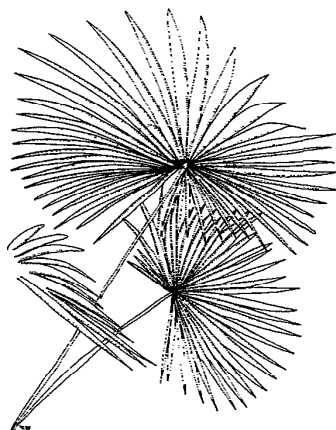

**Urban Bushland
Inventory and Action Plan**



**Volume 2
North Ward Reserves**

Pittwater Council

**Natural Resource Unit
June 1998**

DW doc no. 261477
ser no 215725

Landuse Planning Table (adopted for this plan by council on the 11/2/2001)

Permissible Uses Exempt (these may be subject to approval under Part 5 of the EPA Act 1979)	Permissible Uses Requiring Development Consent	Prohibited Uses
Bush regeneration, habitat restoration and weed control	Utility installations and similar	Extractive industries and agriculture
Fire hazard reduction activities	Buildings ancillary or incidental to the reserve	Sporting facilities
Ecological burns	Major public drainage works	Permanent private access across a reserve
Multi-use tracks other than motor vehicle	Major rock / soil stabilization works and earthworks	Commercial signage
Boardwalks and minor bridges	Major facilities (not buildings) being viewing platforms, bridges, educational facilities and the like	Dumping of refuse (including building materials, soil, fill, household wastes, etc)
Temporary activities or developments requiring a lease or licence under the Local Government Act (1993)	Commercial Eco-tourism Activities	Vegetation removal not in accordance with Council's Tree Preservation and Management Order
Appropriate sustainable low impact recreation activities and facilities (other than buildings)	Vehicle access (emergency access, fire breaks and service trails)	Private alienation or encroachment
Minor public drainage and stormwater works		Introduction of exotic flora and fauna
Minor fences		Playground facilities
Compliance, directional, interpretive, identification and safety signs		Flood structures (damming and reduction of environmental flows)
Environmental education activities		Removal of habitat features such as soil, leaf litter, rocks, stones, pebbles and the like
Any use as permitted under Council's Tree Preservation and Management Order		Recreational motor sports (including 4 wheel driving, motorbike riding, etc)
Minor rock works and earthworks associated with soil stabilization and erosion control		Domestic drainage outlets
Any activity as defined in Management Plans consistent with the core objectives and management objectives		Horse riding facilities
Feral animal control and eradication		Unleashed dog exercise areas
Biodiversity recovery and enhancement		Water extraction

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Palmgrove Park, Avalon

Reserve Number: 0053

Street Address. 18 Palmgrove Road to 32 Plateau Road, between 27 & 29 Dress Circle Road. 14 Dress Circle Road to 2 Bellevue Avenue. Avalon

1.0 Description & Category

1.1 Location and Description

Palmgrove Park is located in North Avalon and occupies 2.34ha. The Reserve is divided by Dress Circle Road. It is bounded above by Palmgrove Road and below by Bellevue Avenue and has residential properties along both sides. A level area contains play equipment and large mown areas enclosed by the remaining 1.398ha of bushland.

1.2 Land Tenure and Property Description

The Reserve is owned by Council, being described as Lot 100 and Lot 101 in DP 11462 and Lot 477 to Lot 488 in DP 16902. The land is zoned 6(a) Open Space - Existing Recreation.

1.3 Category of Land

The Reserve is community land under the Local Government Act 1993. 60% of the Reserve is categorised as a natural area, which is further categorised as bushland and watercourse. It meets the definition of urban bushland described in State Environmental Planning Policy No 19 - Bushland in Urban Areas.

2.0 Natural and Cultural Heritage

2.1 Topography, Geology and Soils

Palmgrove Park is a small Reserve located mid slope in a steep sheltered gully with an easterly aspect. The slopes are steep and colluvial with occasional sandstone boulders. The lower part of the Reserve extends across a road where it becomes level.

The Reserve and much of the slope above is dominated by geology of the Newport Formation in the Narrabeen Group of shales and sandstones. The soils derived are moderately deep podsoils ranging from yellow to red and gleyed. They have been mapped as the Watagan soil landscape, which has a severe soil erosion hazard and is susceptible to mass movement.

2.2 Hydrology

The Reserve is located on a steep slope in the mid to upper section of the Careel Bay Catchment. There is a creekline, which runs through the Reserve draining from Bilgola Plateau.

2.3 Vegetation

The upper slopes support Spotted Gum Forest dominated by Spotted Gum (*Corymbia maculata*). The small tree layer includes Blueberry Ash (*Eleaocarpus reticulatus*), and shrub layer includes Mock Olive (*Notelaea longifolia*) and Sweet-scented Wattle (*Acacia suaveolens*). Ferns include Hare's Foot Fern (*Davallia pyxidata*), Common Maidenhair Fern (*Adiantum aethiopicum*) and Rough Maidenhair Fern (*A. hispidulum*), and vines and scramblers include Water Vine (*Cissus hypoglauca*), Old Man's Beard (*Clematis aristata*), Wombat Berry (*Eustrephus latifolius*) and Hardenbergia (*Hardenbergia violacea*). A specimen of Tree Heath (*Trochocarpa launna*) is present below Palmgrove Road.

In the lower part, the gentler colluvial slopes near the creekline support Cabbage-tree Forest dominated by Cabbage-tree Palm (*Livistona australis*) with a *Gahnia* sp. understorey. With distance from the toe of the slope the vegetation of the level area is increasingly dominated by Rough-barked Apple (*Angophora floribunda*). The creekline is dominated by rainforest species such as Sandpaper Fig (*Ficus coronata*), Cheese Tree (*Glochidion ferdinandi*), and Elk Horn (*Platycerum bifurcatum*).

2.4 Fauna

The tall spotted gums, which dominate Palmgrove Park, are an abundant winter food source for a range of birds as well as gliders. Squirrel gliders are listed as an endangered population on the Barrenjoey Peninsula and an individual was found opposite the Reserve in 1995. Another notable feature of the Reserve are the Cabbage-tree Palms which provide food for species such as the Topknot Pigeon. The understorey is mostly dominated by weeds but as the bush regeneration program progresses this Reserve will be able to support a more diverse range of fauna.

Council's Habitat and Wildlife Corridor Conservation Strategy maps the Reserve as "Corridor R" which indicates smaller Reserves likely to have very modified habitat or suffering adverse edge effects. These can be enhanced by a planting program or by allowing natural regeneration by reducing mown areas.

2.5 Aboriginal and Non-Aboriginal Sites

Although there are no recorded Aboriginal sites within the Reserve, there is potential for sites such as axe grinding grooves and engravings to occur in the area.

There are no known sites of European Heritage in the Reserve. The Reserve is adjacent to Walter Burley Griffin property known as "Burley Griffin Lodge", which is owned by the National Trust. There is a bush regeneration program in place to conserve the Spotted Gum Forest, which features Burrawangs in the understorey, which is present on the property.

3.0 Significance and Objectives

3.1 Statement of Significance

Palmgrove Park is significant because

- ❖ it contributes to the landscape quality of Avalon and protects an example of bushland in a similar condition to that which occurred when the area was first visited by Europeans,

- ❖ it includes examples of significant plant communities, namely Spotted Gum Forest significant in NSW and Cabbage-tree Palm Forest, which is locally significant.
- ❖ it provides habitat for the Squirrel Glider, listed as an endangered population on the Barrenjoey Peninsula, under the Threatened Species Act.
- ❖ it acts as a wildlife habitat and is an important part of the habitat and wildlife corridor for faunal movement from the peninsula to the National Park.
- ❖ it is an education resource and a contact point with nature for residents.
- ❖ it allows urban residents to undertake informal recreational pursuits in a bushland setting.

3.2 Management Objectives

The management objectives for Palmgrove Park are

- ❖ to maintain the structural and floristic diversity of the vegetation communities in the Reserve,
- ❖ to conserve the natural features of the Reserve, particularly the significant plant communities, namely Spotted Gum Forest significant in NSW and Cabbage-tree Palm Forest, which is locally significant,
- ❖ to conserve habitat for the endangered population of Squirrel Glider.
- ❖ to conserve the wildlife habitat and corridor values,
- ❖ to encourage community appreciation and neighbourhood participation in the reserve through supporting the volunteer bush regeneration group and maintaining the track,
- ❖ to expand bushland in the upper part of the Reserve by stopping mowing near the bushland area.

- ❖ to enhance habitat value by planting indigenous in the park area in Bellevue Avenue
- ❖ to adequately manage the bushland in relation to encroachments and weed invasion,
- ❖ to protect life and property from wildlife and to maintain ecological processes by seeking to maintain a near-natural fire regime to conserve native flora and fauna in the Reserve.
- ❖ to control introduced animals in the Reserve,
- ❖ to provide opportunities for low impact recreational and educational use of the Reserve consistent with the other objectives.
- ❖ to control creekline erosion and promote stability.

4.0 Management Issues

4.1 Weed Invasion & Bush regeneration

Weed cover extends throughout the Reserve, with the slope below Palmgrove Road and areas along property boundaries with high cover of weeds *Acacia saligna*, *Lantana* and *Morning Glory*. The remainder of the Reserve contains moderate coverage including *Crofton Weed*, *Paddy's Lucerne*, *Fleabane*, *Fishbone Fern*, *Small-leafed Privet*, *African Olive*, *Ginger* and *Asparagus fern* in drier areas. Occasionally the following exotic trees appear *Pinus radiata*, *Erythrina* and *Norfolk Island Hibiscus*.

A volunteer bush regeneration group is currently working in the Reserve. The regeneration work should be coordinated to firstly utilise fire to burn the north facing slope to remove strangling weeds and provide access, followed by a weeding program. The vegetation below Palmgrove Road has been affected by road work, illegal dumping and urban runoff with *Eucalypt* dieback evident. The slope area will require revegetation.

4.2 Stormwater Management

Increased runoff and previous septic systems have contributed to a change to the water regime with increased sediment loads and creekline erosion occurring. The reinforcing of the creek line with rocks and riparian plants such as *Gahnia*, which occurs in the Reserve, would aid the channel stability.

4.3 Fire Regime

Management of the fire regime in the Reserve will be undertaken by the Warringah Pittwater Bush Fire Management Committee in accordance with Circular C10 - Planning for Bush Fire Prone Areas. The Reserve will be regularly monitored for fuel loadings and any hazard reductions required will be undertaken in accordance with the Draft Fuel Management Plan.

Sections of this Reserve should not be burnt. These are the drainage lines and rainforest species, which will require manual fuel reduction. No more than one third of bushland of the Reserve should be burnt to allow for unburnt areas to remain as a refuge for fauna. Following burns a weeding program will be undertaken.

Ecological considerations will be assessed by Council Environmental Staff to determine methods of hazard reduction and coordinate follow up bush regeneration.

4.4 Management of Native Fauna and Introduced Predators

Palmgrove Park provides good habitat for fauna with a variety of habitat components. The winter flowering *Spotted Gums* and rainforest plants encourage diversity and year-round food availability. When weeding occurs, cover should be retained for fauna that uses the Reserve with no more than one third of the area weeded at a time.

A Pittwater wide public awareness campaign will address the value of bushland as habitat for

fauna and how residents can be responsible neighbours by ensuring that domestic cats and dogs do not roam in the Reserve. Compliance and interpretive signs can assist this. Feral cat and fox predation is an issue that needs to be addressed through a Pittwater-wide control strategy.

4.5 Access, walking tracks and recreation

There is a formal track that provides access from Palmgrove Road, down a stepped path with seating, through a play area to Dress Circle Road. The maintenance of this needs to be regular. The play area requires review.

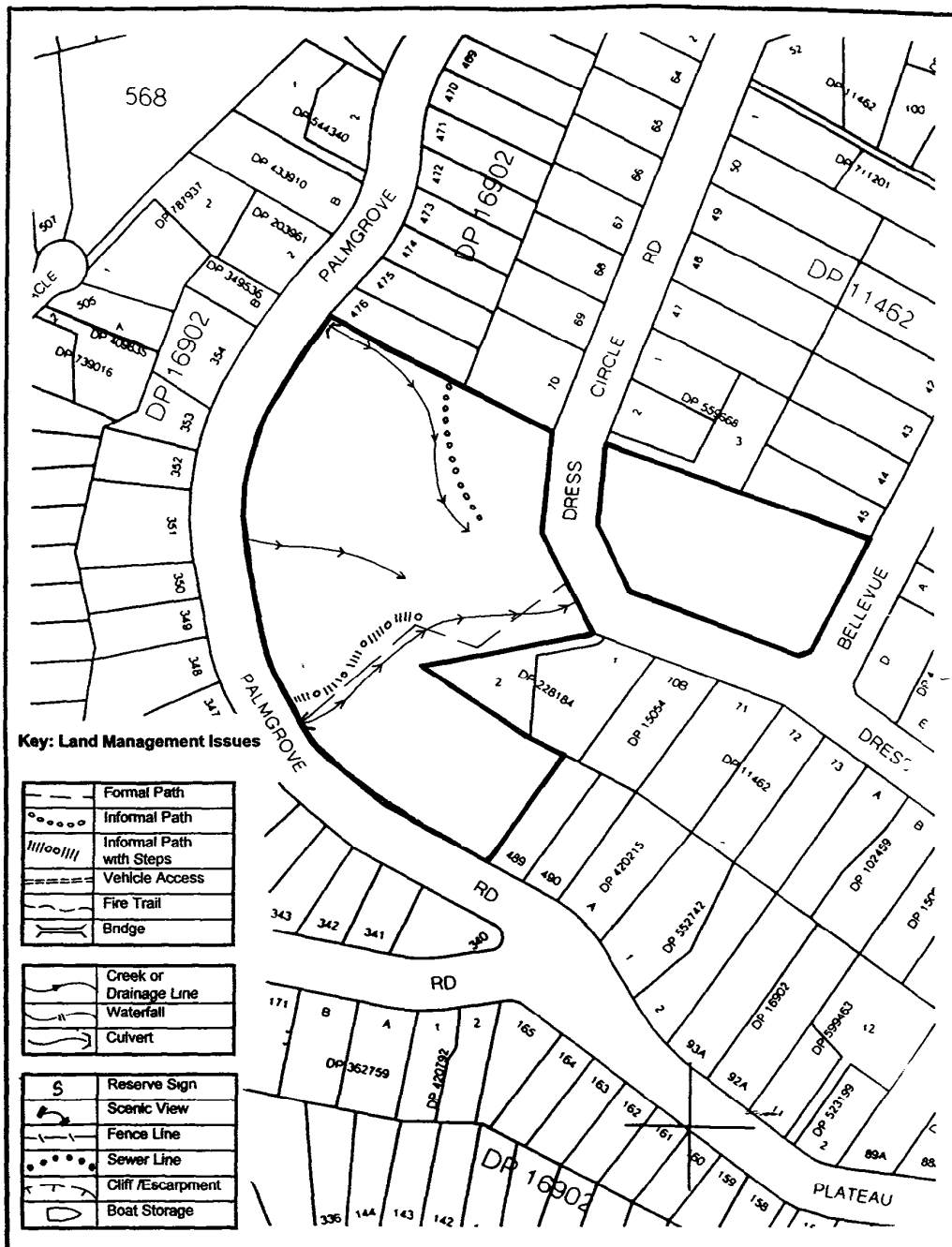
The path allows the movement of walkers and school children from The Plateau to The local school and shops and Beach. Local residents are active in the Reserve, with children playing throughout the Reserve and the play area, dogs walked and picnicking and local bush regeneration and other activities undertaken.


4.6 Boundaries and neighbours

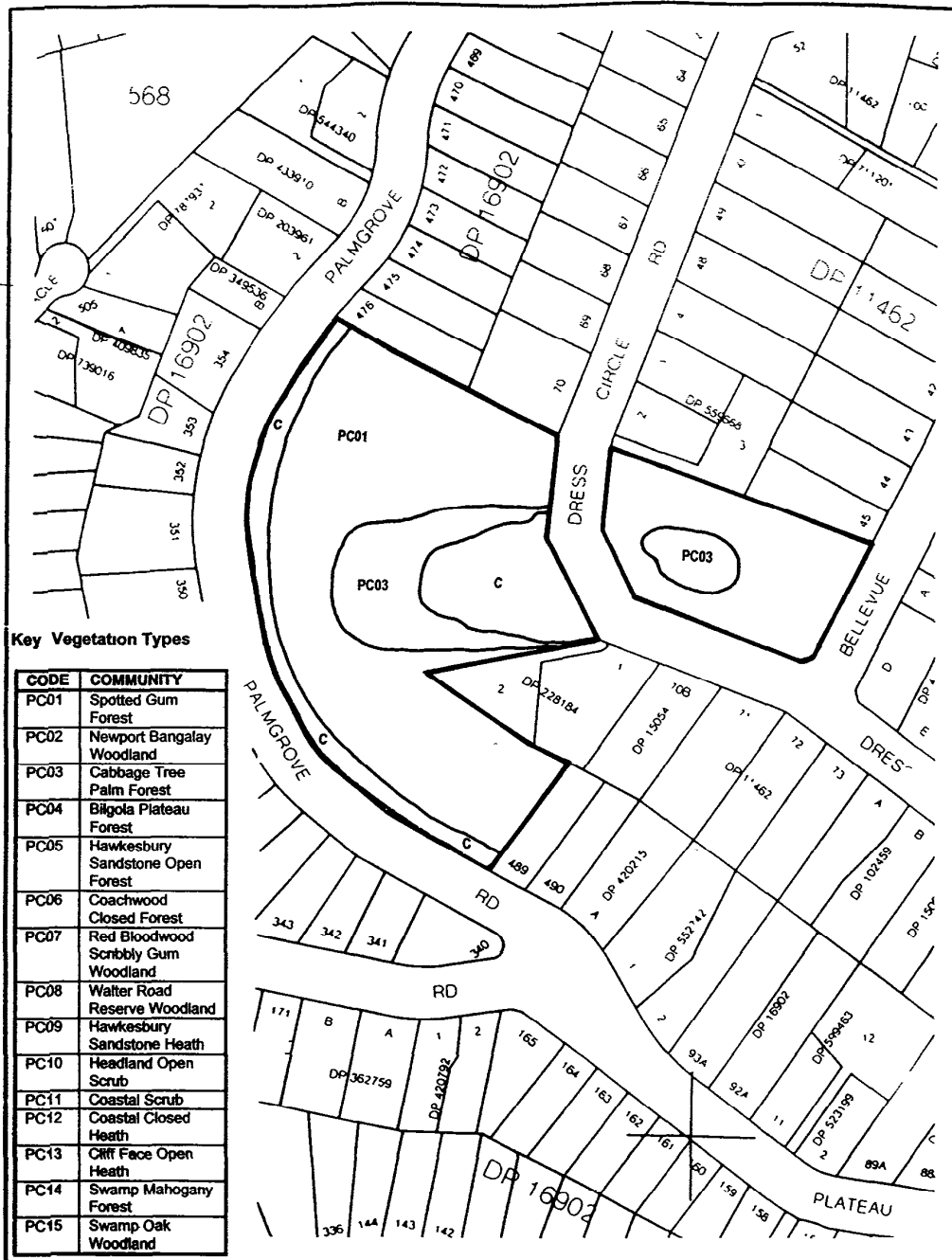
The residential boundaries are generally fenced. This has not prevented residents from dumping garden vegetation or felling trees in the Reserve. The southern corner of the Park has been illegally underscubbed and the roadside dumping of building rubble or rubbish has caused significant problems in the Reserve. The community based environmental grant will address much of the previous damage.

5.0 Performance



Management objectives	Performance Targets (Actions)	Responsibility	Completion date	Capital cost	Recurrent Cost	Performance Measures
Weed control & bush regeneration	Support volunteer group's grant activities	Natural Resources	1997/98	\$3,000	\$2,000	Bushland actively regenerated
Stormwater Control & drainage	Rocks & plantings in creek to support volunteer work	Natural Resources	Ongoing	Seek detailed costs		Scour reduced
Management of native fauna & introduced predators	Public awareness campaign re responsible pet ownership Sign Plant additional habitat trees	Natural Resources Compliance	As part of a Pittwater wide campaign	\$500		Extant fauna populations
Fire management	Maintain safe fuel levels	Fire Control & Natural Resources	Ongoing	NA	Staff time	Life & property protected & biodiversity maintained
Access & walking tracks	Maintain track Review playground	Natural Resources Reserves	Ongoing			Track useable
Boundaries & neighbours	Bush friendly campaign	Natural Resources	1997/98	\$200		Improved appreciation of Reserve



Urban Bushland Plan of Management			 Pittwater Council
Map Management Issues	Scale 12000	Date July 1997	
Locality Palmgrove Park Avalon			



Urban Bushland Plan of Management		
Map Vegetation	Scale 12000	Date July 1997
Locality	Palmgrove Park Avalon	


 Pittwater Council

Toongari Reserve, Avalon

Reserve Number. 0045

Street Address. 118 Avalon Parade, Avalon

1.0 Category & Description

1.1 Location and Description

Toongari Reserve is located in Avalon surrounded by residential properties that front onto Avalon Parade and Central Road. The mainly level reserve occupies 1.42 hectares including Avalon Kindergarten and an area of wetland.

1.2 Land Tenure and Property Description

The Reserve is owned by Council, being described as Lot 102 in DP 785848. The land is zoned 6(a) Open Space - Existing Recreation.

1.3 Category of Land

The Reserve is community land under the Local Government Act 1993. 40% of the Reserve is categorised as a natural area, and is further categorised as bushland, wetland and watercourse. It meets the definition of urban bushland described in State Environmental Planning Policy No 19 - Bushland in Urban Areas. This Plan addresses the natural area.

2.0 Natural and Cultural Heritage

2.1 Topography, Geology and Soils

Toongari Reserve is level and situated in a low lying alluvial valley on Quaternary sands. The valley slopes relate to the Watagan Soil Landscape and have influenced the Warriewood Soil Landscape that characterises the deep and silty to peaty quartz sands and humus podzols of the reserve. The sediments are stream alluvial and estuarine sediments.

2.2 Hydrology

The reserve was part of a wetland area that linked the creekline to the coastal lagoon system behind Avalon Beach and discharging into Careel Bay. The Reserve has been filled but retains some original ground levels. The catchment extends from Bilgola Plateau and Avalon Plateau. It has a high water table. The Reserve receives urban runoff from the surrounding residential development in the catchment.

2.3 Vegetation

The vegetation is Swamp Mahogany Forest (PC 14) dominated by Swamp Mahogany (*Eucalyptus robusta*) with other associated *Livistona australis*, Cheese tree, *Melaleuca quinquenervia* and Swamp Oak, with *Angophora costata* on raised sand margins. The understorey includes vines, rushes and sedges, such as several species of *Juncus* and *Gahnia*, Native Knotweed, Spike – rush (*Eleocharis* sp.) and Common Silkpod (*Parsonia straminea*). The microtopography has depressions and rises, which feature differences in vegetation due to their tolerance of water.

2.4 Fauna

Toongari Reserve is a small remnant with a variety of habitat components. The winter flowering Swamp Mahogonies, rainforest plants and wetland patches encourage diversity and year-round food availability. The reserve was previously important habitat for koalas. Despite the decline in koalas in the area these trees are likely to still be important in maintaining the endangered population of squirrel glider as well as a variety of small birds.

Council's Habitat and Wildlife Corridor Conservation Strategy maps the reserve as "Corridor -HP" which indicates high priority.

areas essential to fauna movement where there should be no increase to existing development. It occupies an important position forming a

vegetated link between Stapleton Park and Angophora Reserve in the Avalon Valley, its location between Pittwater and the ocean and between the two plateaus.

2.5 Aboriginal & Non-Aboriginal Sites

There are no recorded Aboriginal sites within the reserve. There is potential for Aboriginal sites to occur in the area such as axe grinding grooves and engravings. There are no known sites of European Heritage in the Reserve.

3.0 Significance and Objectives

3.1 Statement of Significance

Toongari Reserve is significant because

- ❖ it protects a small example of bushland of Avalon in a similar condition to that which occurred when the area was first visited by Europeans,
- ❖ it protects a small example of a regionally significant plant community, namely the Swamp Mahogany Forest,
- ❖ it is an education resource and a contact point with nature for residents,
- ❖ it allows urban residents to undertake informal recreational pursuits in a bushland setting,
- ❖ it provides a small example of important wetland forest habitat for native fauna, including threatened species such as Koala and endangered Squirrel Glider,
- ❖ it is part of a wildlife corridor essential for faunal movement.

The management objectives for Toongari Reserve are

- ❖ to protect and conserve the natural features of the Reserve, particularly the significant Swamp Mahogany Forest
- ❖ to maintain the natural range of structural and floristic diversity of bushland in the Reserve,
- ❖ to conserve and expand wetland forest habitat for native fauna, including threatened species such as Koala and endangered Squirrel Glider,
- ❖ to improve the wildlife corridor value of the bushland and surrounding areas by planting and promoting beneficial native plants for residential and Kindergarten planting,
- ❖ to adequately manage the bushland in relation to encroachments, weed invasion and fire management,
- ❖ to protect life and property from wildlife and to maintain ecological processes by seeking to maintain a near-natural fire regime in the Reserve to conserve native flora and fauna in the Reserve,
- ❖ to control introduced animals in the Reserve.
- ❖ to provide opportunities for low impact recreational and educational use of the Reserve consistent with the other objectives through provision of a public access pathway.
- ❖ to encourage community appreciation and neighbourhood participation in bushland management of the Reserve through continued support of the volunteer bush regeneration group.

3.2 Management Objectives

4.0 Management Issues

4.1 Weed Invasion & Bush Regeneration

Previous disturbances, including piping drainage and filling of parts of the reserve, have created conditions that promote weeds such as Lantana, *Tradescantia albiflora*, Small-leafed Privet, Erythrina, *Phoenix canariensis*, Crofton Weed, Arum Lily, Honeysuckle, Blackberry, Cape Ivy, Bamboo and Buttercup

The current volunteer bush regeneration program is focussing on the eastern wetland area. Continued support of the group needs to be maintained to stabilise the margins that have been revegetated and allow expansion of the area. Future work includes target weeding of the western wetland area. This needs to be timed effectively so as not to be at the expense of that the eastern area.

Regeneration of the Swamp Mahogany Forest is a high priority and will be addressed through a combination of removal of the smothering layer of weed, the selective use of fire and through replanting of trees, shrubs and ground covers propagated from local seed. There is potential to replant sedges and rushes through division of onsite material.

4.3 Hydrology and water quality

Previous engineering works in this low section of the catchment to allow suburban development, have affected the Swamp Mahogany Forest. No additional draining works should be undertaken, rather the natural uptake of water by native sedges and rushes should be allowed to occur in the remnant wetland patches.

4.4 Fire Regime

Management of the fire regime in the Reserve will be undertaken by the Warringah Pittwater Bush Fire Management Committee in accordance with Circular C10 - Planning for Bush Fire Prone Areas. The reserve will be regularly monitored for fuel loadings and any hazard reductions required will be undertaken in accordance with the Draft Fuel Management Plan.

Ecological considerations will be assessed by Council Environmental Staff to determine

methods of hazard reduction due to the rainforest species

4.5 Management of Native Fauna and Introduced Predators

Continued regeneration of faunal habitat is essential for this high priority vegetated link. In addition replacement planting is a high priority to aid the movement of fauna, by expanding the remnant patches into the large grassed areas and planting around the remnant trees to gradually expand individual trees into patches of bushland.

Monitoring of terrestrial and aquatic fauna in the Reserve will need to rely on the community.

A Pittwater wide public awareness campaign will address the value of bushland as habitat for fauna and how residents can be responsible neighbours by ensuring that domestic cats and dogs do not roam in the Reserve. Compliance and interpretive signs can assist this. Feral cat and fox predation is an issue that needs to be addressed through a Pittwater-wide control strategy.

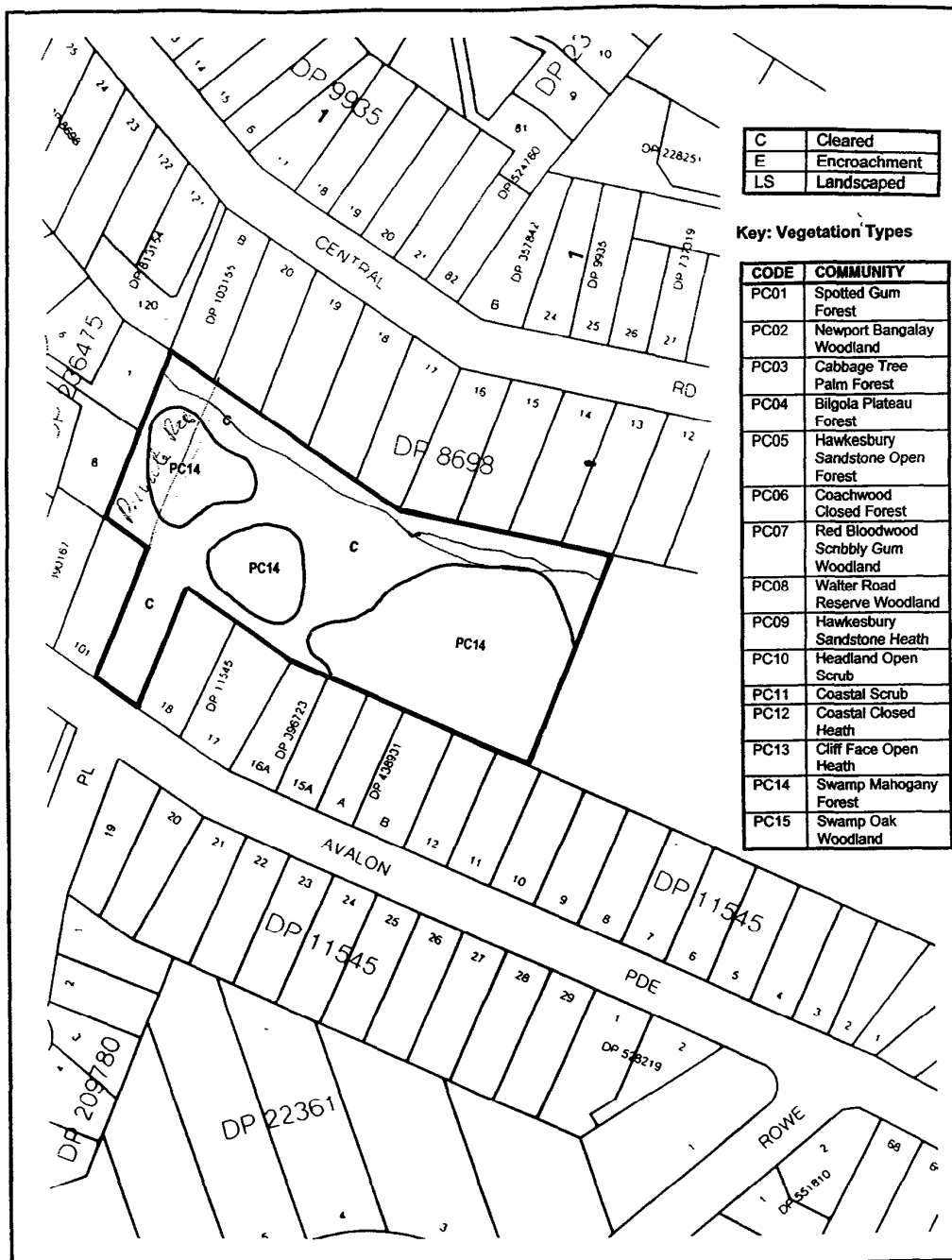
4.6 Access, walking tracks and recreation


The only access into the reserve is via the frontage to Avalon Parade, which is currently fenced off as part of the Kindergarten. A public access path needs to be provided that is separate to the Kindergarten. There is informal access off Central Road.

The reserve has parkland, which is managed under the Parks Plan of Management, which provides maintenance actions and a works schedule for the developed area of the park, including mowing, footpaths and picnic seats. These need to be well integrated with the implementation of bushland objectives.


5.0 Performance

Management objectives	Performance Targets (Actions)	Responsibility	Completion date	Capital cost	Recurrent Cost	Performance Measures
Weed control & bush regeneration	Support volunteer group Expand remnants Integrate bushland & park management	Natural Resources	1997/98		\$1.400	Bushland actively regenerated
Management of native fauna & introduced predators	Public awareness campaign re responsible pet ownership Signs Plant additional habitat patches	Natural Resources Compliance	As part of a Pittwater wide campaign	\$5.000		Used fauna link Extant fauna populations
Fire management	Maintain safe fuel levels	Natural Resources	Ongoing	NA	Staff time	Life & property protected & biodiversity maintained
Access	Provide access	Natural Resources Reserves	1998/99	\$2.000		Public access provided
Boundaries & neighbours	Bush friendly campaign	Natural Resources	1998/99	\$200		Improved appreciation of Reserve



Urban Bushland Plan of Management			 Pittwater Council
Map Vegetation	Scale 12000	Date July 1997	
Locality Toonaan Reserve/Avalon Kindergarten Avalon			



Urban Bushland Plan of Management			 <div>N ↑ Pittwater Council</div>
Map Weed/Management	Scale 12000	Date July 1997	
Locality Toongan Reserve/Avalon Kindergarten Avalon			

Avalon Fauna Species List

Key

Record

APM - Angophora Reserve Plan of management. L - likely to occur

HSS - Household Species Survey

MM – Marita Macrae

Status

R=resident F=frequent visitor W=winter migrant

O=occasional or uncommon visitor S=summer migrant

Bold = regionally significant species **Bold Italic** = Schedule 12 species

* - introduced species

Common Name	Scientific name	Record	Status
Birds			
White-faced Heron	Ardea novaehollandiae	MM	
Sacred Ibis	Threskiornis aethiopica	MM	
Spotted Turtle-dove *	Streptopelia chinensis	APM	R
Crested Pigeon	Ocyphaps lophotes	MM	
Pacific Black Duck	Anas superciliosa	MM	
Topknot Pigeon	Lopholaimus antarcticus	L	O
Brown Cuckoo-Dove	Macropygia amboinensis	L	O
Sulphur-crested Cockatoo	Cacatua galenta	APM	F
Long-billed Corella	Cacatua tenuirostris	MM	
Little Corella	Cacatua sanguinea	APM	R
Galah	Cacatua roseicapilla	APM	R
Australian King-Parrot	Alisterus scapularis	APM	F
Crimson Rosella	Platycercus elegans	APM	F
Eastern Rosella	Platycercus eximius	APM	O
Little Lorikeet	Glosopsitta pusilla	L	O
Scaly-breasted Lorikeet	Trichoglossus chlorolepidotus	APM	O
Rainbow Lorikeet	Trichoglossus haematodus	APM	F
Common Koel	Eudynamys scolopacea	APM	S
Channel-billed Cuckoo	Scythrops novaehollandiae	L	S
Southern Boobook	Ninox novaeseelandiae	APM	R
Powerful Owl	Ninox strenua	L	O
Tawny Frogmouth	Podargus strigoides	L	R
Spine-tailed Swift	Hirundapus caudacutus	L	S
Kookaburra	Dacelo novaeguinea	APM	R
Sacred Kingfisher	Halcyon sancta	L	S
Dollarbird	Eurystomus orientalis	APM	S
Black-faced Cuckoo-shrike	Coracina novaehollandiae	APM	R
Golden Whistler	Pachycephala pectoralis	APM	R
Black-faced Monarch	Monarcha melanopsis	L	S
Grey Fantail	Rhipidura fuliginosa	L	R
Rufous Fantail	Rhipidura rufifrons	L	S
Eastern Whipbird	Psophodes olivaceus	APM	R
Superb Fairy-wren	Malurus cyaneus	APM	F
Variegated Wren	Malurus lamberti lamberti	APM	F
White-browed Scrubwren	Sencornis frontalis	APM	R
White-throated Warbler	Gerygone olivacea	L	S
Yellow-rumped Thornbill	Acanthiza chrysorrhoa	MM	
Brown Thornbill	Acanthiza pusilla	APM	R
Eastern Spinebill	Acanthorhynchus tenuirostris	L	F
Red Wattlebird	Anthochaera carunculatus	APM	F
Little Wattlebird	Anthochaera chrysoptera	APM	R

Urban Bushland Inventory and Action Plan – Fauna Species List, Avalon

Yellow-faced Honeyeater	Lichenostomus chrysops	APM	W
Noisy Miner	Manorina melanocephala	APM	R
White-naped Honeyeater	Melithreptus lunatus	APM	W
Noisy Friarbird	Philemon corniculatus	APM	R
White-cheeked Honeyeater	Phylidonyris nigra	L	F
New Holland Honeyeater	Phylidonyris novaehollandiae	L	F
Mistletoebird	Dicaeum hirundinaceum	APM	O
Spotted Pardalote	Pardalotus punctatus	APM	F
Silveryeye	Zosterops lateralis	APM	F
Red-browed Finch	Emblema temporalis	L	F
House Sparrow	Passer domesticus	MM	
Common Starling	Sturnus vulgaris	MM	
Figbird	Sphecotheres viridis	MM	
Common Mynah *	Acridotheres tristis	APM	R
Olive-backed Oriole	Oriolus sagittatus	L	O
Spangled Drongo	Dicrurus hottentotus	L	S
Grey Butcherbird	Cracticus torquatus	APM	R
Australian Magpie	Gymnorhina tibicen	APM	R
Pied Currawong	Strepera graculina	APM	R
Australian Raven	Corvus coronoides	APM	R
<u>Mammals</u>			
Short-beaked Echidna	Tachyglossus aculeatus	APM	R
Sugar Glider	Petaurus breviceps	HSS	R
Squirrel Glider	Petaurus norfolcensis	Aust	R
		Museum	
Common Ringtail Possum	Pseudocheirus peregrinus	APM	R
Common Brushtail Possum	Trichosurus vulpecula	APM	R
Koala	Phascolarctos cinereus	APM/HS	R
		S	
Long-nosed Bandicoot	Perameles nasuta	APM/HS	R
		S	
House Mouse *	Mus domesticus	L	R
Black Rat *	Rattus rattus	APM	R
Grey-headed Flying-fox	Pteropus poliocephalus	APM	O
Chocolate Wattled bat	Chalinolobus morio	L	F
Gould's Wattled Bat	Chalinolobus gouldii	L	F
Common Bent-wing Bat	Miniopterus schreibersii	L	F
Greater Broad-nosed Bat	Scoteanax rupelli	L	O
Pale Eptesicus	Vespadelus vulturnus	L	O
<u>Reptiles</u>			
Brown Tree Snake	Boiga irregularis	L	R
Eastern Water Dragon	Physignathus leseurii	L	R
Eastern Water Skink	Eulamprus quoyii	APM	R
Copper-tailed Skink	Ctenotus taeniolatus	APM	R
Grass Skink	Lampropholis delicata	APM	R
Weasel Skink	Saproscincus mustelina	L	R
Blue-tongued Lizard	Tiliqua scincoides	L	R
Eastern Long-necked Tortoise	Chelodina longicollis	L	R
<u>Frogs</u>			
Common Eastern Froglet	Crinia signifera	APM	R
Brown-striped Frog	Limnodynastes peronii	APM	R
Green Tree Frog	Litoria caerulea	L	R
Peron's Tree Frog	Litoria peronii	L	R

Hewitt Park, Bilgola

Reserve Number 0072

Street Address 501 Barrenjoey Road, Bilgola

1.0 Description & Category

1.1 Location and Description

Hewitt Park is located in the northern gully of Bilgola Bends overlooking Bilgola Beach. The Reserve is bounded by the residential properties between The Outlook and Plateau Road and extends over Barrenjoey Road. Significant flora and fauna have been recorded in this scenic 3.23 ha Reserve.

1.2 Land Tenure and Property Description

Hewitt Park is owned by Council, being described as Lots 139 to 144, 336 to 338, 547 to 556, 566 and 569 in DP 16902 with some affected by Drainage Easements below Barrenjoey Road. The upper portion of the land is zoned 6(a) Open Space - Existing Recreation A, with the remainder zoned Arterial Road.

1.3 Category of Land

The Reserve is community land under the Local Government Act 1993. It is categorised as a natural area and further categorised as bushland, escarpment and watercourse. It meets the definition of urban bushland described in State Environmental Planning Policy No 19 - Bushland in Urban Areas.

2.0 Natural and Cultural Heritage

2.1 Topography, Geology and Soils

Hewitt Park is located on the western and northern slopes of a steeply sloping gully. The gully is formed from the north eastern edge of Bilgola Plateau and a spur reaching to the ocean. There is a sandstone escarpment in the uppermost section of the Reserve which rapidly drops over 75 metres as a very steep slope.

The aspect of the Reserve protects the gully vegetation from the cold westerlies in winter and the hot north-westerlies in summer.

The parent geology influencing the upper section of the Reserve is Hawkesbury Sandstone, underlain by the shales and sandstones of the Newport Formation in the Narrabeen Group which occurs on the slopes. The soils vary from shallow and porous in nature to deeper, and more fertile with a higher clay content. The soils have been mapped as the Watagan soil landscape. The colluvial slopes are covered by occasional floaters. They are prone to mass movement and present a severe soil erosion hazard when disturbed.

2.2 Hydrology

The Reserve is located mid-slope in the Bilgola Beach catchment, receiving water from two intermittent creeklines which drain the northern portion of Bilgola Plateau. Both creeks are steep and boulder lined. The northern creek forms a waterfall as it enters the Reserve.

2.3 Vegetation

Hewitt Park supports a Cabbage-tree Palm Forest dominated by Cabbage-tree Palm (*Livistona australis*), Lilly Pilly (*Acmena smithii*) and Guioa (*Guioa semiglaucula*) with emergent eucalypts such as Broad-leaved White Mahogany (*E. umbra*). Associated low tree and shrub layer species include Forest Oak (*Allocasuarina torulosa*), Veiny Wilkiea (*Wilkiea huegeliana*), Bolwarra (*Eupomatia laurina*), Bastard Rosewood (*Synoum glandulosum*), Mock Olive (*Notelaea longifolia*) and Sweet Pittosporum (*Pittosporum undulatum*).

The ground layer is low to medium density and dominated by ferns. Common ground layer plants include Rasp Fern (*Doodia aspera*), Jasmine Morinda (*Morinda jasminoides*), Settler's Flax (*Gymnostachys anceps*), Native Grape (*Cissus hypoglauca*), False Bracken Fern.

(*Calochaena dubia*). Lawyer Vine and Harsh Ground-fern (*Hypolepis muelleri*)

Also present are small areas of forest or woodland community where the trees are of lower height than the forest of the upper slopes. Dominant species are Smooth-barked Apple (*Angophora costata*), Rough-barked Apple (*Angophora floribunda*) and Black She-oak (*Allocasuarina littoralis*). Associated small tree species include Bangalay (*E. botryoides*), Cheese Tree (*Glochidion ferdinandi*), Coast Banksia (*Banksia integrifolia*) and Blueberry Ash (*Elaeocarpus reticulatus*). The understorey is similar to that found in Attunga Reserve.

2.4 Fauna

Dominated by closed-forest, Hewitt Park provides resources not available to fauna in woodlands. These include very thick protective cover and fruits of plants such as Native Grape, Cabbage-tree Palm and Morinda. These fruits are favoured by species such as the Topknot Pidgeon and seasonal migrants such as the Koel and Channel-billed Cuckoo. Tree snakes which feed on birds and other reptiles, and water dragons also favour this type of habitat. Hewitt Park forms part of the Bilgola escarpment which has been identified as potential habitat for the endangered population of Squirrel Glider on the Barrenjoey Peninsula, the last area in northern Sydney where it is known to occur. The Greater Broad-nosed Bat likely to feed along the moist creekline and use tree hollows for roosting, is also a threatened species and has been sited in Bilgola Beach Council's Habitat and Wildlife Corridor. Conservation Strategy maps the Reserve as "Major Habitat - MH" which indicates major habitat areas. This highlights the high degree of diversity within the Reserve in both habitat types and species presently using it.

2.5 Aboriginal and Non-Aboriginal Sites

There are no recorded Aboriginal sites within the Reserve, although there is potential for sites such as axe grinding grooves and engravings to occur in the area.

The grove of Cabbage-tree Palm stands have been listed as Heritage item on the Pittwater Local Environment Plan (LEP) 1993.

3.0 Significance and Objectives

3.1 Statement of Significance

Hewitt Park is significant because

- ❖ it protects a locally significant plant community, namely, Cabbage-tree Palm Forest which has a very restricted distribution in Pittwater and is also a regionally significant species.
- ❖ it protects regionally significant plant species, namely *Eucalyptus scias*, *Prostanthera denticulata*, which is locally endemic, and locally significant species including *Eupomatia laurina*, *Guioa semiglaucula* and *Schizomeria ovata*.
- ❖ it provides major habitat for a wide diversity of fauna species in the context of urban bushland in the Sydney Region.
- ❖ it provides habitat for the endangered population of Squirrel Glider on the Barrenjoey Peninsula, the only known population in the northern Sydney area.
- ❖ it contributes to the landscape quality of Bilgola Beach and the peninsula, providing visual amenity along the ridgeline with views to the ocean, and
- ❖ it is an educational resource and a contact point with nature for residents.

3.2 Management Objectives

The management objectives for Hewitt Park are

- ❖ to protect the natural features of the Reserve, particularly flora, fauna, scenic and catchment protection values,
- ❖ to maintain a natural range of structural and floristic diversity of bushland within the Reserve.
- ❖ to protect the locally significant Cabbage-tree Palm Forest.
- ❖ to protect regionally significant plant species, *Eucalyptus scias*, *Prostanthera denticulata*,

and locally significant species *Eupomatia laurina*, *Guioa semiglaucula* and *Schizomeria ovata*,

- ❖ to protect habitat for a wide diversity of fauna species in the context of urban bushland in the Sydney Region.
- ❖ to protect habitat for the endangered population of Squirrel Glider and regionally significant Topknot Pigeon,
- ❖ to adequately manage and prevent damage to the reserve from encroachments, weeds and stormwater pollution.
- ❖ to protect human life and property in and adjacent to the Reserve from wildfire and maintain ecological processes by seeking to maintain a near-natural fire regime in the body of the Reserve and aim to ensure that no plant or animal species becomes extinct as a result of the fire regime,
- ❖ to control and where possible eradicate introduced animals within the Reserve, and
- ❖ to encourage community and neighbour participation in bushland management

4.0 Management Issues

4.1 Weed Invasion & Bush Regeneration

Weeds have established in areas of disturbance on the upper urban edge of the Reserve, where vegetation has been dumped in the Reserve by residents. Also, poor work practices during building development have led to excavated spoil being pushed downslope. Lantana and Cape Ivy dominate, although Asparagus Fern, Bamboo, Cassia, Crofton and Ginger Lily are present. Wandering Jew forms a carpet along the creekline.

The top of the Reserve has been weeded and should be maintained as a priority to assist natural regeneration and limit the downward spread of weeds. Bush regeneration skill will be required to work around new native growth. Revegetation may be considered necessary to

replace canopy cover lost through death of trees. Work in other areas of the Reserve should

proceed from areas of good bush, slowly moving outward as these areas are consolidated.

4.2 Stormwater control and drainage

The stormwater outlet discharging into the Reserve above the waterfall has focussed the energy of the creek. The creek banks below the drop are being eroded by the increased volume of water and the lack of riparian vegetation. Although the channel has boulders along its base, it is not stabilised along the edges. This should be addressed by stabilising edges with sandstone rocks and creekline plantings.

4.3 Fire Regime

Management of the fire regime in Hewitt Park will be undertaken by the Warringah Pittwater Bush Fire Management Committee in accordance with Circular C10 - Planning for Bush Fire Prone Areas. The Reserve will be regularly monitored for fuel loadings and any hazard reductions required will be undertaken in accordance with the Draft Fuel Management Plan. Ecological considerations will be assessed by Council Environmental Staff to determine methods of hazard reduction. Rainforest areas should generally not be burnt.

4.4 Management of Native Fauna and Introduced Predators

Hewitt Park provides good habitat for fauna with a variety of habitat components. The winter-flowering Banksias and rainforest plants encourage diversity and year-round food availability. Residents should be encouraged to plant habitat and food resource species when landscaping. A Pittwater wide public awareness campaign will address the value of bushland as habitat for fauna and how residents can be responsible neighbours by ensuring that domestic cats and dogs do not roam in the Reserve. Feral cat and fox predation is an issue that needs to be addressed through a Pittwater-wide control strategy.

4.6 Access and recreation

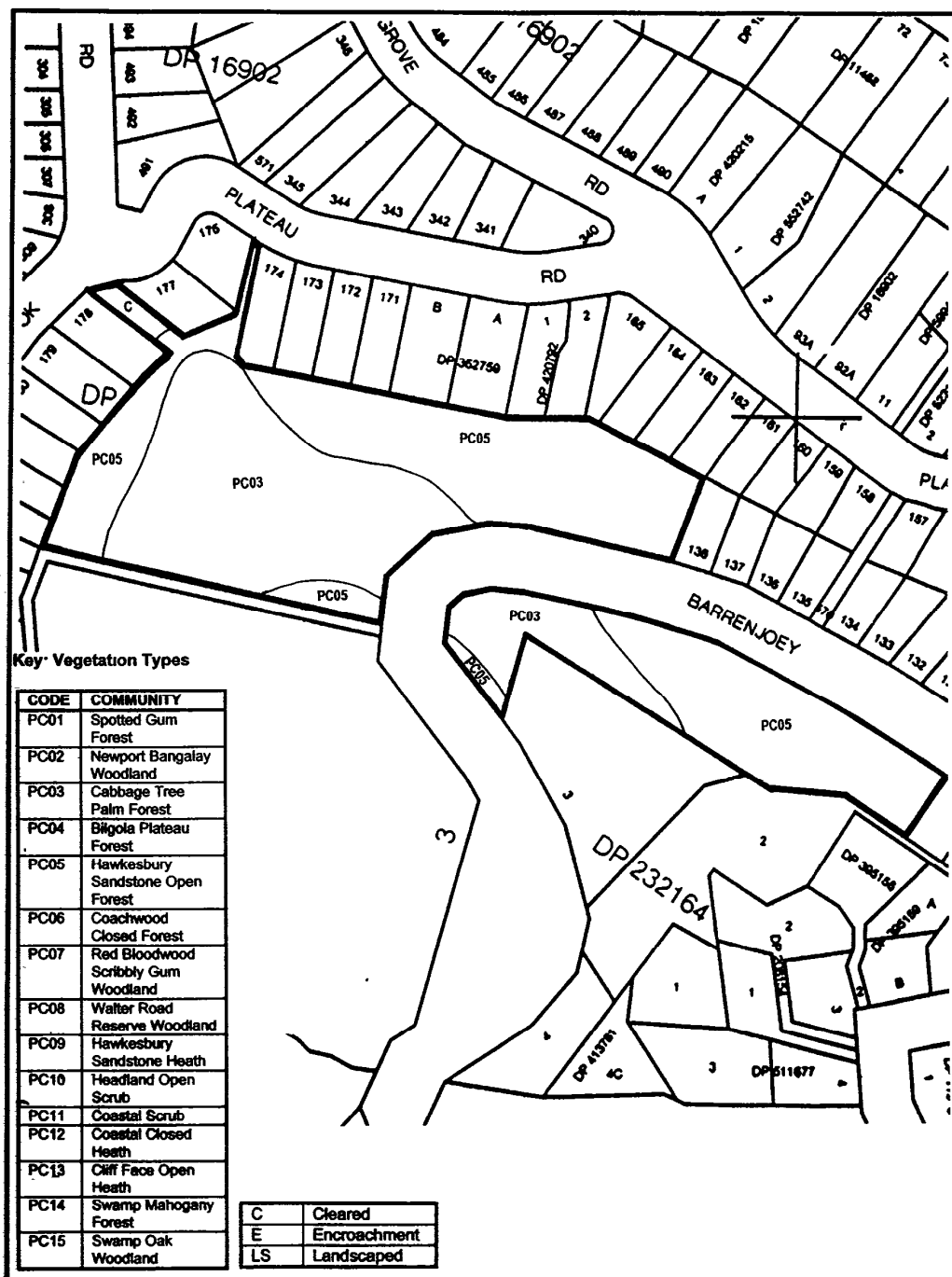
The escarpment and steep slopes make access difficult, yet this does not affect the appreciation of the scenic quality of the Reserve when viewed in the context of the Bilgola Escarpment. An access track is required for management of the Reserve.



4.7 Boundaries and neighbours

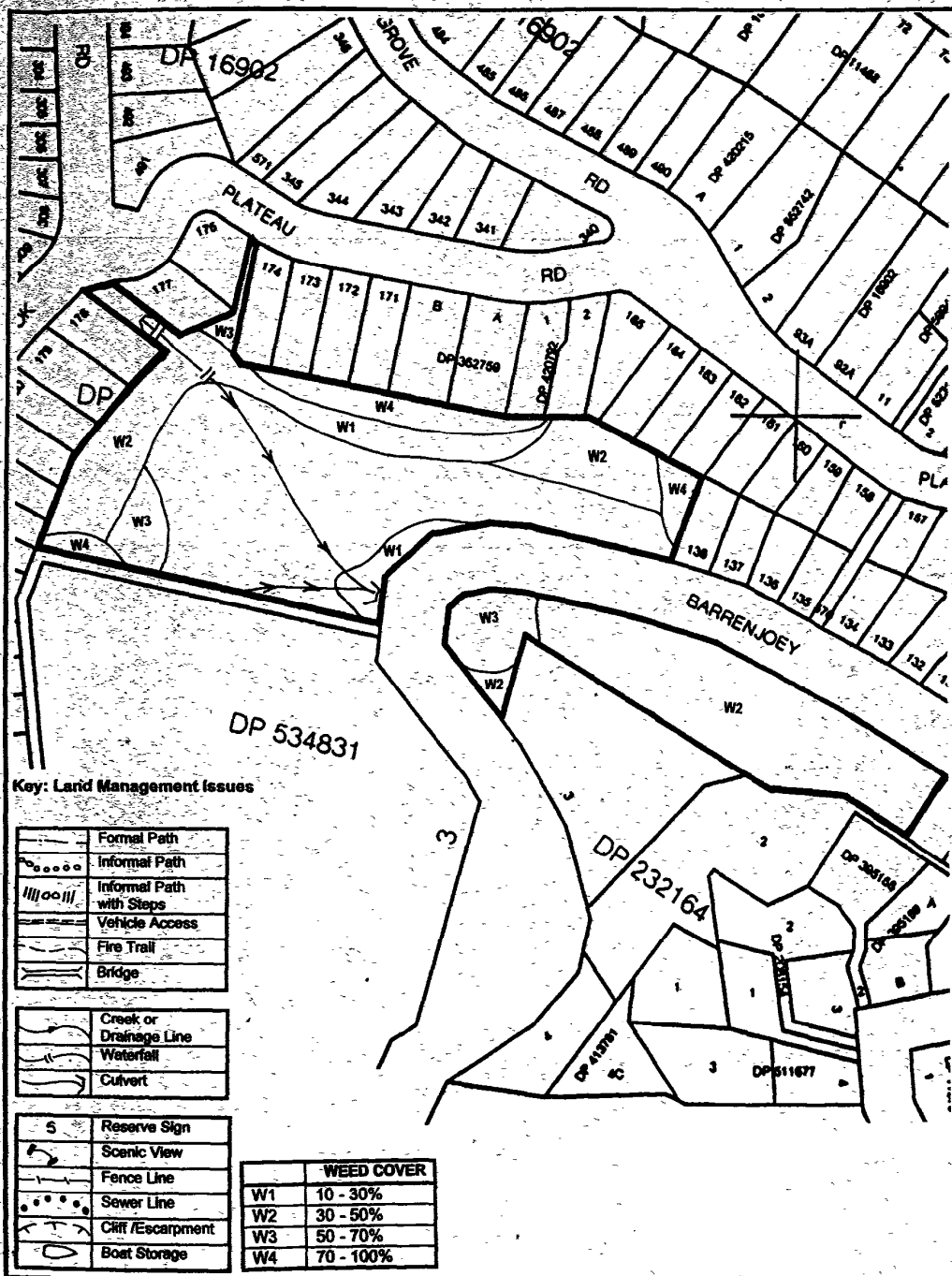
Residents' stormwater outlet pipes discharging directly into the Reserve from multiple point sources degrades the bushland as does vegetation dumped in the Reserve. There is a need for community education on the value of the bushland, its significance and habitat potential. The link between weed infestation and fire hazard to vegetation dumping should be emphasised, as well as the impacts of vegetation dumping on the integrity of the bushland.

5.0 Performance

Management objectives	Performance Targets (Actions)	Responsibility	Completion date	Capital cost	Recurrent Cost	Performance Measures
Weed control & bush regeneration	Continue regeneration program	Natural Resources	Ongoing	NA	\$8000	Bushland actively regenerated
Stormwater Control & drainage	Rock line & plant creek banks	Natural Resources	1998/99	\$2,000		Scour reduced
Management of native fauna & introduced predators	Public awareness campaign re responsible pet ownership Feral animal control	Natural Resources Compliance	As part of a Pittwater wide campaign			Extant fauna populations
Fire management	Maintain safe fuel levels	Fire Control & Natural Resources	Ongoing	NA	Staff time	Life & property protected & biodiversity maintained
Access & walking tracks	Construct access track	Natural Resources	1998/99	\$3,000		Management access
Boundaries & neighbours	Bush friendly campaign	Natural Resources	1998/99	\$200		Improved appreciation of Reserve



Urban Bushland Plan of Management			  Pittwater Council	
Map	Vegetation Communities	Scale: 1:2000		Date: July 1997
Locality Hewitt Park Bilgola Plateau				



Urban Bushland Plan of Management		
Map Weeds Management Issues	Scale: 1:2000	Date: July 1997
Locality: Hewitt Park Bilgola Plateau		

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Pittwater Council

Plateau Park (Newport Heights), Bilgola

Reserve Number 0071

Street Address Via access points between 20 & 22 Bilambee Road. and 132 & 134 Plateau Road.
Bilgola

1.0 Description & Category

1.1 Location and Description

Plateau Park is located on Bilgola Plateau and fronts onto Plateau Road. The Reserve occupies 1.9ha adjacent to Bilgola Plateau Primary School and has accessways to Plateau Road, Bilambee Avenue and Loblay Crescent. An elevated Water Tank defines one of the boundaries, the others are generally unfenced residential properties. The gently sloping Reserve is on the crest of the Plateau at an elevation of almost 150 metres above sea level.

1.2 Land Tenure and Property Description

The Reserve is owned by Council, being described as Lot 4 in DP 221634 and Lot 41 in DP 236420 and an access pathway linked to Bilambee Road. The Reserve has an Easement for Drainage with Sydney Water. The land is zoned 6(a) Open Space - Existing Recreation.

1.3 Category of Land

The Reserve is community land under the Local Government Act 1993. It is categorised partly as a developed park and partly as a natural area which is further categorised as bushland. It meets the definition of urban bushland described in State Environmental Planning Policy No 19 - Bushland in Urban Areas. This plan of management addresses the bushland.

2.0 Natural and Cultural Heritage

2.1 Topography, Geology and Soils

The Reserve lies on the ridgeline of Bilgola Plateau and gently slopes in a north-westerly direction. The parent geology is related to the Hawkesbury Sandstone Formation. The soils derived are characteristic of deeply weathered Hawkesbury Sandstone plateaux and have been mapped as the Somersby soil landscape. The moderately deep red earths on the crest overlie lateritic gravels and clays, and earthy sands occur on the slope.

2.2 Hydrology

The Reserve is at the top of the Refuge Cove and part of the Bilgola Beach catchments. There are no permanent creeklines, however an area of impeded drainage occurs in the upper northern corner of the Reserve.

2.3 Vegetation

The vegetation in Plateau Park has been influenced by the lateritic soils. The vegetation community is Bilgola Plateau Forest dominated by Silvertop Ash (*Eucalyptus sieberi*), Red Bloodwood (*Corymbia gummifera*) and Scribbly Gum (*Eucalyptus haemastoma*).

There is a diverse shrub layer with common species including Cheese Tree (*Glochidion ferrandii*), Elderberry (*Panax* (*Polyscias sambucifolia*)), Myrtle Wattle (*Acacia myrtifolia*), and Mountain Devil (*Lambertia formosa*). Woody Pear (*Xylomelum pyriforme*), uncommon in the Sydney area and Waratah (*Telopea speciosissima*) are also present. Ground layer species include Paroo Lily (*Dianella revoluta*), Kangaroo Grass (*Themeda australis*), Purple Twining-pea (*Hardenbergia violacea*), Bracken Fern (*Pteridium esculentum*), Wiry Panic (*Entolasia stricta*) and *Poa affinis*.

Bilgola Plateau Forest is considered to have local conservation significance being found only this location and on the laterite soils near the Ba'hai Temple at Ingleside. and being conserved at Plateau Reserve within the Pittwater area

2.4 Fauna

The open-forest conserved in Plateau Park would have once covered a much larger area and supported a more diverse fauna community than is now extant. The Reserve contains a range of nectar-rich shrub species eg Mountain devil, not common in nearby Spotted Gum forests. The faunal community is now dominated by larger aggressive species (eg Currawongs, wattlebirds) and those which can stand habitat modification (small skinks). The endangered population of Squirrel Glider may occasionally visit the Reserve as it lies between the known habitat areas of Palmgrove Park and Salt Pan Cove. Council's Habitat and Wildlife Corridor Conservation Strategy maps the Reserve as "Corridor R" which indicates smaller Reserves likely to have very modified habitat or suffering adverse edge effects. These may be enhanced by a planting program or by allowing natural regeneration to re-establish margins.

2.5 Aboriginal and Non-Aboriginal Sites

There are no recorded Aboriginal sites within the Reserve, although there is potential for sites such as axe grinding grooves and engravings to occur in the area. There are no known sites of European Heritage in the Reserve.

3.0 Significance and Objectives

3.1 Statement of Significance

Plateau Park is significant because

- ❖ it protects an example of a plant community of regional conservation significance, namely the Bilgola Plateau Forest community.
- ❖ it protects an example of bushland of Bilgola in a similar condition to that which occurred when the area was first visited by Europeans.

- ❖ it acts as a wildlife refuge and an important link in the wildlife corridor for faunal movement between larger bushland areas,
- ❖ it provides suitable habitat for occasional use by the endangered population of Squirrel Glider.
- ❖ it contributes to the landscape quality of Bilgola and provides a record of the original landscape and the changes wrought by urban development.
- ❖ it is an education resource and a contact point with nature for the adjoining school and local residents. and
- ❖ it allows urban residents to undertake informal recreational pursuits in a bushland setting

3.2 Management Objectives

The management objectives for Plateau Park are

- ❖ to protect the natural features of the Reserve, particularly the significant Bilgola Plateau Forest community and habitat for the endangered population of Squirrel Glider,
- ❖ to maintain the natural range of structural and floristic diversity of bushland in the Reserve, including those rare or uncommon species.
- ❖ to adequately manage the bushland in relation to encroachments, weed invasion and fire management.
- ❖ to protect life and property from wildfire and to maintain ecological processes by seeking to maintain a near-natural fire regime in the Reserve to conserve native flora and fauna in the Reserve.
- ❖ to control introduced animals in the Reserve.
- ❖ to provide opportunities for low impact recreational and educational use of the Reserve consistent with the other objectives, and

- ❖ to encourage community appreciation and neighbourhood participation in bushland management of the Reserve.

4.0 Management Issues

4.1 Weed Invasion & Bush regeneration

Weeds are associated with the many grassed encroachments and vegetation dumping along the margins of the Reserve. The main weeds present are Asparagus Fern, Mornign Glory, Wild Tobacco, Camphor Laurel, Cotoneaster, Lantana, Boston Fern, Palm Grass, Formosa Lily, Watsonia and Jasmine. The northern and eastern borders of the Reserve are most weed affected and should be dealt with in a systematic manner. Work should commence from areas of good bush, slowly working towards the margins. Follow up weeding is required in areas burnt in the Reserve in September 1996.

4.2 Stormwater control and drainage

An artificial drain at a culvert originating from the school, flows through the Reserve to a drain in the northern corner. The drain grate and its path need to be monitored and maintained. The poorly drained area needs to be investigated to establish whether it is naturally occurring, or is present as a result of impacts on the Reserve. A solution may include revegetating the area with wetland plants.

4.3 Fire Regime

Management of the fire regime in the Reserve will be undertaken by the Warringah Pittwater Bush Fire Management Committee in accordance with Circular C10 - Planning for Bush Fire Prone Areas. The Reserve will be regularly monitored for fuel loadings and any hazard reductions required will be undertaken in accordance with the Draft Fuel Management Plan. Ecological considerations will be assessed by Council Environmental Staff to determine methods of hazard reduction, and to co-ordinate follow up if fire is used. The Reserve was most recently burnt in September 1996 and this specific part of the Reserve should not be burnt again for approximately ten years.

4.4 Management of Native Fauna and Introduced Predators

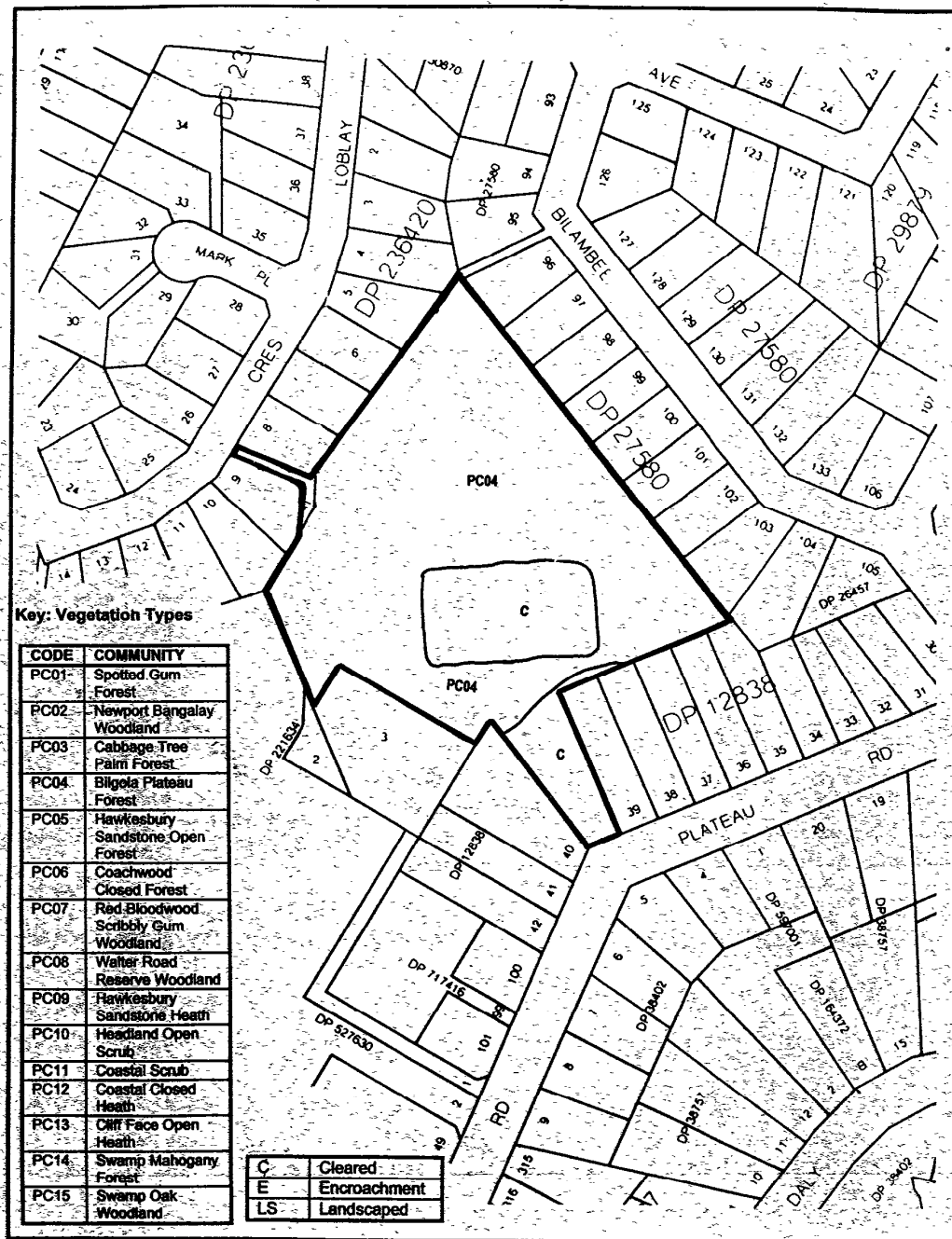
Plateau Park provides good habitat for fauna with a variety of habitat components. The uncommon vegetation community encourages diversity and should be actively regenerated and expanded through planting and reduced mowing. Particular attention should be given to planting species of the Fabaceae indigenous to this community as they attract insects providing a food source for small birds. A Pittwater wide public awareness campaign will address the value of bushland as habitat for fauna and how residents can be responsible neighbours by ensuring that domestic cats and dogs do not roam in the Reserve. Compliance signs can assist this. Feral cat and fox predation is an issue that needs to be addressed through a Pittwater-wide control strategy.

4.6 Access, recreation and environmental education

The main access to the Reserve is from Plateau Road, through the playing area to the rear of the school and a level area surrounded by bush. The bare areas of the main entry need to be revegetated and pedestrian traffic directed along paths. Remnant trees would benefit from island planting with indigenous species. Where mown areas exist along the Reserve margins, these should be minimised by expanding the natural bush in co-operation with neighbours. Opportunities exist for promotion of school based environmental education programs in the Reserve such as "Our Coast" through the Coastal Environment Centre.

5.0 Performance

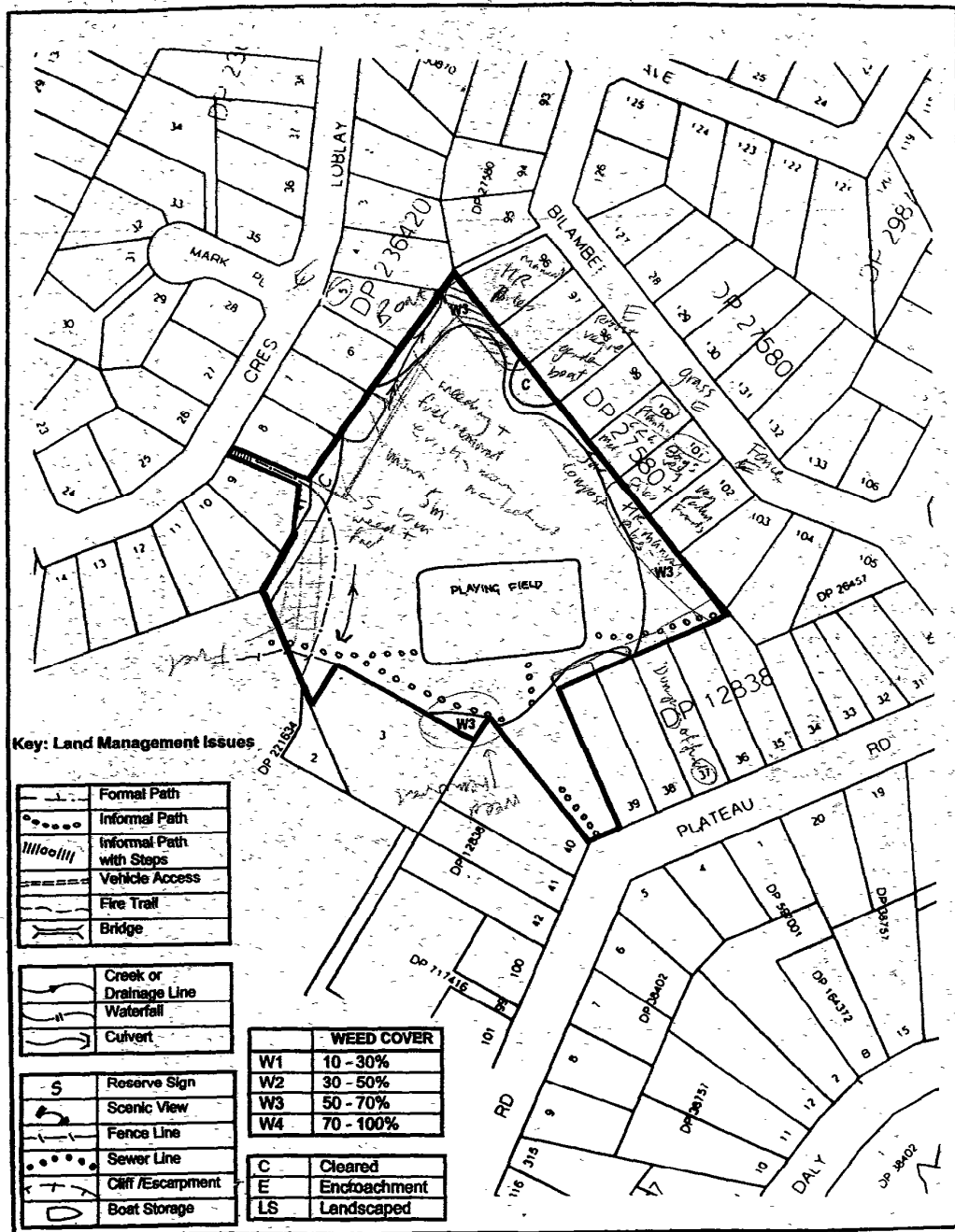
Management objectives	Performance Targets (Actions)	Responsibility	Completion date	Capital cost	Recurrent Cost	Performance Measures
Weed control & bush regeneration	Do letterbox drop for volunteer group	Natural Resources	1998/99 or as community demand		\$1.400 pa	Bushland actively regenerated
Stormwater Control & drainage	Investigate impeded drainage & integrate planting into volunteer work	Natural Resources	1998/99	\$300		Wet area planted with sedges
Management of native fauna & introduced predators	Public awareness campaign re responsible pet ownership Sign Plant additional habitat patches	Natural Resources Compliance	As part of a Pittwater wide campaign	\$1.500		Extant fauna populations
Fire management	Maintain safe fuel levels	Fire Control & Natural Resources	Ongoing	NA	Staff time	Life & property protected & biodiversity maintained
Access, tracks & education	Maintain path Plant entry Promote environmental education in Reserve	Natural Resources Reserves	1998/99	\$2.000		Paths Improved entry School community aware
Boundaries & neighbours	Expand bush with neighbour support	Natural Resources	1998/99	\$5.000		Improved bushland & appreciation of Reserve



Urban Bushland Plan of Management

Map	Vegetation	Scale: 1:2000	Date: July 1997
Locality: Newport Heights Reserve/ Plateau Park Bilgola Plateau			

Pittwater Council



Urban Bushland Plan of Management			 Pittwater Council	
Map	Weeds Management Issues	Scale 1:2000		Date July 1997
Locality Newport Heights Reserve/ Plateau Park Bilgola Plateau				

Lower Plateau Road Reserve, Bilgola

Reserve Number 0927

Street Address Via access points between 284 & 286 and 240 & 242 Lower Plateau Road, Bilgola

1.0 Description & Category

1.1 Location and Description

Lower Plateau Road Reserve is located on Bilgola Plateau overlooking Pittwater. The Reserve is more than 130m above sea level and occupies 0.7 hectares. The Reserve is bounded by residential properties and there are two access handles off Lower Plateau Road.

1.2 Land Tenure and Property Description

The Reserve is owned by Council, being described as Lot 136 in DP 12838. The land is zoned 6(a) Open Space - Existing Recreation A.

1.3 Category of Land

The Reserve is community land under the Local Government Act 1993. It is categorised as a natural area and further categorised as bushland. It meets the definition of urban bushland described in State Environmental Planning Policy No 19 - Bushland in Urban Areas.

2.0 Natural and Cultural Heritage

2.1 Topography, Geology and Soils

Lower Plateau Road Reserve is situated at the end of a spur which slopes towards the north west featuring rock outcrops and benches. The parent geology is Hawkesbury Sandstone which is characterised by medium to coarse grained quartz sandstone with very minor shale and laminate lenses. The soils are shallow coarsely grained earthy sands. Yellow and red podsoils are associated with shale lenses. The soils have been mapped as the Hawkesbury soil landscape.

2.2 Hydrology

Pittwater Council

Lower Plateau Road Reserve contains no permanent watercourses but the natural seepage from rock benches has created damp swales running downslope or areas of impeded drainage on larger benches. Located on a crest there is little or no urban run-off as the Reserve generally sheds water off the slope. The catchment contains Refuge Cove and there are steep slopes below the Reserve.

2.3 Vegetation

The vegetation is Red Bloodwood-Scribbly Gum Woodland dominated by Red Bloodwood (*Corymbia gummifera*), Scribbly Gum (*Eucalyptus haemastoma*) and Smooth-barked Apple (*Angophora costata*). The canopy height reaches 10 to 15 metres.

Common species in the small tree and shrub layer include Black She-oak (*Allocasuarina littoralis*), Tick Bush (*Kunzea ambigua*), Pink Spider Flower (*Grevillea sericea*), *Banksia oblongifolia*, Hair-pin Banksia (*B. spinulosa*), *Calytrix tetragona* and Wedding Bush (*Ricinocarpus pinifolia*). The groundlayer is often composed of damp loving sedges such as Scale-rushes (*Lepyrodis* sp.) and *Juncus* sp., with Kangaroo Grass (*Themeda australis*) and Flannel Flower (*Actinotus helianthi*) in drier areas.

2.4 Fauna

The Reserve provides refuge for locally resident fauna as well as food resources for passing birds. There is a variety of flowering plants including Banksias and extensive rock outcrops. A Boobook Owl was found perching in dense cover in the Reserve during the urban bushland survey. Council's Habitat and Wildlife Corridor Conservation Strategy maps the Reserve as "Corridor R" which indicates smaller Reserves likely to be suffering adverse edge effects. This can be enhanced by a planting program or by allowing natural regeneration.

2.5 Aboriginal and Non-Aboriginal Sites

Page 33

There are no recorded Aboriginal sites within the Reserve, although there is potential for sites such as axe grinding grooves and engravings to occur in the area. There are no known sites of European Heritage in the Reserve.

3.0 Significance and Objectives

3.1 Statement of Significance

Lower Plateau Road Reserve is significant because

- ❖ it provides a small example of urban bushland and a record of the pre-european landscape present in the Bilgola Plateau area
- ❖ it provides visual amenity along the Peninsula Ridgeline and views to Pittwater and the Western foreshores
- ❖ it provides habitat for a diversity of fauna species in the context of urban bushland in the Sydney Region.
- ❖ it provides an corridor link along the Peninsula for the movement of fauna to larger Reserves such as Angophora Reserve
- ❖ it contributes to the landscape quality of Pittwater and the peninsula and provides a record of the original landscape and the changes wrought by urban development.
- ❖ it is an educational resource and a contact point with nature for residents.
- ❖ it allows urban residents to undertake informal recreational pursuits in a bushland setting

3.2 Management Objectives

The management objectives for Lower Plateau Road Reserve are

- ❖ to protect the natural features of the Park, particularly significant plant species, communities and populations of flora and fauna,
- ❖ to maintain a natural range of structural and floristic diversity of bushland within the Park,
- ❖ to adequately manage the bushland/ urban interface in relation to fire management, weed management and stormwater management.
- ❖ to prevent damage to the Park from urban runoff, stormwater and pollution.
- ❖ to protect human life and property in and adjacent to the Park from wildfire and maintain ecological processes in the Park by seeking to maintain a near-natural fire regime in the body of the Park and aim to ensure that no species of plant or animal becomes extinct in the Park as a result of the fire regime.
- ❖ to control and where possible eradicate introduced animals within the Reserve.
- ❖ to provide opportunities for low impact recreational, scientific and educational use of the Reserve.
- ❖ to encourage community and neighbour participation in bushland management

4.0 Management Issues

4.1 Weed Invasion & Bush Regeneration

The upper perimeter of Lower Plateau Road Reserve has medium levels of weed infestation caused by dumping and escape of garden vegetation and direction of domestic stormwater into the Reserve. Weeds include Cassia, Bitou Bush, Mother of Millions, Asparagus Fern, Lantana, Ivy and Fish Bone Fern around the margins and a dense stand of Bamboo in the southern access way.

The damper areas have Whiskey Grass, *Watsonia* and Honey suckle. As the Reserve is located near a hill crest, there is potential for restoration of the Reserve due to the weed free condition of the bushland in the middle and lower areas. This would be possible if the local community joined a volunteer bush regeneration group and ceased current damaging practices. The woody weeds and vines could be removed initially, then with the developing skills of the group, the remaining weeds can be removed.

4.2 Stormwater control and drainage

The stormwater outlets that enter the Reserve need to be removed and replaced with appropriate stormwater treatments.

4.3 Fire Regime

The Lower Plateau Road Reserve has had vegetation dumped and thick weed growth allowed to build up for a number of years without reduction. Management of the fire regime in the Reserve will be undertaken by the Warringah Pittwater Bush Fire Management Committee in accordance with Circular C10 - Planning for Bush Fire Prone Areas. The Reserve will become regularly monitored for fuel loadings and any hazard reductions required will be undertaken in accordance with the Draft Fuel Management Plan. Ecological considerations will be assessed by Council Environmental Staff to determine methods of hazard reduction. The use of any fire in the Reserve will need to be coordinated with a program of bush regeneration to halt the reinfestation of weeds.

4.5 Management of Native Fauna and Introduced Predators

Lower Plateau Road Reserve provides good habitat for fauna with a variety of habitat components (banksias and rock outcrops). A Pittwater wide public awareness campaign will address the value of bushland as habitat for fauna and how residents can be responsible neighbours by ensuring that domestic cats and dogs do not roam in the Reserve. Feral cat and fox predation is an issue that needs to be addressed through a Pittwater-wide control strategy.

4.6 Access, walking tracks and recreation

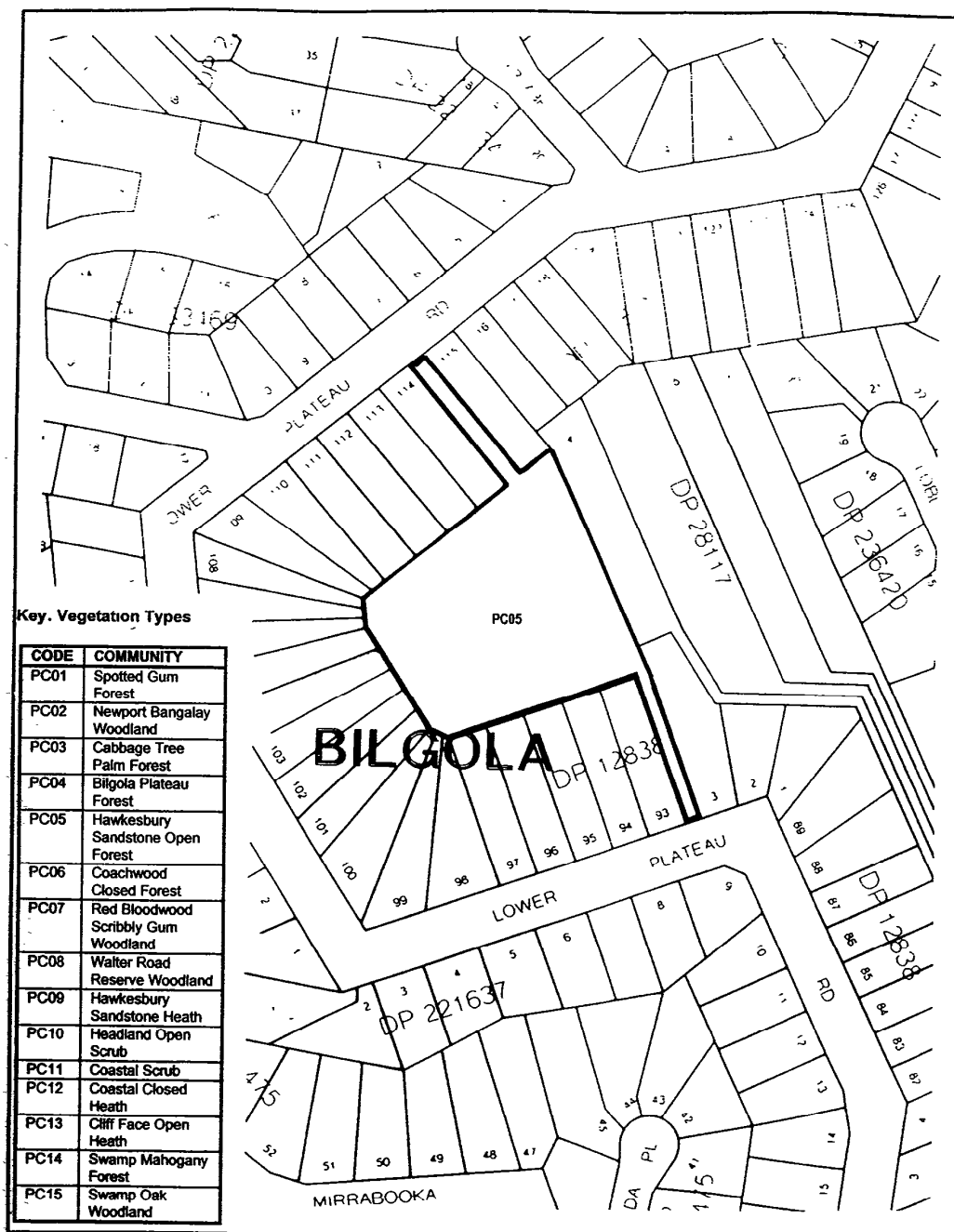
There are no formal tracks in the Reserve due to dense vegetation and steep land form. The residents backing onto the Reserve actively use it for picnics and local recreation and there is potential to formalise this within a total restoration program for the Reserve.



4.7 Boundaries and neighbours

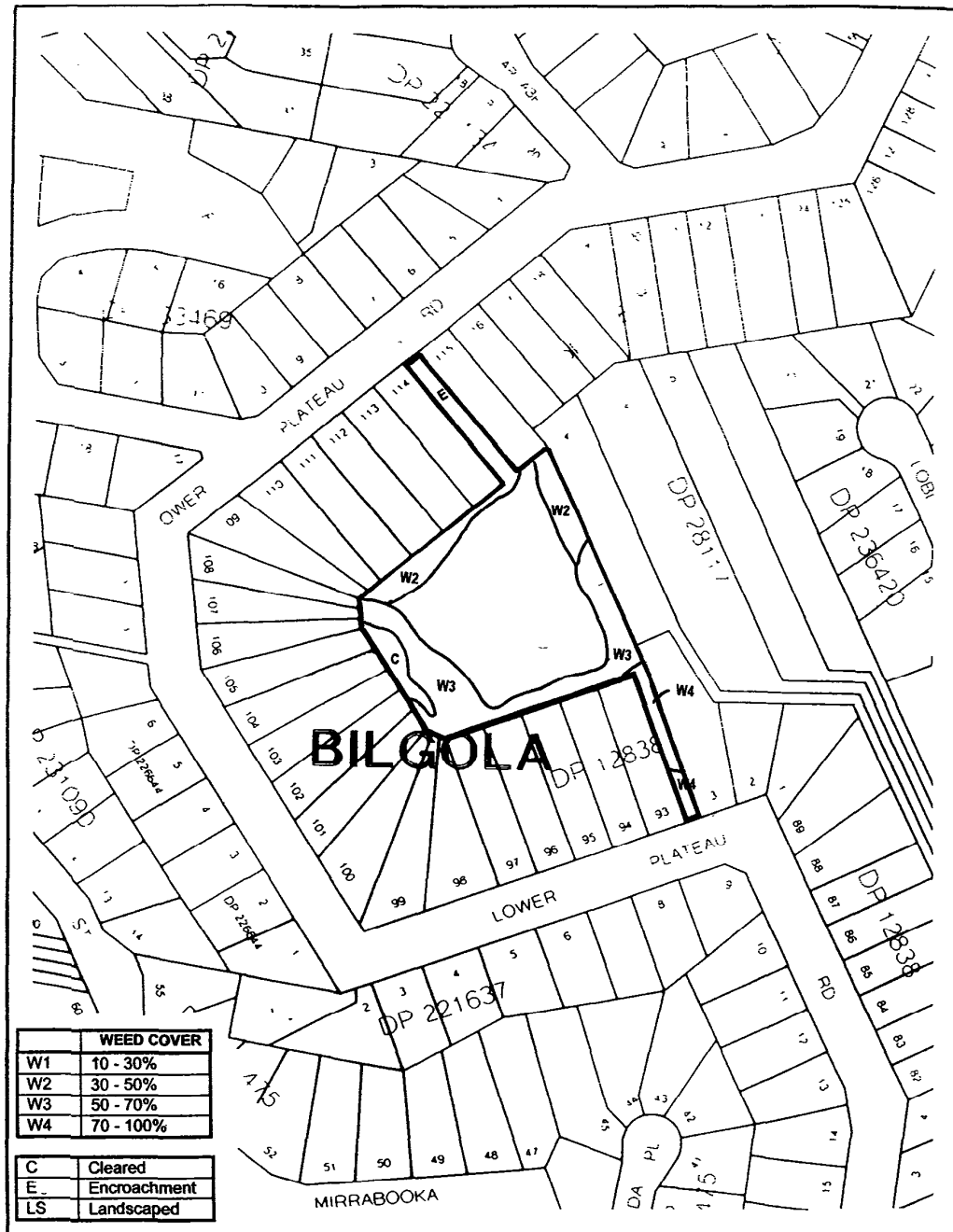
Many residents have used the Reserve for vegetation dumping, clearing for views in the southern corner, or for stormwater disposal. There is a need to educate residents about the bushland as a valued environmental asset and the link between dumping in the bush and resultant weeds and fire fuel.


5.0 Performance

Management objectives	Performance Targets (Actions)	Responsibility	Completion date	Capital cost	Recurrent Cost	Performance Measures
Weed control & bush regeneration	Letterbox drop for volunteer group	Natural Resources	As community demand		\$1,400 pa	Bushland actively regenerated
Stormwater Control & drainage	Remove stormwater outlets in Reserve	Natural Resources	After initial weeding commenced			Weed infestation reduced
Management of native fauna & introduced predators	Public awareness campaign re responsible pet ownership Feral animal control	Natural Resources Compliance	As part of a Pittwater wide campaign			Extant fauna populations
Fire management	Maintain safe fuel levels	Fire Control & Natural Resources	Ongoing	NA	Staff time	Life & property protected & biodiversity maintained
Access & use	Review need for sitting / informal picnic area	Natural Resources	Following start of a Reserve program			Bushland used and enjoyed
Boundaries & neighbours	Bush friendly campaign	Natural Resources	Coordinated with any volunteer activities	\$200		Improved appreciation of Reserve



Urban Bushland Plan of Management			  Pittwater Council
Map Vegetation	Scale 12000	Date July 1997	
Locality Lower Plateau Road Reserve Bigola Plateau			



Urban Bushland Plan of Management			 Pittwater Council
Map Weeds	Scale 12000	Date July 1997	
Locality Lower Plateau Road Reserve Bilgola Plateau			

The Pinnacle Reserve, Bilgola

Reserve Number. 0052

Street Address: Via access points between 4 & 5A The Pinnacle, 71 & 73 and 39 & 43 Palmgrove Road, Bilgola

1.0 Description & Category

1.1 Location and Description

The Pinnacle Reserve is located on Bilgola Plateau overlooking Avalon. It is bounded by residential properties and access is gained from The Pinnacle and Palmgrove Road. The Reserve located on a north-facing slope, occupies 0.61 hectares.

1.2 Land Tenure and Property Description

The Reserve is owned by Council, being described as Lot 568 in DP 16902. The land is zoned 6(a) Open Space - Existing Recreation A.

1.3 Category of Land

The Reserve is community land under the Local Government Act 1993. It is categorised as a natural area and further categorised as bushland. It meets the definition of urban bushland described in State Environmental Planning Policy No 19 - Bushland in Urban Areas.

2.0 Natural and Cultural Heritage

2.1 Topography, Geology and Soils

The Pinnacle Reserve is on a spur extending from Bilgola Plateau in a north-easterly direction. A narrow crest containing extensive rocky outcrops extends as a moderately inclined slope. The parent geology is Hawkesbury Sandstone and derived soils, mapped as the Gynea soil landscape, are shallow to moderately deep yellow earths and earthy sands on the crest grading to gleyed and yellow podsoils on the lower slopes.

2.2 Hydrology

The Reserve which is in an upper portion of the Careel Bay Catchment, is located on a ridgeline and corresponding slope. It has no natural drainage lines.

2.3 Vegetation

The Pinnacle Reserve supports Hawkesbury Sandstone open-forest dominated by Smooth-barked Apple (*Angophora costata*). Tree height ranges from 4 to 5 metres on the crest to 14 metres on the lower slopes. Associated tree species include Black She-oak (*Allocasuarina littoralis*) and Old Man Banksia (*Banksia serrata*) on the crest, and Red Bloodwood (*Corymbia gummifera*) and Blueberry Ash (*Eleocharis reticulatus*) on the slope. The shrub layer includes Prickly Moses (*Acacia ulicifolia*), Muttonwood (*Rapanea variabilis*) and *Oxylobium ilicifolium*. Groundlayer species include Common Bracken (*Pteridium esculentum*), *Lepidosperma* sp., Flannel Flower (*Actinotus helianthi*), Kangaroo Grass (*Themeda australis*), Burrawang (*Macrozamia communis*), Grass Tree (*Xanthorrhoea* sp.), Water Vine (*Cissus hypoglauca*) and Wombat berry (*Eustrephus latifolius*).

2.4 Fauna

Located close to Angophora Reserve, The Pinnacle Reserve provides an important link to and an extension of this larger bushland area and Palmgrove Park. The Reserve provides a variety of habitat features including tree hollows and nectar-rich Banksias which are important requirements for the endangered population of Squirrel Glider in particular. Council's Habitat and Wildlife Corridor Conservation Strategy maps the Reserve as "Corridor - Co1" which indicates corridors or habitat areas though disturbed are likely to be of value due to good crown cover and/or understorey.

2.5 Aboriginal and Non-aboriginal Sites

There are no recorded Aboriginal sites within the Reserve, although there is potential for sites such as axe grinding grooves and engravings to occur in the area. There are no known sites of European Heritage in the Reserve.

- ❖ to encourage community appreciation and neighbourhood participation in bushland management of the Reserve

3.0 Classification, Significance and Objectives

3.1 Statement of Significance

The Pinnacle Reserve is significant because

- ❖ it protects a small example of the bushland of Avalon in a similar condition to that which occurred when the area was first visited by Europeans,
- ❖ it acts as a wildlife habitat and as a stepping stone to aid faunal movement throughout the Peninsula,
- ❖ it is an educational resource and a contact point with nature for residents, and
- ❖ it allows urban residents to undertake informal recreational pursuits in a bushland setting

3.2 Management Objectives

The management objectives for The Pinnacle Reserve are

- ❖ to protect the natural features of the Reserve, and maintain the natural range of structural and floristic diversity of the bushland.
- ❖ to adequately manage the bushland in relation to encroachments, weed invasion and stormwater.
- ❖ to protect life and property from wildfire and to maintain ecological processes by seeking to maintain a near-natural fire regime to conserve native flora and fauna in the Reserve.
- ❖ to control introduced animals in the Reserve,
- ❖ to provide low impact recreational and educational use of the Reserve consistent with the other objectives, and

4.0 Management Issues

4.1 Weed Invasion & Bush regeneration

Near the top of the Reserve, stormwater runoff from the road has created conditions that favour weed infestations in the Reserve. Weeds present include Ginger, Cassia, Honeysuckle, Asparagus Fern, Turkey Rhubarb and Freesias. Although only light infestation occurs along the track, both lower access points are weed infested. There is a dense stand of Bamboo, Lantana and Palm Grass on the eastern arm, and on the west Asparagus Fern, Fishbone Fern and Lantana has invaded. The area near the top of the Reserve should be systematically weeded once stormwater controls are in place. At the entrance, the area of Kikuyu lawn should be reduced and indigenous plants used to create a bushland entrance to the Reserve. The body of the Reserve is relatively weed free, requiring light weeding with more effort along the track. In the lower section of the Reserve, weeding is required near the access points.

4.2 Stormwater Management

At the top of the Reserve, a stormwater solution needs to be implemented. This should include placement of sandstone rocks in the channel and planting of sedges. The necessity for a detention basin needs investigation.

4.3 Fire Regime

Management of the fire regime in the Reserve will be undertaken by the Warringah Pittwater Bush Fire Management Committee in accordance with Circular C10 - Planning for Bush Fire Prone Areas. The Reserve will be regularly monitored for fuel loadings and any hazard reductions required will be undertaken in accordance with the Draft Fuel Management Plan.

Ecological considerations will be assessed by Council Environmental Staff to determine methods of hazard reduction and fire frequency, and to co-ordinate follow up should fire be used.

4.4 Management of Native Fauna and Introduced Predators

The bushland of Pinnacle Reserve is floristically diverse and provides tree hollows and shelter for wildlife. Fringed by residential properties, domestic predators are a constant threat to native fauna. A Pittwater wide public awareness campaign will address the value of bushland as habitat for fauna and how residents can be responsible neighbours by ensuring that domestic cats and dogs do not roam in the Reserve. Compliance and interpretive signs can assist this. Feral cat and fox predation is an issue that needs to be addressed through a Pittwater-wide control strategy.

4.5 Access, Walking Tracks and Recreation

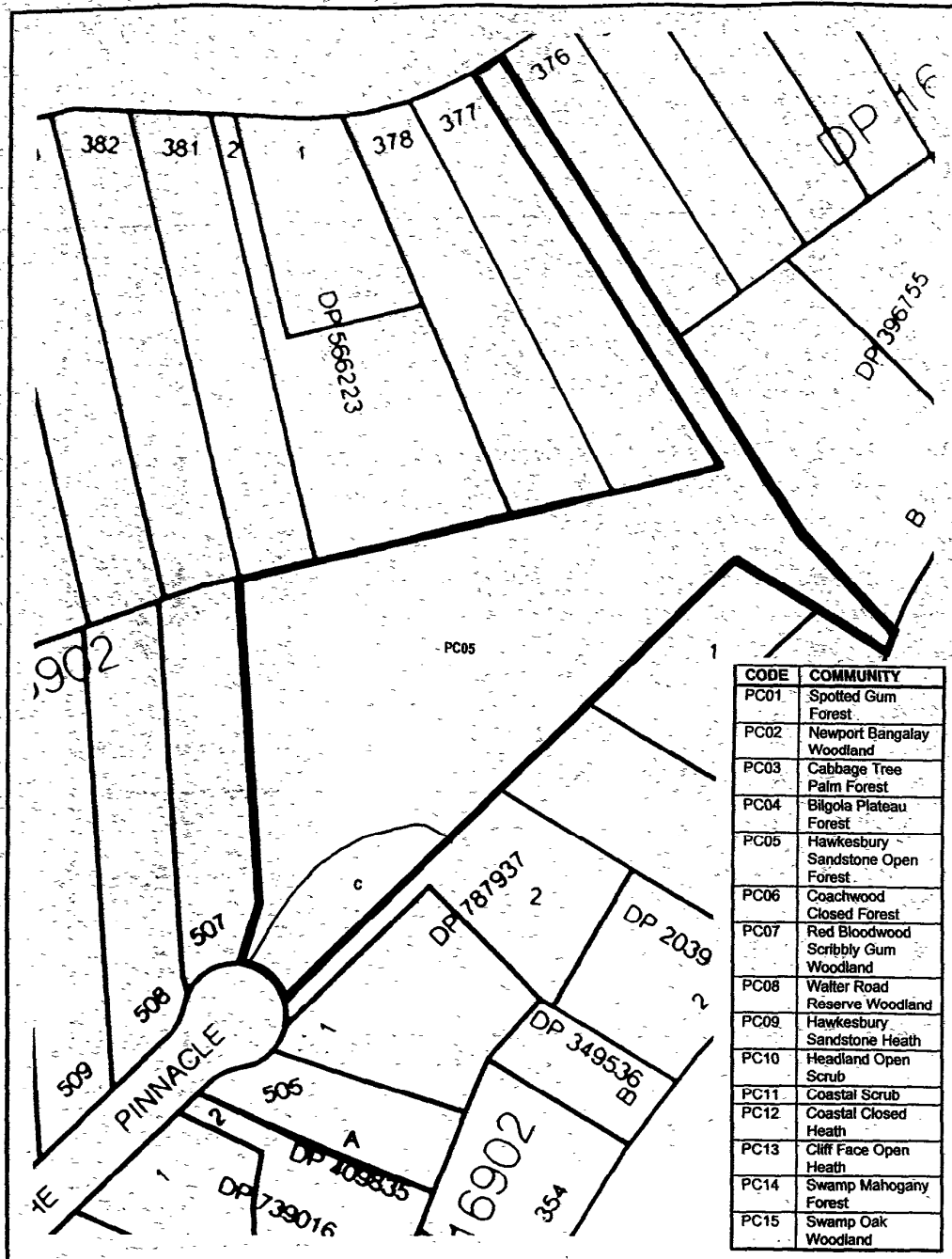
The track linking the Plateau to Avalon valley is regularly used as a thoroughfare. Track upgrade is required and includes step reconstruction and track relining in the lower section. The main entry points are off The Pinnacle and near 39 Palmgrove Road. The other lower access way is overgrown and should be weeded. The Pinnacle Reserve is in close proximity to the other bushland areas, such as Angophora Reserve, allowing bushwalkers to extend their walks from Bilgola Plateau to the Avalon valley.



4.6 Boundaries and Neighbours

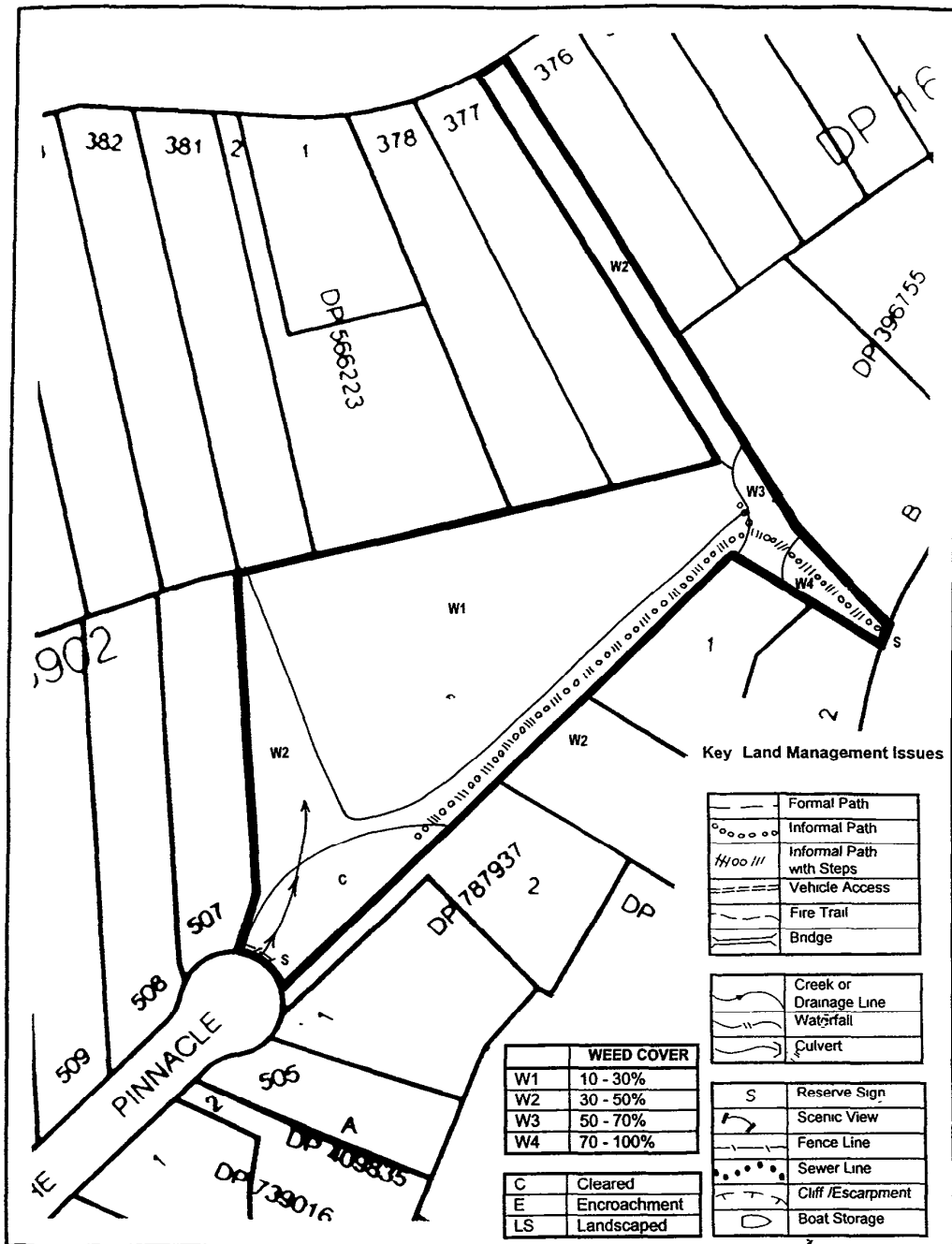
There are no apparent encroachments and some boundaries are fenced.

5.0 Performance

Management objectives	Performance Targets (Actions)	Responsibility	Completion date	Capital cost	Recurrent Cost	Performance Measures
Weed control & bush regeneration	Schedule entrance planting & weeding with track upgrade & stormwater treatment	Natural Resources	1999/2000	\$15 000	\$1 000	Bushland actively regenerated
Stormwater Control & drainage	Stormwater solutions	Natural Resources	1999/2000	Seek detailed designs		Stormwater impacts reduced
Management of native fauna & introduced predators	Public awareness campaign re responsible pet ownership Signs	Natural Resources Compliance	As part of a Pittwater wide campaign	\$1 000		Extant fauna populations
Fire management	Maintain safe fuel levels	Fire Control & Natural Resources	Ongoing	NA	Staff time	Life & property protected & biodiversity maintained
Access & walking tracks	Track upgrade	Natural Resources	1999/2000			Track useable



Urban Bushland Plan of Management			  Pittwater Council
Map	Vegetation	Scale 11000	
Locality		The Pinnacle Reserve Bilgola Plateau	



Kanimbla Reserve, Bilgola

Reserve Number. 0446

Street Address: 25A Kanimbla Crescent, Bilgola

1.0 Description & Category

1.1 Location and Description

Kanimbla Reserve is located on a spur of the Bilgola Plateau escarpment which overlooks Newport. The spearhead shaped Reserve occupies 0.4ha and access is gained from Kanimbla Crescent and Hillside Road.

1.2 Land Tenure and Property Description

The Reserve is owned by Council, being described as Public Reservation in DP 29010 and Lot 62 in DP 9224 (Easement for drainage and pathway). The land is zoned 6(a) Open Space - Existing Recreation.

1.3 Category of Land

The Reserve is community land under the Local Government Act 1993. It is categorised as a natural area and further categorised as bushland and escarpment. It meets the definition of urban bushland described in State Environmental Planning Policy No 19 - Bushland in Urban Areas.

2.0 Natural and Cultural Heritage

2.1 Topography, Geology and Soils

Kanimbla Reserve is on a south-east trending spur in the middle of the escarpment. The Reserve which drops over 30 metres, becomes steeper in the lower portion. The aspect and coastal location exposes the Reserve to the easterly salt-laden winds. Rock outcrops at the top of the Reserve are Hawkesbury Sandstone which is underlain by the Newport Formation shales and sandstones of the Narrabeen Group.

landscape. Lower in the Reserve the soils are deeper with a higher clay content red and brown podsols of the lower slopes, and have been mapped as the Watagan soil landscape. Both soils are highly susceptible to mass movement and considered to an extreme erosion hazard.

2.2 Hydrology

The Reserve is located on a spur, dividing the two catchments that flow into Newport.

2.3 Vegetation

The vegetation of Kanimbla Reserve is mapped as Newport Bangalay Woodland community grading to Coastal Scrub. It is dominated by Coastal Banksia (*Banksia integrifolia*) and Black She-oak (*Allocasuarina littoralis*), and Forest Oak (*Allocasuarina torulosa*) is increasingly dominant lower in the Reserve. There is a general absence of Eucalypts and Angophoras, which may in part be accounted for by the activities of residents lopping mature trees in the neighbourhood. The invasive Sweet Pittosporum (*Pittosporum undulatum*) is dominant throughout the Reserve. The shrub and small tree layer includes gully species such as Mutton Wood (*Rapanea variabilis*), Bastard Rosewood (*Synoum glanulosum*), Lilly Pilly (*Acmena smithii*), Veiny Wilkiea (*Wilkiea huegeliana*) and Cabbage-tree Palm (*Livistona australis*). The groundlayer species includes Burrawang (*Macrozamia communis*), Rough Maidenhair Fern (*Adiantum hispidulum*), Common Maidenhair Fern (*A. aethiopicum*), Rasp Fern (*Doodia aspera*), *Lomandra* sp., Paroo Lily (*Dianella caerulea*), *Poa affinis* and *Entolasia* sp. Vines present include Water Vine (*Cissus hypoglauca*), Kangaroo Grape (*C. antarctica*), Pearl vine (*Scarcopetalum harveyanum*), Devil's Twine (*Cassytha pubescens*) and Gum vine (*Aphanopetalum resinosum*).

2.4 Fauna

The shallow sandy soils of the upper part of the Reserve are mapped as the Hawkesbury soil.

Kanimbla Reserve provides a faunal link between Attunga and the Crown of Newport. The thick vegetative cover though weed infested in parts provides protective cover. There are numerous winter-flowering Coast Banksias which provide a valuable resource for many species, including the endangered population of Squirrel Glider. Council's Habitat and Wildlife Corridor Conservation Strategy maps the Reserve as "Corridor - Co1" which indicates corridors or habitat areas though disturbed are likely to be of value due to good crown cover and / or understorey.

2.5 Aboriginal and Non-Aboriginal Sites

There are no recorded Aboriginal sites within the Reserve, although there is potential for sites such as axe grinding grooves and engravings to occur in the area. There are no known sites of European Heritage in the Reserve.

3.0 Significance and Objectives

3.1 Statement of Significance

Kanimbla Reserve is significant because

- ❖ it contributes to the landscape quality of Newport Beach and provides visual amenity along the Peninsula ridgeline with views to the ocean
- ❖ it provides suitable habitat for fauna species in the context of urban bushland in the Sydney Region, including the endangered population of the Squirrel Glider.
- ❖ it is a significant component of bushland along the escarpment, and acts as a wildlife reservoir and stepping stone to larger bushland areas.
- ❖ it provides a record of the original landscape and the changes wrought by urban development.
- ❖ it is an educational resource and a contact point with nature for residents, and
- ❖ it allows urban residents to undertake informal recreational pursuits in a bushland setting and provides an informal bush track

from the plateau to the beach

3.2 Management Objectives

The management objectives for Kanimbla Reserve are

- ❖ to maintain a natural range of structural and floristic diversity of bushland within the Reserve.
- ❖ to adequately manage the bushland/urban interface in relation to encroachments, weed management and stormwater management.
- ❖ to protect human life and property in and adjacent to the Reserve from wildfire and maintain ecological processes in the Reserve by seeking to maintain a near-natural fire regime in the body of the Reserve,
- ❖ to control introduced animals within the Reserve.
- ❖ to provide opportunities for low impact recreational and educational use of the Reserve. and
- ❖ to encourage community and neighbour participation in bushland management

4.0 Management Issues

4.1 Weed Invasion & Bush regeneration

The narrow shape of Kanimbla Reserve allows ready invasion by weeds and garden escapes. Vegetation dumping particularly near the upper slope boundaries has exacerbated this. Additionally, the previous septic systems of unserviced suburban development and increased run-off have increased the nutrient load and altered the water regime, providing favorable conditions for weeds. Small and Large-leafed Privet, Lantana, Ochna and Camphor Laurel are common, and Morning Glory and Honeysuckle are also present. Asparagus Fern heavily dominates the ground layer and the opportunistic Sweet Pittosporum is dominant throughout the Reserve.

Sweet Pittosporum needs to be controlled in conjunction with weeding in the groundlayer. The resultant additional light combined with burning of weed piles may favour eucalypt

germination The dense cover of weeds throughout the Reserve, particularly Asparagus Fern in the groundlayer, has been penetrated by the recent construction of a bush track as part of a system of walking tracks in Newport. A local volunteer group is currently focussing work along this track and should be continued.

Vegetation dumped and clearing to improve views have significantly impacted on the bushland integrity of the Reserve.

4.2 Fire Regime

Management of the fire regime in Kanimbla Reserve will be undertaken by the Warringah Pittwater Bush Fire Management Committee in accordance with Circular C10 - Planning for Bush Fire Prone Areas. The Reserve will be regularly monitored for fuel loadings and any hazard reductions required will be undertaken in accordance with the Draft Fuel Management Plan. Ecological considerations will be assessed by Council Environmental Staff to determine methods of hazard reduction, and co-ordinate follow up if fire is used.

4.3 Management of Native Fauna and Introduced Predators

Kanimbla Reserve provides good habitat for fauna with a variety of habitat components. The winter flowering Coast Banksia and rainforest plants encourage diversity and year-round food availability. A Pittwater wide public awareness campaign will address the value of bushland as habitat for fauna and how residents can be responsible neighbours by ensuring that domestic cats and dogs do not roam in the Reserve. Compliance signs can assist this. Feral cat and fox predation is an issue that needs to be addressed through a Pittwater-wide control strategy.

4.4 Access, walking tracks and recreation

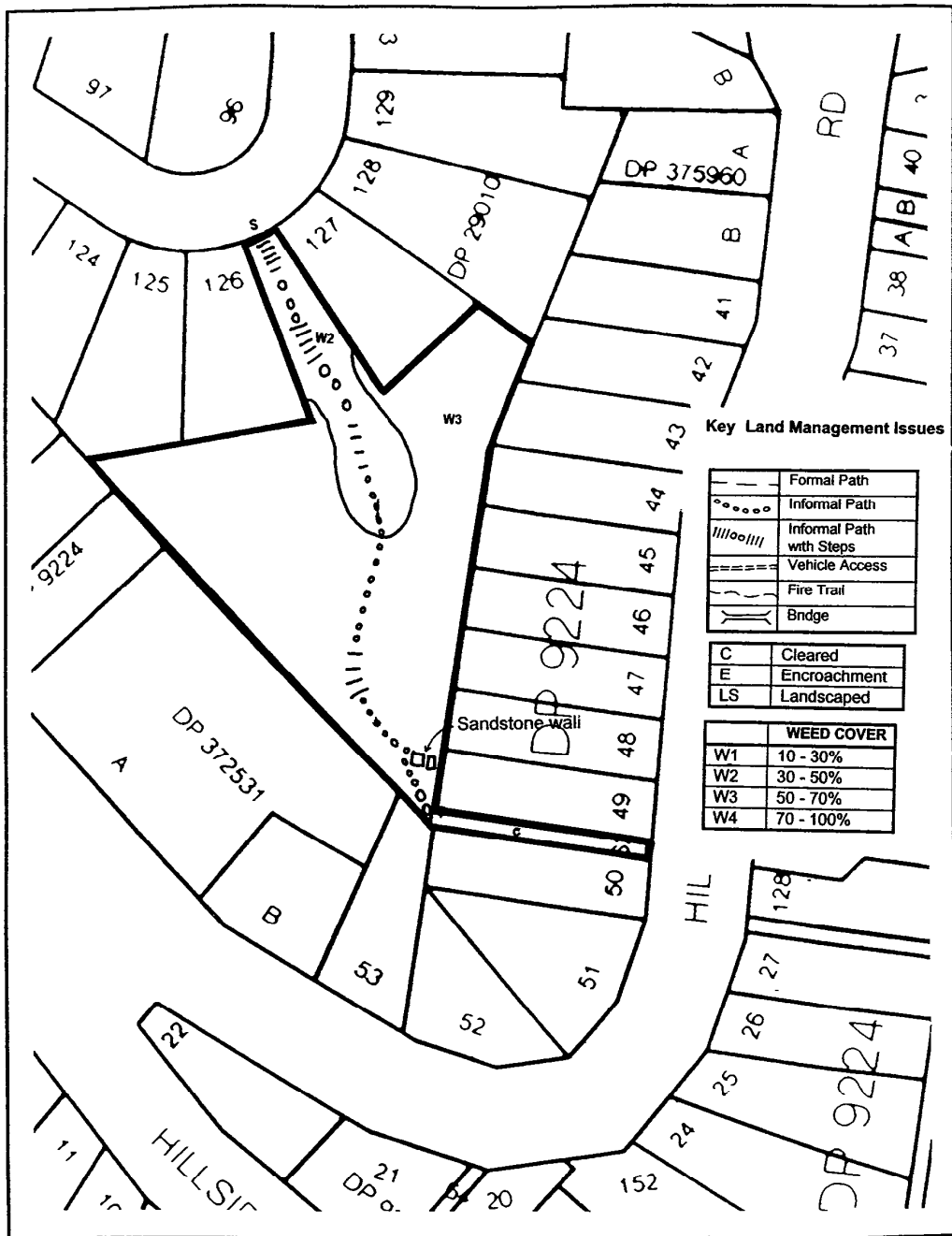
Access to the Reserve is either from the top at Kanimbla Crescent where it is sign posted, or from Hillslope Road. The walking track has recently been upgraded as part of a system of tracks in Newport, to encourage the community to use the Reserve not only for access from the plateau to the beach but also as a bush retreat. The funding was as part of a Catchment



Management Enhancement grant secured by Newport Bushlink, a local community group.

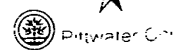
4.5 Boundaries and neighbours

5.0 Performance

Management objectives	Performance Targets (Actions)	Responsibility	Completion date	Capital cost	Recurrent Cost	Performance Measures
Weed control & bush regeneration	Support volunteer group's grant activities	Natural Resources	Ongoing	\$1,000	\$400	Bushland actively regenerated
Management of native fauna & introduced predators	Public awareness campaign re responsible pet ownership Feral animal control	Natural Resources	As part of a Pittwater wide campaign	\$500		Extant fauna populations
Fire management	Maintain safe fuel levels	Fire Control & Natural Resources	Ongoing	NA	Staff time	Life & property protected & biodiversity maintained
Access & walking tracks	Maintain track	Natural Resources	Ongoing			Track useable
Boundaries & neighbours	Bush friendly campaign	Natural Resources	1998/99	\$200		Improved appreciation of Reserve



Urban Bushland Plan of Management			  Pittwater Council	
Map	Weeds Management Issues	Scale 11000		Date JULY:997
Locality Kanimbla Reserve Bilgola Plateau				



Bilgola Fauna Species List

Key R=resident F=frequent visitor W=winter migrant
O=occasional or uncommon visitor S=summer migrant
Bold Italic = Threatened Species
C - confirmed from reserve

Common name	Scientific name	Status
Birds		
Feral Pigeon	Columba livia	R
Spotted Turtle-dove	Streptopelia chinensis	R
Sulphur-crested Cockatoo	Cacatua galerita	F
Galah	Cacatua roseicapilla	F
Australian King-Parrot	Alisterus scapularis	F
Crimson Rosella	Platycercus elegans	F
Eastern Rosella C	Platycercus eximius	F
Musk Lorikeet	Glosopsitta concinna	O
Little Lorikeet	Glosopsitta pusilla	O
Scaly-breasted Lorikeet	Trichoglossus chlorolepidotus	O
Rainbow Lorikeet	Trichoglossus haematodus	F
Common Koel C	Eudynamys scolopacea	S
Southern Boobook	Ninox novaeseelandiae	R
Tawny Frogmouth	Podargus strigoides	R
Kookaburra	Dacelo novaeguinea	R
Sacred Kingfisher	Halcyon sancta	S
Dollarbird	Eurystomus orientalis	S
Black-faced Cuckoo-shrike	Coracina novaehollandiae	R
Red-whiskered Bulbul	Pycnonotus jocosus	R
Superb Fairy-wren	Malurus cyaneus	O
Brown Thornbill	Acanthiza pusilla	R
Eastern Spinebill	Acanthorhynchus tenuirostris	R
Red Wattlebird	Anthochaera carunculatus	R
Little Wattlebird C	Anthochaera chrysoptera	R
Yellow-faced Honeyeater	Lichenostomus chrysops	W
Noisy Miner	Manorina melanocephala	R
White-naped Honeyeater	Melithreptus lunatus	W
Noisy Friarbird	Philemon corniculatus	R
White-cheeked Honeyeater	Phylidonyris nigra	R
New Holland Honeyeater	Phylidonyris novaehollandiae	R
Spotted Pardalote	Pardalotus punctatus	O
Silvereye	Zosterops lateralis	R
Red-browed Finch	Emblema temporalis	O
Common Mynah C	Acridotheres tristis	R
Australian Magpie Lark	Grallina cyanoleuca	R
Grey Butcherbird	Cracticus torquatus	R
Australian Magpie	Gymnorhina tibicen	R
Pied Currawong C	Strepera graculina	R
Australian Raven	Corvus coronoides	R
Mammals		
Sugar Glider	Petaurus breviceps	R
<i>Squirrel Glider</i>	<i>Petaurus norfolcensis</i>	O
Common Ringtail Possum	Pseudocheirus peregrinus	R

Urban Bushland Inventory and Action Plan – Fauna Species List, Bilgola

Common Brushtail Possum	Trichosurus vulpecula	R
Koala	Phascolarctos cinereus	O
Long-nosed Bandicoot	Perameles nasuta	R
Grey-headed Flying-fox	Pteropus poliocephalus	O
Gould's Wattled Bat	Chalinolobus gouldii	F
Reptiles		
Blind Snake	Ramphotyphlops nigrescens	R
Yellow-faced Whip Snake	Demansia psammophis	R
Leaf-tailed Gecko	Phyllurus platurus	R
Eastern Water Skink	Eulamprus quoyii	R
Striped Skink	Ctenotus robustus	R
Copper-tailed Skink	Ctenotus taeniolatus	R
Grass Skink C	Lampropholis delicata	R
Garden Skink	Lampropholis guichenoti	R
Three-toed Skink	Saiphos equalis	R
Weasel Skink	Saproscincus mustelina	R
Blue-tongued Lizard	Tiliqua scincoides	R

Hilltop Road Reserve, Clareville

Reserve Number. 0486

Street Address. 2 Mia Place, Clareville

1.0 Category & Description

1.1 Location and Description

Hilltop Road Reserve is located upper to mid slope on a north facing gully overlooking Pittwater, directly above Clareville Beach. It is bounded by residential properties on Hilltop Road, Hudson Parade, Wandeen Road and Wandeen Place. The Reserve occupies 0.38 hectares and is close to Angophora Reserve.

1.2 Land Tenure and Property Description

The Reserve is owned by Council, being described as Lot 9 in DP 260241. The land is zoned 6(a) Open Space - Existing Recreation A.

1.3 Category of Land

The Reserve is community land under the Local Government Act 1993. It is categorised as a natural area and further categorised as bushland and watercourse. It meets the definition of urban bushland described in State Environmental Planning Policy No 19 - Bushland in Urban Areas.

2.0 Natural and Cultural Heritage

2.1 Topography, Geology and Soils

Hilltop Road Reserve is on a steep slope in a gully with exposed rock benches. The parent geology of the upper slopes is Hawkesbury sandstone characterised by medium to coarse grained quartz sandstone with very minor shale and laminate lenses, which have given rise to the shallow, porous sandy soils of the Hawkesbury soil landscape. The geology in the lower part of the Reserve is shale and sandstone of the Newport Formation in the Narrabeen Group. The soils have a higher clay content and have been mapped as the Watagan soil landscape.

2.2 Hydrology

A small intermittent creekline runs through the Reserve as part of the Clareville Beach catchment and seepage occurs on rock outcrops.

2.3 Vegetation

Hilltop Road Reserve has an exposed western aspect. The vegetation is Spotted Gum Forest at the top of the Reserve and Hawkesbury Sandstone Open-forest at the top of the Reserve and Spotted Gum Forest on the lower slopes. The dominant tree species are Spotted Gum (*Corymbia maculata*), Grey Gum (*Eucalyptus punctata*) and Smooth-barked Apple (*Angophora costata*). The small tree and shrub layer includes Forest Oak (*Allocasuarina torulosa*), Black She-oak (*A. littoralis*), Mutton Wood (*Rapanea variabilis*), Handsome Flat-Pea (*Platylobium formosum*) and Breynia (*Breynia oblongifolia*). Blueberry Ash (*Elaeocarpus reticulatis*) and Cheese Tree (*Glochidion ferdinandii*) occur along the creekline. Groundlayer and vine species include Tongue Orchid (*Dendrobium linguiforme* var. *linguiforme*), Lilac Lily (*Schelhammerya undulata*), Water Vine (*Cissus hypoglauca*), *Glycine* sp and Scrambling Lily (*Geitonopliesium cymosum*).

2.4 Fauna

Like other small bushland areas, Hilltop Road Reserve is an important link for the movement of fauna to larger reserves such as Angophora Reserve. This Reserve has a variety of habitat components such as hollow bearing trees, species that are pollen and nectar producing, rock outcrops and creeklines. The Glossy Black Cockatoo, Greater Broad-nosed Bat and Squirrel Glider are likely visitors. Council's Habitat and Wildlife Corridor Conservation Strategy maps the Reserve as "Corridor - Co1" which indicates corridors or habitat areas though disturbed are likely to be of value due to good crown cover and / or understorey.

2.5 Aboriginal and Non-Aboriginal Sites

There are no recorded Aboriginal sites within the Reserve. There is potential for sites such as axe grinding grooves and engravings to occur as other sites in the area such as those in Angophora Reserve have been recorded in the National Parks and Wildlife Service's site register. There are no known sites of European Heritage in the Reserve.

3.0 Significance and Objectives

3.1 Statement of Significance

Hilltop Road Reserve is significant because

- ❖ it contributes to the landscape quality of Pittwater's eastern foreshores and has extensive views of Pittwater,
- ❖ it protects an example of the bushland along the ridgeline of Bilgola Plateau with a westerly aspect, providing a record of the original landscape and the changes wrought by urban development.
- ❖ it acts as a local refuge for fauna and is a stepping stone between larger areas of habitat due to its proximity between Angophora Reserve and the foreshore. and
- ❖ it allows urban residents to undertake walking and scenic viewing in an enclosed bushland setting

3.2 Management Objectives

The management objectives for Hilltop Road Reserve are

- ❖ to protect the natural, cultural and landscape features of the Reserve,
- ❖ to maintain a natural range of structural and floristic diversity of bushland.
- ❖ to maintain a habitat and corridor values for native fauna.
- ❖ to adequately manage the bushland in relation to encroachments and weed invasion,

- ❖ to utilise fire to maintain the diversity of native plants in the Reserve to conserve native flora and fauna.
- ❖ to control introduced animals in the Reserve.
- ❖ to provide opportunities for low impact recreational and educational use of the Reserve consistent with the other objectives, and
- ❖ to encourage community appreciation and neighbourhood participation in bushland management of the Reserve

4.0 Management Issues

4.1 Weed Invasion & Bush Regeneration

Embankments created during building and engineering works, urban runoff and vegetation dumping by residents have created conditions favouring weed invasion. The creekline has a high cover of Lantana, Crofton Weed, Wandering Jew and Cobblers' Pegs, and there is evidence of eucalypt dieback. The drier areas are almost weed free, although Ochna and Passion Fruit are present on the northern slope. Adjoining the Reserve is Lot 5 which is controlled by a Utility. Before any weeding occurs in the Reserve, weeding of Lot 5 needs to be undertaken by the Utility that controls land. Weeding should then commence in the Reserve with a professional bush regenerators undertaking weeding and revegetation. A community initiative could be then introduced to regenerate the bush in the sparsely weed covered northern slope. This activity could later extend into the other area, once stabilised, with an informed community group guided by a trained Bush regenerator.

4.2 Stormwater management

The increase in the water has impacted on the bushland in Hilltop Road Reserve. Numerous outlets and overflow points, which include overflow from the Wandeen Place gutter and stormwater pipes from Wandeen and Hilltop roads, discharge into the creekline.

Further investigation of the drainage lines is necessary as current assessment is made difficult by dense weed cover.

4.3 Fire Regime

Management of the fire regime in the Reserve will be undertaken by the Warringah Pittwater Bush Fire Management Committee in accordance with Circular C10 - Planning for Bush Fire Prone Areas. The Reserve will be regularly monitored for fuel loadings and any hazard reductions required will be undertaken in accordance with the Draft Fuel Management Plan. Ecological considerations will be assessed by Council Environmental Staff to determine methods of hazard reduction and co-ordinate bush regeneration works following fire.

4.4 Management of Native Fauna and Introduced Predators

Hilltop Road Reserve provides good habitat for fauna with a variety of habitat components. The dense vegetative cover though often weed, provides good habitat and protection from introduced predators, and any clearing should take this into account. A Pittwater wide public awareness campaign will address the value of bushland as habitat for fauna and how residents can be responsible neighbours by ensuring that domestic cats and dogs do not roam in the Reserve. Feral cat and fox predation is an issue that needs to be addressed through a Pittwater-wide control strategy.

4.5 Access, walking tracks and recreation

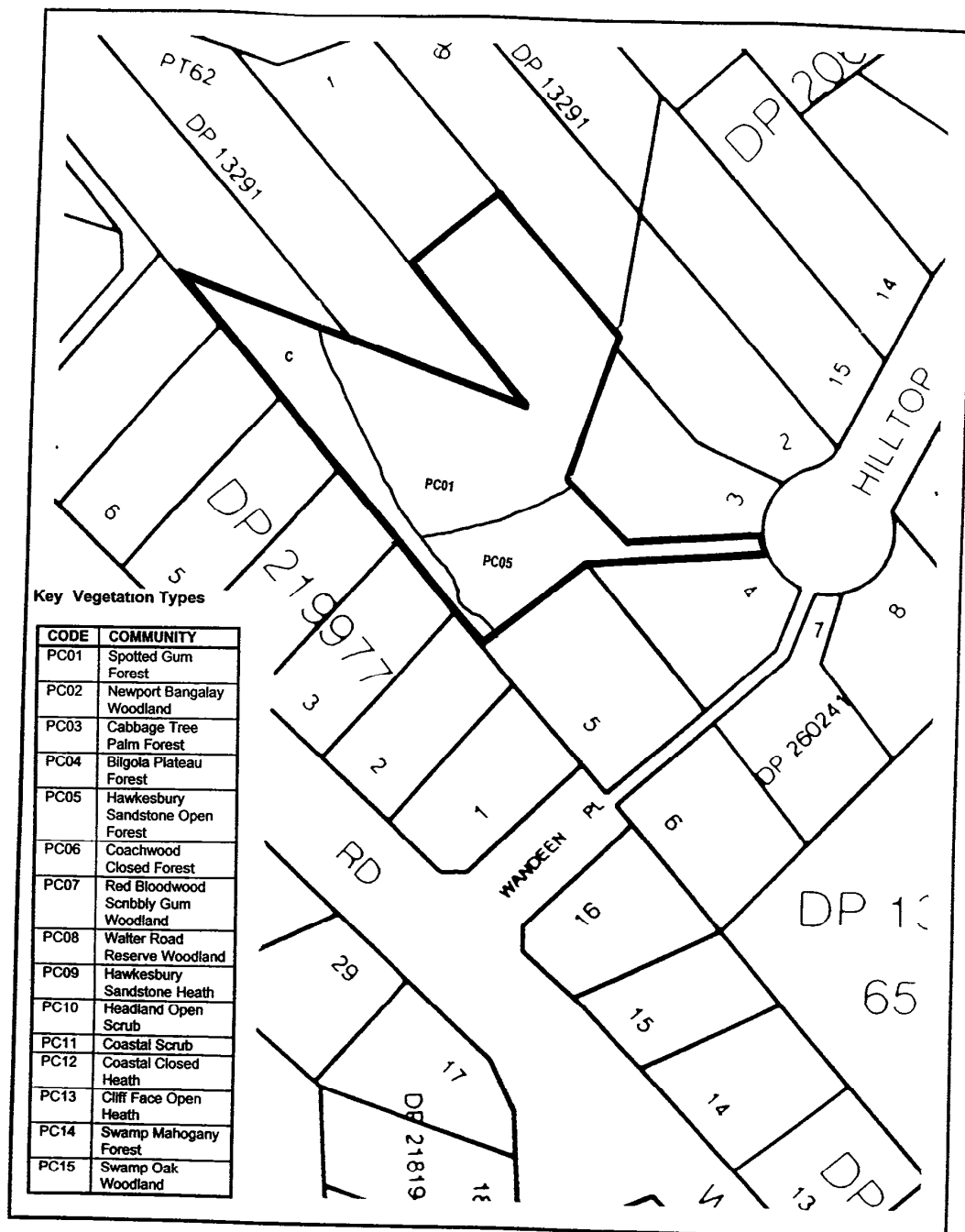
The Reserve has concrete steps built along an access handle from Hilltop Road, however due to the steepness of the landform, there is no access into the Reserve.


4.6 Boundaries and neighbours

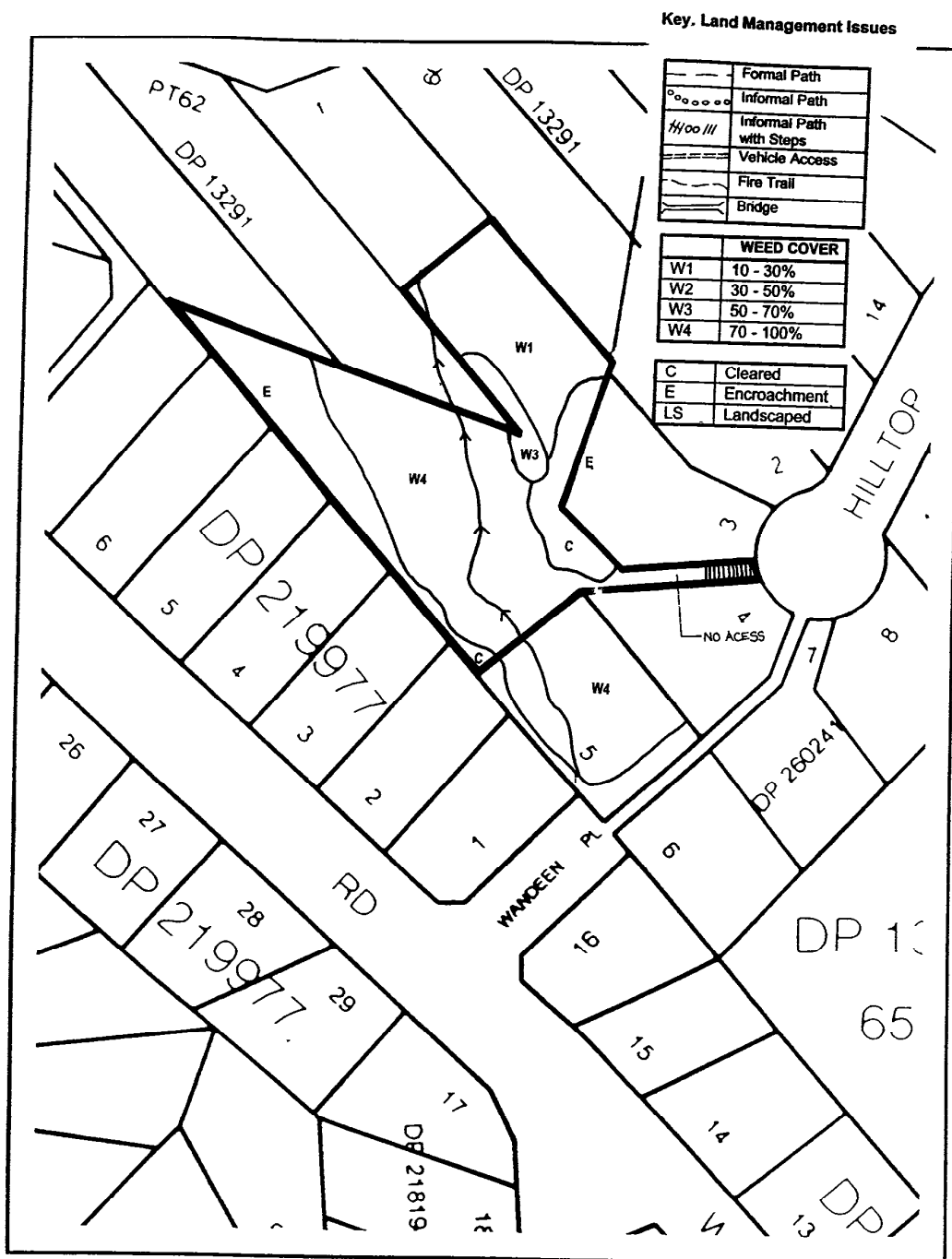
There is a cleared, mown area behind the residential properties along Wandeen Road that acts as a buffer to the dense weed cover. There is a need to distribute "bush friendly" brochures about the problems for the Reserve associated with domestic animals, dumped garden clippings and stormwater piped into the Reserve.



5.0 Performance

Management objectives	Performance Targets (Actions)	Responsibility	Completion date	Capital cost	Recurrent Cost	Performance Measures
Weed control & bush regeneration	Contact utility authority Commence contract regeneration Letterbox drop neighbours	Natural Resources	1999/2000	Seek quotes following Lot 5 works	\$1,400 for volunteer group	Bushland actively regenerated
Stormwater Control & drainage	Investigate storm water impacts	Natural Resources	Following creek line weeding	Seek detailed costs		Any impacts rectified
Management of native fauna & introduced predators	Public awareness campaign re responsible pet ownership Feral animal control	Natural Resources Compliance	As part of a Pittwater wide campaign			Extant fauna populations
Fire management	Maintain safe fuel levels	Fire Control & Natural Resources	Ongoing	NA	Staff time	Life & property protected & biodiversity maintained
Boundaries & neighbours	Bush friendly campaign	Natural Resources		\$200		Reduced dumping of garden refuse



Urban Bushland Plan of Management			
Map Vegetation	Scale 11000	Date JULY1997	 Pittwater Council
Locality Hilltop Road Reserve Clareville			



Urban Bushland Plan of Management			 N  Pittwater Council
Map Weeds Management Issues	Scale 11000	Date JULY 1997	
Locality Hilltop Road Reserve Clareville			

Clareville/Taylors Point Fauna Species List

Key

Record

APM - Angophora Reserve Plan of management, SPM - Stapleton Park Plan of management | L - likely to occur. HSS - Household Species Survey. UBS - Urban Bushland Survey Summer

Status

R=resident F=frequent visitor W=winter migrant

O-occasional or uncommon visitor S=summer migrant

Bold = regionally significant species **Bold Italic** = Schedule 12 species

• - introduced species

•

Common Name	Scientific name	Record	Status
Birds			
Spotted Turtle-dove *	Streptopelia chinensis	UBS	R
Topknot Pigeon	Lopholaimus antarcticus	L	O
Brown Cuckoo-Dove	Macropygia amboinensis	L	O
Sulphur-crested Cockatoo	Cacatua galerita	SPM	F
Little Corella	Cacatua sanguinea	UBS	R
Galah	Cacatua roseicapilla	UBS	R
Australian King-Parrot	Alisterus scapularis	UBS	F
Crimson Rosella	Platycercus elegans	SPM	F
Eastern Rosella	Platycercus eximius	APM	O
Little Lorikeet	Glosopsitta pusilla	L	O
Scaly-breasted Lorikeet	Trichoglossus chlorolepidotus	APM	O
Rainbow Lorikeet	Trichoglossus haematodus	APM	F
Common Koel	Eudynamys scolopacea	APM	S
Channel-billed Cuckoo	Scythrops novaehollandiae	L	S
Southern Boobook	Ninox novaeseelandiae	APM	R
Powerful Owl	Ninox strenua	L	O
Tawny Frogmouth	Podargus strigoides	L	R
Spine-tailed Swift	Hirundapus caudacutus	UBS	S
Kookaburra	Dacelo novaeguinea	SPM	R
Sacred Kingfisher	Halcyon sancta	L	S
Dollarbird	Eurystomus orientalis	UBS	S
Black-faced Cuckoo-shrike	Coracina novaehollandiae	SPM	R
Golden Whistler	Pachycephala pectoralis	SPM	R
Black-faced Monarch	Monarcha melanopsis	L	S
Grey Fantail	Rhipidura fuliginosa	SPM	R
Rufous Fantail	Rhipidura rufifrons	L	S
Eastern Whipbird	Psophodes olivaceus	APM	R
Superb Fairy-wren	Malurus cyaneus	UBS	F
Variegated Wren	Malurus lamberti lamberti	APM	F
White-browed Scrubwren	Sericornis frontalis	SPM	R
White-throated Warbler	Gerygone olivacea	L	S
Brown Thornbill	Acanthiza pusilla	UBS	R
Eastern Spinebill	Acanthorhynchus tenuirostris	UBS	F
Red Wattlebird	Anthochaera carunculatus	SPM	F
Little Wattlebird	Anthochaera chrysoptera	SPM	R
Yellow-faced Honeyeater	Lichenostomus chrysops	SPM	W
Noisy Miner	Manorina melanocephala	APM	R
White-naped Honeyeater	Melithreptus lunatus	APM	W
Noisy Friarbird	Philemon corniculatus	APM	R

Urban Bushland Inventory and Action Plan – Fauna Species List, Clareville/Tailors Point

White-cheeked Honeyeater	Phylidonyris nigra	L	F
New Holland Honeyeater	Phylidonyris novaehollandiae	L	F
Mistletoebird	Dicaeum hirundinaceum	APM	O
Spotted Pardalote	Pardalotus punctatus	SPM	F
Silvereye	Zosterops lateralis	SPM	F
Red-browed Finch	Emblema temporalis	L	F
Common Mynah *	Acridotheres tristis	UBS	R
Olive-backed Oriole	Oriolus sagittatus	L	O
Spangled Drongo	Dicrurus hottentotus	L	S
Grey Butcherbird	Cracticus torquatus	UBS	R
Australian Magpie	Gymnorhina tibicen	UBS	R
Pied Currawong	Strepera graculina	UBS	R
Australian Raven	Corvus coronoides	UBS	R
Mammals			
Short-beaked Echidna	Tachyglossus aculeatus	APM	R
Sugar Glider	Petaurus breviceps	HSS	R
Squirrel Glider	Petaurus norfolcensis	Aust Museum	R
Common Ringtail Possum	Pseudocheirus peregrinus	SPM	R
Common Brushtail Possum	Trichosurus vulpecula	SPM	R
Koala	Phascolarctos cinereus	APM/HSS	R
Long-nosed Bandicoot	Perameles nasuta	SPM/HSS	R
House Mouse *	Mus domesticus	L	R
Black Rat *	Rattus rattus	SPM	R
Grey-headed Flying-fox	Pteropus poliocephalus	APM	O
Chocolate Wattled bat	Chalinolobus morio	L	F
Gould's Wattled Bat	Chalinolobus gouldii	L	F
Common Bent-wing Bat	Miniopterus schreibersii	L	F
Greater Broad-nosed Bat	Scoteanax rupelli	L	O
Pale Epitesicus	Vespertilio vulturnus	L	O
Reptiles			
Eastern Water Dragon	Physignathus lesueurii	L	R
Eastern Water Skink	Eulamprus quoyii	APM	R
Copper-tailed Skink	Ctenotus taeniolatus	APM	R
Grass Skink	Lampropholis delicata	SPM	R
Weasel Skink	Saproscincus mustelina	L	R
Blue-tongued Lizard	Tiliqua scincoides	L	R
Eastern Long-necked Tortoise	Chelodina longicollis	L	R
Frogs			
Common Eastern Froglet	Crinia signifera	SPM	R
Brown-striped Frog	Limnodynastes peronii	APM	R
Green Tree Frog	Litoria caerulea	L	R
Peron's Tree Frog	Litoria peronii	L	R

Great Mackeral Beach, Mackeral Beach

Reserve Number 0004

Street Address Via Ross Smith Parade, Mackeral Beach

1.0 Category & Description

1.1 Location and Description

Great Mackeral Beach Reserve covers most of the headland between Currawong Beach, also known as Little Mackeral Beach, and Great Mackeral Beach. The Reserve occupies 16 hectares and has residential properties along the northern boundary. The Reserve provides panoramic views and is accessed from above via the Ku-ring-gai Chase National Park fire trail or from below by a track linking the two beaches.

1.2 Land Tenure and Property Description

The Reserve is owned by Council, and is described as Part Portion 9 in the Parish of Broken Bay. The land is zoned 6(a) Open Space - Existing Recreation A.

1.3 Category of Land

The Reserve is community land under the Local Government Act 1993. It is categorised as a natural area and further categorised as bushland, escarpment and watercourse. It meets the definition of urban bushland described in State Environmental Planning Policy No 19 - Bushland in Urban Areas.

2.0 Natural and Cultural Heritage

2.1 Topography, Geology and Soils

The Reserve occupies the majority of the broad dividing ridge between Great Mackeral Beach and Currawong Beach. The crest undulates and falls gently towards the east as a headland bluff. The numerous sandstone benches along the ridgeline and the deeply honeycombed caves in the eastern portion of the Reserve are features of the Lambert peninsula.

The parent geology of the ridgeline is Hawkesbury Sandstone underlain by the shales

Pittwater Council

and sandstones of the Newport Formation in the Narrabeen Group, which characterises the steep side slopes. The soils grade from the shallow sandy earths of the Lambert soil landscape along the ridgeline to the moderately deep brown podsoles of the Watagan soil landscape on the slopes.

2.2 Hydrology

The Reserve straddles a ridgeline and drains to two catchments. Numerous seepage lines resulting from rock benches channel into ephemeral drainage lines.

2.3 Vegetation

The exposed north facing slope supports Hawkesbury Sandstone Open-Forest dominated by Smooth-barked Apple (*Angophora costata*) and Red Bloodwood (*Corymbia gummifera*). On the broad ridge, Red Bloodwood (*Corymbia gummifera*) and Grey Gum (*Eucalyptus punctata*) occurs. The flatter ridgetops support Red Bloodwood-Scribbly Gum (*E. haemastoma*). Woodland dominated by with associated tree species including Smooth-barked Apple (*Angophora costata*) and Yellow Bloodwood (*Corymbia eximia*), which has a limited distribution in Pittwater. The shrub layer includes Prickly Moses (*Acacia ulicifolia*) and Flannel Flower (*Actinotus helianthi*), and the locally uncommon Woody Pear (*Xylomelum pyriforme*) is present. The vegetation on the south facing slopes below the crest includes Turpentine (*Syncarpia glomulifera*), *Banksia aemula* and New South Wales Christmas Bush (*Ceratopetalum gummiferum*). In the gullies Coachwood Closed-forest is dominated by Coachwood (*Ceratopetalum apetalum*) with Rough-barked Apple (*Angophora floribunda*) and Black She-oak (*Allocasuarina littoralis*) present.

2.4 Fauna

Great Mackeral Beach Reserve is a large expanse of bushland which adjoins the Ku-ring-gai Chase National Park. It provides a range of habitat types conducive to the presence of a wide range of fauna species. The numerous She-oaks provide a food resource for the threatened Glossy Black Cockatoo. Tree hollows are used by arboreal mammals, bats and a variety of birds, whilst rock outcrops and thick undergrowth providing niches for frogs, reptiles, and small terrestrial mammals.

2.5 Aboriginal and Non-Aboriginal Sites

Numerous Aboriginal sites occur in the Reserve. These include caves and shelters, axe grinding grooves and engravings. There are no known sites of European Heritage in the Reserve.

3.0 Significance and Objectives

3.1 Statement of Significance

Great Mackeral Beach Reserve is significant because

- ❖ it protects an example of bushland that is on the foreshore of Pittwater and is continuous with Ku-ring-gai Chase National Park.
- ❖ it protects examples of a locally significant plant community, namely Red Bloodwood – Scribbly Gum Woodland, and includes a species of limited distribution, namely Yellow Bloodwood,
- ❖ it contributes to the landscape quality of Pittwater's foreshores with panoramic views to Barrenjoey Headland and Pittwater.
- ❖ it provides a record of the original landscape and the changes wrought by urban development,
- ❖ it protects numerous Aboriginal sites, which demonstrate the link between the land and its original human inhabitants.
- ❖ it is an educational resource and a contact point with nature for residents, and

- ❖ it allows urban residents to undertake informal recreational pursuits in a bushland setting

3.2 Management Objectives

The management objectives for Great Mackeral Beach Reserve are

- ❖ to protect and maintain the natural range of structural and floristic diversity of bushland in the Reserve,
- ❖ to protect the locally significant plant community, (Red Bloodwood – Scribbly Gum Woodland), and the species of limited distribution, (Yellow Bloodwood).
- ❖ to protect the landscape quality of Pittwater's foreshores,
- ❖ to adequately manage the bushland in relation to encroachments, weed infestations and access tracks.
- ❖ to protect life and property from wildfire and to maintain ecological processes by seeking to maintain a near-natural fire regime to conserve native flora and fauna in the Reserve,
- ❖ to control introduced animals in the Reserve.
- ❖ to protect Aboriginal sites in the Reserve.
- ❖ to provide low impact recreational and educational use of the Reserve consistent with the other objectives, and
- ❖ to encourage community appreciation and participation in bushland management of the Reserve

4.0 Management Issues

4.1 Weed Invasion & Bush Regeneration

Most weed infestations are towards the western edge of the Reserve and are limited by the steep undisturbed slopes. Stands of Lantana and Cassia occur along the northern boundary. Along the eastern rdgeline Mother of Millions dominates small areas near rock outcrops. A methodical approach to weed removal should occur, progressing slowly from areas of good bush to minimise potential erosion and habitat loss.

4.2 Fire Regime

Management of the fire regime in the Reserve will be undertaken by the Warringah Pittwater Bush Fire Management Committee in accordance with Circular C10 - Planning for Bush Fire Prone Areas. The Reserve will be regularly monitored for fuel loadings and any hazard reductions required will be undertaken in accordance with the Draft Fuel Management Plan. The January 1994 fires affected the Reserve and need to be incorporated into the fire regime. Ecological considerations will be assessed by Council Environmental Staff to determine methods of hazard reduction and coordinate follow up weeding should fire be used.

4.3 Management of Native Fauna and Introduced Predators

The Reserve provides good habitat for fauna with a variety of habitat components. It is located adjacent to a beach and estuarine zone with Woodland and Closed Forest providing year-round food availability. A Pittwater wide public awareness campaign will address the value of bushland as habitat for fauna and how residents can be responsible neighbours by ensuring that domestic cats and dogs do not roam in the Reserve. The strict control and possible removal of domestic animals on the Western Foreshores is an issue that needs further discussion with the community. Feral cat and fox predation is an issue that needs to be addressed with the National Parks and Wildlife Service.

4.4 Access, walking tracks and recreation

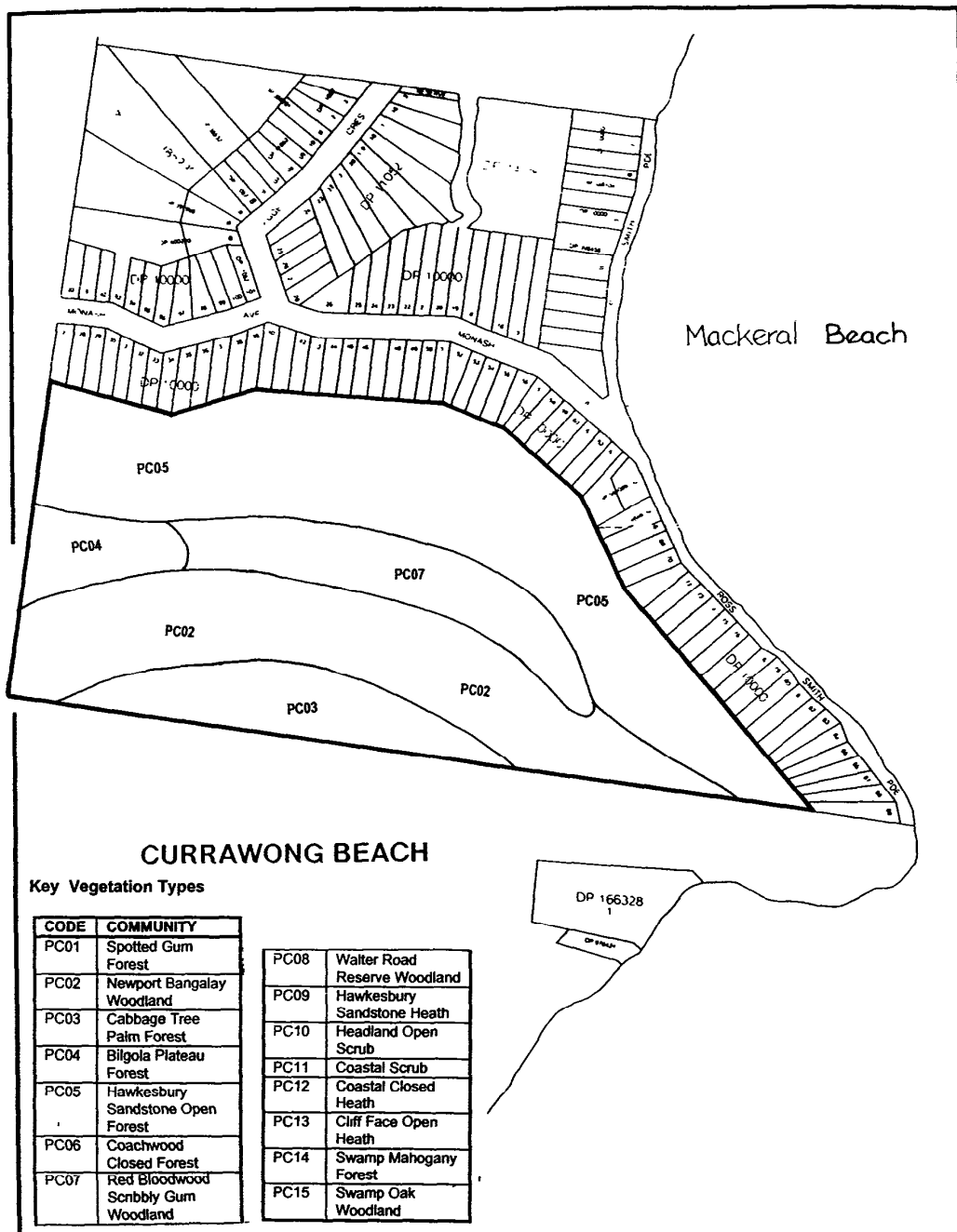
The Reserve is accessed via an informal path linking Great Mackerel Beach and Currawong Beach. An informal path leads up the slope to the rdgeline, where it joins the Mackerel Trail, a fire trail in the National Park. There are panoramic views of Pittwater and Barrenjoey Headland along the length of the track.

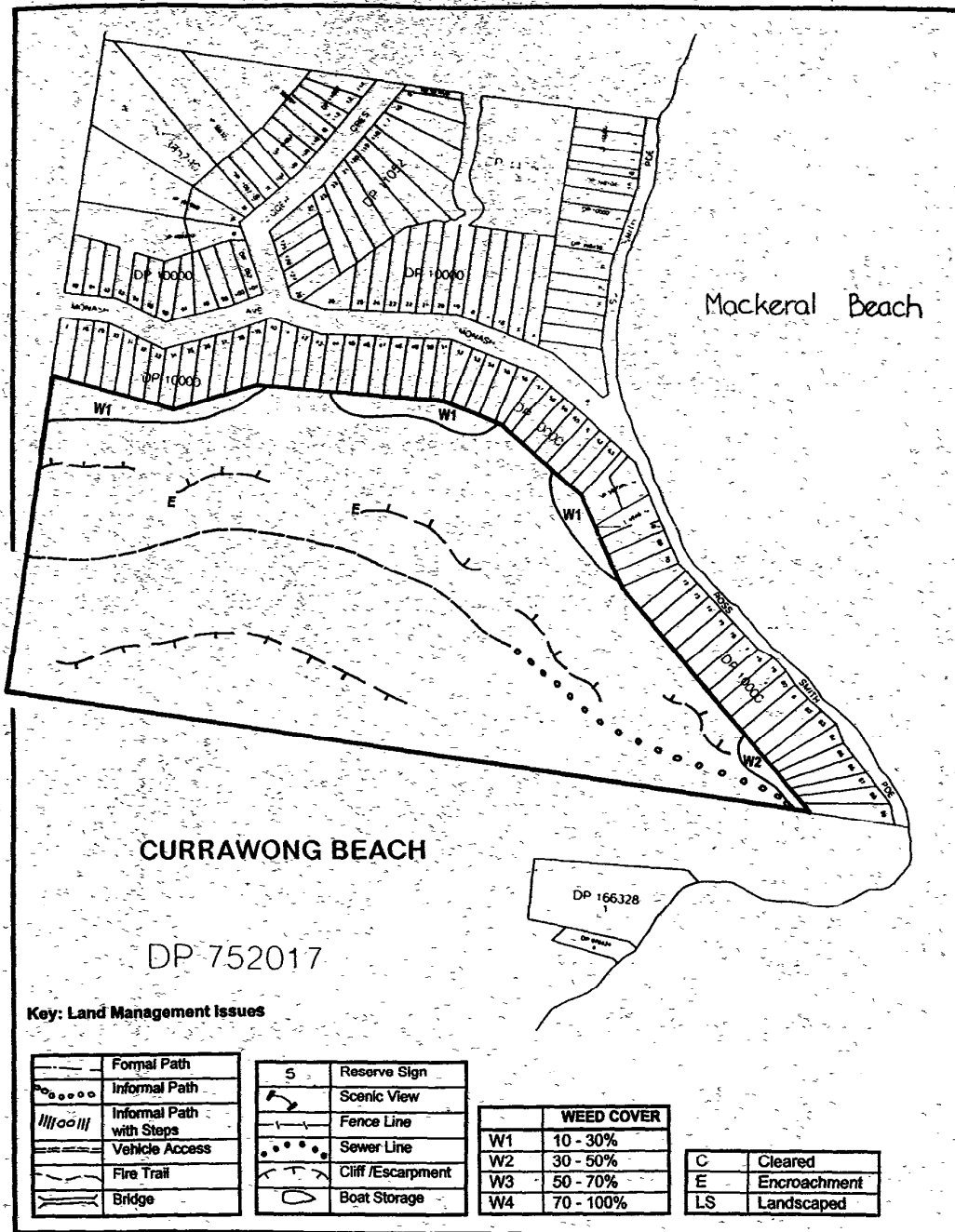
4.5 Boundaries and neighbours

Numerous residents have installed antennae on the rdgeline to improve television reception.

5.0 Performance

Management objectives	Performance Targets (Actions)	Responsibility	Completion date	Capital cost	Recurrent Cost	Performance Measures
Weed control & bush regeneration	Seek community interest for a volunteer bush regeneration group	Natural Resources	1999/2000		\$1400 pa	Bushland actively regenerated
Management of native fauna & introduced predators	Public awareness campaign re responsible pet ownership Feral animal control	Natural Resources Compliance	As part of a Pittwater wide campaign and a joint program with NPWS	\$2000		Extant fauna populations
Fire management	Maintain safe fuel levels	Fire Control & Natural Resources	Ongoing	NA	Staff time	Life & property protected & biodiversity maintained
Access & walking tracks	Investigate track options	Natural Resources Property	1999/2000			Track useable
Boundaries & neighbours	Resolve TV antenna issues	Natural Resources Property	1999/2000			Minimised damage from TV antennae





Urban Bushland Plan of Management		
Map Management Issues	Scale 1:4000	Date JULY 1997
Locality Great Mackerel Beach Reserve		Pittwater Council

Mackerel Reserve, Mackerel Beach

Reserve Number 634

Street Address: Diggers Crescent, Mackerel Beach

1.0 Description and Category

Minor ephemeral drainage lines occur

1.1 Location and Description

Mackerel Reserve is a portion of the escarpment and footslope defining the western limit of the coastal and estuarine zone of Mackerel Beach occupying 0.9ha adjacent to Ku-ring-gai Chase National Park

1.2 Land Tenure and Property Description

The Reserve is owned by Council, being described as Lot A in DP 2004 and Lot A in DP2114. The land is zoned 6(a) Open Space - Existing Recreation

1.3 Category of Land

The Reserve is community land under the Local Government Act 1993. It is categorised as a natural area and further categorised as bushland and escarpment. It meets the definition of urban bushland described in State Environmental Planning Policy No 19 - Bushland in Urban Areas

2.0 Natural & Cultural Heritage

2.1 Topography, Geology and Soils

Mackerel Reserve is located on a steep, east facing colluvial slope and occasional sandstone boulders occur. The parent geology of the ridgeline above the Reserve is Hawkesbury Sandstone, underlain by the shales and sandstones of the Newport Formation of the Narrabeen Group. The soils derived are the fine grained gleyed and yellow earths mapped as the Watagan soil landscape, which are prone to mass movement hazard. On the estuarine flat below the Reserve, the alluvial sands have been mapped as the Warriewood soil landscape and are influenced by colluvium from the slopes

2.2 Hydrology

2.3 Vegetation

Mackerel Reserve supports vegetation of Newport Bangalay Woodland, where Forest Oak (*Allocasuarina torulosa*), Star-hairs (*Astrotricha* sp.) and False Bracken Fern (*Calochlaena dubia*) are common in the understorey. Near the ridgeline, the vegetation is Hawkesbury Sandstone Open Forest. *Banksia aemula* is present in the shrub layer. Stands of Cabbage-tree Palms occur on the foot slopes and the estuarine flats support Swamp Oak Woodland of (*Casuarina glauca*)

2.4 Fauna

Mackerel Reserve provides good habitat for fauna with a variety of habitat components. The Cabbage-tree Palms, the nearby Swamp-oaks and the Eucalypts encourage diversity and provide year-round food availability. Its location adjacent to Ku-ring-gai Chase National Park increases its value for native fauna

2.5 Aboriginal and Non-Aboriginal Sites

There are no recorded Aboriginal sites within the Reserve, however there is potential for sites such as axe grinding grooves and engravings to occur in the area. There are no known sites of European Heritage in the Reserve

3.0 Significance and Objectives

3.1 Statement of Significance

Mackeral Reserve is significant because

- ❖ it protects a foreshore bushland area with mature habitat trees and acts as an extension of bushland areas in the National Park,
- ❖ it provides a scenic backdrop to Mackeral Beach, and contributes to the landscape quality of the Pittwater foreshores,
- ❖ it provides a record of the original landscape. and
- ❖ it is an educational resource and a contact point with nature for residents

3.2 Management Objectives

The management objectives for Mackeral Reserve are

- ❖ to protect and maintain the natural range of structural and floristic diversity of bushland in the Reserve,
- ❖ to adequately manage the bushland in relation to weed invasion and geotechnical issues,
- ❖ to protect life and property from effects of fire and to maintain ecological processes by seeking to maintain a near-natural fire in the Reserve.
- ❖ to control introduced animals in the Reserve.
- ❖ to provide scenic protection of the area as a natural backdrop to the village of Mackeral Beach
- ❖ to encourage community appreciation of bushland in the area

4.0 Management Issues

4.1 Weed Invasion and Bush Regeneration

The Reserve is primarily in a weed free condition. especially on the steep slopes. Weed species present are Lantana and Cassia. These should be treated with techniques that retain roots in the soil and that retain patches of weed for fauna

4.2 Geotechnical Issues

The slopes in the Reserve are identified as susceptible to landslip and the implications are highlighted in expert Geotechnical Reports referenced as GF 110/017/001 and GF 110/017/000. Following a landslip during the management of the Reserve by Warringah Shire Council, the site was stabilised by removing large unstable floaters and hung- up trees. the slope groomed and revegetation undertaken. in accordance with geotechnical advice

4.3 Fire Regime

Management of the fire regime in the Reserve will be undertaken by the Warringah Pittwater Bush Fire Management Committee in accordance with Circular C10 - Planning for Bush Fire Prone Areas. The Reserve will be regularly monitored for fuel loadings and any hazard reductions required will be undertaken in accordance with the Draft Fuel Management Plan. Methods of hazard reduction will be examined for their geotechnical and ecological impacts. Should fire be used, a follow up weeding program and other necessary activities will be implemented. The area was back burnt during the 1994 bushfires and this should be taken into account in future fire regimes when considering appropriate intervals between fires.

4.4 Management of Native Fauna and Introduced Predators

A Pittwater wide public awareness campaign will address the value of bushland as habitat for fauna and how residents can be responsible neighbours by ensuring that domestic cats and dogs do not roam in the Reserve.

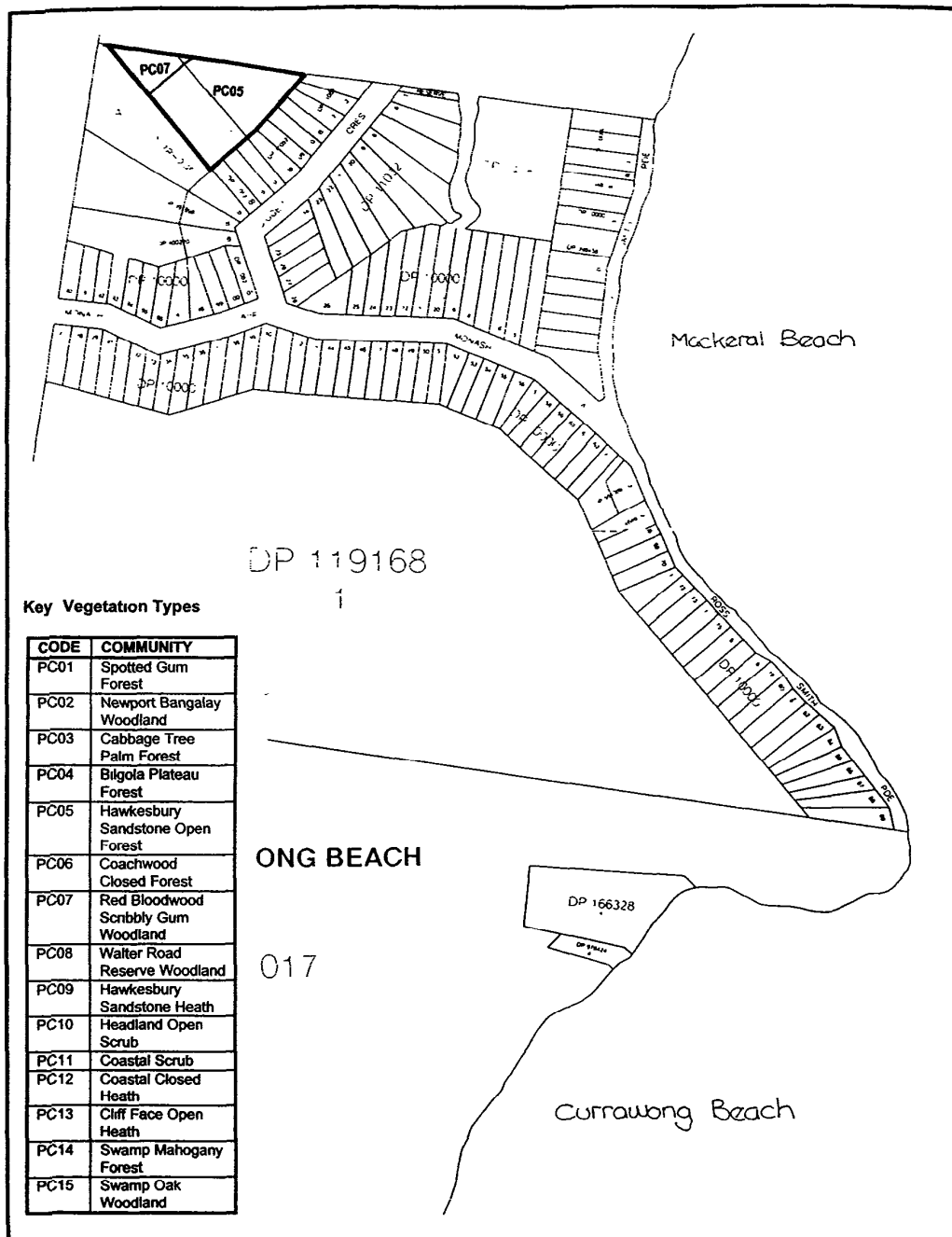
Strict control of domestic pets or their possible removal is an issue that needs further discussion with the community. Feral cat and fox predation is an issue that needs to be addressed through a Pittwater-wide control strategy in consultation with the National Parks and Wildlife Service.


4.5 Access and public use

The steep nature of this Reserve, and residential properties extending down slope of the Reserve to the foreshore, limit public access. The Reserve however does provide a scenic backdrop of natural bushland for the village of Mackeral Beach.

5.0 Performance

Management objectives	Performance Targets (Actions)	Responsibility	Completion date	Capital cost	Recurrent Cost	Performance Measures
Weed control & bush regeneration	Contract bush regeneration	Natural Resources	As funds available	Quotes to be sought		Bushland regenerated
Geotechnical	Monitor land stability	Natural Resources & Urban Services	Ongoing		Staff time	Land risk managed
Management of native fauna & introduced predators	Public awareness campaign re responsible pet ownership Pet issue discussed with community Feral animal control with NPWS	Natural Resources	As part of a Pittwater wide campaign As community interest demands As funds available	Seek costs when actions proceed		Extant fauna populations
Fire management	Maintain safe fuel levels	Fire Control & Natural Resources	Ongoing	NA	Staff time	Life & property protected & biodiversity maintained
Access & use of reserve	Maintain natural bushland as scenic backdrop	Natural Resources	Ongoing			Scenic vista maintained



Urban Bushland Plan of Management			
Map Vegetation Communities	Scale 14000	Date JULY1997	 Pittwater Council
Locality	Mackerel Reserve		

Attunga Reserve, Newport

Reserve Number: 0074

Street Address. Via Old Barrenjoey Rd and Attunga Rd. Newport

1.0 Category and Description

1.1 Location and Description

Attunga Reserve is a coastal bushland reserve located over the ridgeline which separates Bilgola and Newport beaches. The Reserve which occupies 7.95 hectares, is bounded by Attunga and Barrenjoey Roads to the east, on the west by Hillside and Wollombi Roads, and Burke Street and Porters Reserve to the south.

1.2 Land Tenure and Property Description

The Reserve is described as Crown Reserve R 79011 and R 58243 and is owned by the Department of Land and Water Conservation, under the care, control and management of Pittwater Council. The land is zoned 6(a) Open Space - Existing Recreation.

1.3 Acts Which Apply and Category of Land

The Reserve is managed according to the principles of Crown land management under the Crown Lands Management Act, 1989, and this plan of management meets those requirements. For consistency with the management of Council's other bushland, this plan has also been prepared to meet the requirements of the Local Government Act, 1993. The land is community land under the Local Government Act. It is categorised as a natural area and further categorised as bushland. It meets the definition of urban bushland described in State Environmental Planning Policy No 19 - Bushland in Urban Areas.

2.0 Natural and Cultural Heritage

2.1 Topography, Geology and Soils

The Reserve extends over a ridgeline from the edge of Bilgola Plateau down a spur towards the headland which divides Bilgola and Newport beaches. The sideslopes of the ridge are steep and rock outcrops with numerous sandstone floaters and benches are common on the crest. Hawkesbury Sandstone caps the coastal spur and gives rise to the infertile, shallow sandy soils on the ridgeline and western section of the Reserve. Underlying are the interbedded shales and sandstones of the Newport and Bald Hill Claystone Formations in the Narrabeen Group. The soils derived from the Narrabeen Group on the descending spur and southern sideslopes, have a higher clay content with greater waterholding capacity, and have been mapped as the Watagan soil landscape. These soils present an extreme erosion hazard if disturbed, and a high susceptibility to mass movement on the steep slopes.

2.2 Hydrology

The Reserve straddles the South Bilgola Beach and North Newport Beach catchments, and is located in the middle to upper portion of each catchment. Most drainage lines are insignificant except for the unnamed creek on the southern boundary with Porters Reserve.

2.3 Vegetation

Three plant communities occur in Attunga Reserve.

Upper slopes and east-facing ridges support Hawkesbury Sandstone Open-forest dominated by Smooth-barked Apple (*Angophora costata*) and Broad-leaved White Mahogany (*Eucalyptus umbra*). Associated tree species include Bangalay (*E. botryoides*) and Large-fruited Red Mahogany (*E. scias*). Smaller trees include Black She-oak (*Allocasuarina littoralis*).

Forest Oak (*Allocasuarina torulosa*), Old Man Banksia (*Banksia serrata*) and Coast Banksia (*Banksia integrifolia*). The understorey includes a shrub layer of low density and a ground layer of variable density. Shrub species includes Mock Olive (*Notelaea longifolia*), Breynia (*Breynia oblongifolia*) and Clerodendrum (*Clerodendrum tomentosum*). Ground layer species include False Bracken Fern (*Calochlaena dubia*), Gristle Fern (*Blechnum cartilagineum*), Morinda (*Morinda jasminoides*), Settler's Flax (*Gymnostachys anceps*), Rasp Fern (*Doodia aspera*) and Basket Grass (*Oplismenus aemulus*).

Lower slopes on northern and southern aspects support a forest or woodland community where the trees are of lower canopy height than the forest of the upper slopes. Dominant species are Smooth-barked Apple, Rough-barked Apple (*Angophora floribunda*) and Black She Oak. Associated small tree species include Bangalay (*E. botryoides*), Cheese Tree (*Glochidion ferdinandii*), Coast Banksia and Blueberry Ash (*Elaeocarpus reticulatus*). There is a shrub layer of low density and a ground layer of high density. Common shrub species include Bastard Rosewood (*Synoum glandulosum*), *Pultenaea daphnoides*, Twining Guinea Flower (*Hibbertia dentata*), Breynia and *Tristanopsis collina*. Vines and scramblers are common, including Old Man's Beard (*Clematis aristata*), Wonga Vine (*Pandorea pandorana*) and Native Sarsaparilla (*Smilax glycyphylla*). The ground layer plants include Burrawang (*Macrozamia communis*), Saw Sedge (*Gahnia melanocarpa*), Wiry Panic (*Entolasia stricta*), Weeping Meadow Grass (*Microlaena stipoides*) and *Lomandra obliqua*.

East-facing slopes exposed to coastal breezes support Headland Open-scrub. A community of limited distribution in Pittwater, it is dominated by Scrub She-oak (*Allocasuarina distyla*) and *Hakea gibbosa*. Associated shrub species include Rusty Petals (*Lasiopetalum ferrugineum*), Myrtle Wattle (*Acacia myrtifolia*), *Correa reflexa*, Finger Hakea (*Hakea dactyloides*) and Coast Wattle (*Acacia sophorae*). There is a ground layer of medium to high density dominated by grasses and sedges. Ground layer species include Kangaroo Grass (*Themeda australis*), *Ptilantherum deustum*, Rocky Xanthosia (*Xanthosia tridentata*), Spiny Mat-rush (*Lomandra longifolia*) and Blue Flax Lily (*Dianella caerulea* var. *producta*).

Several plants of regional significance occurring in the Reserve include Mintbush (*Prostanthera denticulata*) which is locally endemic, and Murrogun (*Cryptocarya microneura*), and plants of local significance include Dogwood (*Jacksonia scoparia*) and Ti Bush (*Wikstroemia indica*). A grove of Cabbage-tree Palms (*Livistona australis*) in the Reserve is listed as a Heritage Item on the Pittwater Local Environment Plan (LEP) 1993.

2.4 Fauna

An extensive species list has been compiled for this reserve which dominates the southern Bilgola Bends area. This is because it is a large area of uncleared forest with a variety of habitat niches. The forest has thick canopy cover generally dominated by hollow-bearing Angophoras and eucalypts with patches of cabbage tree palm forest along creek lines in Attunga Reserve. Ringtail Possums which are becoming scarce in the residential areas are common and their dreys can be seen in the she-oaks which are common in the understorey. The winter flowering Coast Banksia is common on the upper slopes and due to this the reserves are likely to be an important habitat area for the Squirrel Glider, an endangered population on the Barrenjoey Peninsula. The lack of fire has aided the growth of mesic plants such as native grape, bolwarra and cabbage palm which would attract the Brown Cuckoo Dove and the Topknot Pigeon, and possibly the Pacific Baza. The Open forest habitat makes the reserve suitable habitat for Powerful Owl. The thick shrub and groundcover provided by these plants and their litter provides suitable habitat for uncommon birds such as the Black-faced Monarch and important refuge for the Long-nosed Bandicoot. Reptiles are also favoured by the rocky outcrops which occur on the upper slopes of the reserve. Unfortunately, urban runoff has degraded water quality in the reserves' creeks and limited the range of frog species likely to occur.

A Bat Survey was undertaken by M. Turton in 1996. The Barrenjoey Peninsula has many bridges, culverts and buried pipe drains all of which must be considered potential Chiropteran habitat. Within Attunga Reserve, which formed part of the survey, tree hollows and decorticated bark provide bat habitat. Insectivorous bat calls were detected in the Reserve on both nights and two species were recorded, namely Gould's Wattled Bat (*Chalinolobus gouldii*) and the Large

Bent-wing Bat (*Miniopterus schreibersii*) which is listed as rare and vulnerable in the Threatened Species Conservation Act 1995. In addition, two additional threatened species of bat are likely to occur, the Common Bent-wing Bat and the Greater Broad-nosed Bat. Although no Macrochiropteran species were recorded during the course of the survey, it is likely that the Grey-headed Flying Fox forage in rainforest species in the Reserve.

Council's Habitat and Wildlife Corridor Conservation Strategy maps the Reserve as "Major Habitat - MH" which indicates major habitat areas. This signifies a high degree of diversity within the Reserve in both habitat types and species presently using it.

2.5 Aboriginal and Non-aboriginal Sites

There are no recorded Aboriginal sites within the Reserve, although there is potential for sites such as axe grinding grooves and engravings, to occur in the area. There are no sites of European heritage significance other than the Cabbage Tree Palm stand, listed as a landscape item.

3.0 Significance and Objectives

3.1 Statement of Significance

Attunga Reserve is significant because

- ❖ it protects an example of the bushland of Newport in a similar condition to that which occurred when the area was first visited by Europeans.
- ❖ it protects a plant community of limited distribution in Pittwater, namely open-scrub,
- ❖ it protects a number of regionally significant plant species, namely, *Prostanthera denticulata* and *Cryptocarya microneura*, and locally significant plant species, namely, *Jacksonia scoparia* and *Wikstroemia indica*.
- ❖ it contributes to the landscape quality of Newport and Bilgola providing visual protection of the ridge between Newport and Bilgola and offers panoramic views along the coast.

- ❖ it provides a record of the original landscape and the changes wrought by settlement and development.
- ❖ it acts as a local refuge for fauna due to its diversity of habitat niches and flowering native species, and forms part of a wildlife corridor allowing fauna movement.
- ❖ it provides habitat suitable for a number of threatened species of fauna, in particular the Large Bent-wing Bat, Common Bent-wing bat and Greater Broad-nosed bat, the Powerful Owl, the endangered population of Squirrel Glider, the regionally significant Topknot Pigeon and Pacific Baza and important refuge for the Long-nosed Bandicoot, the locally significant Common Ringtail Possum, Brown Cuckoo Dove and the Black-faced Monarch.
- ❖ it is a contact point with nature for residents, an educational resource and provides a scenic pedestrian link from Bilgola Plateau to the beaches.

3.2 Management Objectives

The management objectives for Attunga Reserve are

- ❖ to protect the natural, cultural and landscape features of the Reserve,
- ❖ to maintain the natural range of structural and floristic diversity of bushland in the Reserve,
- ❖ to maintain the plant community of limited distribution in Pittwater, namely Headland open-scrub,
- ❖ to assess and monitor Eucalypt dieback on the northern slope,
- ❖ to maintain the habitat for native fauna, the threatened and other significant species, and wildlife corridor values,
- ❖ to adequately manage the bushland in relation to encroachments and weed invasion.

- ❖ to protect life and property from fire and to utilise fire to maintain the diversity of native plants in the Reserve to conserve native flora and fauna.
- ❖ to control introduced animals in the Reserve.
- ❖ to provide opportunities for low impact recreational and educational use of the Reserve consistent with the other objectives, and
- ❖ to encourage community appreciation and neighbourhood participation in bushland management in the Reserve

4.0 Management Issues

4.1 Weed Invasion & Bush Regeneration

The areas most affected by weeds are disturbed areas such as easements, tracks and residential boundaries. The main weed species in the open scrub area are Rhodes Grass, *Bidens pilosa*, Parramatta Grass, Formosa Lily and the Lantana. In the forest areas weed cover is generally low. The most common weeds are scattered throughout are Lantana, Small-leafed Privet, Ochna, Cassia Indian Hawthorn, African Olive, Honeysuckle and Asparagus Fern. Below the residences of Wollombi Road the weeds *Nephrolepis* sp and *Arundo donax* occur. The ridgeline has thickets of Lantana beside drains. Council will continue to support the community volunteer group known as Newport Bushlink, that is regenerating a number of reserves in Newport as part of a program to link the bushland through a network of walking tracks.

4.2 Eucalypt Dieback

Two areas of dead and dying trees are apparent on the northern slope. One is a fan-shaped area extending from below the eastern Water Tank to the bottom of the slope. The other is a circular patch between the tanks and the houses near Attunga Road. Both areas generally have a small tree layer dominated by Cheese Tree with a *Gahnia* understorey. No young recruitment *Angophoras* or *Eucalyptus* trees are apparent apart from a section close to the Open-scrub community.

4.3 Stormwater control and drainage

Water bars are required on tracks within the Reserve to alleviate the erosion due to stormwater runoff, to direct water off the track to vegetated verges. Retention of this dense vegetation along the tracks is essential for soil stabilisation.

4.4 Fire Regime

Management of the fire regime in the Reserve will be undertaken by the Warringah Pittwater Bush Fire Management Committee in accordance with Circular C10 - Planning for Bush Fire Prone Areas. The Reserve will be regularly monitored for fuel loadings and any hazard reductions required will be undertaken in accordance with the Draft Fuel Management Plan. Ecological considerations will be assessed by Council Environmental Staff to determine methods of hazard reduction and co-ordinate follow up should fire be used. The lack of fire in Attunga Reserve has favoured the growth of a number of rainforest species in the understorey at the expense of *Eucalyptus* species. Areas to be burnt should be examined at a microclimate level, so that burnt areas suitable for *Eucalypt* germination can be created through patch burning, and that rainforest species, particularly locally and regionally significant species, are not burnt.

4.5 Management of Native Fauna and Introduced Predators

Attunga Reserve provides good habitat for fauna with a variety of habitat components. The insect pollinated heathland and rainforest plants encourage diversity and year-round food availability. A Pittwater wide public awareness campaign will address the value of bushland as habitat for fauna and how residents can be responsible neighbours by ensuring that domestic cats and dogs do not roam in the Reserve. Compliance signs can assist this. Feral cat and fox predation is an issue that needs to be addressed through a Pittwater-wide control strategy.

4.7 Access, Walking Tracks and Recreation

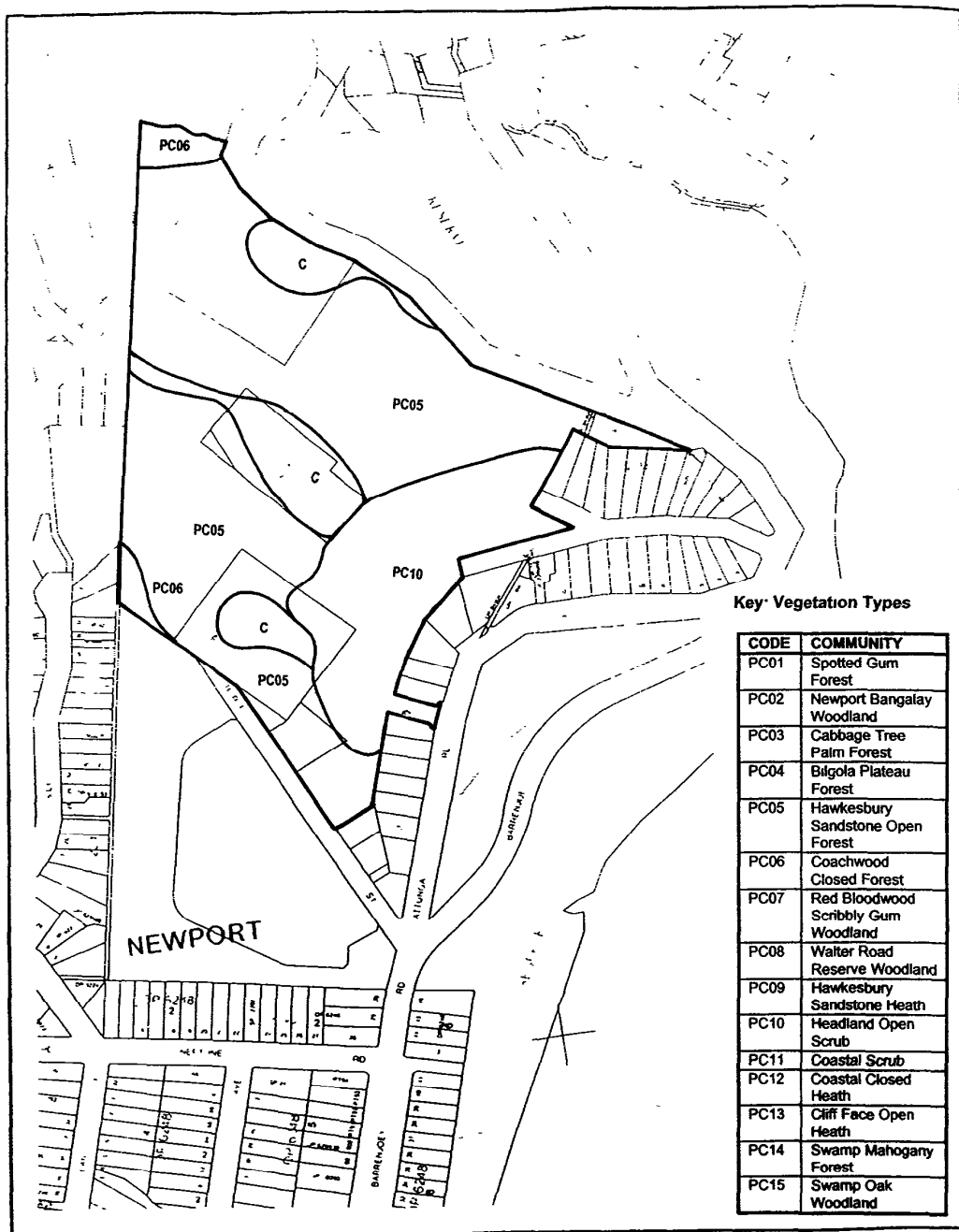
Signs naming the Reserve should be installed at two points of entry off Attunga Road, one at the road end and the other via an access handle. The existing tracks need to be rationalised by upgrading one as an informal bush track and closing the majority by brushmatting, as they are mostly steep and badly eroded. These issues will be addressed in part, as this Reserve is included in a system of pathways constructed for the Newport community group. Bushlink and funded by a Catchment Management Enhancement grant.


4.8 Boundaries and Neighbours

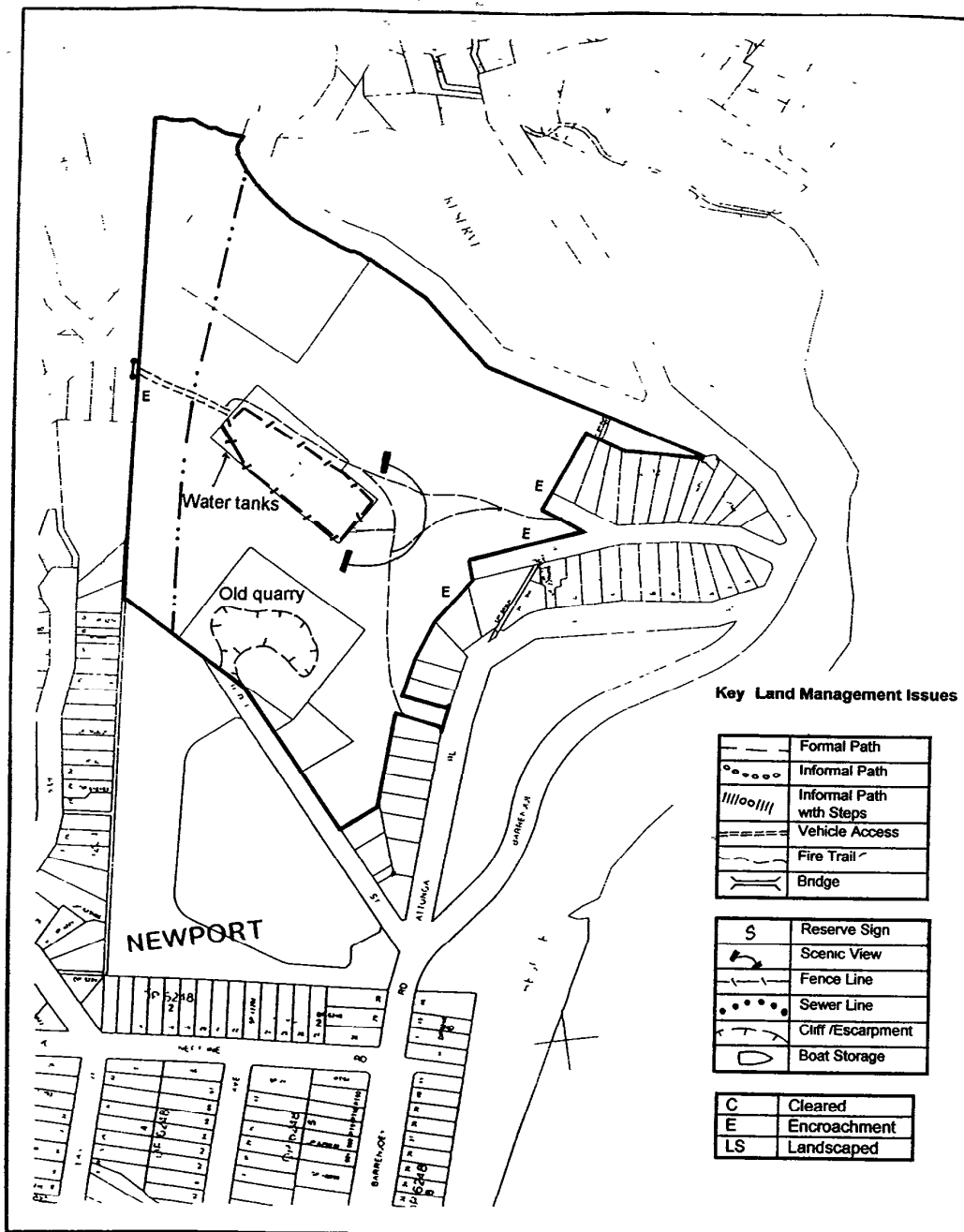
Residents bordering the Reserve need to be reminded of the effects edges can have on bushland. Bush friendly brochures could address this, in particular linking vegetation to weed infestation and fire hazard.


5.0 Performance

Management objectives	Performance Targets (Actions)	Responsibility	Completion date	Capital cost	Recurrent Cost	Performance Measures
Weed control & bush regeneration	Support volunteer group's grant activities	Natural Resources	1998/99	\$1000	\$400	Bushland actively regenerated
Stormwater Control & drainage	Water bars on track as part of Bushlink work	Natural Resources	Ongoing	\$300		Scour reduced
Management of native fauna & introduced predators	Public awareness campaign re responsible pet ownership Sign Plant additional habitat trees	Natural Resources Compliance	As part of a Pittwater wide campaign	\$1000		Extant fauna populations
Fire management	Maintain safe fuel levels Patch burn to favour Eucalypts	Fire Control & Natural Resources	Ongoing	NA	Staff time	Life & property protected & biodiversity maintained
Access & walking tracks	Close eroded tracks Support Bushlink track upgrade	Natural Resources	Ongoing			Track useable
Boundaries & neighbours	Bush friendly campaign	Natural Resources	1998/99	\$200		Improved appreciation of Reserve



Urban Bushland Plan of Management			 Pittwater Council
Map	Vegetation Communities	Scale 14000	
Locality	Attunga Reserve	Date July 1997	



Urban Bushland Plan of Management				 Pittwater Council
Map	Management Issues	Scale	14000	
Locality	Attunga Reserve	Date	July 1997	

Crown of Newport Reserve, Newport

Reserve Number. 0079

Street Address 25A Sybil Street and via Howell Close, Newport

1.0 Description & Category

1.1 Location and Description

The Crown of Newport Reserve is located in a sheltered gully between Newport Beach and Bilgola Plateau on Barrenjoey Peninsula and covers 4.12ha. The Reserve, which comprises a main body and three branching arms, is bounded on all sides by residential properties and a grassed field on the lower southern arm. McMahon's Creek flows through the Reserve and features a waterfall and a steep rainforest gully, to a piped drain under the grassed area.

1.2 Land Tenure and Property Description

Crown of Newport Reserve is owned by Council, being described as Public Reserve in DP 29010, Lot 10 in DP 229781, Lot 376 in DP 16327, Lot 102 in DP 16029, Public Reserve in DP 28775 and Reserve in DP 27578. The land is zoned 6(a) Open Space - Existing Recreation.

1.3 Category of Land

Crown of Newport Reserve is community land and under the Local Government Act, 90% is categorised as a natural area which is further categorised as bushland, escarpment and watercourse. It meets the definition of bushland described in State Environmental Planning Policy No. 19 - Bushland in Urban Areas.

2.0 Natural and Cultural Heritage

2.1 Topography, Geology and Soils

The uppermost area of the Crown of Newport Reserve is situated on the eastern escarpment of Bilgola Plateau, descending down from 120 metres AHD through a steep, narrow gully in a south-easterly direction.

This opens and levels out at Howell Close, in the southern end of the Reserve at approximately 20

metres AHD. The aspect of the Reserve protects the rainforest from the cold westerlies in winter, and the hot north-westerlies in summer. It is susceptible to the salty sea air.

The dominant parent geology is Hawkesbury Sandstone, underlain by the Newport formation of the Narrabeen Group of shales and sandstones. Extensive sandstone outcropping characterises the upper and middle area of the Reserve, and boulders and cobbles cover up to half the ground surface. The shallow, porous soils relate to the Hawkesbury soil landscape. The soils throughout the body of the Reserve, characterised by steep colluvial sideslopes and occasional boulders and benches, are generally deeper and more fertile than those on the upper slopes. They have been mapped as the Watagan soil landscape and are highly susceptible to mass movement and water erosion, as evidenced by the landslide below Hillslope Road.

2.2 Hydrology

The head of McMahon's Creek is on the northern arm of the Reserve on the upper escarpment of Bilgola Plateau. The creek flows along the western boundary of the Reserve, through a waterfall into the main body, down the gully and into the southern arm at Howell Close. Here it is piped underground from a turfed field on introduced fill to Newport Beach.

2.3 Vegetation

Four vegetation types occur in the Crown of Newport Reserve, namely, Spotted Gum Forest, Newport Bangalay Woodland, Coachwood Closed-forest and Hawkesbury Sandstone Open-forest. The upper slopes support Hawkesbury Sandstone Open-forest dominated by Smooth-barked Apple (*Angophora costata*) and Red Bloodwood (*Corymbia gummifera*).

Sydney Peppermint (*Eucalyptus piperita*) is an associated tree species near the head of the creek. The small tree layer includes Forest Oak

(*Allocasuarina torulosa*). Black She-oak (*A. littoralis*). Blueberry Ash (*Elaeocarpus reticulatus*) and Black Wattle (*Callicoma serratifolia*) Common in the shrub layer are Broad-leaved Geebung (*Persoonia levis*). Hairpin Banksia (*Banksia spinulosa*) and Mountain Devil (*Lambertia formosa*) In damper areas the groundlayer is dominated by Saw Sedge (*Gahnia* sp.). Sweet Sarsparilla (*Smilax glycyphylla*), and Pouched Coral-fern (*Gleichenia dicarpa*)

Coachwood Closed-forest occurs in the creekline, dominated by Coachwood (*Ceratopetalum apetalum*) and Lilly Pilly (*Acmena smithii*) Coachwood Closed-forest is a significant plant community in the Sydney Region Newport Bangalay Woodland occurs on the lower slopes dominated by Bangalay (*Eucalyptus botryoides*) with Cabbage-tree Palm (*Livistona australis*), Turpentine (*Syncarpia glomulifera*) and Port Jackson Fig (*Ficus rubiginosa*) as associated tree species Common shrub layer species include Veiny Wilkea (*Wilkea huegeliana*). Bolwarra (*Eupomatia laurina*) and large Mock Olive (*Notelaea longifolia*) The groundlayer includes a variety of ferns and lithophytes such as Creeping Shield Fern (*Lastreopsis microspora*). Gristle Fern (*Blechnum cartilagineum*) and King Fern (*Todea barbara*) Herbs and vines include Native Violet (*Viola hederacea*), Pixie Caps (*Acianthus formicatus*) and Sandfly Ziera (*Sieria smithii*) and Gum Vine (*Aphanopetalum resinosum*) With increased light conditions the understorey becomes more dense, and vines such as Supplejack (*Ripogonum album*). Jasmine Morinda (*Morinda jasminoides*), Pearl Vine (*Sarcopetalum harveyanum*) and Water Vine (*Cissus hypoglauca*) become more prevalent

Spotted Gum Forest is dominated by Spotted Gum (*Corymbia maculata*) in association with Grey Ironbark (*Eucalyptus paniculata*) occurs along the south-western arm Grey Gum (*Eucalyptus punctata*). Red Bloodwood (*Corymbia gummifera*) and Turpentine (*Syncarpia glomulifera*) are emergent tree species The low tree and shrub layer is of medium density and includes Cabbage-tree Palm, Port Jackson Fig, Lilly Pilly, Forest Oak (*Allocasuarina torulosa*), Burrawang (*Macrozamia communis*), Handsome Flat-pea (*Platylobium formosum*), Veiny Wilkea and Mock

Olive (*Notelaea longifolia*) The ground layer is densely covered by Soft Bracken (*Coloclaena dubia*), Basket Grass (*Oplismenus aemulus*).

Pastel Flower (*Pseuderanthemum variable*) and Centella (*Centella asiatica*) are common Vines are common and include Water Vine, Sweet Sarsparilla, Twining Guinea Flower (*Hibbertia dentata*) and Prickly Supplejack (*Smilax australis*) Spotted Gum Forest is considered to be of conservation significance at State level as it is inadequately conserved in NSW

141 native plant species have been recorded and include regionally significant species, namely Cabbage-tree Palm, Murrogun (*Cryptocaria microneura*) and Brown Beech (*C. glaucescens*) and locally significant species Bolwarra (*Eupomatia laurina*), Snow-wood (*Pararchidendron pruinsum*) and Crabapple (*Schizomera ovata*)

2.4 Fauna

Prior to residential development it is likely that the Closed-forest habitat of the Reserve supported a range of now uncommon reptile and frog species and may have been a roosting area for powerful owls Rocky outcrops and the creekline continue to provide habitat for frogs and reptiles, although urban runoff has led to a decline in diversity of species The Reserve provides good habitat for species such as White-browed Scrubwren and Long-nosed Bandicoots Red-bellied Black Snake, Golden-crowned Snake, Blue Tongue Lizard, Eastern Water Dragon and Freshwater Eels are amongst those recently recorded The winter-flowering Spotted Gum provides an important food resource for species such as the endangered population of Squirrel Glider, sugar gliders and ring-tailed possums

The Reserve is described as "Corridor - Co1" in Council's Habitat and Wildlife Corridors Conservation Strategy, 1995 Co1 indicates corridors or habitat areas though disturbed are likely to be of value due to good crown cover and/or understorey This Reserve is an important link to the corridors for faunal movement throughout the Peninsula

2.5 Aboriginal and Non-Aboriginal Sites

Four axe grinding groove sites are located on the steep slopes in the Reserve. There is potential for other sites such as axe grinding grooves and engravings to occur in the area. There are no known European Heritage sites in the Reserve.

3.0 Significance and Objectives

3.1 Statement of Significance

The Crown of Newport Reserve is significant as

- ❖ it contributes to the landscape quality of Newport
- ❖ it protects an example of bushland in a similar condition to that which occurred when the area was first visited by Europeans.
- ❖ it protects an example of a plant community of State conservation significance, namely, Spotted Gum Forest, and a plant community of regional conservation significance, namely, Coachwood Closed-forest,
- ❖ it protects regionally significant species, namely Cabbage-tree Palm, Murrogun (*Cryptocaria microneura*) and Brown Beech (*C. glaucescens*) and locally significant species Bolwarra (*Eupomatia laurina*), Snow-wood (*Pararchidendron pruinosum*) and Crabapple (*Schizomeria ovata*),
- ❖ it provides habitat for the endangered population of Squirrel Glider on the Barrenjoey Peninsula, regionally significant Long-nosed Bandicoots and locally significant sugar gliders and ring-tailed possums,
- ❖ it acts as a wildlife refuge and is an important part of the habitat and wildlife corridor for faunal movement,
- ❖ it is an education resource and a contact point with nature for residents, and
- ❖ it allows urban residents to undertake informal recreational pursuits in a bushland setting.

3.2 Management Objectives

The management objectives for Crown of Newport Reserve are

- ❖ to protect the natural features of the Reserve, particularly the significant Coachwood and Spotted Gum Forest communities.
- ❖ to maintain the natural range of structural and floristic diversity of bushland in the Reserve, including those rare or uncommon species.
- ❖ to protect regionally significant species (Cabbage-tree Palm, Murrogun and Brown Beech) and locally significant species (Bolwarra, Snow-wood and Crabapple),
- ❖ to provide habitat for the endangered population of Squirrel Glider, regionally significant Long-nosed Bandicoots and locally significant sugar gliders and ring-tailed possums,
- ❖ to provide a wildlife refuge and part of the habitat and wildlife corridor for faunal movement,
- ❖ to adequately manage the bushland in relation to encroachments, weed invasion and stormwater,
- ❖ to protect life and property from wildfire and to maintain ecological processes by seeking to maintain a near-natural fire regime in the Reserve to conserve native flora and fauna in the Reserve,
- ❖ to control areas of instability and/or erosion.
- ❖ to control introduced animals in the Reserve,
- ❖ to provide opportunities for low impact recreational and educational use of the Reserve consistent with the other objectives,
- ❖ to encourage community appreciation and neighbourhood participation in bushland management of the Reserve,

4.0 Management Issues

4.1 Weed Invasion

The majority of weeds are along the boundaries and creekline, leaving the main area of the Reserve weed free. On disturbed drainage lines Wandering Jew, Balsam, Ginger and Monstera occur. In open areas Crofton Weed, Creeping Buttercup, Turkey Rhubarb and Wild Strawberry are present. Elephants' Ears, Banana and Tomato occur at the head of the creek. A heavy infestation of Morning Glory is spreading from the Hillslope Road verge, over the canopy of the gully trees. On the slopes, Small-leafed Privet and Broad-leafed Privet are common, varying in height from seedlings to 2 metres. Pennywort, Moth Plant, Crofton, Black Nightshade, Cobbler's Peg, African Olive, Cassia, Wild Tobacco and Plantain are located further up the slope. A heavy infestation of Lantana occurs below Kanimbla Crescent. The main body of the Reserve has relatively few weeds, with only scattered seedlings of Moth Vine, Lantana, Ochna, Small-leafed Privet, Asparagus Fern, Wandering Jew and Balsam.

4.2 Bush regeneration

Between 1987 and 1992 extensive primary weeding of dense Lantana and Morning Glory was undertaken by a local volunteer group, covering approx 1.5ha in the western section below Grandview Drive. The same group contacted and involved both Warringah Council and the then Water Board (1988). This led to the upgrading of the reserve's significance category and the eventual acceptance by the Water Board of the obligation to provide substantial remedial expenditure. Accordingly Sydney Water commissioned a bush regeneration contract in the Reserve between November 1991 to October 1993. Primary work removed dense Lantana reaching high into the rainforest canopy, Small and Large-leafed Privet, Cassia, Wandering Jew, Moth Vine, Balsam and Crofton Weed throughout the native understorey. To create a viable work boundary, it was necessary to include the large Lantana bases growing across the main creekline, and the degraded site below Hillslope Road where Morning Glory was invading adjacent bushland. Work is described in detail for each site in the National Trust Report 1991-93. Contract and volunteer work, consolidating previously weedy areas, is ongoing in the Reserve.

4.3 Eucalypt Dieback

Persistent urban run-off into the Reserve has increased nutrient and moisture levels, and are considered to be linked to signs of dieback evident in approximately one third of the Sydney Peppermints (*Eucalyptus piperita*) near the head of the creek, and should form part of the Council's Tree Preservation Officer's regular monitoring program.

4.4 Sewer Lines and Stormwater

Sewer pipes have been laid throughout the Reserve. Several sections of creek embankment and verge have collapsed and been reconstructed using sandstone boulders. Parts of the original pipe, concrete and asphalt remain in the gully, resulting in scouring of the creek bank. A Coastcare grant was recently secured by Newport Bushlink, a local community group, to address this and restore vegetation cover lost through slippage. Stormwater pipes from both private residential properties direct urban runoff into McMahon's Creek, which has allowed weed infestations to establish. Water quality has declined in the Creek.

4.5 Fire Regime

Management of the fire regime in the Reserve will be undertaken by the Warringah Pittwater Bush Fire Management Committee in accordance with Circular C10 - Planning for Bush Fire Prone Areas. The Reserve will be regularly monitored for fuel loadings and any hazard reductions required will be undertaken in accordance with the Draft Fuel Management Plan. Ecological considerations will be assessed by Council Environmental Staff to determine methods of hazard reduction and co-ordinate follow up bush regeneration if fire is used. Rainforest areas generally should not be burnt.

4.6 Management of Native Fauna and Introduced Predators

A Pittwater wide public awareness campaign will address the value of bushland as habitat for fauna and how residents can be responsible neighbours by ensuring that domestic cats and dogs do not roam in the Reserve. Interpretive signs can assist this. Feral cat and fox predation is an issue that needs to be addressed through a Pittwater-wide control strategy.

4.7 Access, walking tracks and recreation

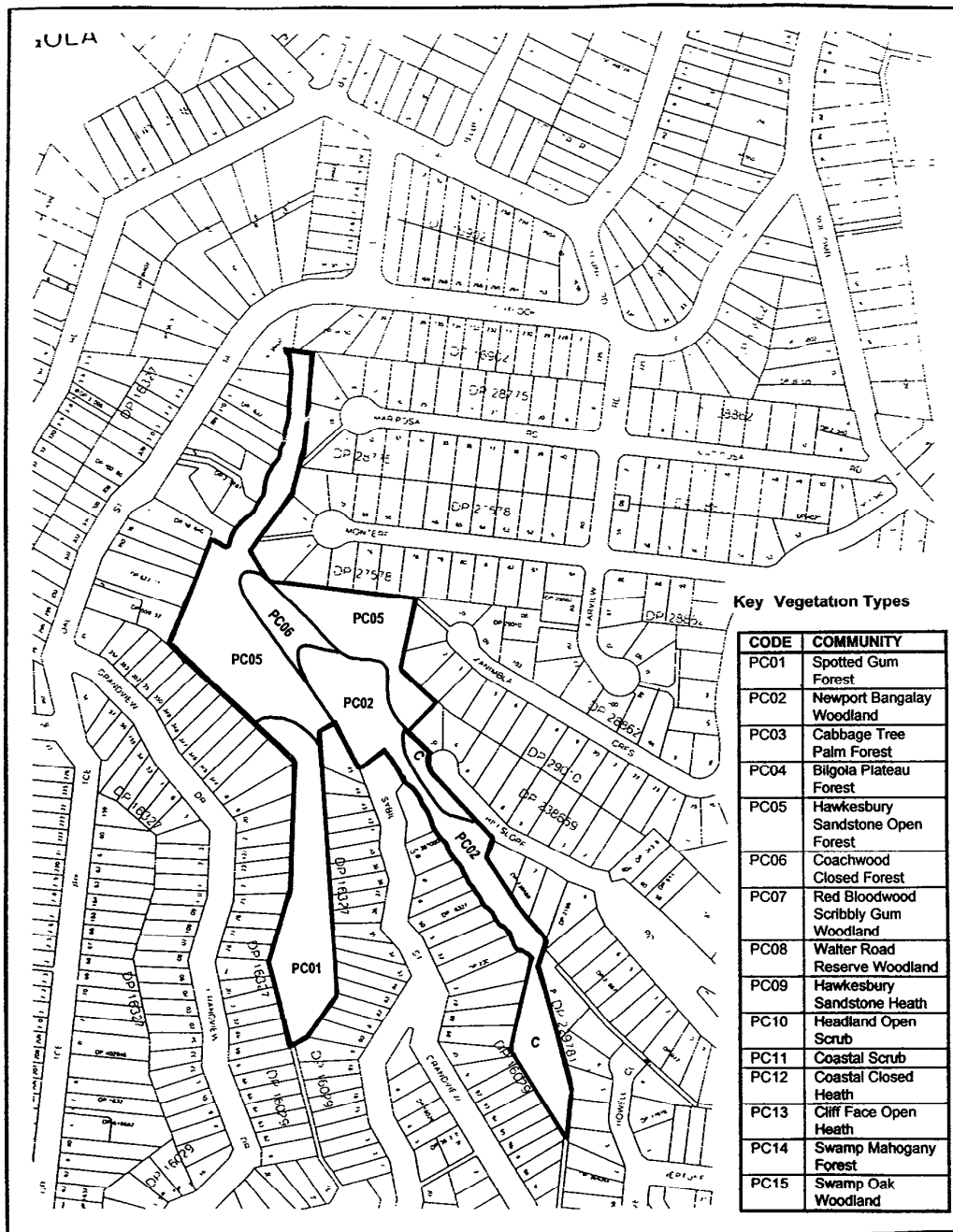
Access to the main body of the Reserve is from the end of Hillslope Road, where an informal track leads through the Reserve to the right-of-way in Kanimbla Crescent. This newly constructed track forms part of the Newport Bushlink project funded by a Catchment Management Enhancement grant, to link the four main bushland reserves in Newport. An informal track at the Howell Close entrance enters the rainforest near the creek. Access ways exist at Mariposa and Monterey Roads and Lower Grandview Drive but are heavily overgrown with weeds.

4.8 Boundaries and neighbours

Large amounts of garden material and tree loppings have been dumped, usually at entrances to the Reserve. This has resulted in increased nutrient loadings and encouraged weed growth. Non-compostible rubbish, including household items and building rubble, has also been dumped in the Reserve in the past. There is need to educate and remind residents about the responsibilities of living next to bushland. Some issues include controlling domestic pets, bush rock and firewood and lopping of trees.

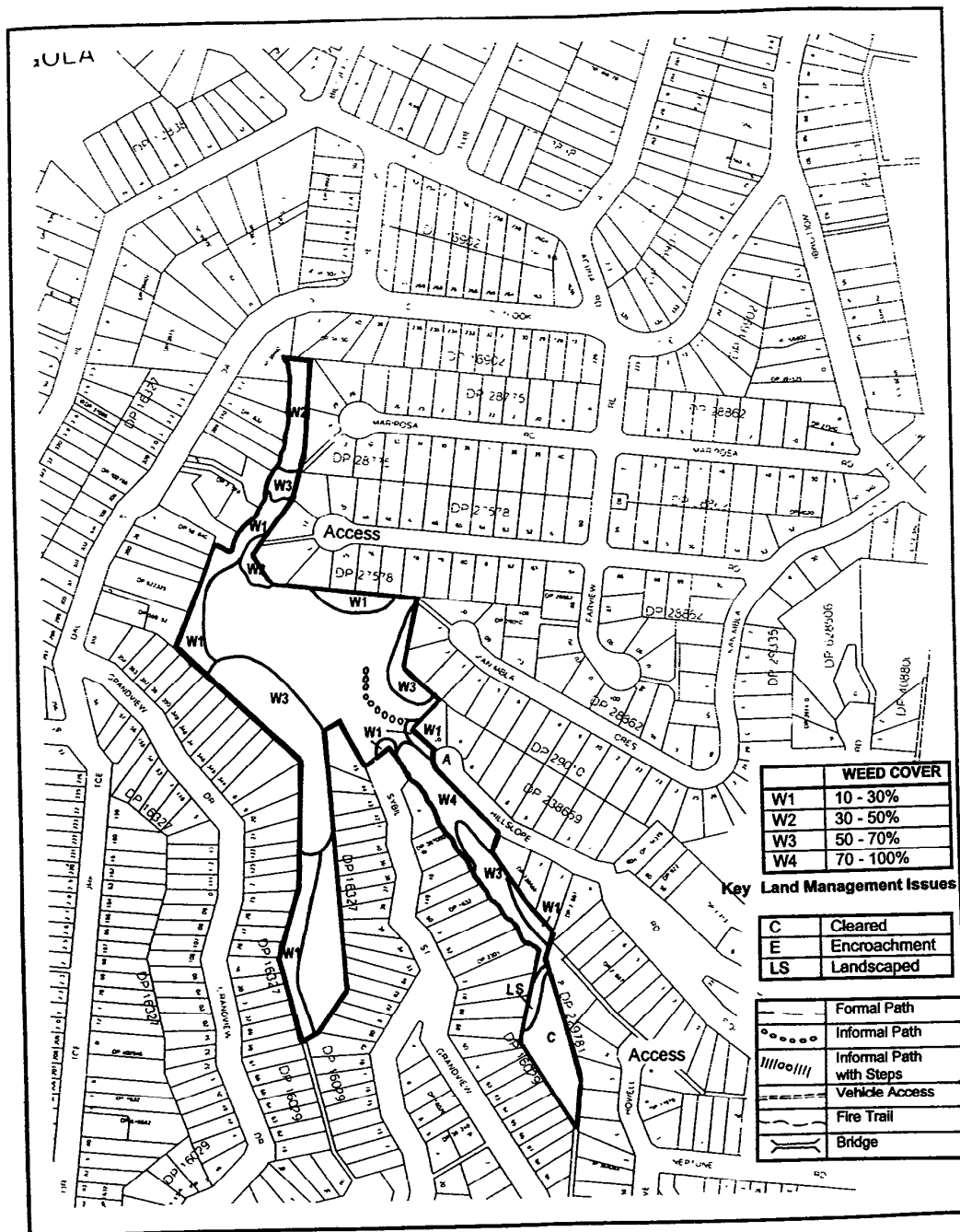
5.0 Performance

Management objectives	Performance Targets (Actions)	Responsibility	Completion date	Capital cost	Recurrent Cost	Performance Measures
Weed Control & Bush Regeneration	Support volunteer group & continue contract program	Natural Resources	Ongoing	Ongoing	\$1400pa for volunteer group	Bushland actively regenerated
Eucalypt dieback	Monitor affected tree health	Reserves			Staff time	
Stormwater control and drainage	Support volunteer vegetation restoration program	Reserves, Natural Resources		Coast care grant	Staff time	Restored rainforest canopy
Management of native fauna & introduced predators	Public awareness campaign for responsible pet ownership & feral animal program	Natural Resources & Compliance	When funds available as well as ongoing programs	Ongoing	Costed within a Pittwater wide feral animal control program	An increase in native fauna in the Reserve
Fire Management	Maintain appropriate fire regime	Bushfire Services & Natural Resources	Ongoing		Staff time	Fire regime that caters for safe fuel levels and biodiversity conservation
Boundaries & neighbours	Bush friendly information distributed	Natural Resources	1998/99	\$150	Staff time	Sympathetic public behaviour



Urban Bushland Plan of Management			
Map	Vegetation Communities	Scale	14000
		Date	July 1997
Locality	Crown of Newport Reserve Newport		





Urban Bushland Plan of Management			 Pittwater Council	
Map	Weeds Management Issues	Scale 14000		Date July 1997
Locality		Crown of Newport Reserve Newport		85

Algona Reserve, Newport

Reserve Number: 0078

Street Address: Access between 7 Algona St and 7 Joanne Place, Newport

1.0 Category and Description

1.1 Location and Description

Algona Reserve is located in Newport on the western side of the Barrenjoey Peninsula. The 2.47ha Reserve is above Alfred Parade and below Algona Crescent. Except along Algona Crescent, residential properties form its boundaries.

1.2 Land Tenure and Property Description

Algona Reserve is owned by Council, being described as Lot 154 in DP 225585 and Lot 206 in DP 13457. The land is zoned 6(a) Open Space - Existing Recreation.

1.3 Category of Land

The Reserve is community land under the Local Government Act 1993. It is categorised as a natural area and further categorised as (95%) bushland and watercourse. It meets the definition of urban bushland described in State Environmental Planning Policy No 19 - Bushland in Urban Areas.

2.0 Natural and Cultural Heritage

2.1 Topography, Geology and Soils

Algona Reserve is on a west facing slope. It is located mid slope on the southern side of a gully below Bilgola Plateau, and slopes down towards Salt Pan Cove. The geology is mainly Hawkesbury Sandstone and has resulted in extensive sandstone outcrops and boulders on a steep west facing slope. The soils derived are the characteristic earthy low fertility sands of the Hawkesbury soil landscape.

The shales and sandstones in the northwest corner of the Reserve relate to the Newport

Formation in the Narrabeen Group, and give rise to the higher clay content soils of the Watagan soil landscape.

2.2 Hydrology

The catchment above the Reserve is a residential development with kerbed roadways on a moderately sloping crest. The Reserve acts as a confluence for creeklines mid-slope to Salt Pan Cove and Pittwater, and contains one permanently moist creekline and another intermittent drainage line.

2.3 Vegetation

The vegetation is Hawkesbury Sandstone Open-forest dominated by Sydney Peppermint (*Eucalyptus piperita*). There is an association with Grey Gum (*E. punctata*) on the upper slopes. In the lower section of the Reserve, the creekline is dominated by Cabbage-tree Palm Forest with a mesomorphic understorey.

2.4 Fauna

Grey Gums, a notable feature of Algona Reserve, form a stand in the mown upper part of the Reserve. These are favoured Koala food trees and their claw marks can be seen incised into the trunks. These trees also have hollows suitable for other arboreal mammals, as indicated by numerous smaller scratch marks, and may be used by Sugar Gliders or the threatened Squirrel Glider. Although the understorey is severely weed infested by Lantana, it would still provide cover for small birds, reptiles and frogs.

Council's Habitat and Wildlife Corridor Conservation Strategy maps the Reserve as "Corridor - Co1" which indicates corridors or habitat areas though disturbed are likely to be of value due to good crown cover and/or understorey.

2.5 Aboriginal and Non-Aboriginal Sites

Although there are no recorded Aboriginal sites within the Reserve, there is potential for sites such as axe grinding grooves and engravings to occur in the area. There are no known sites of European Heritage in the Reserve.

3.0 Significance and Objectives

3.1 Statement of Significance

Algona Reserve is significant because

- ❖ it contributes to the landscape quality of Salt Pan Cove with extensive views of Pittwater and acts as a visual backdrop to the Eastern Foreshore of Pittwater.
- ❖ It protects a small example of bushland containing regionally significant species, namely of Cabbage Tree Palms stands which are very restricted in Pittwater.
- ❖ it provides a record of the original landscape and the changes wrought by settlement and development.
- ❖ it acts as a local refuge for fauna and is a stepping stone between larger areas of habitat due to its position between the ridgeline and foreshore.
- ❖ it contains a significant number of Grey Gums, a favoured Koala food tree, and habitat for arboreal mammals including Squirrel Glider.
- ❖ it is a contact point with nature for residents and an educational resource.

3.2 Management Objectives

The management objectives for Algona Reserve are

- ❖ to maintain viable habitat for native fauna, particularly Koalas and Squirrel Gliders
- ❖ to protect the natural, cultural and landscape features of the Reserve.
- ❖ to maintain the natural range of structural and floristic diversity of bushland in the Reserve.

- ❖ to conserve the regionally significant species, namely of Cabbage Tree Palms stands which are very restricted in Pittwater.
- ❖ to adequately manage the bushland in relation to encroachments and weed invasion.
- ❖ to utilise fire to maintain the diversity of native plants in the Reserve to conserve native flora and fauna,
- ❖ to control introduced animals in the Reserve.
- ❖ to provide opportunities for low impact recreational and educational use of the Reserve consistent with the other objectives, and
- ❖ to encourage community appreciation and neighbourhood participation in bushland management in the Reserve

4.0 Management Issues

4.1 Weed Invasion & Bush Regeneration

A dense understorey of Lantana occupies the top area of the Reserve. The shady creekline areas feature a diversity of native plants but are moderately weed infested with Wandering Jew and Fishbone Fern are present. Below Birudi Crescent on the drier slopes, weed infestation occurs adjacent to edge disturbances near residential property boundaries, and includes Lantana, Mother of millions, Asparagus Fern and Jasmine.

Some weeding has been initiated in the middle section of the Reserve. Difficult access is an important consideration for an assisted bush regeneration program for this Reserve. Weeding should commence in the least weed infested areas of bush, slowly and systematically moving outward as these stabilize.

4.2 Eucalypt Dieback

Dieback occurring along the creekline should be regularly monitored as part of Council's Tree Preservation Officer's programme

4.3 Stormwater Management

Sydney Water used the reserve for drainage pipes, which has resulted in weed infestation. The creeklines are fed by 5 stormwater outlets, from Birubi Crescent, Algona Crescent, de Laureat Avenue and Joanne Place, which directs urban runoff from roads and residential properties into the Reserve

4.4 Fire Regime

Management of the fire regime in the Reserve will be undertaken by the Warringah Pittwater Bush Fire Management Committee in accordance with Circular C10 - Planning for Bush Fire Prone Areas. The Reserve will be regularly monitored for fuel loadings and any hazard reductions required will be undertaken in accordance with the Draft Fuel Management Plan. Ecological considerations will be assessed by Council Environmental Staff to determine methods of hazard reduction and co-ordinate a follow up bush regeneration programme if fire is used. The reduction of habitat by fire may be detrimental to native fauna if unplanned. In addition, the creeklines generally should not be burnt

4.5 Management of Native Fauna and Introduced Predators

Algona Reserve provides good habitat for fauna with a variety of habitat components. The open forest and rainforest plants encourage diversity and year-round food availability. A regeneration program is critical to allow fauna movement through the understorey to the eucalypts for species such as Koalas. A Pittwater wide public awareness campaign will address the value of bushland as habitat for fauna and how residents can be responsible neighbours by ensuring that domestic cats and dogs do not roam in the Reserve. Compliance signs can assist this. Feral cat and fox predation is an issue that needs to be addressed through a Pittwater-wide control strategy

4.6 Access, Walking Tracks and Recreation

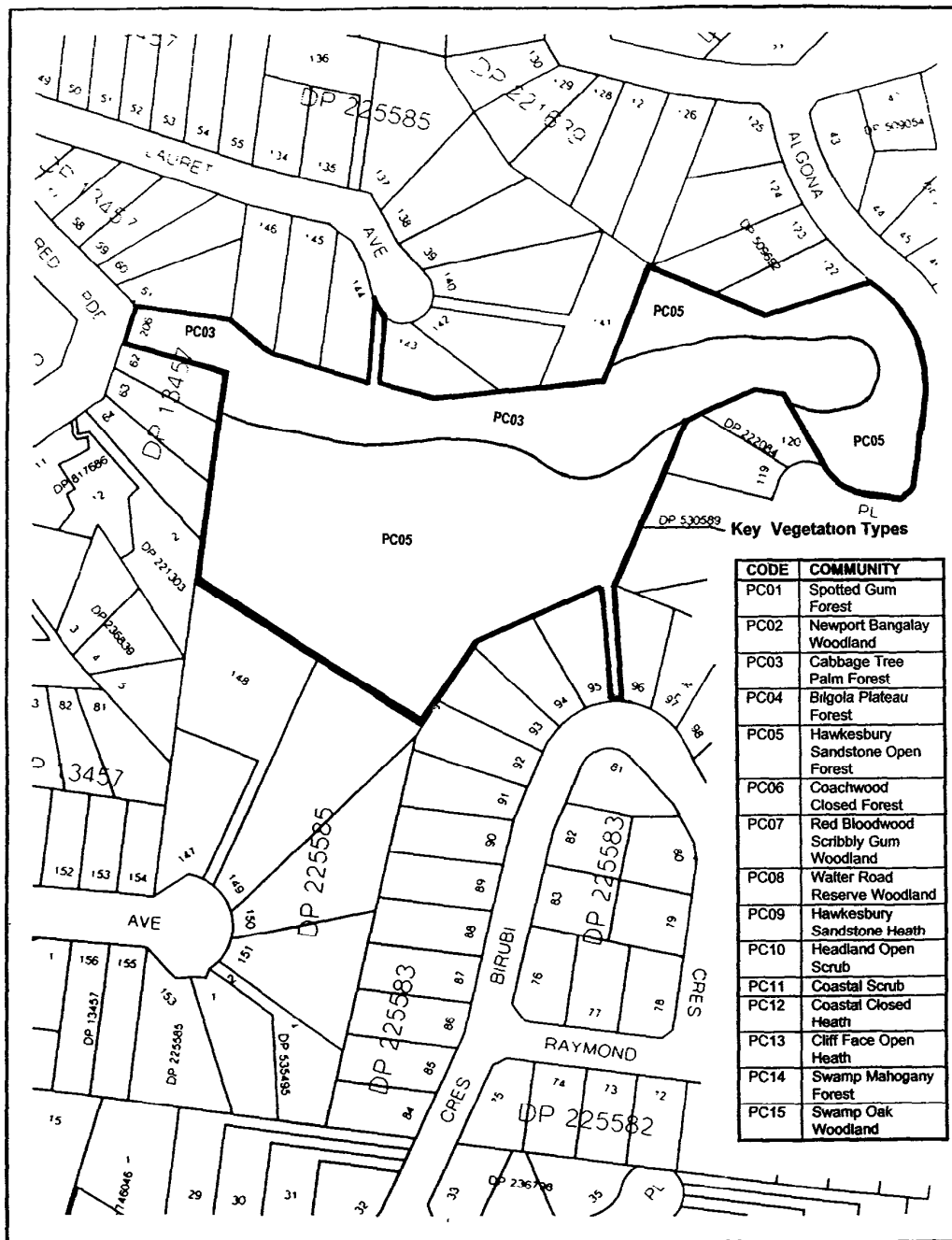
There is a swing set in the south-east corner of the Reserve, at the corner of Algona Crescent and Joanne Place. This requires review. Two access paths end behind property boundaries and there are no tracks within the Reserve


4.7 Boundaries and Neighbours

There are many encroachments in the Reserve. These require investigation and restoration, as they are illegal and threaten the integrity of the bushland. A good neighbour approach will be taken to restoring the encroachments

5.0 Performance

Management objectives	Performance Targets (Actions)	Responsibility	Completion date	Capital cost	Recurrent Cost	Performance Measures
Weed control & bush regeneration	Commence a contract regeneration of fauna habitat	Natural Resources	1997/98	\$2,000	\$500	Bushland actively regenerated
Management of native fauna & introduced predators	Public awareness campaign re responsible pet ownership Feral animal control program	Natural Resources	As part of a Pittwater wide campaign		Costed within a Pittwater wide feral animal control program	Extant fauna populations
Fire management	Maintain safe fuel levels	Fire Control & Natural Resources	Ongoing	NA	Staff time	Life & property protected & biodiversity maintained
Access & walking tracks	Review playground	Natural Resources & Reserves	Ongoing			Appropriate use of reserve
Boundaries & neighbours	Restore encroachments	Natural Resources	As funds available			Improved viability of Reserve



Urban Bushland Plan of Management			
Map	Vegetation Communities	Scale	12000
Locality	Algonia Reserve Newport	Date	July 1997
		 Pittwater Council	

Fauna Species List Newport

Key

Record

APM - Angophora Reserve Plan of management. L - likely to occur

Status

R=resident F=frequent visitor W=winter migrant

O=occasional or uncommon visitor S=summer migrant

Bold = regionally significant species **Bold Italic** = Schedule 12 species

* - introduced species

Common Name	Scientific Name	Record	Status
Birds			
Spotted Turtle-dove *	Streptopelia chinensis	APM	F
Sulphur-crested Cockatoo	Cacatua galerita	APM	F
Little Correla	Cacatua sanguinea	APM	F
Galah	Cacatua roseicapilla	APM	F
Australian King-Parrot	Alisterus scapularis	APM	F
Crimson Rosella	Platycercus elegans	APM	F
Eastern Rosella	Platycercus eximius	APM	O
Scaly-breasted Lorikeet	Trichoglossus chlorolepidotus	APM	O
Rainbow Lorikeet	Trichoglossus haematodus	APM	F
Common Koel	Eudynamis scolopacea	APM	S
Channel-billed Cuckoo	Scythrops novaehollandiae	L	S
Southern Boobook	Ninox novaeseelandiae	APM	R
Powerful Owl	<i>Ninox strenua</i>	L	O
Tawny Frogmouth	Podargus strigoides	L	R
Spine-tailed Swift	Hirundapus caudacutus	L	S
Kookaburra	Dacelo novaeguinea	APM	R
Sacred Kingfisher	Halcyon sancta	L	S
Dollarbird	Eurystomus orientalis	APM	S
Black-faced Cuckoo-shrike	Coracina novaehollandiae	APM	R
Golden Whistler	Pachycephala pectoralis	APM	R
Grey Fantail	Rhipidura fuliginosa	L	R
Rufous Fantail	Rhipidura rufifrons	L	S
Eastern Whipbird	Psophodes olivaceus	APM	R
Superb Fairy-wren	Malurus cyaneus	APM	R
Variegated Wren	Malurus lamberti lamberti	APM	F
White-browed Scrubwren	Sericornis frontalis	APM	R
Brown Thornbill	Acanthiza pusilla	APM	R
Eastern Spinebill	Acanthorhynchus tenuirostris	L	R
Red Wattlebird	Anthochaera carunculatus	APM	R
Little Wattlebird	Anthochaera chrysoptera	APM	R
Yellow-faced Honeyeater	Lichenostomus chrysops	APM	W
Noisy Miner	Manorina melanocephala	APM	R
White-naped Honeyeater	Melithreptus lunatus	APM	W
Noisy Friarbird	Philemon corniculatus	APM	R
White-cheeked Honeyeater	Phylidonyris nigra	L	F
New Holland Honeyeater	Phylidonyris novaehollandiae	L	F
Mistletoebird	Dicaeum hirundinaceum	APM	O
Spotted Pardalote	Pardalotus punctatus	APM	F
Silvereye	Zosterops lateralis	APM	F
Red-browed Finch	Emblema temporalis	L	F
Common Mynah	Acridotheres tristis	APM	R
Olive-backed Oriole	Oriolus sagittatus	L	S
Spangled Drongo	Dicrurus hottentotus	L	S

Urban Bushland Inventory and Action Plan –Fauna Species List, Newport

Grey Butcherbird	Cracticus torquatus	APM	R
Australian Magpie	Gymnorhina tibicen	APM	R
Pied Currawong	Strepera graculina	APM	R
Australian Raven	Corvus coronoides	APM	R
Mammals			
Sugar Glider	Petaurus breviceps	UBS	R
Squirrel Glider	Petaurus norfolcensis	L	F
Common Ringtail Possum	Pseudocheirus peregrinus	APM	R
Common Brushtail Possum	Trichosurus vulpecula	UBS	R
Koala	Phascolarctos cinereus	UBS	R
Long-nosed Bandicoot	Perameles nasuta	APM	R
House Mouse	Mus domesticus	L	R
Black Rat	Rattus rattus	APM	R
Grey-headed Flying-fox	Pteropus poliocephalus	APM	O
Gould's Wattled Bat	Chalinolobus gouldii	F	R
Reptiles			
Eastern Water Dragon	Physignathus lesseuri	L	R
Eastern Water Skink	Eulamprus quoyii	APM	R
Copper-tailed Skink	Ctenotus taeniolatus	APM	R
Grass Skink	Lampropholis delicata	APM	R
Weasel Skink	Saproscincus mustelina	L	R
Blue-tongued Lizard	Tiliqua scincoides	L	R
Eastern Long-necked Tortoise	Chelodina longicollis	L	R
Frogs			
Common Eastern Froglet	Crinia signifera	APM	R
Brown-striped Frog	Limnodynastes peronii	APM	R
Green Tree Frog	Litoria caerulea	L	R
Peron's Tree Frog	Litoria peronii	L	R

Morella Reserve, Palm Beach

Reserve Number: 0023

Street Address 230A & 251A Whale Beach Road. Palm Beach

1.0 Description and Category

1.1 Location and Description

Morella Reserve is located above Whale Beach on the escarpment. It is bounded by residential properties on Whale Beach Road, Morella Road and Bynya Road. The steep sloping Reserve occupies 1.2 hectares.

1.2 Land Tenure and Property Description

Morella Reserve is owned by Council, being described as a Public Park in DP 15376. There are two reservations adjoining the Reserve and they are described as Reservation for drainage and access off Whale Beach Road and Reservation for access and drainage off Bynya and Morella Roads. The land is zoned 6(a) Open Space - Existing Recreation A.

1.3 Category of Land

The Reserve is community land under the Local Government Act 1993. It is categorised as a natural area and further categorised as bushland, escarpment and watercourse. It meets the definition of urban bushland described in State Environmental Planning Policy No 19 - Bushland in Urban Areas.

2.0 Natural and Cultural Heritage

2.1 Topography, Geology and Soils

Morella Reserve is on an east facing escarpment that extends from the sandstone crest down a steep slope. The escarpment has an undulating form defining the drainage and seepage lines. Numerous rock outcrops and boulders occur on the upper slopes. The parent geology of the crest and upper slopes is Hawkesbury Sandstone which is characterised by medium to coarse grained quartz sandstone.

This geology has given rise to the sandy porous soils of the Gynea soil landscape. The lower

slopes are characterised by the geology of the Newport Formation in the Narrabeen Group, where the shales and sandstones have given rise to the red, brown or gleyed podsols of the Watagan soil landscape. The soils are deeper on the lower part of the Reserve where they are influenced by the sandier soils of the upper slopes.

2.2 Hydrology

The Reserve lies within the steep upper to mid catchment of Whale Beach. The drainage lines are ephemeral responding to runoff or sourced from strong areas of seepage. The coastal location has resulted in an orthographic effect, raising general moisture levels.

2.3 Vegetation

The vegetation varies with changes in aspect and increasing exposure. Hawkesbury Sandstone Open-woodland dominated by Smooth-barked Apple (*Angophora costata*) and Hawkesbury Sandstone Heath is present, dominated by Heath-leaved Banksia (*Banksia ericifolia*), Old Man Banksia (*B. serrata*), Scrub She-oak (*Allocasuarina distyla*) and Blueberry Ash (*Elaeocarpus reticulatus*) occurs at the top of the Reserve. Further down the Reserve Newport Bangalay Woodland occurs dominated by *Eucalyptus botryoides*. In areas of impeded drainage, Umbrella Fern (*Sticherus flabellatus*) is common in the groundlayer.

2.4 Fauna

Due to its proximity to McKay Reserve and its rocky outcrops and thick vegetative cover, Morella Reserve has suitable habitat for a range of fauna species. The thick undergrowth provides important refuge for small insectivorous birds and the Long-nosed Bandicoot. Autumn winter migrating birds such as the White-naped Honeyeater would be attracted by winter

flowering species such as Bangalay as they prepare to cross Broken Bay to the larger areas of bushland further north. Snakes and lizards are favoured by the Reserve's extensive rocky

outcrops. The threatened Common Bent-wing Bat, which has been recorded at McKay Reserve, would also forage for insects above the Reserve's canopy.

Council's Habitat and Wildlife Corridor Conservation Strategy maps the Reserve as "Corridor - Co1" which indicates corridors or habitat areas though disturbed are likely to be of value due to good crown cover and/or understorey.

2.5 Aboriginal and Non-Aboriginal Sites

There are no recorded Aboriginal sites within Morella Reserve. There is potential for Aboriginal sites such as axe grinding grooves and engravings to occur in the area. There are no known European Heritage sites in the Reserve.

3.0 Significance and Objectives

3.1 Statement of Significance

Morella Reserve is significant because

- ❖ it provides an example of diverse urban bushland and a record of the pre-European landscape in the Palm and Whale Beach area.
- ❖ it protects the escarpment of Whale Beach and provides visual amenity and an essential backdrop creating part of the landscape character of Whale Beach.
- ❖ it acts as a local refuge for native fauna, especially the threatened Common Bent-wing bat and the regionally significant Long-nosed Bandicoot.
- ❖ it provides an important corridor link for migratory birds such as the White-naped Honeyeater along the coastal escarpment,
- ❖ it is an educational resource and a contact point with nature for residents, and

- ❖ it allows urban residents to undertake informal recreational pursuits in a bushland setting with panoramic ocean views

3.2 Management Objectives

The management objectives for Morella Reserve are

- ❖ to protect the natural and landscape features of the Reserve,
- ❖ to maintain a natural range of structural and floristic diversity of bushland in the Reserve,
- ❖ to protect the reserve's habitat values for native fauna, especially the threatened Common Bent-wing bat and the regionally significant Long-nosed Bandicoot.
- ❖ to provide naturally vegetated links for migratory birds such as the White-naped Honeyeater as part of a corridor system on the peninsula.
- ❖ to adequately manage the bushland in relation to encroachments, stormwater pollution and weed invasion.
- ❖ to utilise fire to maintain the diversity of native plants in the Reserve to conserve native flora and fauna,
- ❖ to control introduced animals in the Reserve.
- ❖ to provide opportunities for low impact recreational, and educational use of the Reserve consistent with other objectives,
- ❖ to encourage community and neighbour participation in bushland management in the Reserve

4.0 Management Issues

4.1 Weed Invasion and Bush Regeneration

Builders' rubble, stormwater discharge and septic seepage have contributed to bushland degradation. The steep nature of the Reserve has enabled weeds, either as garden escapes or from vegetation dumping, to spread and establish along drainage lines. Weed species include Crofton Weed, Turkey Rhubarb, Blackberry, Lantana, Pampas Grass, Banana and Coral Tree. Access is an important consideration when developing a bush regeneration plan for this steeply sloping Reserve. Weeds should be targeted systematically down the full length of drainage lines.

4.2 Stormwater Management

Development along the ridgeline on the thin sandstone soils has changed the hydrology in Morella Reserve. In addition to stormwater, until recently septic system seepage contributed to water quality degradation. The increased volume and stormwater outlets do not necessarily relate to natural drainage lines. Stormwater detention or redirection will aid the long term health of the bush.

4.3 Fire Regime

Management of the fire regime in Morella Reserve will be undertaken by the Warringah Pittwater Bush Fire Management Committee in accordance with Circular C10 - Planning for Bush Fire Prone Areas. The Reserve will be regularly monitored for fuel loadings and any hazard reductions required will be undertaken in accordance with the Draft Fuel Management Plan. Ecological considerations will be assessed by Council Environmental Staff to determine methods of hazard reduction and co-ordinate follow up bush regeneration work.

4.4 Management of Native Fauna and Introduced Predators

Morella Reserve provides good habitat for fauna with a variety of habitat components. The winter flowering Banksias and rainforest plants encourage diversity and year-round food availability. A Pittwater wide public awareness campaign will address the value of bushland as habitat for fauna and how residents can be responsible neighbours by ensuring that domestic cats and dogs do not roam in the Reserve. Feral cat and fox predation is an issue that needs to be addressed through a Pittwater-wide control strategy.

4.5 Access, walking tracks and recreation

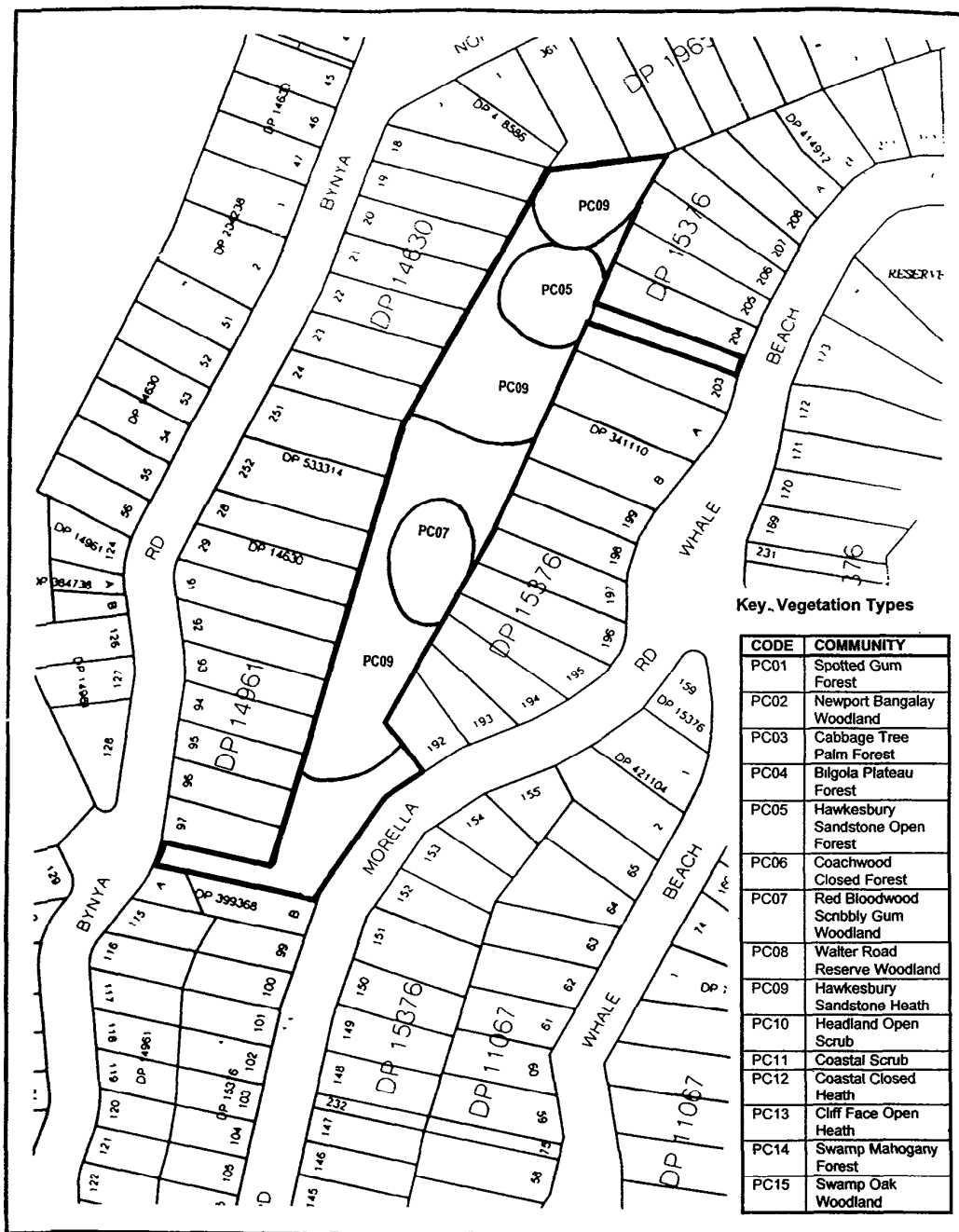
There are no formal tracks in the Reserve. The Reserve is a visual rather than recreational amenity as the limited access is steep and difficult. Tourists and birdwatchers make use of vantage points and the beach below.

4.6 Boundaries and neighbours

Residents should be encouraged to alter stormwater outlets and to curb vegetation dumping which is linked to weed infestation and increased fire hazard. Several residences have encroached on the Reserve, occupying easy access areas. Reserve encroachments are illegal and compromise the integrity of the bushland.

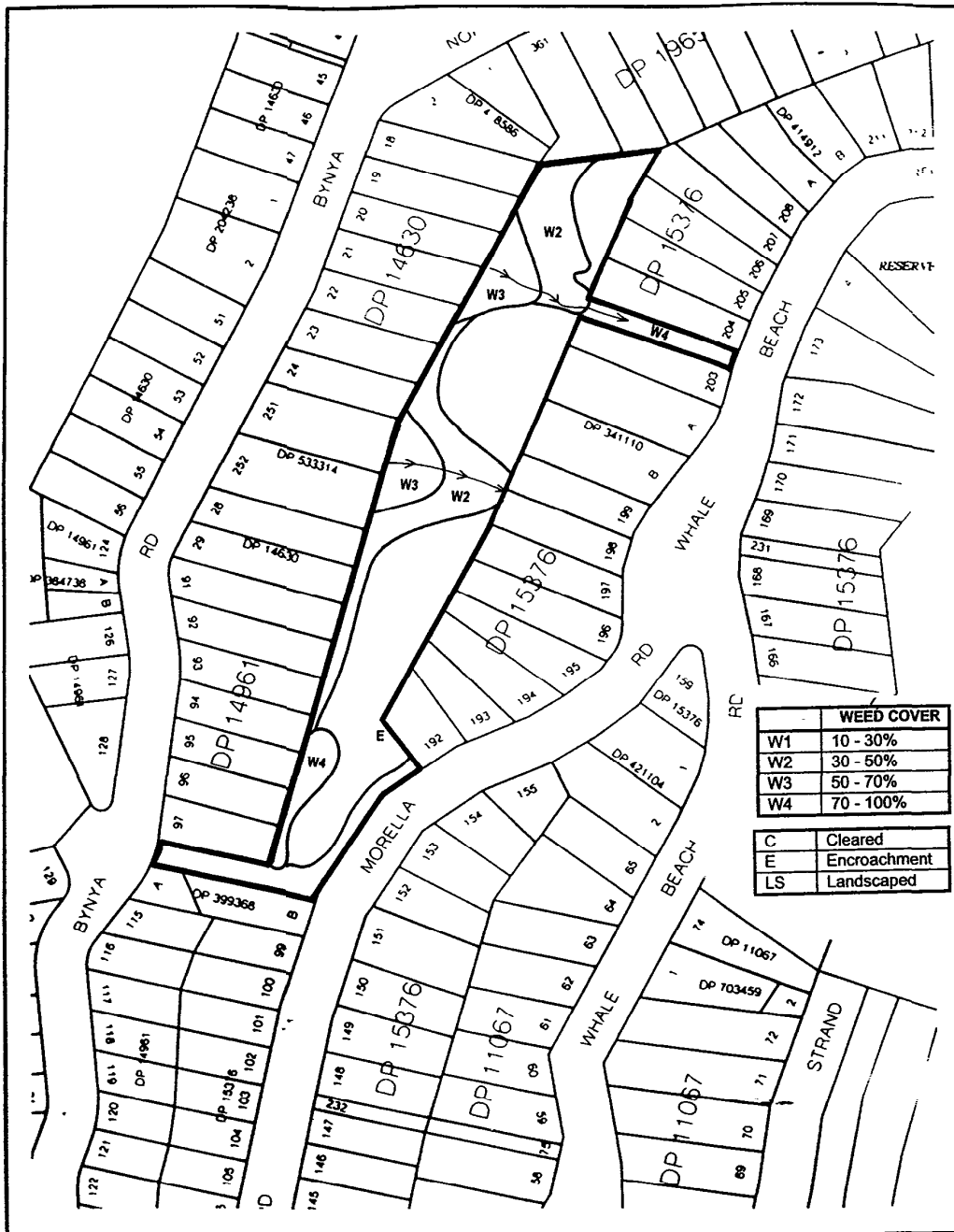
5.0 Performance


Management Objectives	Performance Targets (Actions)	Responsibility	Completion date	Capital cost	Recurrent Cost	Performance Measures
Weed Control & Bush Regeneration	Initiate a bush regeneration program	Natural Resources	When funds secured	Seek detailed costs of contract program	As required	Regeneration program commenced
Management of native fauna & introduced predators	Public awareness campaign for responsible pet ownership & feral animal program	Natural Resources & Compliance	When funds available as well as ongoing programs	Ongoing	Costed within a Pittwater wide feral animal control program	An increase in native fauna in the Reserve
Fire Management	Ensure appropriate fire regime	Natural Resources & Fire Control	Ongoing		Staff time	Fire regime protects property & biodiversity
Boundaries & neighbours	Encourage community awareness re stormwater outlets & vegetation dumping, and regain encroachments	Natural Resources & Compliance	Ongoing & when funds available		Staff time	Good resident practices and encroachments regained



Urban Bushland Plan of Management		
Map Vegetation Communities	Scale 12000	Date JULY1997
Locality Morella Park Palm Beach		





Urban Bushland Plan of Management			 Pittwater Council
Map	Weeds	Scale 12000	
Locality Morella Park Palm Beach		Date JULY1997	

Wiltshire Park, Palm Beach

Reserve Number: 0015

Street Address: Between 40 & 44 Florida Road, Palm Beach

1.0 Category and Description

1.1 Location and Description

Wiltshire Park is located at the southern end of Cabbage Tree Boat Harbour, at south Palm Beach, and occupies 0.7ha. Boundaries are defined by Ocean Road, which separates the Reserve from the beach. Florida Road and residential properties. The Reserve is easily accessed by formed paths and has a small developed area.

1.2 Land Tenure and Property Description

The Reserve is owned by Council, and is described as Lot 84 in DP 6745, Lot 92 in DP 6937 and Lot 92a (Drainage Reserve) in DP 6937, which is zoned 6 (a) Open Space - Existing Recreation A. It is also further described by Part of Lot 93 in DP 6937 which is zoned 2 (a) Residential.

1.3 Category of Land

The Reserve is community land under the local Government Act 1993. It is categorised as a natural area and further as bushland and watercourse. It meets the definition of urban bushland described in State Environmental Planning Policy No. 19 - Bushland in Urban Areas.

2.0 Natural and Cultural Heritage

2.1 Topography, Geology and Soils

Wiltshire Park extends from mid slope to the lower colluvial slopes above the coastal dune system along via a steeply to gently sloped creek line. The geology is the Newport Formation shales and sandstones of the Narrabeen Group.

The fine-grained sediments form yellow podsols on sandstone and brown, red and gleyed

podsoils. These soils have been mapped as the Watagan soil landscape and present a severe erosion hazard if disturbed, whilst the slopes are prone to mass movement. The soils of the lower part of the reserve are influenced by the deep sandy podsols of the Tuggerah soil landscape, which present an extreme erosion hazard if disturbed.

2.2 Hydrology

The Reserve is at the lower end of the catchment and there is a creek line that discharges into the ocean.

2.3 Vegetation

The vegetation at Wiltshire Park is Spotted Gum Forest with a significant component of rainforest species. Dominant species are Spotted Gum (*Corymbia maculata*) and Cabbage-tree Palm (*Livistona australis*). Associated tree species are Cheese Tree (*Glochidion ferdinandi*), Blueberry Ash (*Elaeocarpus reticulatus*), Bolworra (*Eupomatia laurina*) and Rough-barked Apple (*Angophora floribunda*). The understorey comprises a small tree layer of medium density, a shrub layer of medium density dominated by exotic species and a ground layer of high density dominated by ferns. Native shrubs and climbers present include Breyenia (*Breyenia oblongifolia*), Sweet Pittosporum (*Pittosporum undulatum*), *Stephania japonica* ssp. *discolor*, Scrambling Lily (*Geitonoplesium cymosum*) and Golden Guinea Flower (*Hibbertia scandens*). Ground layer species include False Bracken Fern (*Calochlaena dubia*), Blady Grass (*Imperata cylindrica*), Kidney Weed (*Dichondra repens*) and Scurvy Weed (*Commelina cyanea*).

The Spotted Gum Forest is considered significant in NSW. Cabbage-tree Palm is a regionally significant species and Bolworra is a locally significant species.

2.4 Fauna

The small reserve dominated by Spotted Gum and Cabbage-tree Palms are therefore likely to attract a range of bird species including Topknot Pigeons, honeyeaters and vagrant lorikeets. Squirrel Gliders may also occur locally due to the presence of Coast Banksia, an important winter flowerer, and tree hollows that are used for shelter. The thick though weed-infested understorey would provide shelter for reptiles, small birds and frogs.

Council's Habitat and Wildlife Corridor Conservation Strategy maps the Reserve as "Corridor R" which indicates smaller Reserves likely to have very modified habitat or suffering adverse edge effects. These can be enhanced by a planting program or by allowing natural regeneration.

2.5 Aboriginal Sites and Non-Aboriginal Sites

There are no recorded Aboriginal sites within the Reserve, although there is potential for sites such as axe grinding grooves and engravings to occur in the area. There are no known sites of European Heritage in the Reserve.

3.0 Significance and Objectives

3.1 Statement of Significance

Wiltshire Park is significant because

- ❖ it contributes to the landscape quality Palm Beach and provides a record of the original landscape and the changes wrought by urban development,
- ❖ it contains significant vegetation communities and species, namely Spotted Gum Forest which has conservation significance at State level, Cabbage-tree Palm a regionally significant species, and Bolworra a locally significant species
- ❖ It provides habitat for a wide diversity of native fauna species in the context of urban bushland in the Sydney Region.
- ❖ it provides suitable habitat for significant species of fauna including Squirrel Glider, an endangered population on the Barrenjoey

Peninsula, and the regionally significant Topknot Pigeon.

- ❖ it forms part of an important faunal corridor link to remnant coastal woodland and forest habitats near northern limit of the peninsula
- ❖ it is an educational resource and a contact point with nature for residents, and
- ❖ it allows urban residents to undertake informal recreational pursuits in a littoral bushland setting

3.2 Management Objectives

The management objectives for Wiltshire Park are

- ❖ • to protect the natural features of the Park, particularly the significant plant communities and species and habitat values for significant fauna.
- ❖ • to maintain a natural range of structural and floristic diversity of bushland within the Park.
- ❖ to maintain and enhance the wildlife corridor function of the Park.
- ❖ to adequately manage the bushland/ urban interface in relation to encroachments, weed management and stormwater management.
- ❖ to protect human life and property in and adjacent to the Park and maintain ecological processes in the Park by seeking to maintain a near-natural fire regime in the body of the Park and aim to ensure that no species of plant or animal becomes extinct in the Park as a result of the fire regime,
- ❖ to control introduced animals within the Reserve,
- ❖ to provide opportunities for low impact recreational, scientific and educational use of the Park,
- ❖ to encourage community and neighbour participation in bushland management, and

- ❖ to maintain the formal path which provides access through the Park to the beach

4.0 Management Issues

4.1 Weed Invasion & Bush Regeneration

Many of the trees and emergent palms are being suppressed by a thick weed layer dominated by Morning Glory and Lantana, and a range of garden escapes, particularly Honeysuckle. A ground layer of Palm Grass is well established in the shadier areas of the Reserve. Other weed species present include Camphor laurel, Coral Tree, Giant Bamboo, Large-leafed Privet, Small-leafed Privet, Fish-bone Fern, Crofton Weed, Wandering Jew and Impatiens.

A small area on a western slope that is least affected by weeds, shows the greatest potential for a program of assisted bush regeneration. Restoration is hampered by the path and numerous drainage lines, which fragmented the Park, and long boundaries that provide edge disturbance. Areas that are to be worked will be determined by accessibility, and should be clearly delineated with objectives clarified. Weeded areas should then be gradually expanded.

4.2 Stormwater Issues

The Reserve has been highly modified along the full length of creek by construction of an open concrete channel to contain water flow. Weeds are well established in the highly disturbed soils in areas adjacent to the channel, and the vegetation community shows signs of stress, particularly as dieback in mature Eucalypts. The creek channelling has also changed the soil water regime, especially apparent on the curve towards the eastern portion of the Reserve where there is an area of impeded drainage. Revegetation with appropriate indigenous riparian species along the creek line would improve the appearance and viability of the plant communities of this bushland Reserve.

4.3 Fire Regime

Management of the fire regime in Wiltshire Park will be undertaken by the Warringah Pittwater Bush Fire Management Committee in accordance with Circular C10 - Planning for Bush Fire Prone Areas. The Reserve will be regularly monitored for fuel loadings and any hazard reductions required will be undertaken in accordance with the Draft Fuel Management Plan. Ecological considerations will be assessed by Council Environmental Staff to determine methods of hazard reduction. Following any burning within the Reserve a program to suppress weed growth will be commenced simultaneously.

4.4 Management of Native Fauna and Introduced Predators

A Pittwater wide public awareness campaign will address the value of bushland as habitat for fauna and how residents can be responsible neighbours by ensuring that domestic cats and dogs do not roam in the Reserve. Interpretive signs can assist this. Feral cat and fox predation is an issue that needs to be addressed through a Pittwater-wide control strategy.

4.5 Access, walking tracks and recreation.

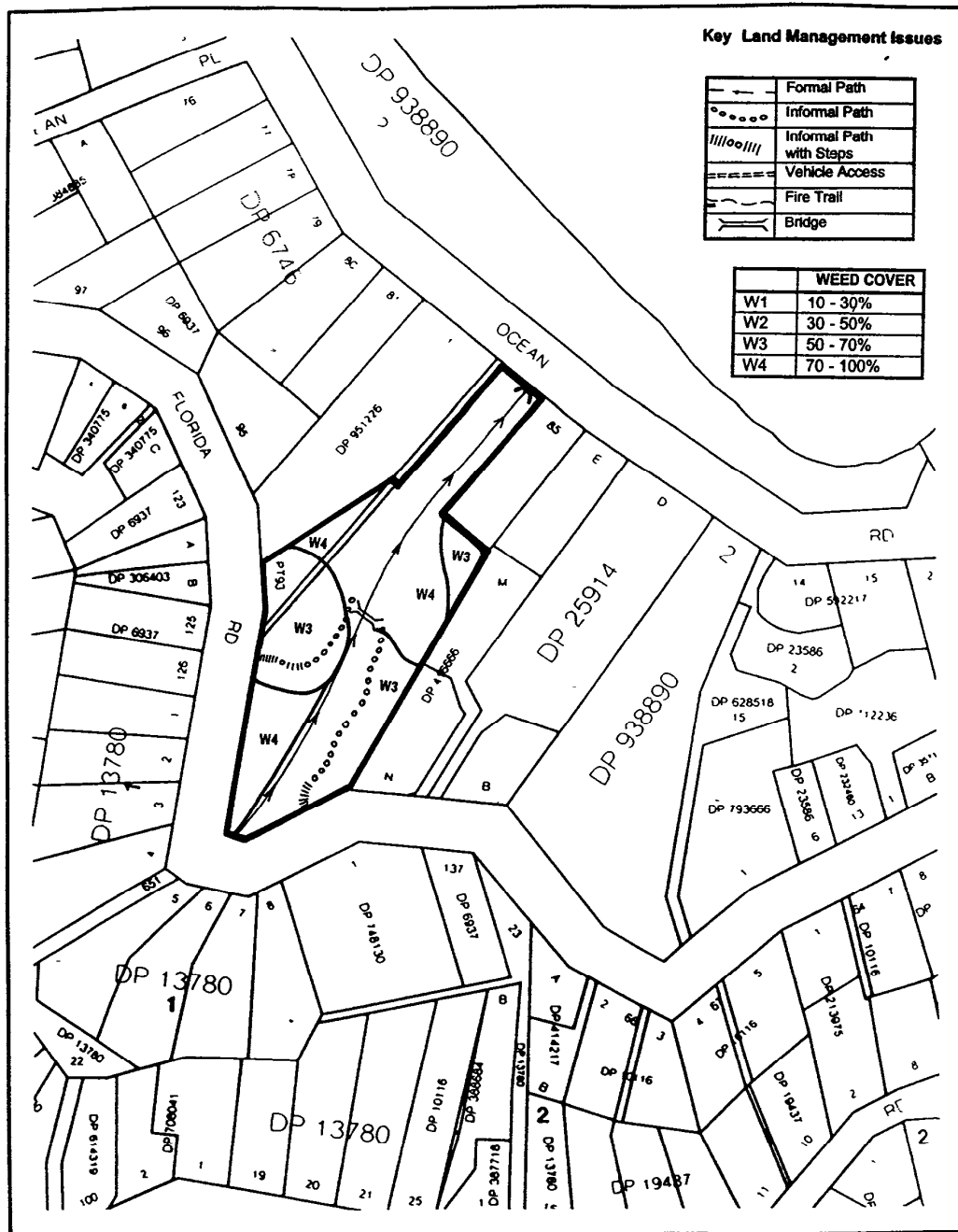
An established track provides access between the beach and Florida Road with a timber bridge over the channel. Lawn, used by picnickers and beach goers, dominates the front of the Reserve. Close by, retaining works have been used to stabilise the bank and pathway.


4.6 Boundaries and neighbours

There is a need for a bush friendly campaign to improve the awareness of residents about the value of bushland and the effect their actions may have on its integrity, in particular the damage caused by vegetation dumping and resultant weed invasion and fire hazard.

5.0 Performance

Management Objectives	Performance Targets (Actions)	Responsibility	Completion date	Capital cost	Recurrent Cost	Performance Measures
Weed Control & Bush Regeneration	Initiate a bush regeneration program	Natural Resources	When funds secured	Seek detailed costs of contract program	As required	Regeneration program commenced
Management of native fauna & introduced predators	Public awareness campaign for responsible pet ownership & feral animal program	Natural Resources & Compliance	When funds available as well as ongoing programs	Ongoing	Costed within a Pittwater wide feral animal control program	An increase in native fauna in the Reserve
Fire Management	Ensure appropriate fire regime	Natural Resources & Fire Control	Ongoing		Staff time	Fire regime protects property & biodiversity
Access, walking tracks & recreation	Maintain track & bridge in safe condition	Natural Resources	As required		Seek detailed costs on an as needs basis	Safe walking access through the reserve
Boundaries & neighbours	Encourage community awareness re stormwater outlets & vegetation dumping	Natural Resources	Ongoing & when funds available		Staff time	Good resident practices and improved awareness of the bushland



Urban Bushland Plan of Management			
Map	Weeds Management Issues	Scale. 12000	Date JULY 1997
Locality Wilshire Park Palm Beach		 Pittwater Council	

Annie Wyatt Reserve, Palm Beach

Reserve Number 0019

Street Address Between 4 & 6 Rock Bath Road, Palm Beach

1.0 Description & Category

1.1 Location and Description

Annie Wyatt Reserve is located in Palm Beach and overlooks the ocean. Rock Bath Road provides easy access to this small perched Reserve. The Reserve occupies 0.7 hectares.

1.2 Land Tenure and Property Description

Annie Wyatt Reserve is described as Crown Reserve, R 67806, and is owned by the Department of Land and Water Conservation. Pittwater Council has care, control and management. The land is zoned 6(a) Open Space - Existing Recreation A.

1.3 Category of Land

The Reserve is managed according to the principles of Crown land management under the Crown Lands Management Act, 1989. For consistency with the management of other Council bushland reserves, it is also managed as community land under the Local Government Act 1993. It is categorised as a natural area and further categorised as bushland. It meets the definition of urban bushland described in State Environmental Planning Policy No 19 - Bushland in Urban Areas.

2.0 Natural & Cultural Heritage

2.1 Topography, Geology and Soils

Annie Wyatt Reserve is located on a spur running north-east from a broad convex ridgeline above Whale Beach and Palm Beach. Moderately inclined sideslopes and wide benches occur over most of the Reserve before an increasingly steep scarp to the rock platform below Whale Beach Road.

The underlying geology is Hawkesbury Sandstone which is characterised by medium

coarse quartz sandstone with minor shale lenses. This geology gives rise to the shallow yellow earths and earthy sands of the Gynea soil landscape.

2.2 Hydrology

Though the Reserve is on a spur, ephemeral drainage lines exist from frequently broken benches creating drainage lines and seepage at rock benches.

2.3 Vegetation

The vegetation in Annie Wyatt Reserve is a type of Sydney Sandstone Ridgetop Woodland. The dominant species are Broad-leaved White Mahogany (*Eucalyptus umbra*) and Red Bloodwood Scribbly Gum (*E. haemastoma*) is also present.

There is a shrub layer of low to medium density and a ground layer of medium density. Common shrubs include Needle Bush (*Hakea senecioea*), Pink Spider Flower (*Grevillea senecioea*), Heath-leaved Banksia (*Banksia ericifolia*) and Tick Bush (*Kunzea ambigua*). Common ground layer plants include *Xanthorrhoea media*, Burrawang (*Macrozamia communis*), Wiry Panic (*Entolasia stricta*), and Bracken Fern (*Pteridium esculentum*).

2.4 Fauna

Important habitat features in this Reserve are its diverse thick shrub and groundcover layers and rocky outcrops. These make Annie Wyatt Reserve a small refuge for resident species such as skinks as well as providing nectar for passing honeyeaters and nocturnal species such as micro-bats. Long-nosed Bandicoot diggings are present in the Reserve.

Council's Habitat and Wildlife Corridor Conservation Strategy maps the Reserve as "Corridor - Co1" which indicates corridors or habitat areas though disturbed are likely to be of

value due to good crown cover and / or understorey

2.5 Aboriginal and Non-Aboriginal Sites

There are no recorded Aboriginal sites within the Reserve although there is potential for sites such as axe grinding grooves and engravings to occur in the area. Although there are no known European heritage sites, the Reserve is culturally significant as it was named after one of the founders of the National Trust who donated the land for conservation purposes.

3.0 Significance & Objectives

3.1 Statement of Significance

Annie Wyatt Reserve is significant because

- ❖ it conserves a small sample of bushland in a similar condition to that when the area was first settled.
- ❖ it contributes to the landscape quality of Palm Beach,
- ❖ it provides panoramic views to the ocean in an urban bushland setting,
- ❖ it provides habitat for a range of native fauna species in the context of urban bushland in the Pittwater area and forms part of a movement corridor for fauna.
- ❖ it is an educational resource and a contact point with nature for residents, and
- ❖ it allows urban residents to undertake informal recreational pursuits in a coastal bushland setting

3.2 Management Objectives

The management objectives for Annie Wyatt Reserve are

- ❖ to maintain a natural range of structural and floristic diversity of bushland within the Reserve,
- ❖ to adequately manage the bushland/ urban interface in relation to encroachments and weed invasion.
- ❖ to prevent damage to the Reserve from urban runoff, stormwater and pollution.
- ❖ to protect human life and property in and adjacent to the Reserve and maintain ecological processes in the Park by seeking to maintain a near-natural fire regime in the body of the Reserve and aim to ensure that no species of plant or animal becomes extinct in the Reserve as a result of the fire regime.
- ❖ to control introduced animals within the Reserve.
- ❖ to provide opportunities for low impact recreational and educational use of the Reserve.

4.0 Management Issues

4.1 Weed Invasion & Bush Regeneration

Weed infestation occurs along the perimeter of the Reserve and the track. Cassia, Campor Laurel, Fishbone Fern and Asparagus Fern occur on the track and the northern boundary. Oleander, Large-leaved Privet, Small-leaved Privet, Polygala, Jasmine and a dense groundlayer of Asparagus Fern are present along the southern boundary and are due to garden escapes established over a long period.

Assisted bush regeneration has occurred in the Reserve with Council staff undertaking an infrequent but regular weeding program. Weeds have been removed from the body of the Reserve. The track and the northern perimeter need to be weeded.

The road verge should occasionally requires light weeding along its length to prevent weeds establishing along this edge. The weed infestation in the southern section of the Reserve will require a major commitment that will entail primary weeding, with numerous follow-up visits and possible plantings along the boundary edge.

Residents walk from the Rock Bath Road entry and pathway through the Reserve to gain access to their dwellings. The Reserve is signposted and has bollards along the roadway. The ocean views and enclosing bush create a relaxing environment and the Reserve is frequently used by locals.

4.2 Stormwater Management

The access track and the lack of an adequate roadside swale have allowed stormwater runoff to impact on the northern area of the Reserve. By reinforcing the rim of the swale or otherwise limiting runoff from the road, degradation in this section of the Reserve will be reduced.

4.3 Fire Regime

Management of the fire regime in the Reserve will be undertaken by the Warringah Pittwater Bush Fire Management Committee in accordance with Circular C10 - Planning for Bush Fire Prone Areas. The Reserve will be regularly monitored for fuel loadings and any hazard reductions required will be undertaken in accordance with the Draft Fuel Management Plan.

Ecological considerations will be assessed by Council Environmental Staff to determine methods of hazard reduction. The perimeter should be weeded prior to a burn and a follow up bush regeneration program scheduled.

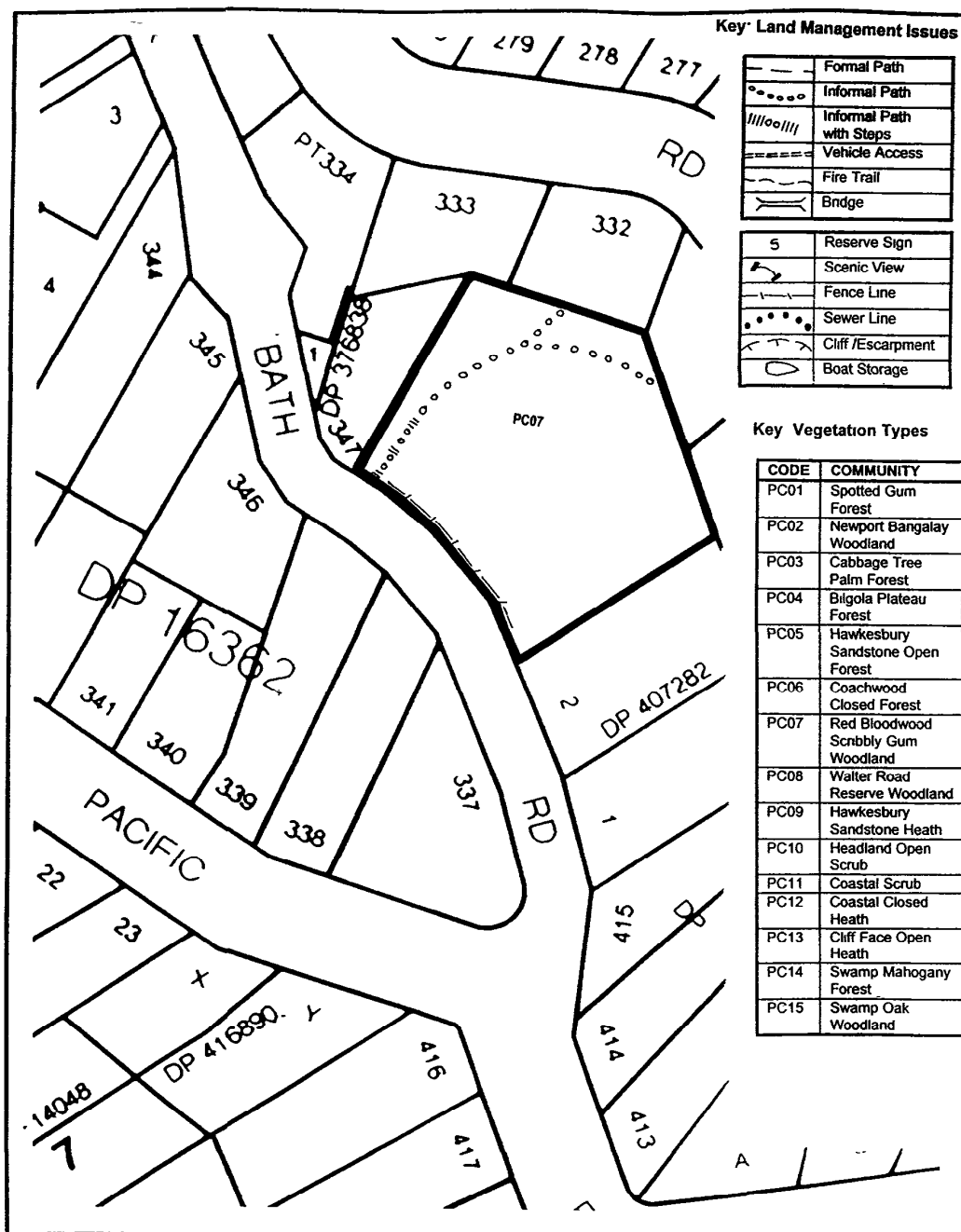
4.4 Management of Native Fauna and Introduced Predators


Annie Wyatt Reserve provides good habitat for fauna with a variety of habitat components available. A Pittwater wide public awareness campaign will address the value of bushland as habitat for fauna and how residents can be responsible neighbours by ensuring that domestic cats and dogs do not roam in the Reserve. Interpretive signs can assist this. Feral cat and fox predation is an issue that needs to be addressed through a Pittwater-wide control strategy.

4.5 Access, walking tracks and recreation

5.0 Performance

Management objectives	Performance Targets (Actions)	Responsibility	Completion date	Capital cost	Recurrent Cost	Performance Measures
Weed Control & Bush Regeneration	Continue current program & letterbox drop to initiate a volunteer group	Natural Resources	Ongoing Volunteer group when community demand	Staff time	\$1400pa supervision & materials when group commenced	Bushland actively regenerated Group commenced
Stormwater Management	Reinforce roadside swale	Engineers	When funds available	Seek detailed design & costs	Integrate into works & maintenance program	Reduced stormwater impact on Reserve
Management of native fauna & introduced predators	Public awareness campaign for responsible pet ownership & feral animal program Interpretive sign	Natural Resources & Compliance	When funds available as well as ongoing programs	Ongoing	Costed within a Pittwater wide feral animal control program	An increase in native fauna in the Reserve
Fire Management	Maintain appropriate fire regime	Bushfire Services & Natural Resources	Ongoing		Staff time	Fire regime that caters for safe fuel levels & conservation of plant & animal communities



Urban Bushland Plan of Management			
Vegetation Communities	Map Management issues	Scale 1:1000	Date JULY 1997
Locality Annie Wyatt Reserve Palm Beach		 Pittwater Council	

Hordern Park, Palm Beach

Reserve Number. 0016

Street Address. Adjacent to 38 Florida Rd, Palm Beach

1. Category & Description

1.1 Location and Description

Hordern Park is located at the southern end of Cabbage Tree Boat Harbour, Palm Beach and occupies 0.68ha. Boundaries are defined by Ocean Road, which separates the Reserve from the beach, Florida Road and residential properties. There is a small developed area with a formed path which extends to Florida Road.

1.2 Land Tenure and Property Description

The Reserve is owned by Council, being described as Lot 2 in FP 938890 (also known as Part Portion 18 in DP 8427). The land is zoned 6(a) Open Space - Existing Recreation A.

1.3 Category of Land

The Reserve is community land under the Local Government Act 1993. It is categorised as a natural area and further categorised as bushland and watercourse. It meets the definition of urban bushland described in State Environmental Planning Policy No 19 - Bushland in Urban Areas.

2.0 Natural and Cultural Heritage

2.1 Topography, Geology and Soils

Hordern Park extends from mid slope to the footslopes above the coastal dune system along a creekline. The gully sideslopes become longer and steeper initially then the footslope dominates the gradient. The soils of the initially gentle undulating landform are the deep sandy podsols of the Tuggerah soil landscape, which present an extreme erosion hazard if disturbed.

The geology of the colluvial footslope is the Newport Formation shales and sandstones of the Narrabeen Group. The fine-grained sediments form yellow podsols on sandstone and brown, red and gleyed podsols on shale.

These soils have been mapped as the Watagan soil landscape and present a severe erosion hazard if disturbed, whilst the slopes are prone to mass movement.

2.2 Hydrology

The Reserve is in the lower end of the catchment and is the last point prior to the beach and discharge into the ocean. There is a creekline running through the Reserve, receiving runoff from the catchment above.

2.3 Vegetation

The vegetation of the western part of Hordern Park is Spotted Gum Forest dominated by Spotted Gum (*Corymbia maculata*) and Cabbage-tree Palm (*Livistona australis*) which grades to a stand of Cabbage-tree Forest. Associated tree species include Rough-barked Apple (*Angophora floribunda*). The small tree and shrub layer includes Cheese Tree (*Glochidion ferdinandi*), Lilly Pilly (*Acmena smithii*), Blueberry Ash (*Elaeocarpus reticulatus*), Coast Banksia (*Banksia integrifolia*), Bolworra (*Eupomatia laurina*), Breynia (*Breynia oblongifolia*), Sweet Pittosporum (*Pittosporum undulatum*), Rough-fruit Pittosporum (*P. revolutum*) and planted Cedar Wattles (*Acacia elata*).

The fern-dominated groundlayer includes False Bracken Fern (*Calochlaena dubia*), Kangaroo Grass (*Themeda australis*), Blady Grass (*Imperata cylindrica*), Kidney Weed (*Dichondra repens*) and Scurvy Weed (*Commelina cyanea*), and the climbers Snake Vine (*Stephania japonica* ssp. *discolor*), Water Vine (*Cissus hypoglauca*), Native Raspberry (*Rubus arifolius*), Scrambling Lily (*Geitonoplesium cymosum*), *Glycine* sp. and Golden Guinea Flower (*Hibbertia scandens*).

The Cabbage-tree Palm Forest is considered a significant community which has a limited distribution in Pittwater, and the conservation status of the Spotted Gum Forest, is considered significant in NSW.

2.4 Fauna

The dominance of Spotted Gum and Cabbage-tree Palm in Hordern Park is likely to attract a range of bird species including Topknot Pigeon, honeyeaters and lorikeets. Gliders, in particular Squirrel gliders, known to feed on Spotted Gum, Cabbage-tree Palm and especially Coast Banksia, may also be attracted. Tree hollows in the Reserve provide shelter for birds and arboreal mammals, and the thick though weed-infested understorey would provide shelter for reptiles, small birds and frogs.

Council's Habitat and Wildlife Corridor Conservation Strategy maps the Reserve as "Corridor R" which indicates smaller Reserves likely to have very modified habitat or suffering adverse edge effects. These can be enhanced by a planting program or by allowing natural regeneration.

2.5 Aboriginal and Non-Aboriginal Sites

There are no recorded Aboriginal sites within the Reserve, although there is potential for sites such as axe grinding grooves and engravings to occur in the area.

There are no known European Heritage sites in the Reserve.

3.0 Significance and Objectives

3.1 Statement of Significance

Hordern Park is significant because

- ❖ it contributes to the landscape quality Palm Beach and provides a record of the original landscape and the changes wrought by urban development.
- ❖ it includes samples of significant plant communities, Cabbage-tree Palm Forest which is very restricted and Spotted Gum Forest which has conservation significance at the State level,
- ❖ it includes samples of significant plant species including Bolworra (*Eupomatia laurina*) which has local conservation significance.
- ❖ it provides an important corridor link between remnant littoral and coastal woodland and forest communities at this northern limit of the peninsula, and provides habitat for a wide diversity of fauna species in the context of urban bushland in the Sydney region.

- ❖ it is an educational resource and a contact point with nature for residents, and
- ❖ it allows urban residents to undertake informal recreational pursuits in a littoral bushland setting

3.2 Management Objectives

The management objectives for Hordern Park are

- to protect the natural features of the Park, particularly the significant Spotted Gum Forest and Cabbage-tree Palm Forest plant communities and significant plant species.
- ❖ to maintain a natural range of structural and floristic diversity of bushland within the Park, and adequately manage the bushland/ urban interface in relation to fire management, weed management and stormwater management.
- ❖ to protect human life and property in and adjacent to the Park and maintain ecological processes in the Park by seeking to maintain a near-natural fire regime in the body of the Park and aim to ensure that no species of plant or animal becomes extinct in the Park as a result of the fire regime.
- ❖ to control introduced animals within the Reserve.
- ❖ to provide opportunities for low impact recreational, scientific and educational use of the Reserve, and
- ❖ to encourage community and neighbour participation in bushland management

4.0 Management Issues

4.1 Weed Invasion

Many of the trees and emerging palms are being suppressed by a thick weed layer dominated by *Morning Glory* and *Lantana*, and a range of garden escapes, particularly *Honeysuckle*. The road batter and drainage pipe works have had an impact on the native community. Other weeds species present include *Camphor Laurel*, *Coral Tree*, *Large and Small Leafed Privet*, *Fish-bone Fern*, *Crofton Weed*, *Wandering Jew* and *Balsam*. There is also a stand of *Giant Reed* and *Bamboo*.

4.2 Bush regeneration

A team of bush regenerators have weeded the top of the Reserve, adjacent to a section of the creekline which has a lower level of Lantana invasion. Continued maintenance of this area should occur. The path, numerous drainage lines and long boundary edges fragment the area. To undertake bush restoration, areas need to be divided into workable areas with objectives to achieve habitat maintenance, expansion of worked areas and accessibility.

4.3 Stormwater Management

Stormwater has been redirected into the Reserve from the road surface and adjoining residences. Four piped outlets discharge into the Reserve from Florida Road. Of these, only one discharges into a natural watercourse, the others result from redirected runoff from upper catchment development. Pacific Road properties discharge directly into the Reserve causing the path to scour and accelerating erosion. One drain has been sandstone-lined but all have altered the water regime below the road embankment. The increased moisture levels and degraded water quality will continue to contribute to the weed issues in this Reserve.

4.4 Fire Regime

Management of the fire regime in Hordern Park will be undertaken by the Warringah Pittwater Bush Fire Management Committee in accordance with Circular C10 - Planning for Bush Fire Prone Areas. The Reserve will be regularly monitored for fuel loadings and any hazard reductions required will be undertaken in accordance with the Draft Fuel Management Plan.

Ecological considerations will be assessed by Council Environmental Staff to determine methods of hazard reduction.

4.5 Management of Native Fauna and Introduced Predators

Hordern Park provides good habitat for fauna with a variety of habitat components. The winter flowering Spotted Gums and Cabbage-tree Palms encourage diversity and year-round food availability. A Pittwater wide public awareness campaign will address the value of bushland as habitat for fauna and how residents can be responsible neighbours by ensuring that domestic cats and dogs do not roam in the Reserve. Interpretive signs can assist this. Feral cat and fox predation is an issue that needs to be addressed through a Pittwater-wide control strategy.

4.6 Access, walking tracks and recreation

An established track, which requires regular maintenance, provides access between the beach and Florida Road. Within the Reserve access across two bridges has been blocked by Lantana. Prior to allowing access, the timber work needs to be inspected.

Lawn, used by picnickers and beachgoers, dominates the front of the Reserve. Closeby, retaining works have been used to stabilise the bank and pathway.

4.7 Boundaries and neighbours

There is a need for public awareness on the part of adjoining residents as to the value of bushland. It is particularly important that they understand the effect their actions may have on its integrity, in particular linking vegetation dumping to weed invasion and fire hazard, pollution from stormwater runoff with weed invasion, and the control of domestic animals with local extinction issues.

5.0 Performance

Management Objectives	Performance Targets (Actions)	Responsibility	Completion date	Capital cost	Recurrent Cost	Performance Measures
Weed Control & Bush Regeneration	Follow up bush regeneration	Natural Resources	When funds secured	Seek detailed costs of contract program	As required	Regeneration program commenced
Management of native fauna & introduced predators	Public awareness campaign for responsible pet ownership & feral animal program Interpretive sign	Natural Resources & Compliance	When funds available as well as ongoing programs	Ongoing	Costed within a Pittwater wide feral animal control program	An increase in native fauna in the Reserve
Fire Management	Ensure appropriate fire regime	Natural Resources & Fire Control	Ongoing		Staff time	Fire regime protects property & biodiversity
Access, walking tracks & recreation	Inspect bridges for safety & determine action	Natural Resources	As required		Seek detailed costs on an as needs basis	Safe walking access through the reserve
Boundaries & neighbours	Encourage community awareness re stormwater outlets & vegetation dumping	Natural Resources	Ongoing & when funds available		Staff time	Good resident practices and improved awareness of the bushland

Sunrise Reserve, Palm Beach

Reserve Number 0010

Street Address: 19 Sunrise Road, Palm Beach

1.0 Category and Description

1.1 Location and Description

Sunrise Reserve is located on the crest at the end of the ridgeline that divides Palm Beach from the ocean and Pittwater. The 0.14 ha Reserve is bounded by residential properties on one side.

1.2 Land Tenure and Property Description

The Reserve was dedicated as a Crown Reserve, R 100205, by the Department of Education and is owned by the Department of Land and Water Conservation. Pittwater Council has acre, control and management of the Reserve. The land is zoned 6(a) Open Space - Existing Recreation A.

1.3 Acts Which Apply and Category of Land

The Reserve is managed according to the principles of Crown land management under the Crown Lands Management Act, 1989. For consistency with the management of Council's other bushland reserves it is also managed as community land under the Local Government Act 1993. It is categorised as a natural area and further categorised as bushland. It meets the definition of urban bushland described in State Environmental Planning Policy No 19 - Bushland in Urban Areas.

2.0 Natural and Cultural Heritage

2.1 Topography, Geology and Soils

Sunrise Reserve is situated 70m above sea level on an exposed crest, which is part of the ridgeline between Pittwater and the ocean. The broad crest slopes moderately to the east with wide benches and rock outcropping at low benches.

The parent geology is Hawkesbury Sandstone characterised by medium to coarse-grained quartz sandstone with minor shale and laminate lenses. The shallow sandy soils have been mapped as the Gynea soil landscape.

2.2 Hydrology

There are no drainage lines in the Reserve but seepage regularly occurs over rock benches. The Reserve, situated on the crest and above the road, does not receive urban stormwater runoff.

2.3 Vegetation

The vegetation at Sunrise Reserve is a woodland dominated by Bangalay (*E. botryoides*) and Old Man Banksia (*Banksia serrata*). The geology is Hawkesbury sandstone, but the exposure of the ridge top to coastal breezes gives rise to a plant community which differs from the usual Sydney Sandstone Ridgetop Woodland.

There is a shrub layer of low density and a ground layer of medium density. Common shrub species include Sweet-scented Wattle (*Acacia suaveolens*), Black She-oak (*Allocasuarina littoralis*), Sydney Golden Wattle (*Acacia longifolia*) and *Aotus ercoides*. Ground layer species include Spiny Mat-rush (*Lomandra longifolia*), Dusky Coral Pea (*Kennedia rubicunda*), Flannel Flower (*Actinotus helianthi*), Pomax (*Pomax umbellata*) and Wiry Panic (*Entolasia stricta*).

2.4 Fauna

Like Annie Wyatt Reserve, Sunrise Reserve provides an important local refuge for species, disadvantaged by the modified habitat of surrounding residences.

Council's Habitat and Wildlife Corridor Conservation Strategy maps the Reserve as "

Corridor - Co1 " which indicates corridors or habitat areas though disturbed are likely to be of value due to good crown cover and / or understorey

2.5 Aboriginal Sites

Although there are no recorded Aboriginal sites within the Reserve, there is potential for sites such as axe grinding grooves and engravings to occur in the area

2.6 European Heritage Sites

On the Pittwater Local Environment Plan (LEP) 1993 - Sunrise Hill conservation area is listed as a Heritage item. which includes the public reserve on the crown of Sunrise Hill. There is evidence of quarrying in the Reserve and on the roadside edge

3.0 Significance and Objectives

3.1 Statement of Significance

Sunrise Reserve is significant because

- ❖ It protects a small example of bushland of Palm Beach.
- ❖ it is classified as a Scenic Protection Zone,
- ❖ it contributes to the landscape quality of Palm Beach and Pittwater,
- ❖ it provides a record of the original landscape and the changes wrought by settlement and development,
- ❖ it acts as a local refuge for fauna and due to the diversity of flowering native sandstone species, is a stepping stone between larger areas of habitat,
- ❖ it is a contact point with nature for residents and an educational resource, and
- ❖ it allows urban residents to undertake walking and scenic viewing in an enclosed bushland setting

3.2 Management Objectives

The management objectives for Sunrise Reserve are

- ❖ to protect the natural, cultural and landscape features of the Reserve as a Scenic Protection Zone,
- ❖ to maintain the natural range of structural and floristic diversity of bushland in the Reserve,
- ❖ to adequately manage the bushland in relation to encroachments and weed invasion,
- ❖ to protect life and property from bushfire and utilise fire to maintain the diversity of native flora and fauna in the Reserve.
- ❖ to control introduced animals in the Reserve,
- ❖ to provide opportunities for low impact recreational and educational use of the Reserve consistent with the other objectives, and
- ❖ to encourage community appreciation and neighbourhood participation in the bushland management of the Reserve

4.0 Management Issues

4.1 Weed Invasion & Bush regeneration

The weeds are most dense around the perimeter and roadside, and at a disturbed site in the centre of the Reserve. Herbaceous weeds Canadian Fleabane and *Bidens pilosa* occur on the roadside. *Arundo donax* occurs in the southern corner, and a number of disturbed areas occur in the body of the Reserve, contributed to in part by access tracks. Woody weed species present include Lantana, *Acacia podaricifolia*, Coral Tree and Bitou Bush.

A program of assisted bush regeneration is required to improve the condition of the remnant native vegetation and should be coordinated with community involvement.

Work should be initiated from weed free bushland slowly working towards the more weed infested edges and lower slope. Targeting weeds should then occur, and the disturbed site in the centre of the Reserve.

Encroachments occur and there is a tipping site next to the track. There is excessive clearing and garden escapes along one boundary, and clearing for power lines on the roadside.

4.2 Fire regime

The Reserve shows signs of a burn within the last 3 years. Follow up weeding should now occur. Management of the fire regime in the Reserve will be undertaken by the Warringah Pittwater Bush Fire Management Committee in accordance with Circular C10 - Planning for Bush Fire Prone Areas. The Reserve will be regularly monitored for fuel loading and any hazard reductions required will be undertaken in accordance with the Draft Fuel Management Plan. Ecological considerations will be assessed by Council Environmental Staff to determine methods of hazard reduction and coordinate post fire weeding.

4.3 Management of native fauna and introduced predators

Community support and the initiation of a bush regeneration program improve the habitat of the Reserve. Adjoining properties could enhance the habitat value of the Reserve by retaining and planting local native species.

A Pittwater wide public awareness campaign will address the value of bushland as habitat for fauna and how residents can be responsible neighbours by ensuring that domestic cats and dogs do not roam in the Reserve. Feral cat and fox predation is an issue that needs to be addressed through a Pittwater-wide control strategy.

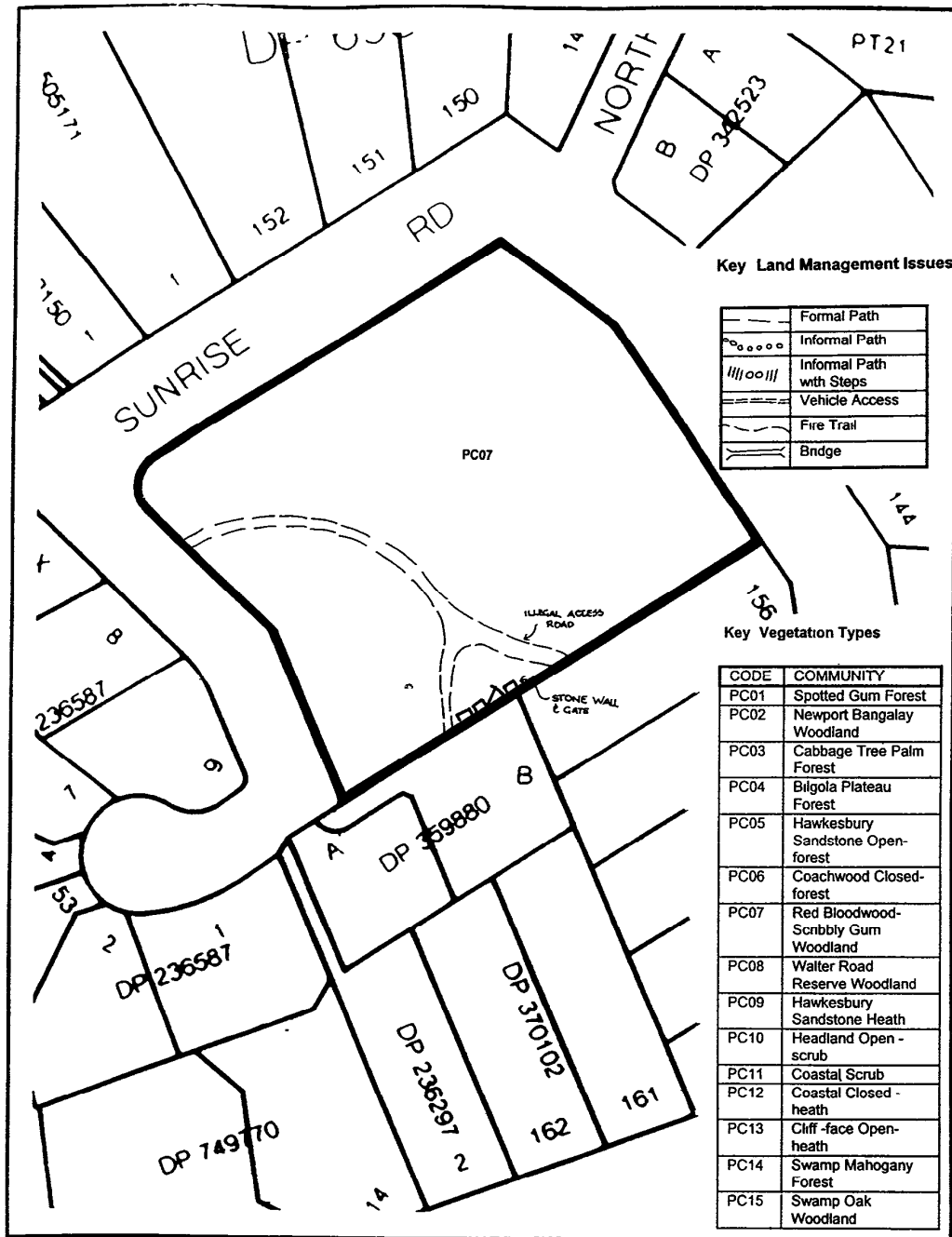
4.4 Access, walking tracks and recreation

The Reserve is accessed directly off Sunrise Road, although there is no formalised path into the bush. Residents that front the Reserve use a track as a driveway. Private use of the Reserve as a driveway is illegal and the track should be converted to a walking track. Views of the ocean and some of Pittwater are gained through the bushland, and naturalists also use the Reserve for bird watching.

4.5 Boundaries and neighbours

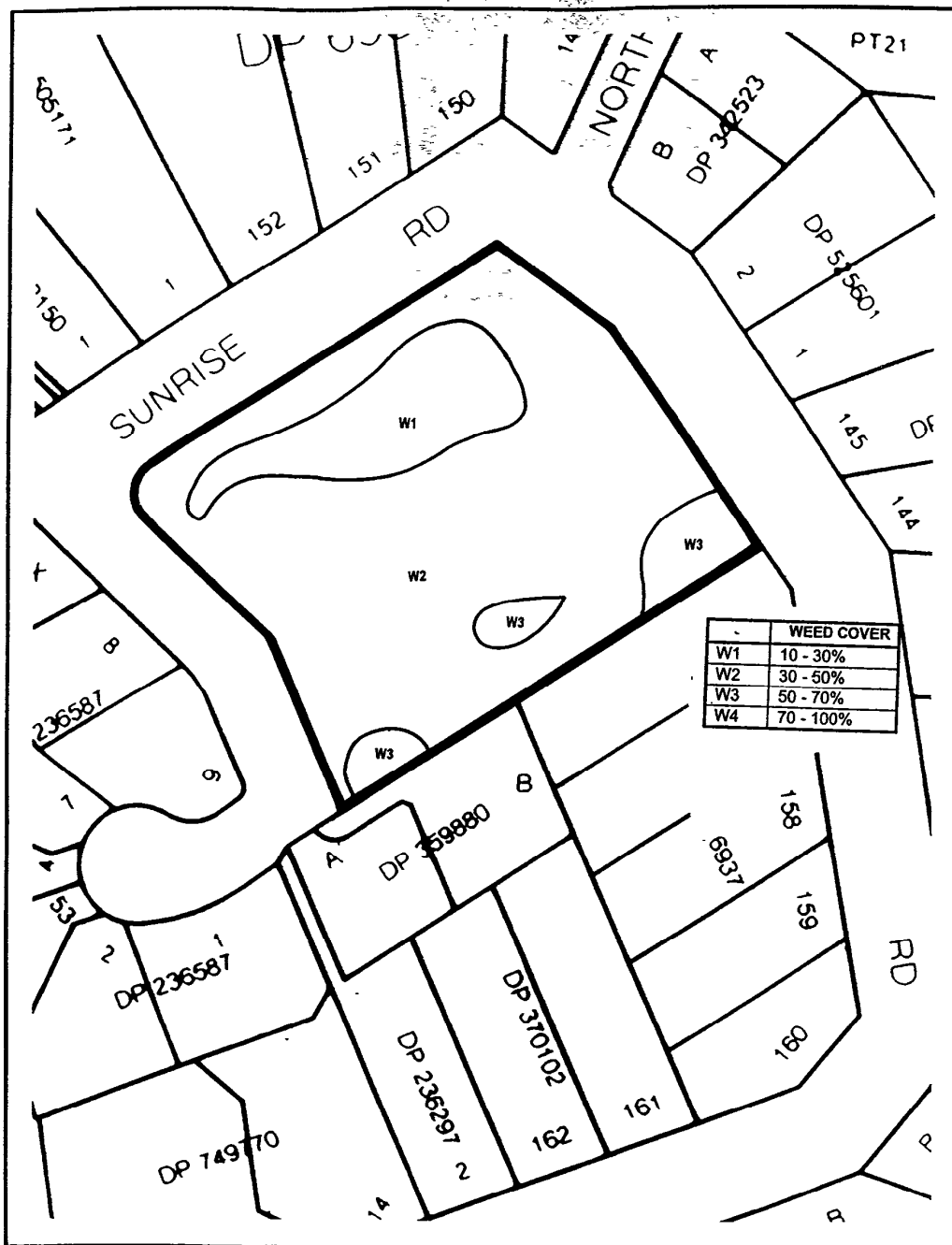
5.0 Performance



Management objectives	Performance Targets (Actions)	Responsibility	Completion date	Capital cost	Recurrent Cost	Performance Measures
Weed control & bush regeneration	Seek community interest for a volunteer bush regeneration group	Natural Resources	As community demand	\$3.000	\$2.000	Bushland actively regenerated by community
Management of native fauna & introduced predators	Public awareness campaign re responsible pet ownership Feral animal control	Natural Resources Compliance	As part of a Pittwater wide campaign			Extant fauna populations
Fire management	Maintain safe fuel levels Follow up weeding	Fire Control & Natural Resources	Ongoing Follow up weeding 1997/98	NA	Staff time \$3.000	Life & property protected & biodiversity maintained
Access & walking tracks	Maintain track for walkers	Natural Resources	Ongoing			Walking track for public
Boundaries & neighbours	Bush friendly campaign Regain encroachments	Natural Resources	In priority order with other reserves	Seek detailed costs		Improved appreciation of Reserve Public use returned



Urban Bushland Plan of Management			
Map	Vegetation Communities and Management Issues	Scale 1:1000	Date JULY 1997
Locality	Sunrise Reserve Palm Beach		





Urban Bushland Plan of Management			 N  Pittwater Council	
Map	Weeds	Scale 1:1000		Date JULY 1997
Locality				Sunrise Reserve Palm Beach

Norma Road Reserve, Palm Beach

Reserve Number: 0448

Street Address: Corner of Norma Road & Whale Beach Road, Palm Beach

1.0 Description & Category

1.1 Location and Description

Norma Road Reserve is located on the northern headland of Whale Beach. The Reserve is bounded on the west by residential properties and the remainder of the Reserve is bounded by Norma Road and Whale Beach Road. This coastal Reserve occupies 0.065ha.

1.2 Land Tenure and Property Description

The Reserve is owned by Council, being described as Public Reserve in DP 19651. The land is zoned 6(a) Open Space - Existing Recreation A.

1.3 Category of Land

The Reserve is community land under the Local Government Act 1993. It is categorised as a natural area and further categorised as bushland and escarpment. It meets the definition of urban bushland described in State Environmental Planning Policy No. 19 - Bushland in Urban Areas.

2.0 Natural and Cultural Heritage

2.1 Topography, Geology and Soils

Norma Road Reserve is on a spur near the coastal scarp and forms part of the north Whale Beach headland. The spur has a moderately inclined slope with wide benches, localised rock outcrops and exposed floaters. The geology of the upper slope is Hawkesbury Sandstone, overlying the shales and sandstones of the Newport Formation in the Narrabeen Group which are exposed on the lower slope.

The soils derived from the Hawkesbury Sandstone are mapped as the Gympie soil

landscape, and range from earthy sands on and around the benches to gleyed and yellow podzols on the shale lenses. Soils on the lower slope relate to the Erina soil landscape and have a high clay content, although strongly influenced by the sandier soils upslope.

2.2 Hydrology

The Reserve straddles two catchments, namely Whale Beach and a rock platform to the north. The ridgeline contains numerous ephemeral drainage lines through the low broken sandstone benches and seepage is apparent at some rock benches.

2.3 Vegetation

Vegetation is exposed to salt-laden winds and is Headland Open-scrub, dominated by Heath-leaved Banksia (*Banksia encifolia*) and Scrub She-oak (*Allocasuarina distyla*). Also present are Rusty Fig (*Ficus rubiginosa*), Cheese tree (*Glochidion ferdinandi*), Coastal Tea-tree (*Leptospermum laevigatum*), Myrtle Wattle (*Acacia myrtifolia*), *Melaleuca hypericifolia*, Bottlebrush (*Callistemon* sp.). Ground layer species include Flannel Flower (*Actinotus helianthi*), Fish Bones (*Lomandra obliqua*) and Kangaroo Grass (*Themeda australis*).

2.4 Fauna

The dense heathland vegetation provides habitat for nomadic honeyeaters and the numerous rocky outcrops is suitable for a range of reptile species. Council's Habitat and Wildlife Corridor Conservation Strategy maps the Reserve as "Corridor - Co1" which indicates corridors or habitat areas though disturbed are likely to be of value due to good crown cover and / or understorey.

2.5 Aboriginal and non-Aboriginal Sites

There are no recorded Aboriginal sites within Norma Road Reserve, although there is potential for sites such as axe grinding grooves and engravings to occur in the area. There are no known European Heritage sites in the Reserve.

in the context of urban bushland in the Sydney Region,

- ❖ to protect the scenic values of the Reserve and its panoramic views from a coastal heathland setting.
- ❖ to adequately manage the bushland/urban interface in relation to fire management, weed invasion and encroachments.
- ❖ to control introduced animals within the Reserve,
- ❖ to provide opportunities for low impact recreational, and educational use of the Reserve.
- ❖ to encourage community and neighbour participation in bushland management particularly regarding garden escapes

3.0 Significance and Objectives

3.1 Statement of Significance

Norma Road Reserve is significant because

- ❖ it provides a visual amenity to Whale Beach, with views north along the peninsula and a viewing area south over Whale Beach.
- ❖ it protects an example of Headland Open-scrub which is locally significant due to its limited distribution.
- ❖ it provides habitat and an important corridor link along the coastal escarpment for a wide diversity of local and migratory fauna species in the context of urban bushland in the Sydney Region,
- ❖ it contributes to the landscape quality of the peninsula and Whale Beach and provides a record of the original landscape and the changes wrought by urban development,
- ❖ it is an educational resource and a contact point with nature for residents, and
- ❖ it allows urban residents to undertake informal recreational pursuits in a bushland setting with panoramic ocean views

3.2 Management Objectives

The management objectives for Norma Road Reserve are

- ❖ to protect the natural features of the Reserve and maintain a natural range of structural and floristic diversity,
- ❖ to protect the locally significant plant community, Headland Open-scrub,
- ❖ to provide habitat and a corridor link for a diversity of local and migratory fauna species

4.0 Management Issues

4.1 Weed Invasion & Bush Regeneration

Weed cover is low in the Reserve, but features Bitou Bush, Lantana and Asparagus Fern. The more level upper portion of the Reserve contains a moderate cover of weeds occurring as a result of vegetation dumping or as garden escapees. Additional species here include Cotoneaster and Cassia.

The exposed nature of this Reserve requires gradual implementation, with careful selection of sites for weeding so as to minimise the exposure and effects of salt laden prevailing winds entering below a newly exposed canopy. Any bare soil should be protected by brush matting. To encourage growth of native plants, the less weed infested areas of bush should be dealt with first.

4.2 Fire Regime

Management of the fire regime in the Reserve will be undertaken by the Warringah Pittwater Bush Fire Management Committee in accordance with Circular C10 - Planning for Bush Fire Prone Areas. The Reserve will be regularly monitored for fuel loadings and any hazard reductions required will be undertaken in accordance with the Draft Fuel Management Plan. Ecological considerations will be assessed by Council Environmental Staff to determine methods of hazard reduction and co-ordinate follow up bush regeneration. Care should be taken in scrub communities due to the fire sensitive nature of some of the plant species.

4.3 Management of Native Fauna and Introduced Predators

A Pittwater wide public awareness campaign will address the value of bushland as habitat for fauna and how residents can be responsible neighbours by ensuring that domestic cats and dogs do not roam in the Reserve. Interpretive signs can assist this. Feral cat and fox predation is an issue that needs to be addressed through a Pittwater-wide control strategy.

4.4 Access, walking tracks and recreation

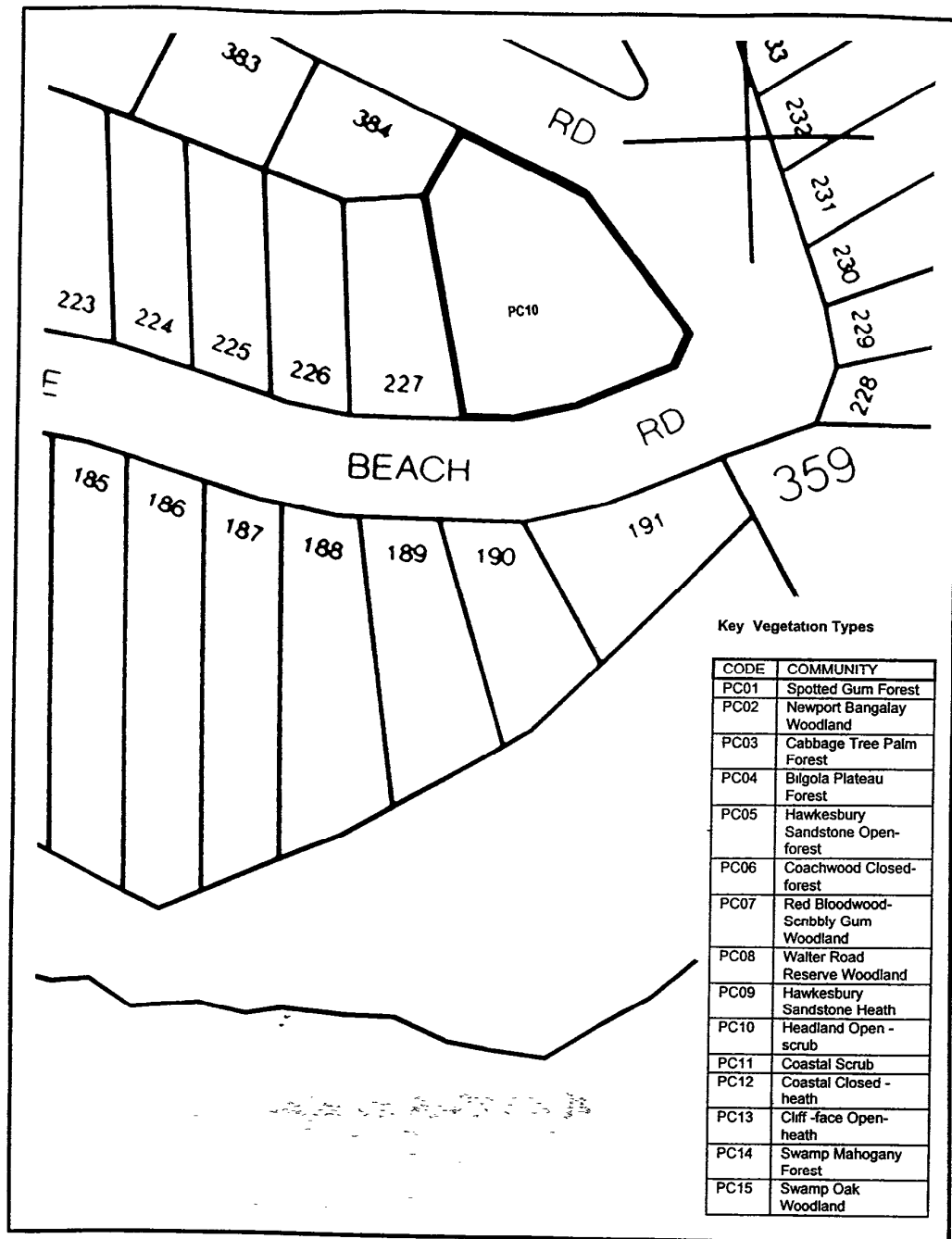
The carparking facilities have recently been re-surfaced and landscape plantings define the area. The views are scenic and panoramic. There are no defined paths in the Reserve.



4.5 Boundaries and neighbours

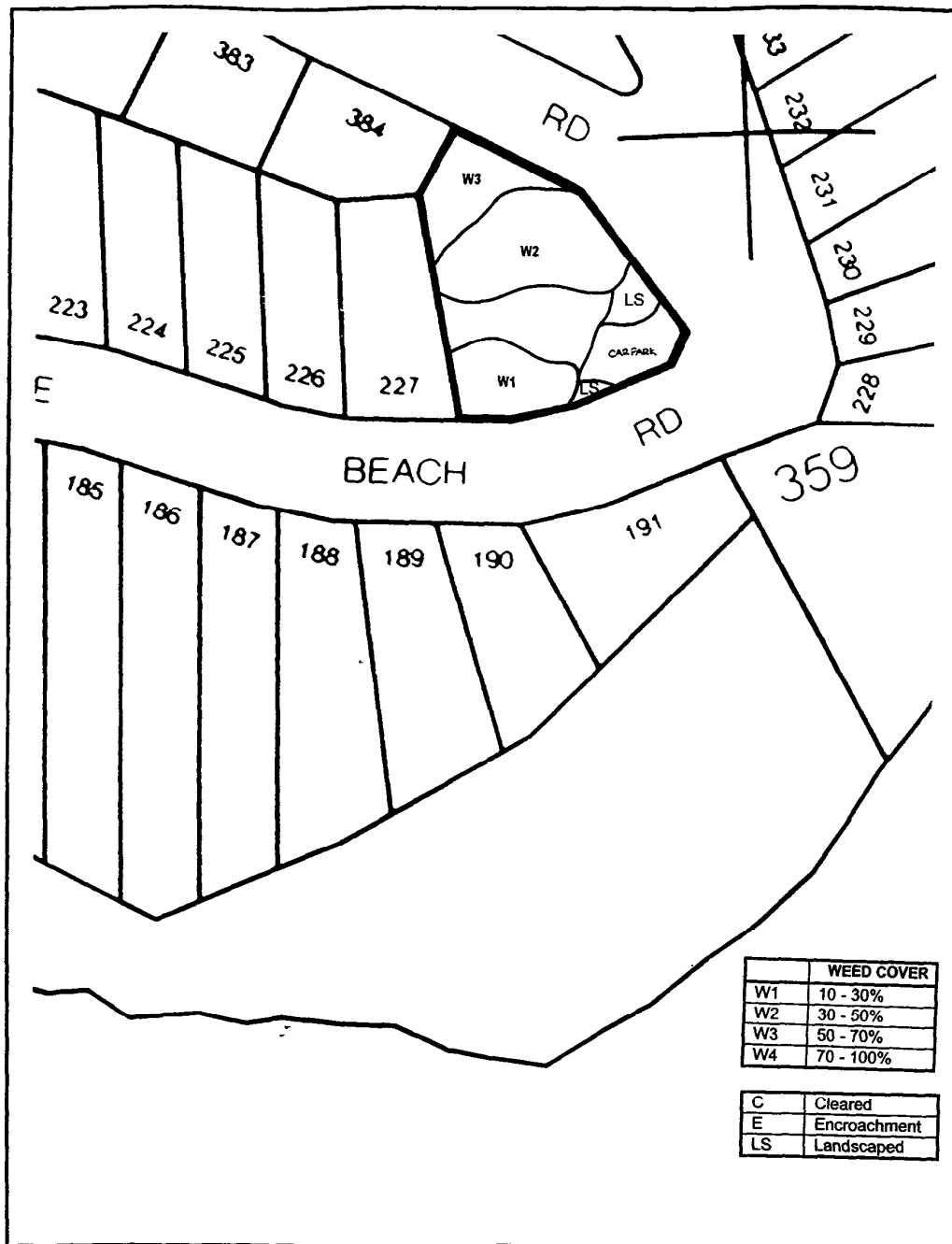
There is a need for a public awareness and education campaign for residents about the significance of the Reserve and the importance of bush friendly behaviour to maintain its values. There is a need to communicate that vegetation dumping causes weed infestation and fire hazard. Information could encourage the planting of local species of native plants to provide habitat on residents own properties, that will also survive in the exposed conditions and require low maintenance.


5.0 Performance

Management objectives	Performance Targets (Actions)	Responsibility	Completion date	Capital cost	Recurrent Cost	Performance Measures
Weed Control & Bush Regeneration	Letterbox drop for volunteer group	Natural Resources	When community demand	Staff time	\$1400pa supervision & materials	Group commenced
Management of native fauna & introduced predators	Public awareness campaign for responsible pet ownership. Interpretive sign & feral animal program	Natural Resources & Compliance	When funds available as well as ongoing programs	Ongoing	Costed within a Pittwater wide feral animal control program	An increase in native fauna in the Reserve
Fire Management	Maintain appropriate fire regime	Bushfire Services & Natural Resources	Ongoing		Staff time	Safe fuel levels & conservation of biodiversity
Boundaries & neighbours	Community awareness & participation in the Reserve	Natural Resources	When funds available	Within an overall reserve regen program	Staff time	Good boundary & bushland interface



Urban Bushland Plan of Management			 N
Map Vegetation Communities	Scale 1:1000	Date. JULY 1997	
Locality	Norma Road Reserve Palm Beach		
			 Pittwater Council



Urban Bushland Plan of Management				 Pittwater Council
Map	Weeds	Scale	11000	
Locality	Norma Road Reserve Palm Beach	Date	JULY 1997	

Fauna Species List Palm Beach Reserves

Key

Record

MPM - Mackay Reserve Plan of Management. UBS -urban bushland survey summer. L - likely to occur

Status

R=resident F=frequent visitor W=winter migrant

O=occasional or uncommon visitor S=summer migrant

Bold = regionally significant species ***Bold Italic*** = Schedule 12 species

* - introduced species

Common Name	Scientific Name	Record	Status
Birds			
White-bellied Sea-Eagle	Haliaeetus leucogaster	MPM	O
Whistling Kite	Haliastur sphenurus	MPM	O
Little Eagle	Hieraaetus morphnoides	MPM	O
Peregrine Falcon	Falco peregrinus	MPM	O
Feral Pigeon	Columba livia	MPM	R
Spotted Turtle-dove*	Streptopelia chinensis	MPM	R
Crested Pigeon	Ocyphaps lophotes	MPM	R
Sulphur-crested Cockatoo	Cacatua galerita	MPM	F
Little Correla	Cacatua sanguinea	MPM	F
Galah	Cacatua roseicapilla	MPM	F
Glossy Black-Cockatoo	<i>Calyptorhynchus lathami</i>	MPM	O
Australian King-Parrot	Alisterus scapularis	L	F
Crimson Rosella	Platycercus elegans	MPM	F
Eastern Rosella	Platycercus eximius	MPM	O
Little Lorikeet	Glosopsitta pusilla	L	O
Scaly-breasted Lorikeet	Trichoglossus chlorolepidotus	MPM	O
Rainbow Lorikeet	Trichoglossus haematodus	MPM	F
Fan-tailed Cuckoo	Cuculus pyrophanus	MPM	R
Shining Bronze-Cuckoo	Chrysococcyx lucidus	L	S
Common Koel	Eudynamis scolopacea	MPM	S
Southern Boobook	Ninox novaeseelandiae	MPM	R
Tawny Frogmouth	Podargus strigoides	MPM	R
Spine-tailed Swift	Hirundapus caudacutus	MPM	S
Kookaburra	Dacelo novaeguinea	MPM	R
Sacred Kingfisher	Halcyon sancta	MPM	S
Dollarbird	Eurystomus orientalis	MPM	S
Black-faced Cuckoo-shrike	Coracina novaehollandiae	MPM	R
Red-whiskered Bulbul	Pycnonotus jocosus	MPM	R
Golden Whistler	Pachycephala pectoralis	MPM	R
Grey Fantail	Rhipidura fuliginosa	MPM	R
Rufous Fantail	Rhipidura rufifrons	L	S
Eastern Whipbird	Psophodes olivaceus	MPM	R
Superb Fairy-wren	Malurus cyaneus	MPM	F
Variegated Wren	Malurus lamberti lamberti	MPM	F
White-browed Scrubwren	Sericornis frontalis	MPM	R
White-throated Warbler	Gerygone olivacea	M PM	S
Brown Warbler	Gerygone mouki	MPM	S
Brown Thornbill	Acanthiza pusilla	MPM	R
Red Wattlebird	Anthochaera carunculatus	MPM	R
Little Wattlebird	Anthochaera chrysoptera	MPM	R
Yellow-faced Honeyeater	Lichenostomus chrysops	MPM	W
Scarlet Honeyeater	Myzomela sanguinolenta	L	O
Noisy Miner	Manorina melanocephala	MPM	R

Urban Bushland Inventory and Action Plan – Fauna Species List, Palm Beach

Lewin's Honeyeater	Meliphaga lewinii	MPM	R
White-naped Honeyeater	Melithreptus lunatus	MPM	W
Noisy Friarbird	Philemon corniculatus	MPM	R
White-cheeked Honeyeater	Phylidonyris nigra	MPM	F
New Holland Honeyeater	Phylidonyris novaehollandiae	MPM	F
Mistletoebird	Dicaeum hirundinaceum	MPM	O
Spotted Pardalote	Pardalotus punctatus	MPM	F
Striated pardalote	Pardalotus striatus	MPM	O
Silvereye	Zosterops lateralis	MPM	F
Red-browed Finch	Emblema temporalis	MPM	F
House Sparrow	Passer domesticus	MPM	R
Common Mynah*	Acridotheres tristis	MPM	R
Common Starling*	Sturnus vulgaris	MPM	R
Spangled Drongo	Dicrurus hottentotus	L	S
Australian Magpie Lark	Grallina cyanoleuca	MPM	R
Grey Butcherbird	Cracticus torquatus	MPM	R
Australian Magpie	Gymnorhina tibicen	MPM	R
Pied Currawong	Strepera graculina	MPM	R
Australian Raven	Corvus coronoides	MPM	R
Mammals			
Sugar Glider	Petaurus breviceps	MPM	R
Squirrel Glider	Petaurus norfolcensis	MPM	F
Common Ringtail Possum	Pseudocheirus peregrinus	MPM	R
Common Brushtail Possum	Trichosurus vulpecula	MPM	R
Koala	Phascogale cinerea	MPM	O
Long-nosed Bandicoot	Perameles nasuta	MPM	R
Common Bentwing Bat	Miniopterus schreibersii	UBS	F
Gould's Wattled Bat	Chalinilobus gouldii	UBS	F
House Mouse*	Mus domesticus	MPM	R
Black Rat*	Rattus rattus	MPM	R
Grey-headed Flying-fox	Pteropus poliocephalus	MPM	O
Reptiles			
Blind Snake	Ramphotyphlops nigriscens	MPM	R
Golden-crowned Snake	Cacophis squamulosus	MPM	R
Black-bellied Swamp Snake	Hemiaspis signata	MPM	R
Leaf-tailed Gecko	Phyllurus platurus	MPM	R
Eastern Water Skink	Eulamprus quoyii	MPM	R
Cunninghams Skink	Egernia cunninghami	MPM	R
Striped Skink	Ctenotus robustus	MPM	R
Copper-tailed Skink	Ctenotus taeniolatus	MPM	R
Grass Skink	Lampropholis delicata	MPM	R
Blue-tongued Lizard	Tiliqua scincoides	MPM	R

Refuge Cove Reserve, Taylors Point

Reserve Number: 0058

Street Address: 268A, 310A, 310B, 316A, 320A, Hudson Parade, Taylors Point

1.0 Description & Category

1.1 Location and Description

Refuge Cove Reserve is located in Taylors Point on the southern side of Refuge Cove. This narrow foreshore Reserve occupies 1.01 hectares and lies between the eastern shoreline of Pittwater Estuary and residential properties along Hudson Parade. The main access is a path and steps opposite Hudson Parade.

1.2 Land Tenure and Property Description

The Reserve is owned by Pittwater Council, being described as Lot 17 in DP 217688, Lot 1 in DP 222134, Lot 5 in DP 261693, Lot 33 in DP 233469, Lot 2 in DP 827733, Lot 5 in DP 261693. The land was zoned 6(a) Open Space - Existing Recreation and is now zoned E2.

1.3 Category of Land

The Reserve is community land under the Local Government Act 1993. It is categorised as General Community Use, and as a Natural Area. The Natural Areas are further categorised as Bushland, Foreshore and Watercourse. It meets the definition of urban bushland described in State Environmental Planning Policy No 19 - Bushland. See Figure 1 Land Categorisation.

2.0 Natural and Cultural Heritage

2.1 Topography, Geology and Soils

Refuge Cove Reserve is a narrow strip of land with a west to north-western aspect located on a short, steep foreshore slope. The shales and sandstones of the parent geology relate to the Newport formation of the Narrabeen Group Rock platforms, displaced upslope. Sandstone floaters and exposed shale stratum are apparent throughout the Reserve.

The soils derived vary from shallow to moderately deep brown, red and gleyed podzols characteristic of the Watagan soil landscape.

The landform and clay content contribute to the potential for mass movement and present a severe soil erosion hazard if disturbed.

2.2 Hydrology

The foreshore Reserve has three creek lines discharging to sandy beaches or mudflats and mangroves in Pittwater. The catchment commences at Bilgola Plateau with very steep slopes occur in the mid catchment and development is residential with kerbed roads.

2.3 Vegetation

The vegetation is Spotted Gum (*Corymbia maculata*) is the dominant species with associated species including Broad leaved White Mahogany (*Eucalyptus umbra*), Grey Gum (*E. punctata*) and Grey Ironbark (*E. paniculata*) on the exposed slopes. Understorey and groundlayer species include Narrow-leaved Geebung (*Persoonia lineans*), Burrawang (*Macrozamia communis*) and Kangaroo Grass (*Themeda australis*), while species such as Blueberry Ash (*Eleaocarpus reticulatus*), Mock Olive (*Notelaea longifolia*) and Water Vine (*Cissus hypoglauca*) occur in sheltered gullies. Stands of Swamp Oak Woodland dominated by Grey Mangrove (*Avicennia marina* var. *australasica*) occur along the tidal foreshore. Tongue Orchid (*Dendrobium linguiforme*) cling to large sandstone floaters on the water's edge.

2.4 Fauna

The many mature trees provide valuable habitat in the form of tree hollows and high nesting opportunities. The Reserve also acts as a stepping stone for birds and bats using the western foreshores as habitat. Council's Habitat and Wildlife Corridor Conservation Strategy maps the Reserve as "Corridor - Co1" which indicates corridors or habitat areas though disturbed are likely to be of value due to good crown cover and/or understorey.

2.5 Aboriginal and Non-Aboriginal Sites

Numerous Aboriginal sites, including rock engravings and middens, have been recorded at the Reserve and there is potential for others to exist.

There are no known European heritage sites in the Reserve

3.0 Significance and Objectives

3.1 Statement of Significance

Refuge Cove Reserve is significant because:

it protects an example of bushland of Pittwater's Eastern Foreshore in a similar condition to that which occurred when the area was first visited by Europeans

it protects Aboriginal sites which demonstrate the link between the land and its original human inhabitants

It Includes Spotted Gum Forest, a community which has conservation significance at a State level

it includes examples of plant communities which are inadequately conserved in the Pittwater area, namely the Mangroves and Swamp Oak Woodland communities

It is an important part of the habitat and wildlife corridor for faunal movement on the Barrenjoey Peninsula

It contributes to the landscape quality of Clareville and provides a record of the original landscape and the changes wrought by urban development,

it is an education resource and a contact point with nature for residents, and

it allows urban residents to undertake informal recreational pursuits in a bushland setting.

3.2 Management Objectives

The management objectives for Refuge Cove Reserve are:

to protect the natural and landscape features of the Reserve,

to maintain the natural range of structural and floristic diversity of bushland in the Reserve

to conserve Aboriginal sites in the Reserve.

to conserve significant plant communities, namely Spotted Gum Forest, Mangroves and Swamp Oak Woodland.

to conserve the habitat and wildlife corridor values for native fauna.

to adequately manage the bushland in relation to encroachments and weed invasion,

to protect life and property from wildfire and to maintain ecological processes by seeking to maintain a near-natural fire regime in the Reserve to conserve native flora and fauna in the Reserve,

to control introduced animals in the Reserve,

to provide opportunities for low impact recreational and educational use of the Reserve consistent with the other objectives,

to encourage community appreciation and management of the Reserve, and

to control erosion and address areas of instability.

4.0 Management Issues

4.1 Weed invasion & Bush regeneration

Weed invasion is well-established along the length of this narrow Reserve and appears directly related to garden escapes from nearby residences or dumped garden waste. The worst areas, in particular are the northern section of the Reserve. These have been compounded by fill or stormwater. In the wetter areas weeds include Willows, Balsam, Crofton, Mist flower and Bamboo, whilst in other areas Asparagus Fern, Ivy, Lantana, Mother of Millions and Kikuyu are present. Eucalypt dieback is evident in some tree stands.

A bush regeneration program in this narrow Reserve should have local participation to ensure long term success. Initially, areas of least weed would be targeted, and areas adjacent to creeklines tackled once other areas have been stabilised.

4.2 Stormwater management

Stormwater is piped into the Reserve. Apart from weedy areas where residents have directed overland flows, impacts on eucalypts, creek banks and weed invasion will be monitored.

4.3 Fire Regime

Management of the fire regime in the Reserve will be undertaken by the Warringah Pittwater Bushfire Management Committee in accordance with Circular C10- Planning for Bush Fire Prone Areas. The Reserve will be regularly monitored for fuel loadings and any hazard reductions required will be undertaken in accordance with the Draft Fuel Management Plan.

Ecological considerations will be assessed by Council Environmental Staff to determine the methods of hazard reduction and coordinate with follow-up bush regeneration.

4.4 Management of Native Fauna and Introduced Predators

Refuge Cove Reserve provides good habitat for fauna with a variety of habitat components. The winter-flowering Spotted Gum and other eucalypts with abundant pollen or nectar such as Grey Gum and Grey Ironbark provide suitable habitat for the Squirrel Glider, an endangered population on the Barrenjoey Peninsula.

A Pittwater wide public awareness campaign will address the value of bushland as habitat for fauna and how residents can be responsible neighbours by ensuring that domestic cats and dogs do not roam in the Reserve. Compliance signs can assist this. Feral cat and fox predation is an issue that needs to be addressed through a Pittwater-wide control strategy.

4.5 Access, walking tracks and recreation

Access is available at one of three unmarked access handles. At the Northern Cove access, the terrain is too rough, at the other an encroachment has been extended as a garden and landscaped. The main access is via a stairway and concrete steps and then an informal track to the foreshore. This path is used for access to dinghies stored on the foreshore or to fishing off the rock platform and the rough old stone wharfs. An old boathouse occurs at the southern end of the Reserve and the sandy beaches are used regularly. There are numerous informal paths in some sections of the Reserve.

Access at the northern section could be improved if the path was extended. Combined with educational signage this would allow public access to the interesting Mangrove area. Work should also incorporate a revegetation programme of the fill embankment.

4.6 Boundaries and neighbours

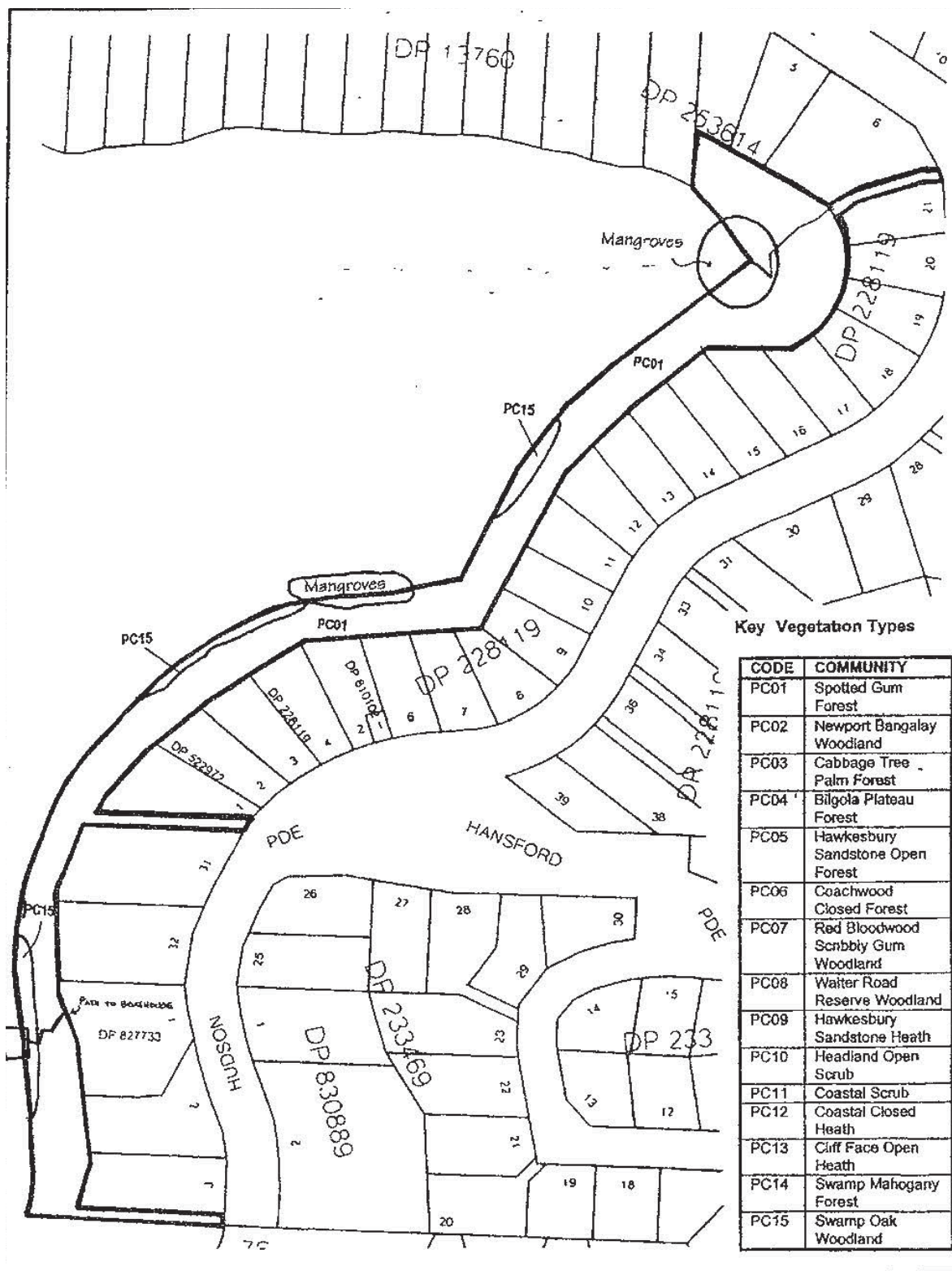
To create and maintain views, some residents have encroached by pushing fill into the Reserve. Often, the extended areas are included in maintained gardens and vegetation dumped in large piles beyond the encroachments. These encroachments are illegal and threaten the integrity of the Reserve and should be returned to the public Reserve. A community awareness program is required to encourage the inclusion of local native plantings in residential properties, explaining stormwater issues and to link dumped vegetation to weed infestation and fire hazard.


5.0 Performance

Management Objectives	Performance Targets (Actions)	Responsibility	Completion Date	Capital Cost	Recurrent Cost	Performance Measures
Weed control and bush regeneration	Letterbox drop for volunteer group	Natural Resources	When community demand		\$1400 pa	Group commenced
Management of native fauna and introduced predators	Public awareness campaign for responsible pet ownership and feral animal program	Natural Resources and Compliance	When funds available as well as ongoing programs	Ongoing	Funded within a Pittwater wide feral animal control program	An increase in native fauna in the Reserve
Fire management	Maintain appropriate fire regime	Natural Resources and bushfire services	Ongoing		Staff time	Safe fuel levels and biodiversity conservation
Access, walking tracks and recreation	Investigate extending northern track and removing unnecessary tracks	Natural Resources	When funds available		Seek detailed costs	Good public access
Boundaries and neighbours	Encourage community participation and awareness. Regain	Natural Resources and Compliance	Ongoing		Staff time	Good boundary and bushland interface



Figure 1. Land Categorisation



Urban Bushland Plan of Management			 Pittwater Council	
Map	Vegetation	Scale 12000		Date JULY1997
Locality Refuge Cove Reserve Taylors Point				

Reserves of Lovett Bay (north) and Towlers Bay

Reserve Number:
Street Address

1.0 Category and Description

as do National Parks. Roads and Crown land
Many have waterfrontages

1.1 Location and Description:

The reserves described are located from Lovett Bay North to Towlers Bay on the western foreshore of Pittwater in this area of low residential development

The reserves are bushland dominating these largely undeveloped areas Residential properties often form a boundary with the reserve

1.2 Land Tenure and Property Description:

There are 17 parcels of land described as reserves either owned by Council or Crown land that is under Council's care and control They are all zoned 6(a) - Existing Recreation and are listed in table 1 showing the property description

Table 1 Property Description

RESERVE No	TITLE DESCRIPTION	Location	OWNERSHIP	NAME
PR VG 39/1	Lot 3 in DP 23104	Lovett Bay Nth	Council	
PR VG 39/2	Lot 6 in DP 20284	Lovett Bay Nth	Council	
PR VG 39/3	Lot B in MPS(RP) 54929	Lovett Bay Nth	Council	
PR VG 39/4	Lot C in MPS(RP) 54929	Lovett Bay Nth	Council	
PR VG 39/5	Lot D in MPS(RP) 54929	Lovett Bay Nth	Council	
PR VG 39/6	Lot A in MPS(RP) 46227	Lovett Bay Nth	Council	
PR VG 39/7	Lot B in MPS(RP) 46227	Lovett Bay Nth	Council	
PR VG 39/8	Lot 4 in DP 746424	Lovett Bay Nth	Council	
PR VG 39/9	Lot 10 in DP 3455	Lovett Bay Nth	Council	
PR VG 39/10	Lots 1 to 8 in DP 14201	Towlers Bay	Council	
PR VG 39/11	Lot 10 in DP 14201	Towlers Bay	Council	
PR VG 39/12	Lot 11 in DP 14201	Towlers Bay	Council	
PR VG 39/13	Lot 12 in DP 14201	Towlers Bay	Council	
PR VG 39/14	Lot 16 in DP 14201	Lovett Bay Nth	Department of Urban Affairs & Planning	(adjacent to Halls Wharf)
PR VG 90/1	Public Reserve in DP 23180	Towlers Bay	Council	Towlers Headland Reserve
PR VG 90/2	Lot 1 in DP 21880	Towlers Bay	Council	
PR VG 90/3	Lot 2 in DP 21880	Towlers Bay	Council	

1.3 Category of Land:

The reserves of Lovett Bay North and Towlers Bay on the western foreshores are community land under the Local Government Act, 1993 and categorised as natural areas. Some are further categorised as bushland, watercourse, escarpment and/or wetland. They meet the definition of urban bushland described in State Environmental Planning Policy No 19 - Bushland in Urban Areas.

2.0 Natural and Cultural Heritage

2.1 Topography, Geology and Soils

The Reserves of the western foreshores have parent geology of the Newport formation of the Narrabeen Group of shales and sandstones. In the upper slope areas the geology is Hawkesbury sandstone. The Narrabeen geology gives rise to soils of the Watagan soil landscape which are yellow to red podsol soils usually with high clay content. There is a mass movement hazard and the soils are prone to a severe soil erosion hazard. The sandstone derived soils are mapped as Lambert, Oxford Falls and Hawkesbury Soil Landscapes.

2.2 Hydrology

There are intermittent watercourses flowing through some of the Reserves during storm events. Tracks and trails have altered natural drainage patterns in some Reserves.

2.3 Vegetation

The vegetation is Spotted Gum (*Corymbia maculata*) Open Forest PC01 community. Associated tree species are Grey Ironbark (*Eucalyptus paniculata*) and Rough-barked Apple (*Angophora floribunda*). The small tree and tall shrub layer is dominated by Forest Oak (*Allocasuarina torulosa*) and the shrub layer includes Burrawang (*Macrozamia communis*), Grass Trees, Mock Olive, *Acacia longissima*, *Persoonia linearis* and *Breynia* sp. Vines and scramblers include *Hibbertia scandens*, *Hardenbergia violacea* and *Clematis aristata*.

The herb layer often features Kangaroo Grass (*Themeda australis*) and Weeping Meadow Grass (*Microlaena stipoides*). The conservation status of the Spotted Gum Forest is considered to be have significance in NSW due to inadequate conservation in the state's national parks.

The gullies are characterised by Coachwood (*Ceratopetalum apetalum*) Closed Forest, PC06, with associated tree species including Cheese Tree, Cabbage Tree Palm (*Livistona australis*) and Lilly Pilly (*Acmena smithii*). Small trees include Water Gums *Tristania laurina* *Tristania nerifolia*, with Bastard Rosewood. The fern layer features False Bracken Fern (*Calochlaena dubia*) and Gristle Fern (*Blechnum cartilagineum*). Coachwood Closed Forest is considered to be significant in the Sydney Region.

The supratidal area on the foreshore is often dominated by the salt tolerant Swamp Oak (*Casuarina glauca*) Woodland.

The ridgetop community is generally described within the Smooth-barked Apple (*Angophora costata*) Red Bloodwood (*Corymbia gummifera*) – Sydney Peppermint (*E. piperita*) Woodland PC05. Small trees include *Allocasuarina littoralis* and shrubs include *Grevillea sericea*.

2.4 Fauna

The Reserves of Lovett Bay North and Towlers Bay form part of the eastern extent of land continuous with Kur-ring-gai Chase National Park which is the estuarine limit of this large expanse of bushland. The habitat types represented are Hawkesbury Sandstone Forest, Narrabeen Forest, Closed Forest and the estuarine habitats (Swamp Oaks and Mangroves) on alluvial flats.

Within these habitats are a number of features which are conducive to the presence of a wide range of fauna species. Tree hollows which are used by arboreal mammals, bats and a variety of birds (especially parrots), are common in mature trees.

The rocky outcrops, fallen logs and thick ground cover provide niches for reptiles, frogs and small terrestrial mammals. The ridgetops are host to heaths and woodlands nearby.

Council's Habitat and Wildlife Corridor Conservation Strategy maps the reserve as "Major Habitat - MH " which indicates major habitat areas. This signifies a high degree of diversity within the Reserve in both habitat types and species presently using it.

2.5 Aboriginal Sites

There are numerous Aboriginal sites within the reserves. There are Aboriginal sites with caves/shelters, axe grinding grooves and engravings.

Morning Bay Wharf is listed on Council's heritage register as site no 67 of European Heritage significance.

3.0 SIGNIFICANCE AND OBJECTIVES

3.1 Statement of Significance

The reserves of Lovett Bay North and Towlers Bay are significant because

- ❖ they contain Spotted Gum Forest that is considered significant at a state level and Coachwood Closed Forest that is regionally significant,
- ❖ they provide a range of habitats including intertidal habitats adjacent to forest habitats and act as an extension of large bushland areas in the National Park.
- ❖ they provide panoramic views to Barrenjoey Headland and Pittwater,
- ❖ they contribute to the landscape quality of Pittwater Foreshore and are used for a range of activities in a bushland setting,
- ❖ they provide a record of the original landscape and the changes wrought by urban development, and
- ❖ they are an educational resource and a contact point with nature for residents
- ❖ they contain significant aboriginal sites and a European heritage site

3.2 Management Objectives

The management objectives for the reserves of Lovett Bay North and Towlers Bay are

- ❖ to protect and maintain the natural range of structural and floristic diversity of bushland in the Reserves,
- ❖ to conserve the significant plant communities in the Reserves, namely, Spotted Gum Forest and Coachwood Closed Forest,
- ❖ to conserve the range of habitats for protected and threatened fauna.
- ❖ to adequately manage the bushland Reserves in relation to encroachments, erosion, weed invasion and tracks,
- ❖ to protect life and property from wildfire and to maintain ecological processes by seeking to maintain a near-natural fire regime to conserve native flora and fauna in the Reserves.
- ❖ to control introduced animals in the Reserves.
- ❖ to provide low impact recreational and educational use of the Reserves consistent with the other objectives, and
- ❖ to encourage community appreciation and participation in bushland management of the Reserves

4.0 MANAGEMENT ISSUES

4.1 Weed Invasion:

Weeds generally require a disturbance and modification of the natural environment for successful establishment (Amor and Piggitt, 1977). Weed invasion in the Reserves is predominantly associated with watercourses, border areas associated with urban development, areas of past disturbance, tracks and specific areas of high public usage and some small areas of undisturbed bushland.

Increased runoff and erosion has led sedimentation in watercourses which provides a substrate for weed growth. Sources of weed propagules includes dumped garden refuse, weedy plants grown in local gardens with bird and wind dispersed seed and mature weeds established in the national park.

Plant communities most severely affected are in areas which have urban development nearby. The major weeds present are Lantana, *Rubus* sp, Crofton Weed, Mist Flower and *Tradescantia albiflora*.

Some boundary areas and tracks are severely affected by weed invasion but the extent is usually restricted to a short distance into the bushland area, where a watercourse adjoins the boundary area penetration may be further.

Trails provide disturbed areas which are colonised by weeds. The movement of people and vehicles assists weed dispersal and is a source of weed propagules and weed species present along these trails are grasses or herbs. Fortunately the species do not extend more than a few metres into the undisturbed bushland adjacent to tracks. Weed species include *Bidens pilosa*, *Sida rhombifolia*, *Plantago* sp, *Conyza* sp.

4.2 Bush Regeneration and Land Management

A strategy for weed management should be based on a system of priorities for managing current weed problems and the prevention of potential weed problems. In particular the rate of likely spread of the weed infestations should be given high consideration. The broad areas of priorities are:

- i) Weed invasion into significant vegetation which is likely to increase
- ii) Weed invasions into undisturbed bushland which are likely to increase in if immediate remedial action is not taken

The basic principles of weed removal are working from the least weed infested areas to the most heavily weed infested areas, minimal soil disturbance and allowing native plant regeneration to dictate the rate of weed removal.

A volunteer bush regeneration has been working in the national park, Council land and on the private bushland following the 1994 bushfires. The group has been jointly supported by Council and the National Parks and Wildlife Service.

Land management issues include soil erosion associated with a network of illegal tracks and altered drainage patterns. These areas have been fenced and require erosion control and revegetation.

4.3 Fire Regime

Management of the fire regime in the Reserves of Lovett Bay North and Towlers Bay will be undertaken by the Warringah Pittwater Bush Fire Management Committee, especially the National Parks and Wildlife Service and the Warringah Pittwater Rural Fire Service, in accordance with Circular C10 - Planning for Bush Fire Prone Areas. The Reserves will be regularly monitored for fuel loadings and any hazard reduction burns required will be undertaken in accordance with the Draft Fuel Management Plan. Following burns in the Reserves, weed follow up programs will be undertaken.

Ecological considerations will be assessed by Council Environmental Staff to determine methods of hazard reduction. For example, areas of Closed Forest should not be burnt. The fires of 1994 affected the reserve and need to be incorporated into the fire regime.

4.4 Management of Native Fauna and Introduced Predators

The Reserves of Lovett Bay North and Towlers Bay provide good habitat for fauna with a variety of habitat components. The location extends from ridgetop to foreshore estuarine areas with intertidal, woodland, open forest and closed forest associations providing year-round food availability.

A Pittwater wide public awareness campaign will address the value of bushland as habitat for fauna and how residents can be responsible neighbours by ensuring that domestic cats and dogs do not roam in the Reserve. The enforcement with possible removal or permanent removal from the western foreshores of all introduced animals is an issue needing further discussion.

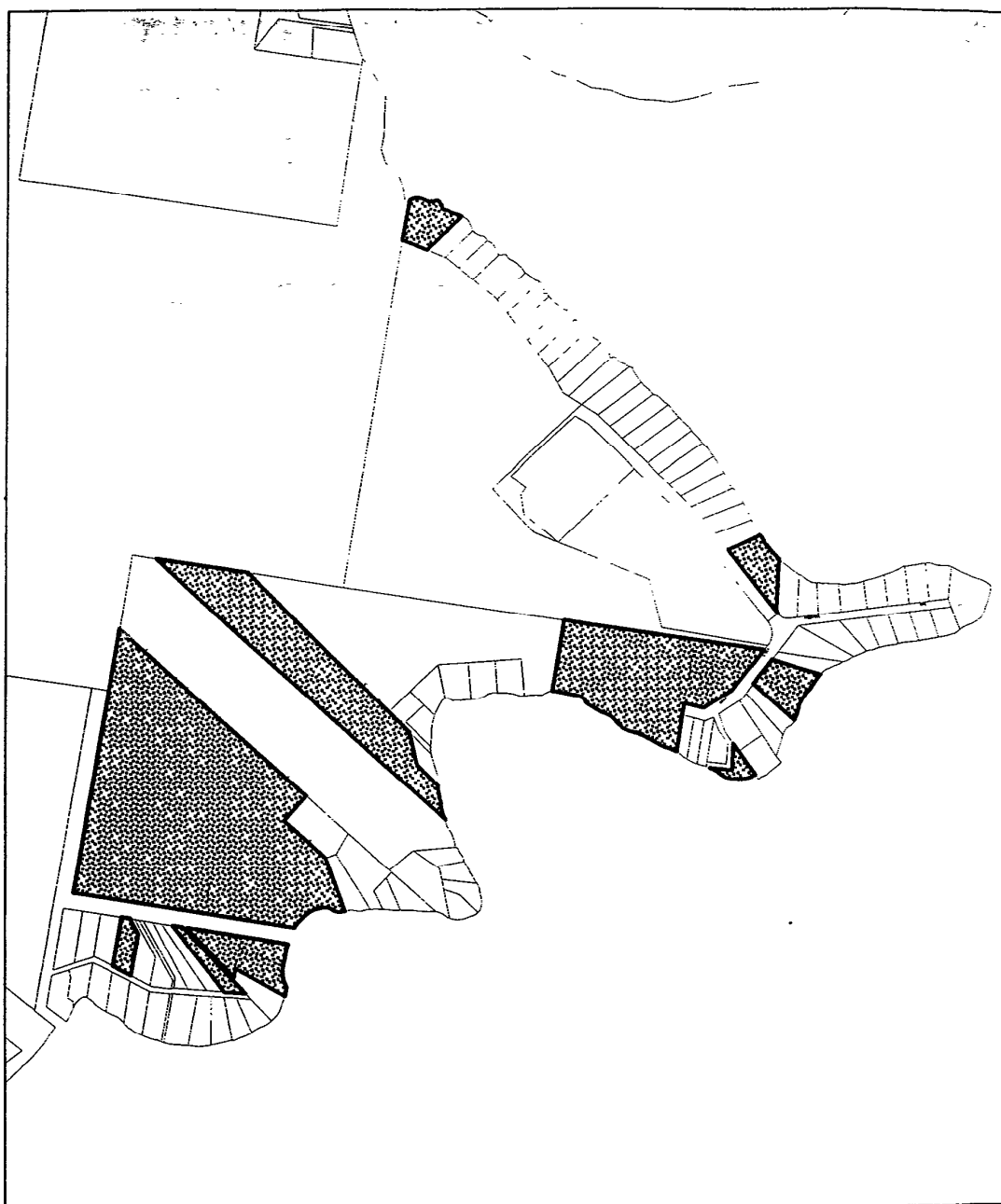
Compliance signs can assist this. Feral cat and fox predation is an issue that needs to be addressed through a Pittwater-wide control strategy integrated with pest species management in Ku-ring-gai Chase National Park.

4.5 Access, walking tracks and recreation

A network of illegal and legal tracks and fire trails exists, as well as the foreshore wharf. Many tracks have been closed to improve the management of the area. There is a proposal to upgrade part of Bona Crescent to fire trail standard to improve fire vehicle and pedestrian access. The access to the foreshore has recently been upgraded, however the wharf requires some repair.

5.0 PERFORMANCE

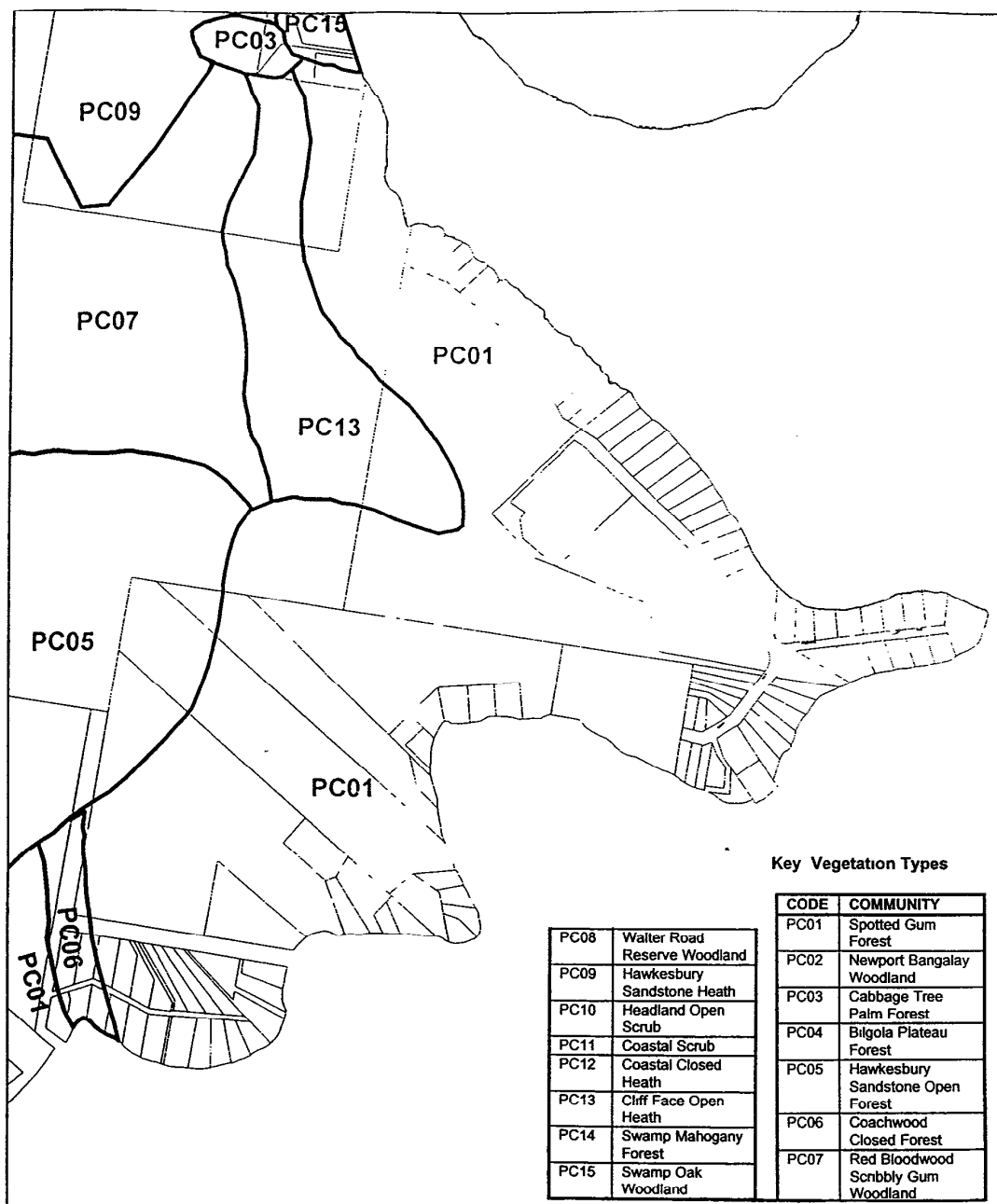
Management objectives	Performance Targets (Actions)	Responsibility	Completion date	Capital cost	Recurrent Cost	Performance Measures
Bush regeneration & Land Management	Support bush regeneration group Revegetate closed tracks	Natural Resources & NPWS	Ongoing	NA	\$1400 pa	Bushland restored & community awareness improved
Fire Management	Maintain appropriate fire regime Upgrade fire trail	Natural Resources & Fire Control & NPWS Urban Services	Ongoing Fire trail upgrade 1997/98	NA	\$10,000	Fire regime that protects life, property & biodiversity Emergency access
Introduced Predators	Community awareness program re pet control Fox & feral cat control program with NPWS	Natural Resources & NPWS	When program developed	\$500	Staff time	Responsible pet ownership Extant fauna populations
Access & walking tracks	Repair wharf	Building Services	When funds secured	Seek detailed costings		Heritage item in useable condition





Urban Bushland Plan of Management			
Map	RESERVE'S LOCATION	Scale	NOT TO SCALE
Locality	LOVETT AND TOWLER'S BAY	Date	JULY 1997



Pittwater Council



Urban Bushland Plan of Management			
Map	VEGETATION COMMUNITIES	Scale	NOT TO SCALE
Locality	LOVETT AND TOWLER'S BAY	Date	JULY 1997
<div>   </div> <div>Pittwater Council</div>			

Dolphin Park, Whale Beach

Reserve Number 0027

Street Address 89 Dolphin Crescent, Whale Beach

1.0 Description & Category

1.1 Location and Description

Dolphin Park is located near Whale Beach between Barrenjoey Road, Whale Beach Road and residential properties in Crane Lodge Place and Dolphin Crescent. The Reserve occupies 1.07 hectares on a mainly southwest facing slope that reaches the coastal ridge line.

1.2 Land Tenure and Property Description

The Reserve is owned by Council, being described as Reserve in DP 28663, Lot B in DP 31294 and Reserve in DP 10782. The land is zoned 6(a) Open Space - Existing Recreation A.

1.3 Category of Land

The Reserve is community land under the Local Government Act 1993. It is categorised as a natural area and further categorised as bushland. It meets the definition of urban bushland described in State Environmental Planning Policy No 19 - Bushland in Urban Areas.

2.0 Natural & Cultural Heritage

2.1 Topography, Geology and Soils

Dolphin Park straddles the narrow north-south ridge between Whale Beach and Careel Bay and extends down a steep to moderate side slope adjacent to the low-lying Careel Bay wetlands. The Reserve descends steeply over a short distance to the ocean. Numerous boulders and narrow benches occur below the crest. The sandy soils on the crest are derived from a small capping of Hawkesbury Sandstone geology. The geology of the mid to lower colluvial slope relates to the shales and sandstones of the Newport Formation in the Narrabeen Group.

The soils, with a higher clay content than those further upslope, are prone to seasonal

waterlogging on the footslopes and present a very high erosion hazard. These soils have been mapped as the Erina soil landscape.

2.2 Hydrology

The Reserve sheds water into two catchments. One drains to the ocean and Whale Beach, the other into Careel Bay. Whilst there are no permanent creeklines, an area of impeded drainage occurs in the southern corner of the Reserve.

2.3 Vegetation

The vegetation of Dolphin Park is a remnant transect of an environmental gradient that crosses the landform with different soils and aspect affecting vegetation. The lower section of the Reserve near Pittwater is an ecotone of Swamp Mahogany Forest and Swamp Oak Woodland. Trees present include Coastal Banksia (*Banksia integrifolia*), Cheese Tree (*Glochidion ferdinandi*), Muttonwood (*Rapanea variabilis*) and Rough-fruit Pittosporum (*Pittosporum revolutum*). The southern slope supports Spotted Gum Forest dominated by Spotted Gum (*Corymbia maculata*), and associated trees include Grey Ironbark (*Eucalyptus paniculata*) and Rough-barked Apple (*Angophora floribunda*). The understorey includes a small tree and shrub layer of Forest Oak (*Allocasuarina torulosa*), Blueberry Ash (*Eleocharis reticulata*) and Mock Olive (*Notelaea longifolia*). Ground layer species include vines and ferns, including Morinda (*Morinda jasminoides*), Settlers Flax (*Gymnostachys anceps*), Water Vine (*Cissus hypoglauca*) and Kangaroo Grape (*C. antarctica*).

Spotted Gum Low Open-forest is present on the ridge top with trees 4-5m high. Tree species include Spotted Gum, Grey Ironbark and Smooth-barked Apple (*Angophora costata*).

On the east-facing slope exposed to the ocean, tree height is 3-4m and the understorey includes small trees and shrubs Forest Oak, Port Jackson

Fig (*Ficus rubiginosa*). Coastal Banksia (*Banksia integrifolia*) and Dogwood (*Jacksonia scoparia*) Tongue Orchid (*Dendrobium linguiforme*) is also present

2.4 Fauna

Although the provision of grassed areas in Dolphin Park has disturbed fauna habitat, the upper section of the Reserve contains a thick mesic understorey, rock outcrops and tree hollows. The canopy is generally still intact throughout the Reserve, providing mature habitat trees such as Spotted Gums and Swamp Oaks. The reserve provides suitable habitat for the endangered population of Squirrel Glider, Glossy Black-cockatoo and the Greater Broad-nosed Bat. Council's Habitat and Wildlife Corridor Conservation Strategy maps the Reserve as "Corridor - Co1" which indicates corridors or habitat areas though disturbed are likely to be of value due to good crown cover and/or understorey.

2.5 Aboriginal and Non-Aboriginal Sites

There are no recorded Aboriginal sites within the Reserve. There is potential for Aboriginal sites such as axe grinding grooves and engravings to occur in the area. There are no known European Heritage sites in the Reserve.

3.0 Significance & Objectives

3.1 Statement of Significance

Dolphin Park is significant because

- ❖ it protects an example of bushland in Whale Beach, overlooking Careel Bay in a similar condition to that which occurred when the area was first visited by Europeans.
- ❖ it protects an example of Spotted Gum Forest, which is significant in NSW.
- ❖ it provides suitable habitat for the endangered population of Squirrel Glider, and the threatened Glossy Black-cockatoo and the Greater Broad-nosed Bat

- ❖ it is adjacent to Careel Bay, a significant estuarine wetland habitat, and forms an important habitat and part of a wildlife corridor for faunal movement on the Peninsula.

- ❖ it contributes to the landscape quality of Whale Beach and provides a record of the original landscape and the changes wrought by urban development,

- ❖ it is an education resource and a contact point with nature for residents, and

- ❖ it allows urban residents to undertake informal recreational pursuits in a bushland setting.

3.2 Management Objectives

The management objectives for Dolphin Park are

- ❖ to protect the natural features of the Reserve, particularly the significant Spotted Gum Forest.

- ❖ to maintain the natural range of structural and floristic diversity of bushland in the Reserve,

- ❖ to maintain suitable habitat for Squirrel Glider, Glossy Black-cockatoo and the Greater Broad-nosed Bat

- ❖ it is adjacent to Careel Bay, a significant estuarine wetland habitat, and forms an important habitat and part of a wildlife corridor for faunal movement on the Peninsula.

- ❖ to adequately manage the bushland in relation to encroachments and weed invasion,

- ❖ to protect life and property from wildlife and to maintain ecological processes by seeking to maintain a near-natural fire regime in the Reserve to conserve native flora and fauna in the Reserve,

- ❖ to control introduced animals in the Reserve.

- ❖ to provide opportunities for low impact recreational and educational use of the Reserve consistent with the other objectives,
- ❖ to encourage community appreciation and neighbourhood participation in bushland management of the Reserve,
- ❖ to control those areas of instability and/or erosion,

4.0 Management Issues

4.1 Weed Invasion

Along the ridge the shrub and ground layer is heavily weed infested by garden escapes including Asparagus Fern, Lantana, Resurrection Plant and Cape Ivy. This is possibly due to clearing to improve water views. The southern slope is moderately weed infested by Strelitzia, Paddy's Lucerne, Asparagus Fern, Cassia, Balsam and Wandering Jew.

In the middle section of the Reserve the area is largely mown leaving little understorey. Weeds have infested the poor drainage area and include Small-leaved Privet, Cassia and Wandering Jew. In the lower part of the Reserve weed species include Wandering Jew, Turkey Rhubarb, Mulberry, Bamboo, Ochna and Ginger Lilly.

4.2 Bush regeneration

The areas adjoining the mown area of the Reserve need to be weeded and monitored for further encroachment. The exposed body of the Reserve would benefit from weeding and revegetation with local native species. The upper bush area should be weeded in strips, starting in the middle of the Reserve and slowly working outwards to the margins. The exposed ridge should only be dealt with once other areas have been secured. Residents and locals should be encouraged to participate to ensure long term success of the program.

4.3 Stormwater management

An area of impeded drainage has become weed infested after clearing, and requires revegetating with local native species. Minor swales may be necessary to direct water away from the properties below.

4.4 Fire Regime

Management of the fire regime in the Reserve will be undertaken by the Warringah Pittwater Bush Fire Management Committee in accordance with Circular C10 - Planning for Bush Fire Prone Areas. The Reserve will be regularly monitored for fuel loadings and any hazard reductions required will be undertaken in accordance with the Draft Fuel Management Plan.

Ecological considerations will be assessed by Council Environmental Staff to determine methods of hazard reduction and co-ordinate follow up bush regeneration.

4.5 Management of Native Fauna and Introduced Predators

Dolphin Park provides good habitat for fauna with a variety of habitat components. The winter-flowering Spotted Gum and Swamp Oak encourage diversity and year-round food availability. A Pittwater wide public awareness campaign will address the value of bushland as habitat for fauna and how residents can be responsible neighbours by ensuring that domestic cats and dogs do not roam in the Reserve. Interpretive signs can assist this. Feral cat and fox predation is an issue that needs to be addressed through a Pittwater-wide control strategy.

4.6 Access, walking tracks and recreation

Access is provided from Barrenjoey Road, along an informal path to Dolphin Crescent. There is an informal track from Crane Lodge Place to the grassed section of the Reserve. No access is available to the ridge from the lower section of the Reserve or Whale Beach Road. The middle section is used as an informal play area. Mowing should be reduced. There is a need for signs naming the Reserve.

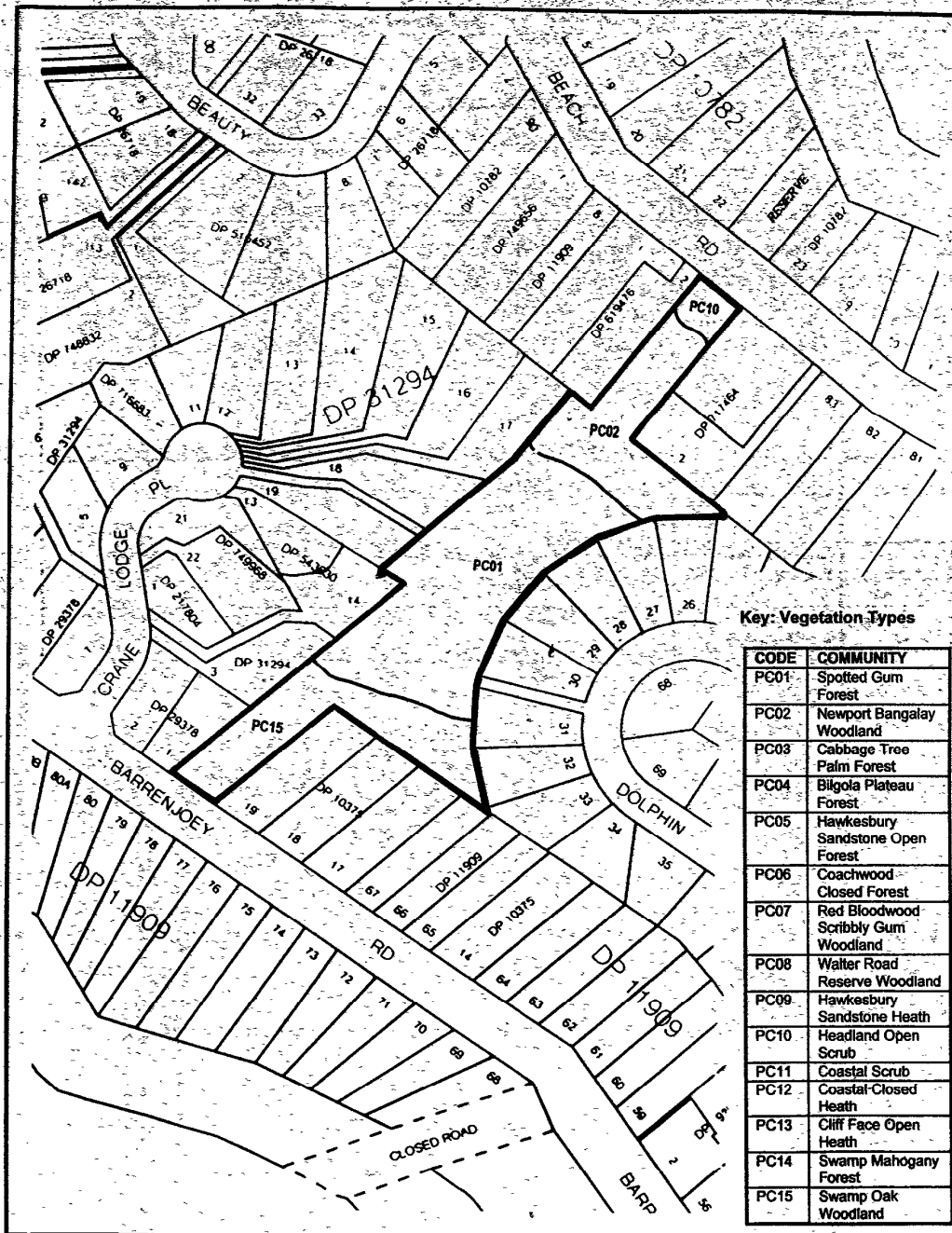
4.7 Boundaries and neighbours



There is a need for an awareness and education program for neighbours of the Reserve.

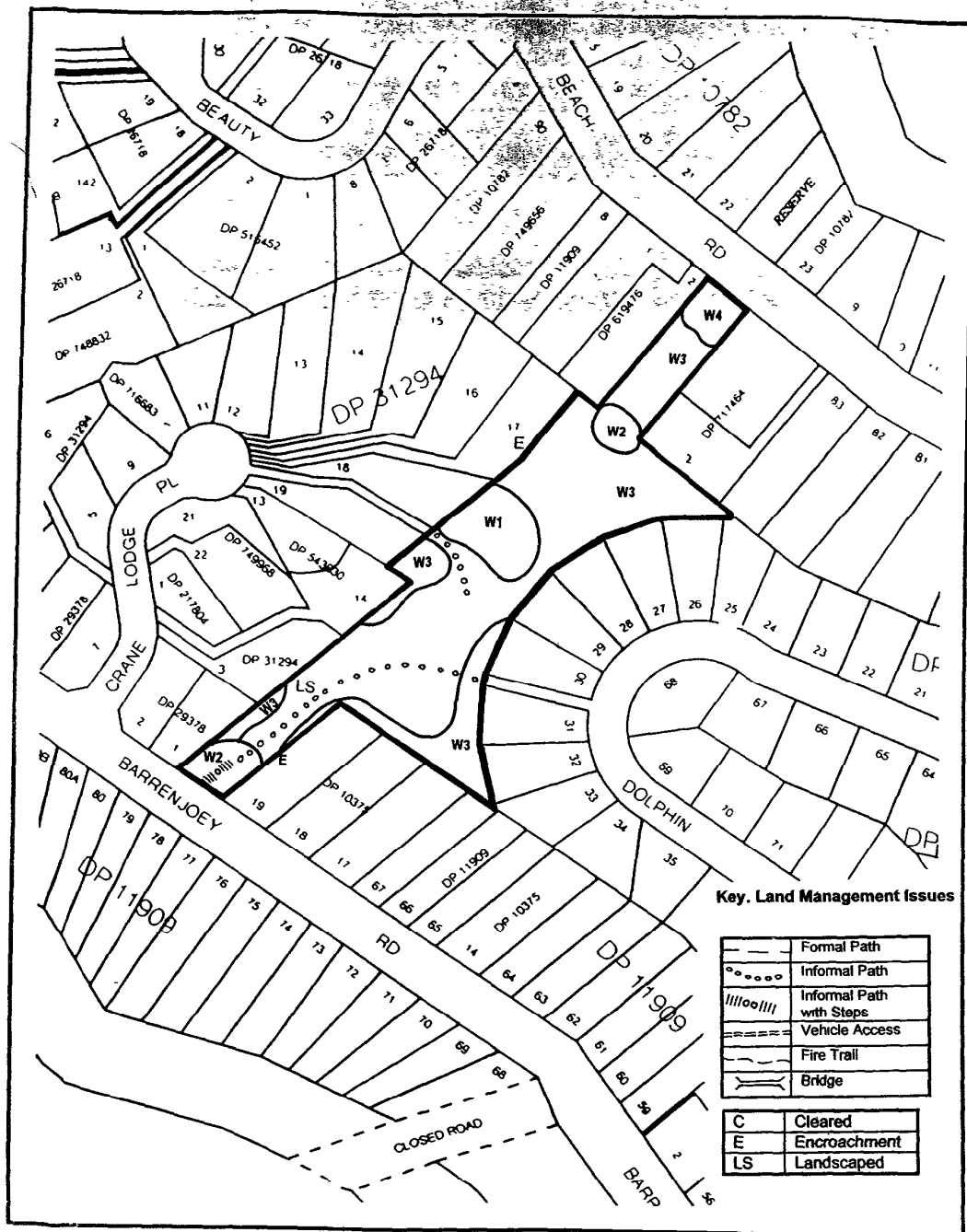
demonstrating that dumping of vegetation leads to weed infestation and fire hazard Residential boundaries in the upper Reserve need to be identified and any encroachments removed



5.0 Performance

Management objectives	Performance Targets (Actions)	Responsibility	Completion date	Capital cost	Recurrent Cost	Performance Measures
Weed Control & Bush regeneration	Reduce mown areas Letterbox drop for volunteer group	Reserves & Natural Resources	Mowing 1997/98 Group when community demand		\$1400pa supervision & materials	Increased understorey and group commenced
Management of native fauna & introduced predators	Public awareness campaign for responsible pet ownership Interpretive sign feral animal control	Natural Resources & Compliance	When funds available as well as ongoing programs	Ongoing	Costed within a Pittwater wide feral animal control program	An increase in native fauna in the Reserve
Fire Management	Maintain appropriate fire regime	Bushfire Services & Natural Resources	Ongoing		Staff time	
Access, walking tracks & recreation	Sign naming the Reserve	Building Services	1998/99	\$500		Reserve given an identity
Boundaries & neighbours	Community awareness & boundaries surveyed	Natural Resources & Urban Services			Staff time	Good resident practices



Urban Bushland Plan of Management			  Pittwater Council	
Map	Vegetation	Scale 12000		Date JULY1997
Locality				Dolphin Park Whale Beach



Urban Bushland Plan of Management			 N  Pittwater Council	
Map	Weeds Management Issues	Scale 12000		Date JULY1997
Locality Dolphin Park Whale Beach				