

4. SITE ANALYSIS

The site analysis identifies the current condition and use of the land, an assessment of access and circulation, a summary of the background studies such as the Aboriginal sites survey and the flora and fauna assessment, as well as identifying bushfire management issues. This information has been used to assist in the development of actions for the Plan of Management.

4.1 Access and Circulation

Figure Seven indicates the bus and bicycle routes around the area. The main bus routes are to the South and East of the site. To the South, it follows Oxford Falls Road and Tristram Road, past the Beacon Hill schools. To the East the route follows Willandra Road, and McIntosh Road.

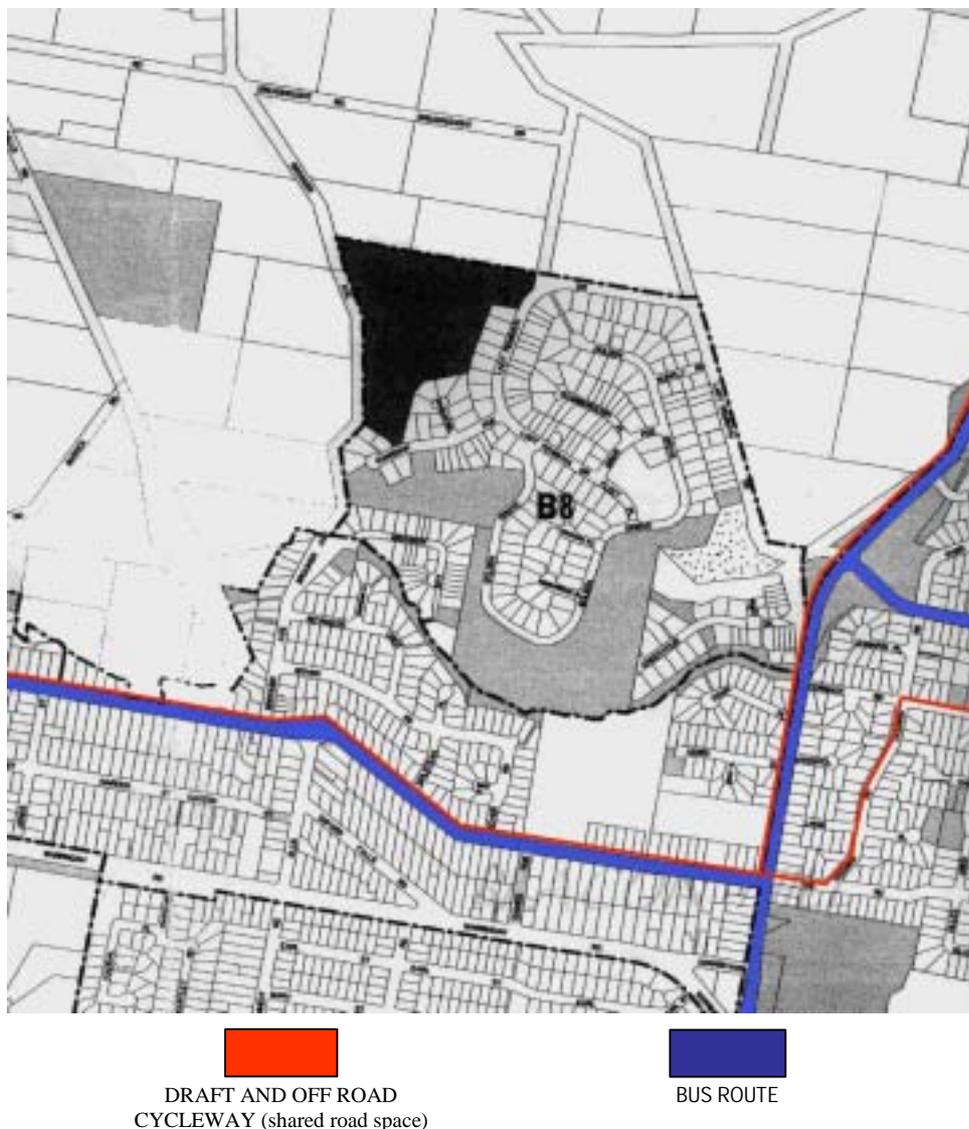


Figure 7 - Public Transport Routes (GEOPLAN Urban & Traffic Planning, 1998)

The bicycle routes have been adapted from the “Warringah Draft Bicycle Routes” (GEOPLAN Urban & Traffic Planning, 1998) indicating a shared road space.

Residents from Red Hill traverse the reserves to meet the bus stops on Tristram Road and Willandra Road. School children also need to cross South Creek to reach the local High School. These desired accessways require formalising.

4.2 Archaeological Survey

An archaeological survey was carried out by Helen Brayshaw Heritage Consultants to identify any sites or areas of archaeological and Aboriginal significance on the subject land; to assess the direct and indirect impact of any alteration to land use on any site identified; and to advise on the protection and management of any site identified. The field survey was carried out by MLALC representatives Mr Alan Madden (Sites Officer) and Mr Andrew Roberts, and by archaeologists Ms Elizabeth White and Dr Helen Brayshaw.

The archaeological field survey failed to identify any Aboriginal archaeological sites or isolated relics within the study area. The archaeology therefore provides no constraint to the design of the park. However, survey efficiency was restricted by vegetation overlying many rock surfaces. In view of the number of rock engraving sites which have been recorded within the Warringah Council area, it is recommended that clearing of rock surfaces for the construction of trails or other facilities be monitored by a representative of the MLALC.

A full report is attached in Appendix B for further information.

4.2.1 Archaeological Context

The types of Aboriginal sites occurring on Hawkesbury sandstone formations include rock engravings, shelter sites with art and or occupation deposit, open occupation sites in the form of artefact scatters or middens, grinding grooves where axes or other stone implements have been sharpened or seeds ground, scarred trees with evidence of bark removal for the manufacture of shields or other implements and stone arrangements.

Rock engravings are the most frequently recorded site types in the Warringah area. Many of these sites were recorded by a government surveyor in the late 19th century (Campbell 1899). During the present century a number of archaeologists re-recorded many of these and recorded other sites. The interest of all surveys focussed on rock engravings, and has no doubt contributed to the dominance of these site types in records of sites in the area.

A number of surveys have been carried out in the vicinity of the present study area. Many of these have not identified any new sites. Shelter sites with art and archaeological deposits have been identified in the region, in some cases with test excavation being carried out (Haglund 1984, 1986).

Within nine square kilometres surrounding the present study area, the National Parks & Wildlife Service site register contains details of 33 Aboriginal archaeological sites which have been recorded. As indicated, 28 (>80%) of the sites are rock engravings, two associated with grinding grooves and another with a rock shelter containing a midden deposit. Other sites recorded (5) are rock shelters with art and/or archaeological deposit and an open campsite.

The geology and topography of the study area consists of moderate slopes and rock outcrops with no steep cliff lines. Given this and the types of sites already recorded in the Beacon Hill/Red Hill area, the most likely site to be encountered would be engravings on flat sandstone slabs. Occasional small rock shelters may also be found. It is not

uncommon however, for large expanses of sandstone to be devoid of engravings, in spite of the rich tradition in the area (see McDonald 1994:24).

Because surface visibility was limited and no Aboriginal sites were found, monitoring of surface clearing for the construction of walking trails is recommended. While no further archaeological investigation is warranted prior to development, where upgrading of open space facilities or other development involves soil and vegetation removal from rock platforms this process should be monitored by a representative of the MLALC. Council's protocols, established with the MLALC as part of its reconciliation strategy should be observed in the event of new development or of a site or relic being uncovered.

4.3 Flora and Fauna Survey

P. and J. Smith Ecological Consultants undertook a brief survey of Flora and Fauna within the site area for this Plan of Management. The following text represents excerpts from the main report, which is attached in Appendix C.

Five native vegetation communities are present within the two parks, as shown in Table 2. These communities were previously mapped from aerial photographs as part of the Natural Area Survey of Warringah (Smith and Smith 1997). Figure Eight illustrates the location of the communities.

Table 2. Native vegetation communities of Red Hill and Golden Grove Parks, as identified in the Natural Area Survey of Warringah (Smith and Smith 1997), and their relationship to the vegetation map units distinguished in the Royal Botanic Garden's 1:100 000 Sydney vegetation map (Benson and Howell 1994).

Vegetation community of Smith and Smith		Vegetation map unit of Benson and Howell	
9.	Silvertop Ash-Brown Stringybark Forest (map code LL)	9sf.	Duffy's Forest
15.	Peppermint-Angophora Forest (map code GG)	10ag.	Sydney Sandstone Gully Forest
18.	Bloodwood-Scribbly Gum Woodland (map code RR)	10ar.	Sydney Sandstone Ridgetop Woodland
27.	Sandstone Heath (map code HH)	21g.	Coastal Sandstone Heath
31.	Sandstone Swamp (map code HS)		

Key Management Recommendations from the Flora and Fauna Report have been included in the Actions Table. Management of the two parks should have conservation, maintenance and rehabilitation of its native vegetation and fauna habitats as a high priority.

The most significant and sensitive areas of the two parks, as identified in the survey are:

- The two stands of Silvertop Ash-Brown Stringybark Forest (Duffy's Forest) in Golden Grove Park. This is a listed Endangered Ecological Community and supports a population of a listed Vulnerable Species, *Pimelea curviflora* variety *curviflora* (Curved Rice-flower).
- The stand of Bloodwood-Scribbly Gum Woodland in Red Hill Park North West of Charlotte Place, which supports populations of the listed Vulnerable Species,

Tetratheca glandulosa, and the rare species, *Lomandra brevis* (Tufted Mat-rush), and the adjoining rock platforms, which support a population of the rare species, *Platysace stephensonii* (Stephenson's Platysace).

- The two stands of Sandstone Swamp in Golden Grove Park, which is a vegetation community of restricted distribution in Warringah and important for the conservation of biodiversity at the local level.
- The creekline in Golden Grove Park between Guardian Parade and South Creek. This creekline is in reasonable condition over most of its length and provides potential habitat for two frogs listed as Vulnerable Species in the Threatened Species Conservation Act, the Red-crowned Toadlet (*Pseudophryne australis*) and Giant Burrowing Frog (*Heleioporus australiacus*).
- The routes of any trails constructed through the two stands of Silvertop Ash-Brown Stringybark Forest (Duffy's Forest) will need to be carefully checked for occurrences of the Vulnerable Species, *Pimelea curviflora* variety *curviflora*, and relocated where necessary to avoid any disturbance of these plants.
- Too frequent burning of the native vegetation of the two parks should be avoided to prevent loss of plant species diversity. A particular concern is *Banksia ericifolia* (Heath-leaved Banksia), whose flowers are a major winter food source for honeyeaters and other fauna, and can attract birds from well outside the local area. *Banksia ericifolia* is common in the two parks at present, but it is a species that is killed by fires and must regenerate from seed. It can be eliminated from a site if fires occur at too frequent intervals that do not allow the regenerating plants enough time to replenish the soil seedbank. Fires at intervals of less than 10 years can be expected to have an adverse effect on populations of *Banksia ericifolia* and other fire sensitive species.



Figure 8: Vegetation Map (Source: Warringah Council, 1999)

Legend	
Vegetation Communities:	
Sydney Sandstone Gully Forest: Peppermint-Angophora Forest	GG
Sydney Sandstone Ridgtop Woodland: Bloodwood-Scribbly Gum Woodland	RR
Coastal Sandstone Heath: Dry Sandstone Heath / Wet Sandstone Heath	HH
Coastal Sandstone Heath: Sandstone Swamp	HS
Duffy's Forest: Lateral Forest	LL
Highly Disturbed Vegetation	D
Cleared Areas	C
Priority	
First Priority (endangered community or provides habitat for threatened species)	1
Second Priority (restricted distribution)	2
Third Priority (common)	3
Condition of Vegetation	
Good condition	1
Intermediate condition	2
Poor condition	3
Example: Vegetation Community / Priority / Condition of Vegetation (GG/1/3)	
Site Boundary	

N

Scale: Not to Scale

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4.4 Geology and Soils

Red Hill is part of a rocky ridge extending between Middle Creek to the West and North; and South Creek to the South and East. Both of these creeks drain into Narrabeen Lagoon about three kilometres to the North East of the study area. The areas covered by the survey include part of the top of Red Hill and the South facing slope down to houses on Guardian Parade, and a strip extending South of Guardian Parade and along the Northern side of South Creek.

The quarried plateau of Red Hill is between 160 and 170m Australian Height Datum (AHD), while that section of South Creek adjoining the survey area is 90-100m AHD.

Bedrock in the area is Hawkesbury sandstone. The landscape is typified by broad ridges with gently to moderately inclined slopes with wide rock benches and low broken scarps, small hanging valleys and areas of poor drainage. There are expanses of exposed sandstone outcrops, and many smaller exposures on the lower slope above South Creek, but overhangs of sufficient scale to provide shelters of occupiable proportions are not present in the study area. The sandstone exposures vary from smooth surfaces suitable for engraving and coarsely pitted or roughly angled surfaces that could not be engraved.

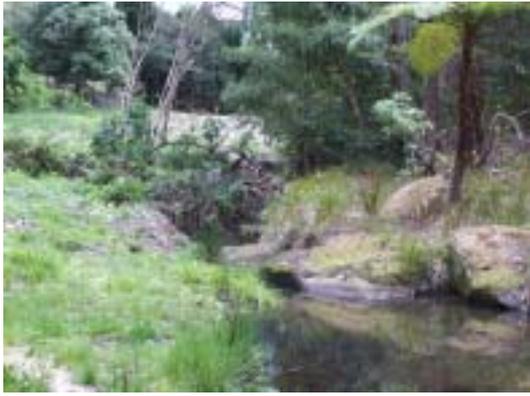
Soils formed on Hawkesbury sandstone tend to be shallow, sandy and acidic. Some raw materials for stone artefacts, particularly quartz pebbles, may be found in bands of conglomerate within the sandstone. Other rock used for stone artefacts, such as silcrete, from which flaked tools were made, and basalt, used mainly for making ground implements such as hatchet heads, would have had to have been brought from sources further afield on the Cumberland Plain, or from Hawkesbury River gravels.

4.5 Hydrology

South Creek runs along the Southern boundary of the site, and other small drainage lines run mainly in a Southerly direction to connect into South Creek. The catchment for the site ends up in Narrabeen Lagoon and it is important that Total Catchment Management Principles are adapted and reinforced throughout the site. The Northern Beaches Catchment Management Committee has formed a Catchment Management Strategy to implement best practice approach to land and water management. South Creek was rated in Council's "Urban Streams and Riparian Zone Audit" (Warringah Council, 1998), as having moderate to high conservation value, both as a core habitat and as a corridor linking areas of habitat.

Urbanisation is the greatest threat to water quality and channelling run-off into creeks and nutrient enrichment are major problems.

Initial site visits indicate that many of these problems are occurring along South Creek. Siltation, rubbish, weeds, run-off of chlorinated water from swimming pool are all occurring, and need to be addressed.



South Creek crossing location



Typical view - South Creek

4.6 Bushfire Fire Risk Management

The Rural Fires Act 1997, requires a Bush Fire Management Committee to be formed in each Local Government Area containing a rural fire district or a fire district with a bush fire risk. The Warringah/Pittwater Bush Fire Management Committee has consequently been formed and has prepared a draft Bush Fire Risk Management Plan for its area of responsibility

The purpose of bush fire risk management is to protect the community and its values from the adverse affects of wildfire. The outcome sought is to achieve better integration of community preparedness and prevention strategies as key elements of bush fire management. The strategies established in the draft bush fire risk management plan which are mirrored in this Plan of Management address the following issues:

- Bush fire hazard;
- Vulnerability of assets to fire;
- Safety of the community and fire fighters;
- Protection of the land and environment from fire; and
- Biodiversity management through the application of appropriate fire regimes upon the landscapes.

Bush fire risk management priorities are to be allocated according to the bush fire risk ratings. Those areas faced with an extreme bush fire risk are given the highest management priority, while those areas with an insignificant risk have the lowest management priority. The bush fire risk management priority influences:

- When the risk is likely to be treated – high priority areas will be addressed first;
- The resources allocated to the treatment – more resources will be allocated to manage the risk in high priority areas, as more work will be needed to reduce the risk; and
- The range of treatment strategies required to manage the risk – a greater range of management strategies will be implemented to manage the risk in high priority areas, as more factors contribute to the risk.

A series of bush fire management zones have been identified in the Draft Warringah Pittwater Bush Fire Risk Management Plan. Bush fire management zones identify those areas where the bush fire risk management strategies will focus on the management of the bush fire hazard (or fuel). The zones include:

Asset Protection Zone	To protect human life, property and highly valued public assets.
Strategic Fire Advantage Zone (Fire Management Access Zone)	To provide strategic areas of fire protection which will reduce the speed and intensity of bush fires, and reduce the potential for spot fire development.
Land Management Zone	To meet relevant land management objectives in areas where Asset Protection or Strategic Fire Advantage Zones are not appropriate.
Fire Exclusion Zone	To exclude fires (both bush fire and hazard reduction burning) due to the presence of fire intolerant assets.

Warringah Council has produced a “Management Strategy for Weed Control and Fire Management Access Zones (Urban Bushland Boundaries)” (1996). The fire management aim of the Management Strategy is to *“identify areas of urban bushland boundaries within Warringah that are a fire hazard and that require access for fire fighting organisations to undertake fire management operations”*.

Council is obligated under the Rural Fires Act, 1997 (formerly the Bush Fires Act, 1949); the State Environmental Planning Policy No. 19 – Bushland in Urban Areas, 1986; The Environmental Planning and Assessment Act, 1979; The Noxious Weeds Act, 1993; and the Occupational Health and Safety Act, 1983; to address the problems and issues arising at the residential/bushland interface. Council is also obligated to manage bushland so as to conserve indigenous flora and fauna in accordance with the National Parks and Wildlife Act, 1974, in particular rare or threatened plant species or habitat. The boundaries program is designed to run parallel with the conservation-based program, in order to address the problems and issues at the residential/bushland interface.

A Boundary Assessment Database has been developed by Council and provides an inventory and detailed costing of urban boundaries that need to be treated, based on weed control methods and follow up techniques proven to work in the bushland management industry. Works are also prioritised in accordance with pre-determined criteria. Data was collected for both weed and fire control, only 25 of 138 kilometers of urban/bushland boundaries had been surveyed at the time of writing the Management Strategy (Warringah Council, 1996).

Fuel Management Plans are prepared and costed in detail for those areas identified as “high risk” from an initial assessment. Areas are assessed for their previous fire history, fuel loads, and these areas are summarised and taken to review at a Risk Management Committee, which incorporates local fire fighting and bush fire control bodies.

Fire Management Access Zones are identified and costed in detail. To date, neither the Red Hill nor Golden Grove areas have been assessed. For the purposes of this Plan of Management, an initial assessment has been prepared, based on “The Basic Risk Index”. Two factors were considered; the size of adjoining bushland, and aspect and steepness of the slopes. The score ranges from 15-100, the higher the score the greater the fire risk, scores over 70 require Fire Management Access Zones. Adjoining roads and linear strips of open spaces etc affect the point system. Figure Nine shows the results of this initial assessment; further investigation is needed for a more accurate representation of bush fire risk.

Warringah Council will provide detailed Fuel Management Plans for those areas identified as high risk.

Further investigation into bush fire risk and bush fire management zones should be carried out in accordance with the draft Warringah Pittwater Bush Fire Risk Management Plan once adopted. It should be noted that further investigations may result in a change to the zones identified within Figure Nine. Investigations should be carried out in consultation with the NSW Rural Fire Service (Warringah – Pittwater District).

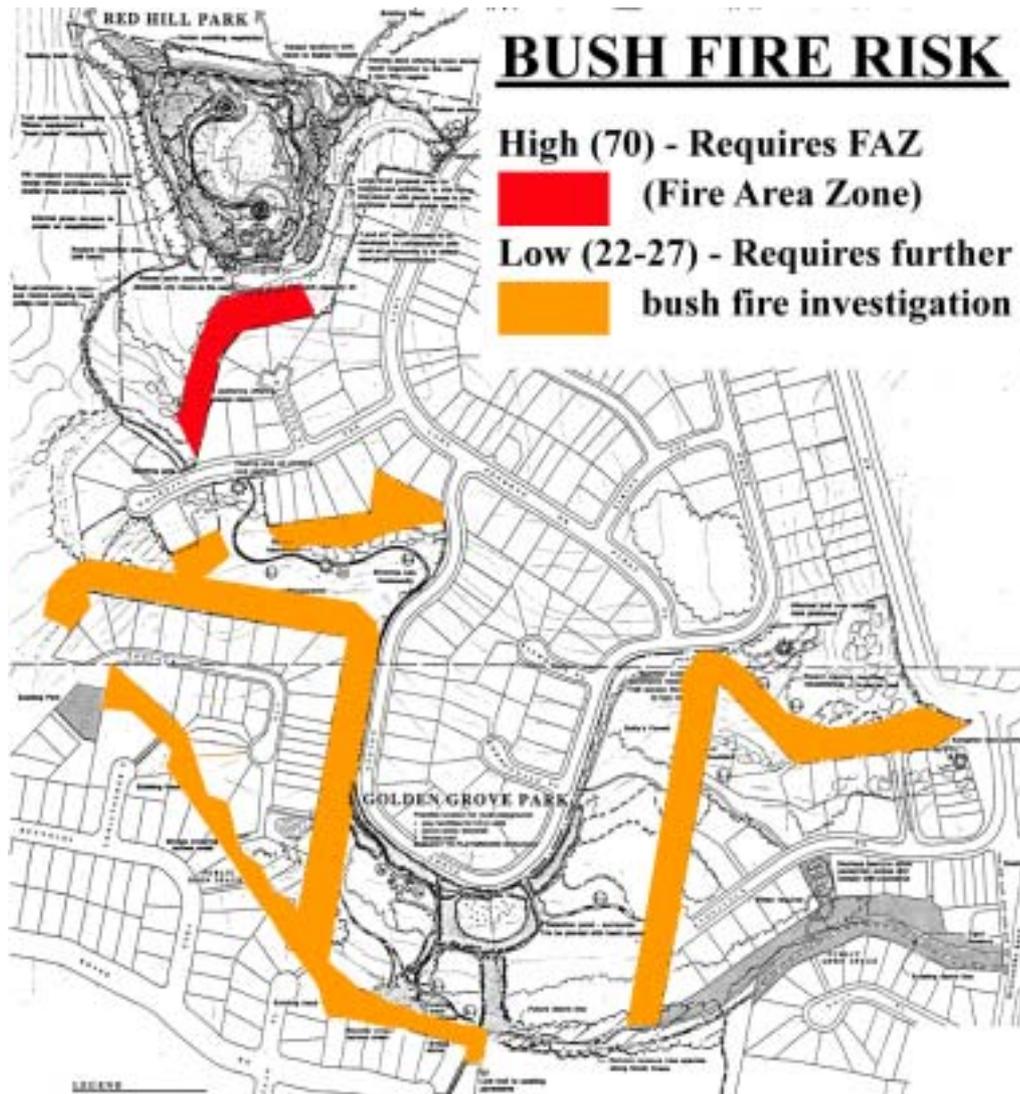


Figure 9 - Bush Fire Risk
(source: Kiah Environmental Designers 1998 draft Red Hill Plan of Management.)