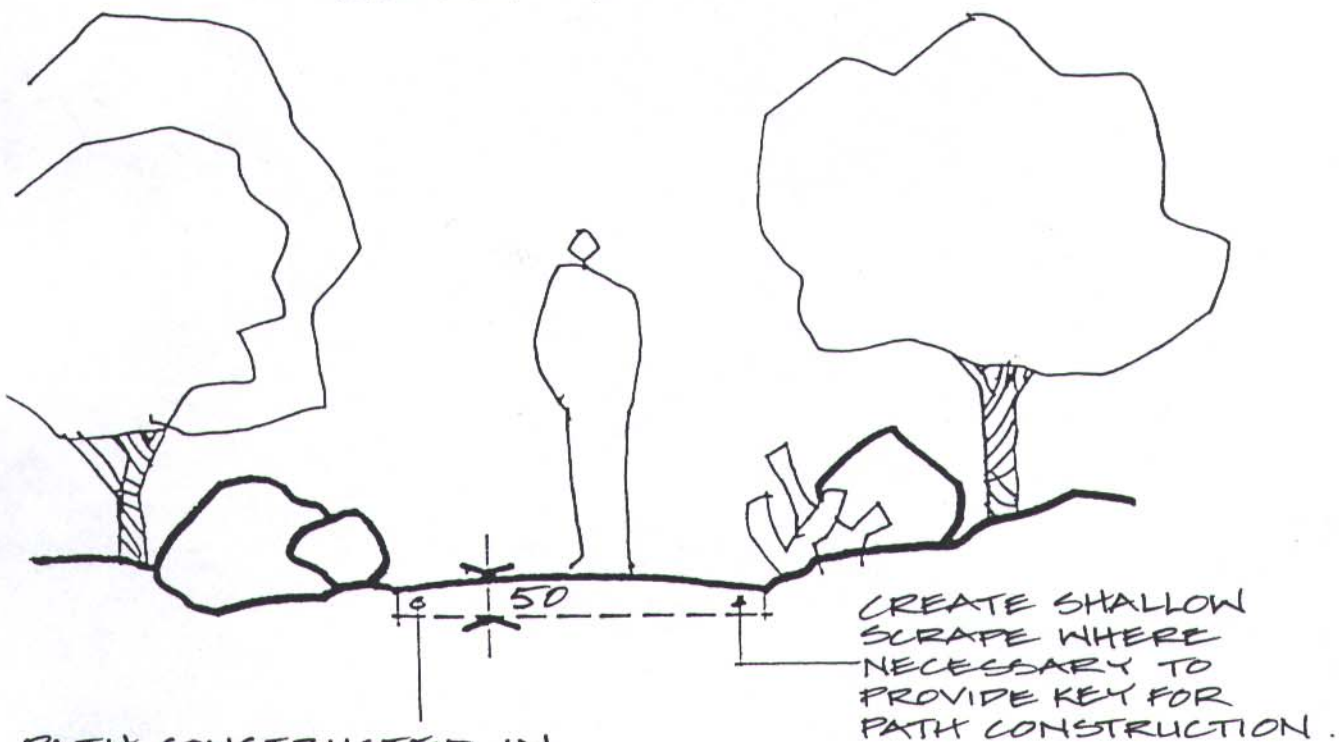
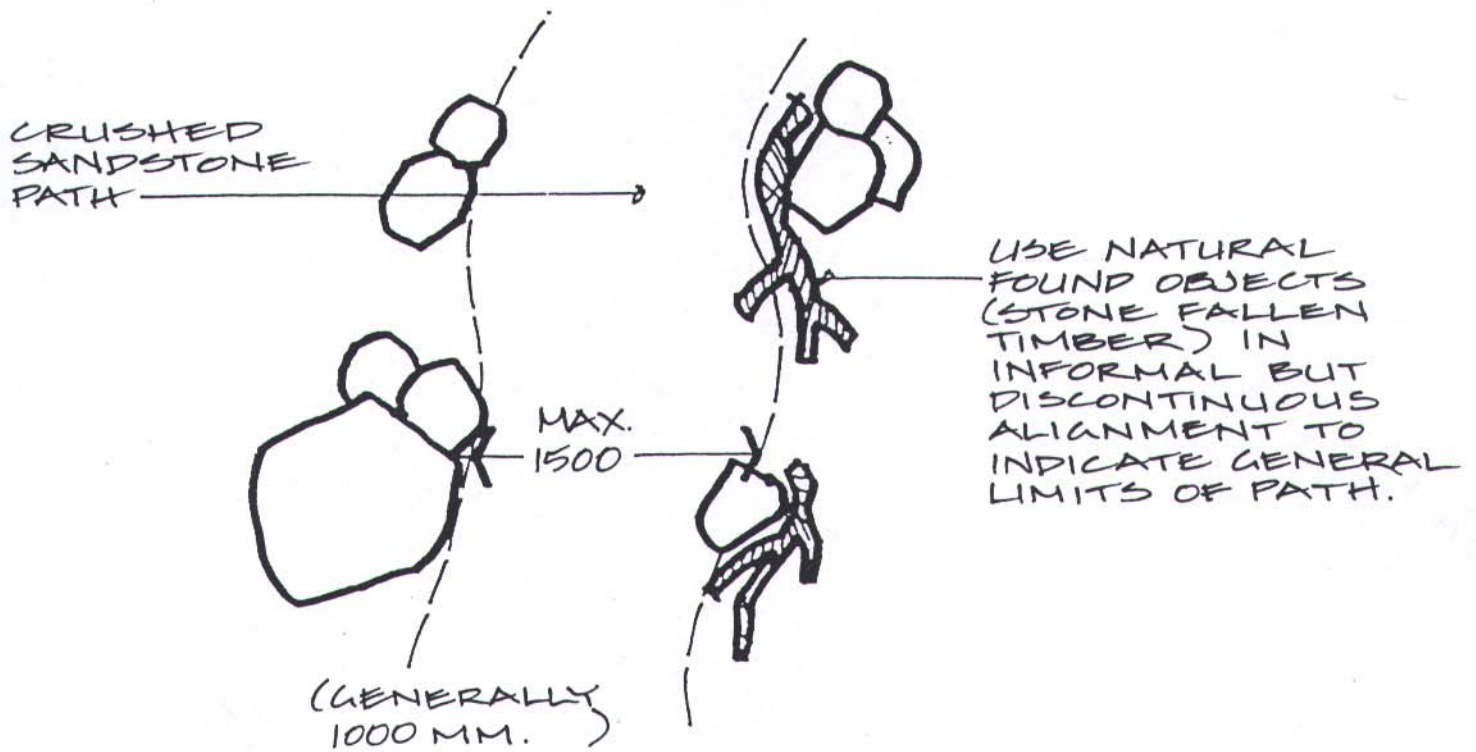


FIGURE 16
PRINCIPLES OF STORMWATER
DIVERSION FROM NATIVE
BUSHLAND



- * GENERAL NOTES: - FOR UPSLOPE PLANTING WEED CONTROL (FOLLOW REVEGETATION PROCESS). IF GREATER THAN 1:4 USE COCONUT MAT, OTHERWISE LEAF MULCH, WITH TUBESTOCK PREFERABLY.
- ALL BANK STABILISATION TREATMENTS ARE SUBJECT TO DETAILED INVESTIGATION AND DESIGN.
- FLAG LOCATIONS WHERE BANK INSTABILITY OCCURS IN CONJUNCTION WITH ADJACENT LAND MANAGER.

**FIGURE 17
STABILISATION TREATMENT OF
CREEK BANKS, VEGETATION
MANAGEMENT**



PATH CONSTRUCTED IN INERT CRUSHED SANDSTONE MIXED SIZE 35 MM Ø SAND. LAY DRY, RAKE OUT, WET & COMPACT BY HAND.

FIGURE 10
DESIGN CONCEPT FOR
STABILISED PATH IN AREAS
PRONE TO EROSION

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