



Brewster Hjorth Architects

Proposed Redevelopment at the Australian Institute of Police Management at North Head, Manly.

Indigenous Archaeological Assessment

December 2008

McCardle Cultural Heritage Pty Ltd
P.O. Box 166,
Adamstown, NSW, 2289
Ph: 0412 702 396
Fax: 02 4952 5501
Email: mcheritage@iprimus.com.au

Photograph on front cover: the study area



Report No: J07025

Approved by:	Penny McCardle
Position:	Project Manager
Signed:	
Date:	December 2008

This report has been prepared in accordance with the scope of services described in the contract or agreement between McCardle Cultural Heritage Pty Ltd (MCH), ACN: 104 590 141, ABN: 89 104 590 141, and Brewster Hjorth Architects. The report relies upon data, surveys, measurements and specific times and conditions specified herein. Any findings, conclusions or recommendations only apply to the aforementioned circumstances and no greater reliance should be assumed or drawn by Brewster Hjorth Architects. Furthermore, the report has been prepared solely for use by Brewster Hjorth Architects and MCH accepts no responsibility for its use by other parties.

CONTENTS

1	INTRODUCTION	
1.1	SCOPE OF WORKS	1
1.2	STUDY AREA	2
1.3	ABORIGINAL COMMUNITY CONSULTATION	3
1.4	STATUTORY CONTROLS	4
1.5	REPORT STRUCTURE	5
2	ENVIRONMENTAL CONTEXT	
2.1	INTRODUCTION	6
2.2	GEOLOGY	6
2.3	SOILS	7
2.4	LANDFORMS AND TOPOGRAPHY	7
2.5	CLIMATE	8
2.6	WATERWAYS	8
2.7	FAUNA AND FLORA	8
2.8	PAST LAND USES AND DISTURBANCES	9
2.9	DISCUSSION	10
3	ETHNOGRAPHIC AND HISTORICAL BACKGROUND	
3.1	USING ETHNO-HISTORIC DATA	11
3.2	PORT JACKSON ETHNO-HISTORIC ACCOUNTS	11
4	ARCHAEOLOGICAL CONTEXT	
4.1	NSW DEC ABORIGINAL HERITAGE INFORMATION MANAGEMENT SYSTEM	12
4.2	ARCHAEOLOGICAL CONTEXT	12
4.3	SITES WITHIN THE STUDY AREA	16
4.4	PREDICTIVE MODEL FOR THE STUDY AREA	17
4.5	ARCHAEOLOGICAL POTENTIAL IN THE STUDY AREA	18
5	SURVEY RESULTS	
5.1	METHODOLOGY	19
5.2	LANDFORM UNITS	19
5.3	SURVEY UNITS	19
5.3.1	SURVEY UNIT 1	19
5.3.2	SURVEY UNIT 2	19
5.3.3	SURVEY UNIT 3	19
5.4	EFFECTIVE COVERAGE	20
5.5	ARCHAEOLOGICAL SITES	19
5.6	POTENTIAL ARCHAEOLOGICAL DEPOSIT (PAD)	19
5.7	DISCUSSION & CONCLUSIONS	19
6	ASSESSMENT OF IMPACTS	
6.1	IMPACTS OF PROPOSED DEVELOPMENT	20

CONTENTS

7	MANAGEMENT STRATEGIES	
7.1	CONSERVATION/PROTECTION	21
7.2	FURTHER INVESTIGATION	21
7.3	MITIGATED DESTRUCTION	22
7.4	MONITORING	22
8	RECOMMENDATIONS	

REFERENCES

LIST OF TABLES

TABLE 1.1	INITIAL CONSULTATION LETTERS	3
TABLE 5.1	GROUND SURFACE VISIBILITY RATING	21
TABLE 5.2	EFFECTIVE COVERAGE	21

LIST OF FIGURES

		<i>Follows Page</i>
<i>FIGURE 1.1</i>	<i>REGIONAL LOCATION OF THE STUDY AREA</i>	<i>2</i>
<i>FIGURE 1.2</i>	<i>LOCAL LOCATION OF THE STUDY AREA</i>	<i>2</i>
<i>FIGURE 1.3</i>	<i>GROUND FLOOR PLANS</i>	<i>2</i>
<i>FIGURE 4.1</i>	<i>REGIONAL LOCATION OF KNOWN SITES</i>	<i>13</i>
<i>FIGURE 5.1</i>	<i>SURVEY UNITS ACROSS THE STUDY AREA</i>	<i>20</i>
<i>FIGURE 5.3</i>	<i>EXAMPLES OF DISTURBANCES AND VEGETATION</i>	<i>21</i>

McCardle Cultural Heritage Pty Ltd (MCH) has been commissioned Brewster Hjorth Architects to prepare an indigenous archaeological assessment for the proposed redevelopment at the Australian Institute of Police Management at North Head, Manly. The report provides an assessment of the Preferred Project Scheme and responds to the indigenous archaeological and cultural matters that have arisen during the public exhibition of the Major Project Application.

The assessment employs a regional approach, taking into consideration both the landscape of the study area (landforms, water resources, soils, geology etc) and the regional archaeological patterning identified by past studies.

The archaeological assessment will determine possible impacts on the indigenous cultural heritage at the site. The objective of the assessment is to identify areas of indigenous cultural heritage value and to develop management recommendations.

*1.1**SCOPE OF WORKS*

The following tasks were carried out:

- a review of relevant statutory registers and inventories for indigenous cultural heritage including the NSW NPWS Aboriginal Heritage Information Management System (AHIMS) for known archaeological sites, the State Heritage Register, the Register of the National Estate, the Lake Macquarie Local Environmental Plan and the Register of the National Trust;
- a review of local environmental information (topographic, geological, soil, geomorphological and vegetation descriptions) to determine the likelihood of archaeological sites and specific site types, prior and existing land uses and site disturbance that may effect site integrity;
- a review of previous cultural heritage investigations to determine the extent of archaeological investigations in the area and any archaeological patterns;
- the development of a predictive archaeological statement based on the data searches and literature review;
- consultation with the Aboriginal community as per DEC Interim Community Consultation Requirements for Applicants (2005);
- identification of impacts in relation to known and recorded archaeological sites and predicted archaeological potential of the study area, and
- the development of mitigation and conservation measures.

The Australian Institute of Police Management is situated off Collins Beach Road, Manly on the North Head of Sydney Harbour. The site is described as Lot 2766 of Deposited Plan 752038 (refer to *Figures 1.1 and 1.2*).

The AIPM site is located on NSW Crown land and the proposed development is declared a Major Project, subject to the assessment and approval instruments under Part 3A of the Environmental Planning and Assessment Act 1979 (EP&A Act). Concurrently with the assessment of the proposal under Part 3A, the Commonwealth Department of Environment, Water, Heritage and the Arts (DEWHA) has declared the AIPM redevelopment project as a controlled action and agreed that it will be subject to a 'one-off accredited assessment' under the Bilateral Agreement with NSW, resulting in the requirements of the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) being assessed under the NSW planning and approval process.

It is proposed to redevelop and upgrade the existing Australian Institute of Police Management (AIPM) facilities at North Head, for the ongoing and long term sustainable use of the site by AIPM.

The design has 54 residential accommodation suites, new administration and academic offices, refurbishment of existing buildings for teaching, dining, library and Senior Common room. Existing residential cottages are to be retained and redundant buildings removed from the site (refer to *Figure 1.3*).

There is a stream on the southern part of the site between the existing library and administration building. Currently the water goes into a boxed culvert before the Administration building. This stream will be reinstated as part of the proposed development. This existing stormwater outlet will be different at the cliff edge as instead of a pipe it will be a stream in this location. The other 2 stormwater run off points one adjacent to the eastern boundary and the other near Kookaburra Cottage will be in the same location as existing.

The AFP and DECC have communicated to MCH the existence of a site of importance and sensitivity to the Aboriginal community that is within the study area. To date, details of its location and content have been withheld in order to maintain its protection and management.

During previous surveys no sites were identified along the cliff line but were identified further to the east and west of the current study area. DECC had also determined that the site was outside AFP land boundaries. Additionally, as described by Darwala-Lia (2001), the headlands is significant to the Aboriginal people of the area and notes that 26 sites are recorded throughout the headlands, however it is noted that none were below the current study areas cliff line (Refer to *Sections 4.2 and 4.3*).

Further discussions with the AFP had revealed that the DECC records indicate that the site is in fact outside the AFP site boundaries and that they are currently working to amend this. Consultation with NPWS site care takers have indicated that access to information regarding the site is limited and that

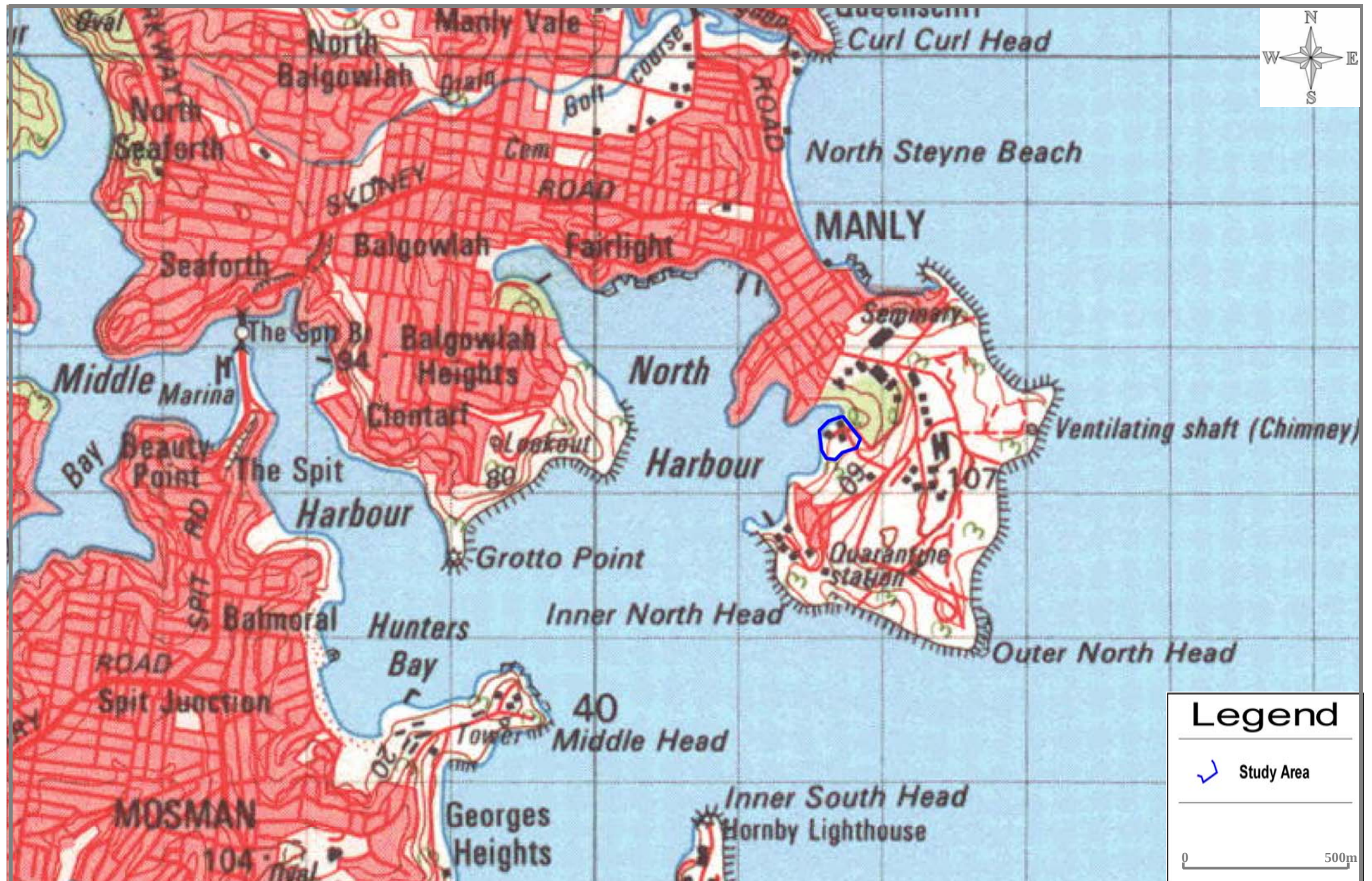


Figure 1.1 Regional location of the study area

Source: 1:100 000 Sydney Topo Series ,



Figure 1.2 Local location of the study area

Source: 1:25 000 Sydney Topo Series ,

Figure 1.3 Ground floor plans

NPWS have a management plan that entails the protection, conservation and management of the site to ensure its survival. In keeping with the protection of this site, only a brief description of the site will be provided and no site coordinates will be included.

1.3 ABORIGINAL COMMUNITY CONSULTATION

As per the new DECC Interim Guidelines for Consultation, MCH contacted the required organisations (Refer to *Table 1.1*) to identify who to contact and consult as part of the preparation of the Project Application and the Environmental Assessment Report."

Table 1.1 *Initial consultation letters*

Organisations contacted	Date	Response
DECC	26 th September 2007	MLALC
Metropolitan LALC		No response
Manly Council		No response
Native Title Services		No response
Registrar of Aboriginal Owners		No response

Following this, MCH wrote to MLALC to inform them of the project and request that they notify MCH, in writing, should they wish to be consulted regarding this project. MCH received no response.

An advertisement was placed in the Manly Daily on 13th October 2007 that outlined the project, its general location and called for interested parties to register their interest no later than 26th October 2007.

Following the above endeavours to identify who the interested groups were, MCH received no written response from any group. Despite this MLALC were forwarded an information pack that included an outline of the project with relevant location maps and a description of the methods. This pack also asked for comments on the methods and asked if people had any traditional knowledge they would feel comfortable in sharing with MCH for inclusion in the report.

MCH contacted MLALC by phone on 7th November to discuss the proposed methods of survey and organised the survey for 16th November 2007. Unfortunately MLALC sites officer did not attend the survey with MCH and were uncontactable by phone.

A copy of the DRAFT report was forwarded to MLALC for their review.

MCH asked the MLALC to provide a cultural assessment and cultural significance assessment for its inclusion in the final report if they wished to do so. MCH received no cultural assessment.

MCH were notified in late November 2008 that a few pieces of shell had become exposed behind the library building and requested that MCH and the registered group investigate and determine if it was a shell midden. MCH

contacted the MLALC on 1st December and invited them to attend the site visit on 12th December and to notify MCH of their attendance. MLALC did not contact MCH or attend the site visit. It was determined that there was no shell midden.

Although all relevant Aboriginal groups were contacted a number of times in accordance with DECC requirements to provide comment and input into the cultural significance of the site, no response was received. Additionally, DECC have not requested or questioned the methodology of the consultation process, and has not requested any further investigations or studies relating to Indigenous Archaeological or Cultural considerations. MCH consulted with all groups identified. All documentation regarding the consultation process can be forwarded to DECC upon request.

1.4

STATUTORY CONTROLS

Land managers are required to consider the affects of their activities or proposed development on the environment under several pieces of legislation. Indigenous cultural heritage in NSW is protected and managed under the following Commonwealth and State legislation:

- *New South Wales National Parks and Wildlife Act 1974, Amendment 2001* (State)

All indigenous objects within the state of New South Wales are protected under Section 90 of the National Parks and Wildlife Act 1974 (NPW Act), (State). Under s.5 of the Act, “object” means any deposit, object or material evidence (not being a handicraft made for sale) relating to indigenous habitation of the area that comprises New South Wales, being habitation both prior to and concurrent with the occupation of that area by persons of European extraction, and includes Aboriginal remains.

Sites of traditional significance that do not necessarily contain archaeological materials may be gazetted as “Aboriginal places” and are protected under Section 84 of the Act. This protection applies to all sites, regardless of their significance or land tenure. Under Section 90, it is an offence to knowingly disturb, damage or destroy objects or Aboriginal Places without the prior written consent of the Director-General of National Parks and Wildlife.

Amendments introduced by the National Parks & Wildlife Amendment Act 2001, include renaming Section 90 “consent” to “Heritage Impact Permit”, removal of the term “knowingly” from Section 90, and adding reasonable precaution and due diligence as defences against prosecution under the amended Section 90. At the time of writing, these amendments have yet to commence.

- *Environmental Planning and Assessment Act 1979, (EP&A Act), (State)*

The EP&A Act requires that environmental impacts be considered in land-use planning, including impacts on indigenous and non-indigenous heritage.

Local Environmental Plans prepared in accordance with the EP&A Act identify permissible land use and development constraints, and provide guidance on the level of environmental assessment required.

The NSW NPWS provides guidelines for Aboriginal heritage assessment, including those conducted under the EP&A Act 1979. Where indigenous heritage assessment is conducted under the Integrated Development Approval process, a more detailed set of NPWS guidelines applies.

- *The Heritage Act 1977 (State)*

The Heritage Act 1977 protects the natural and cultural history of NSW with emphasis on non-indigenous cultural heritage through protection provisions and the establishment of a Heritage Council. While Aboriginal heritage sites and objects are protected primarily by the NPW Act 1974, if an Aboriginal site, object or place is of great significance it can be protected by a heritage order issued by the Minister on the advice of the Heritage Council.

- *The Aboriginal and Torres Strait Islander Heritage Protection Act 1984, Amendment 1987 (Commonwealth)*

The Aboriginal and Torres Strait Islander Heritage Protection Act 1984 (Commonwealth) protects areas and/or objects which are of significance to Aboriginal people and which are under threat of destruction. A significant area or object is defined as one that is of particular importance to Aboriginal people according to Aboriginal tradition. The Act can, in certain circumstances override state and territory provisions, or it can be implemented in circumstances where state or territory provisions are lacking or are not enforced. The Act must be invoked by or on behalf of an Aboriginal or Torres Strait Islander or organisation.

- *The Australian Heritage Commission Act 1975 (Commonwealth)*

The Australian Heritage Commission Act 1975 (Commonwealth) established the Australian Heritage Commission, which assesses places to be included in the National Estate and maintains a register of these places, which are significant in terms of their association with particular community or social groups for social, cultural or spiritual reasons. The Act does not include specific protective clauses.

1.5

REPORT STRUCTURE

The report adheres to the following structure:

Chapter 2 outlines the environmental context, *Chapter 3* provides an ethno-historical background, *Chapter 4* provides the archaeological context, *Chapter 5* discusses the results, *Chapter 6* presents the assessment of impacts, and *Chapter 7* presents the recommendations.

2.1

INTRODUCTION

Although factors of socio-cultural structure are of vital importance to archaeological patterning, the nature and distribution of Aboriginal cultural materials within a landscape is strongly influenced by environmental factors such as topography, geology, landforms, climate, geomorphology, hydrology and the associated soils and vegetation (Hughes and Sullivan 1985). These factors influence the availability of plants, animals, water, raw materials, location of suitable camping places, ceremonial grounds, burials, and suitable surfaces for the application of rock art. Variations in environmental constraints result in the physical manifestation of different spatial distributions and forms of archaeological evidence, and therefore these environmental factors are used in constructing predictive models of Aboriginal site locations.

Environmental factors also affect the degree to which cultural materials have survived in the face of both natural and human influences and influence the likelihood of sites being identified during ground surface survey. Site detection is dependent on a number of environmental factors including surface visibility (which is determined by the nature and extent of ground cover including grass and leaf litter etc), the survival of the original land surface and associated cultural materials (due to the deposition and/or removal of flood alluvium and slope wash materials), and the exposure of the original landscape and associated cultural materials through agencies such as sheet and gully erosion, ploughing and vehicle movements (Hughes and Sullivan 1985).

The full range of environmental factors is therefore assessed to determine the likelihood of both surface and subsurface cultural materials surviving and being detected.

2.2

GEOLOGY

The underlying regional geology plays a major role in the structure of the surrounding environment (landforms, topography, geomorphology, vegetation, climate etc), and also influences patterns of past occupation and their manifestation in the archaeological record. This is primarily relevant to past Aboriginal land use in regard to the location of stone resources or raw materials and their procurement for the manufacturing and modification of stone tools.

The study area is situated on the Hawkesbury sandstone overlying the Narabeen sandstone. Volcanic dykes occur to the south west of the headland and across the south east of the area. Some sandstone bedrock outcrops in the area and there are several sandstone shelters and overhangs. These two sandstone units are overlain by elevated undulating dunes and swales

consisting of conglomerate, sandstone and shale (Sydney 1:250 000 Geological Map).

The availability and distribution of stone materials has a number of archaeological implications. Evidence of stone extraction and artefact manufacture is typically concentrated in the areas of stone availability. However, stone can also be transported for artefact manufacture and traded across relatively large distances in both raw and reduced form.

2.3 SOILS

The nature of the surrounding soil landscapes has implications for Aboriginal land use and site preservation, mainly relating to supporting vegetation, preservational factors and burials.

The study area consists of one major soil landscape: the Gymea erosional landscape which is described below.

The Gymea soil landscape typically consists loose loamy sand to sandy loam topsoil (A₁ horizon). The B horizon is commonly a yellowish brown clayey sand that occurs over sandstone bedrock. Additionally, a yellowish-brown sandy loam clay occurs as a subsoil (B or C horizon). Occurring as subsoils on shale bedrock are yellowish-brown sandy clay or light clays (Chapman and Murphy 1989: 64 – 67).

Crests generally have up to 30cm of topsoils (A₁ horizon) that overlies bedrock or <30cm of B horizon, Total soil depth on crests is typically <50cm. Side slopes are discontinuous and rock outcrops can cover up to 25% of the ground surface. Up to 20cm of A₁ horizon may be found on the outside of benches close to rock outcrops that overlies bedrock. On the inside of benches up to up to 30cm of A₁ overlies up to 30cm of B horizon and total soil depth in these area is 30-70cm (Chapman and Murphy 1989: 64 – 67). Severe sheet erosion occurs following bushfires with minor gullying occurring along roads.

2.4 LANDFORMS AND TOPOGRAPHY

The topographical context is important in identifying potential factors relating to past Aboriginal land use patterns.

The study area is located on one of several headlands surrounding North Harbour and to the north of Port Jackson.

The surrounding area is gently to steeply sloping. Slope gradients vary from 5% to 15% with gullies descending from the sandstone outcrops providing run-off. The area is typically flat at the top of the headland with most of the land above 80 metres and steep cliffs dropping down to the sandy beaches and bays and rock platforms (Chapman and Murphy 1989: 64 – 67).

Climatic conditions would also have played a part in the occupation of an area whilst also impacting upon soils, vegetation and the preservation of the associated cultural materials and their context.

The climate of the region is relatively warm with uniform annual rainfall. The temperate maritime climate is characterised by warm to hot summers and cool to mild winters. Temperatures in summer peak in January, with consecutive maximum temperatures of over 26°C common for days at a time and mild winter temperatures of 7 - 8°C (Chapman and Murphy 1989:64 - 67).

Rainfall is known to impact upon soils through runoff and rain splash, resulting in further disturbance of the landscape through erosion and the associated movement of cultural materials.

The availability of water and the associated faunal and floral resources is one of the most important factors influencing patterns of past Aboriginal land use.

There is a stream on the southern part of the site between the existing library and administration building. Currently the water goes into a boxed culvert before the Administration building. This stream will be reinstated as part of the proposed development. The area is surrounded by Ocean waters that would have been a reliable source of resources for past societies. However, the distance from the study to obtain these resources is significant.

The availability of floral and faunal resources is an integral factor when considering patterns of past Aboriginal land use and occupation. The preservation and detection of surface cultural materials from past Aboriginal land uses are also influenced by flora and fauna.

A large part of the area has been cleared for both residential purposes and for the establishment of the Quarantine Station, Department of Defence, School of Artillery, Manly District Hospital and a Water Pollution Control Plant. The use of the study area for these purposes has resulted in large-scale land clearance. However these areas are bordered by Sydney Harbour National Park and although some of the area is now denuded of trees and populated by imported pasture grass species, there are some areas that are vegetated with native plants.

Prior to clearing, the area would have comprised of open woodland, rainforest and heath land. Stringy bark, red bloodwood, yellow bloodwood, scribbly gum and tea trees would have predominated with an understorey of grass trees, banksia, heath species and native grasses on ridges and upper slopes.

On the more sheltered slopes would have been Sydney peppermint and smooth barked apple (Chapman and Murphy 1989:64 – 67).

The rock overhangs on the slopes and access to the beach areas would have offered food (roots, berries and fruits), raw material resources (volcanic dykes for artefacts) and rock surfaces for drawings and engravings. In its original form, it can be assumed that vegetation patterns within the area would have supported further food resources including species such as fish, rock and estuarine shell fish, and possibly beached whales in addition to kangaroo, wallaby, goanna, marsupial mice, snakes, possum, koala and a variety of birds. The headlands would have been excellent vantage points.

2.8

PAST LAND USES AND DISTURBANCES

Based upon archaeological evidence, the occupation of Australia extends back some 40,000 years (Mulvaney and Kamminga 1999) whilst Aboriginal people have been present within the region for at least 20,000 years (Koettig 1987). Although the impact of past Aboriginal occupation on the natural landscape is thought to have been relatively minimal, it cannot simply be assumed that 20,000 years of land use have passed without affecting various environmental variables.

The practice of ‘firestick farming’ whereby the judicious setting of fires served to drive game from cover, provide protection and alter vegetation communities significantly influenced seed germination, thus increasing diversity within the floral community.

European settlement of the North Head area began in the early 1800’s with the establishment of the Quarantine Station in 1834, army fortifications and barracks in the area in the 1870’s and the establishment of recreational reserves at Ashton Park in 1918 (Morris 1986). Currently the area is dominated by urban development but with large areas of National Park protecting the harbour bushland.

Large areas of land were cleared and resulted in disturbances which could have caused displacement of artefacts. Furthermore the vegetation clearance for residential and industrial developments such as the Quarantine Station and Defence Force works resulted in a high degree of landscape disturbance including the cultural materials contained within these areas.

The processes of bioturbation can also adversely affect the integrity of the soil profile. Due to the activities of plants and animals, soils may be artificially sorted and thus artefacts deposited within the soils will also be disturbed. Depending on the severity and nature of the bioturbation factors in operation, artefacts may be subject to significant lateral and/or vertical disturbance (Fowler *et al* 2004; Peacock and Fant 2002).

A review of environmental variables indicates that the resources available within the regional and local environment were conducive to human occupation and exploitation of the area.

However, natural agencies, primarily in the form of erosion, may result in the displacement and loss of cultural materials thus negatively affecting the archaeological record. These agencies are expected to have varied across the study area.

Human disturbances such as land clearing and the construction of buildings may also have altered the landscape and accelerated erosion, displacing any cultural materials that may have been present in these areas.

Whilst site integrity cannot be assumed in light of these inter-relating activities and agencies, the existence of in situ cultural materials cannot be ruled out and will be determined during the survey.

3.1 *USING ETHNO-HISTORIC DATA*

Unfortunately, due to European settlement and the associated negative impacts upon past Aboriginal communities, their culture, social structure, activities and beliefs, little information with regards to the early traditional way of life of past Aboriginal societies remains. Although providing a glimpse into the past, one must be aware that information obtained on cultural and social practices were commonly biased and generally obtained from informants including white settlers, bureaucrats, officials and explorers. Problems encountered with such sources are well documented (e.g. Barwick 1984; L'Oste-Brown et al 1998).

3.2 *PORT JACKSON ETHNO-HISTORIC ACCOUNTS*

According to Morris (1986), the first record of contact with the Aborigines in this area was in 1788 (Tench 1961). They were recorded as having lived in rock shelters and ate oysters and fish. Tench (1961) also notes that in 1789 the population was halved by an outbreak of smallpox.

It is well documented that in September 1790, the famous whale feast took place. Although the exact location remains contentious (may have been Spring Cove), it was at a harbour beach around North Head. The carcass of a wounded whale washed up at the beach and a large number of Aboriginal people gathered there to feast on it. The feast was joined later by Arthur Phillip who after a friendly meeting with Bennelong was speared in the shoulder by Wil-lemaring - an Aboriginal man. 143 years after the attack in 1933 an obelisk was erected above the eastern end of Collins Beach. While the exact location of the incident is the subject of argument, the importance of the event in foundational contact history remains uncontested.

A review of the archaeological literature of the North Head area and the results of a DECC AHIMS search are discussed below. The reports and recorded sites provide a broader picture of the cultural landscape, highlighting the range of site types throughout the region and the patterning in site frequency, distribution and location.

4.1

NSW DEC ABORIGINAL HERITAGE INFORMATION MANAGEMENT SYSTEM

A search of the Department of Environment and Conservation (DEC) AHIMS has shown that 88 known Aboriginal sites are currently recorded within a five kilometre radius of the study area. This includes 29 artefact/earth mound/shell, 28 art, 13 artefact, 3 habitation structures, 2 earth mound/habitation structures, 2 ochre quarries, 4 PADs, 1 art/artefact, 1 earth mound, 1 burial, 1 shell/habitat structure, 1 artefact/burial/earth mound/shell, 1 art/grinding groove and 1 art/artefact/burial/earth mound/shell. Site co-ordinates are not provided due to site protection and conservation; however general site locations are shown in *Figure 4.1*.

4.2

ARCHAEOLOGICAL CONTEXT

A number of the sites above were recorded in the course of archaeological assessments conducted within the local area and therefore can provide more specific insight into local archaeological patterning, however a number of reports were not available from DECC. Also it must be recognised that cultural heritage assessments, conducted in association with development activity, by their very nature adhere to a proscribed project area and thus may not give an entirely holistic representation. The relevant studies are reviewed below.

O'Donnell and Walker (1974) undertook an archaeological investigation of an area that was subject to previous excavations and the remove skeletal remains that had been affected by wave action and had been located at Reef Beach. It was also intended to try to determine the relationship of the remains of one adult and one infant with shell material that had been radiocarbon dated.

Several post-European artefacts were found during the excavation and date from 1916 onwards up to mid 1950's. About half a tonne of shell remains were removed from the site for analysis and various shell fish species were identified and were probably the result of human food gathering. Vertebrate remains were generally those associated with European habitation including cattle, pig, chicken and rabbit. It was determined that the skeletal remains were probably associated with European settlement and a likely date around 1825 was given. Reference is made in the study to several other burials in the area including Forty Baskets Beach and a discovery in 1889 at North Harbour.

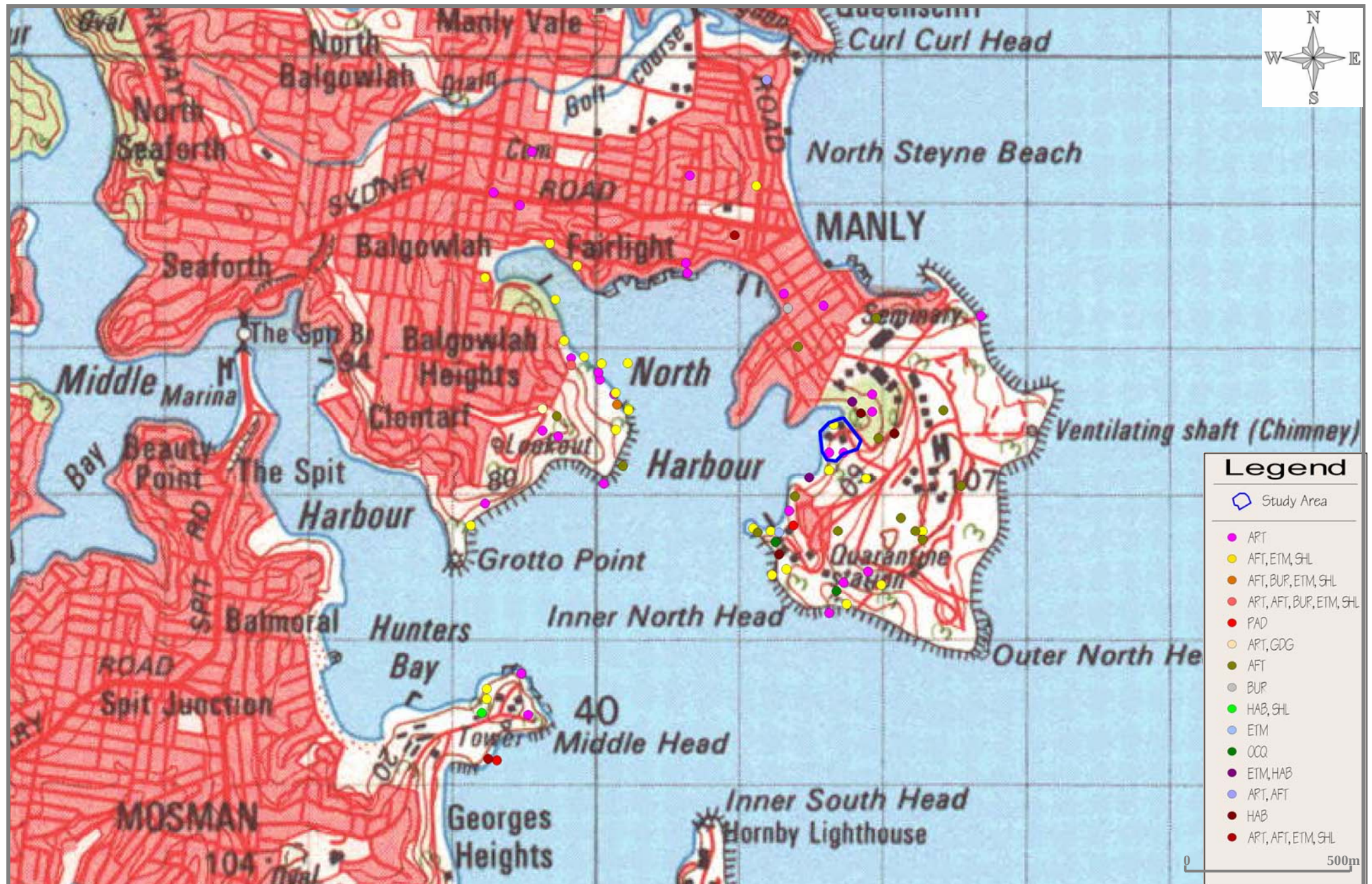


Figure 1.2 Local of previously recorded sites

Attenbrow and Conyers (1983) undertook a study for NSW National Parks and Wildlife Service in order to add the Quarantine Station to the Sydney Harbour National Park. A total of 10 sites had been previously identified at North Head and a further 19 in close proximity including engraving sites, open middens, burials and shelters with midden, archaeological deposit painting and burials. Other sites in the area from Port Jackson to Broken Bay include sites at South Head, Balls Head and Bantry Bay.

Archaeological investigations were undertaken at the Quarantine Station and Old Mans Hat. The Quarantine area was predominantly cleared of vegetation and comprised eroded patches, grassed areas, buildings and flat exposed sandstone outcrops. Visibility was good. Old Mans Hat area was predominantly thick tea tree shrub land on the top of the plateau and banksia heath land close to the cliff line with small hanging swamps to the east. Visibility was poor except in eroded areas or on rock outcrops.

Four Aboriginal sites were located at Cannae Point (1 shelter with midden and burial (skeletons removed 20 years before); 2 open shell midden; 1 shelter with midden) and two at Old Mans Hat (1 open shell midden and 1 shelter with engravings). Five potential habitation shelters were located at the perimeter of the Quarantine Station and one isolated artefact site. 29 shell scatters and 1 natural shell heap were also noted.

It was recommended that the sites be preserved and that protective action be undertaken to prevent them being damaged or destroyed. It was important that unrestricted access not be permitted and that future access to those sites suitable for public visitation should be by guided tour and that those sites form part of an interpretative/ educational programme.

A Study area that encompassed Dobroyd Point, Dobroyd Hill and Grotto Point on a headland in Port Jackson between North Harbour and Middle Harbour directly to the west of North Head was surveyed by Oakley (1983). Dobroyd Hill is relatively flat and slopes gently to Reef Beach and Dobroyd Head and Point. Dobroyd Point is comprised of a rock platform area. Disturbances in the area include roads and residential development. The survey was undertaken on foot and focused on slopes, gullies, exposed and eroded areas and sandstone outcrops. Vegetation included dry sclerophyll eucalypt; angophora; tea tree and heath.

A number of Aboriginal sites were located in the area and included shelters and rock surfaces with engravings. Several previously recorded sites were revisited including rock engraving sites and grinding groove sites. It was recommended that a detailed study of the area be undertaken.

Morris (1986) undertook an assessment on land located on the northern side of Port Jackson and included the foreshore of Middle and North Harbours, the headlands of North Head, Dobroyd Head, Middle Head and Bradleys Head. Twelve sample areas of 0.25km square grid blocks were to be surveyed within a 100 square kilometre area. It was noted that there were 238 recorded sites in the region comprised of 65 rock engraving sites, 57 shelter with midden sites, 52 open midden sites, 36 shelter with art sites, 10 shelter with deposit sites, 7

axe –grinding groove sites, 6 burial sites, 4 open camp sites and one scarred tree.

Vegetation is generally open woodland with low heath land with some rain forest pockets and mangrove swamps.

Five new sites were identified and one previously recorded site was found (2 open midden sites, 3 shelter with midden sites and one rock engraving). Five potential shelter with deposit sites were noted. No other sites were identified. Recommendations were that the five potential sites be investigated further; that the effect on site integrity of sand drift, vegetation growth and other disturbances be investigated; that further erosion of midden material at sites be prevented; and that measures be undertaken to protect the sites.

Attenbrow (1990) undertook an assessment of land located on the eastern part of South Head at Nielson Park near Vaucluse and comprised a rock shelter site with shell midden and skeletal remains (Mt Trefle) and a rock shelter with shell midden site (Hydrofoil Cave). Surface collection and excavations in 50 x 50cm squares were undertaken. Mt Trefle yielded estuarine shell material, stone artefacts, animal bone and some post-European contact material. The site also yielded skeletal remains and excavations ceased. Hydrofoil cave also yielded estuarine shell material, a stone fish hook file and post-European contact material.

A study was undertaken by Koettig (1991) and included three parts – Volume 1 was a Heritage and Conservation Policy document with recommendations for long and short term management strategies for the conservation of Aboriginal sites in the Mosman Municipality; Volume 2 recorded detailed information on Aboriginal sites in the area; and Volume 3 recorded an inventory of the sites. A total of 77 sites in the local area had previously been recorded at the time of the study and included shelter with midden sites, shelter with midden and art sites, shelter with art sites, open midden sites and engraving sites. The study provided detailed information on the sites, large scale plans showing location of the sites, an inventory of the sites, an information booklet, and a heritage conservation policy.

Vegetation in this area is predominantly open forest, low woodland and heath. A detailed ethno history of the area was recorded describing material culture, dwellings, social organisation and customs and subsistence activities. Early recorded observations of Aborigines in Mosman were also described.

Koettig also describes previous systematic surveys and records the results of these surveys and identified several new sites. Koettig (1991) noted that it is possible that there could be more unrecorded sites remaining. Many sites were damaged and were in need of protective works.

Dallas (1994) undertook an assessment located within the Department of Defence Holdings at HMAS Penguin. The area was highly disturbed being the site of existing residential housing for the Defence Department. No sites were found within the survey area and it was recommended that no further archaeological survey was warranted.

An archaeological study undertaken by Brayshaw (1996) was compiled as part of an Environmental Management Plan and was to provide an overview of the known and potential Aboriginal archaeological resource in the area. The area is highly disturbed where the main buildings are located, but vegetation is dense in surrounding areas except along the eroded access tracks. Survey was conducted on foot and two isolated artefact sites and one open site were recorded. They were located close to swampy areas that may previously have provided water. The survey area was considered to have low potential for archaeological remains.

Attenbrow and Bow (2002) described in detail the analysis of the material located in 1974 and excavated in 1982 by O'Donnell & Walker from a site at Reef Beach revealing human remains, stone artefacts, animal bone, shell material and post-European contact material. It was recommended that the materials be fully documented and that further analysis be conducted.

A number of reports were not available at DECC. However, a report by Freeman (2006) reviews one of the missing reports and this is summarised below.

Freeman (2006) undertook a brief literature review of the study area that included a Department of Defence study (Roberts in 1996) which covered the School of Artillery site. This study included a field investigation of the grounds which found an open site at which three stone artefacts were identified. In addition, two other isolated artefacts were found.

The most relevant study, however, is one undertaken by Darwala-Lia (2001). In his report Freeman states that after reviewing the Darwala-Lia report, it argues for the whole headland to be recorded as one site or place of Aboriginal Heritage on the basis that it is a 'cultural island'.

The study found that North Head is a cultural place of significance to the Aboriginal people because:

- historically Aboriginal people and Europeans have taken a similar approach to its use
- the use of North Head as a place of isolation or special purpose away from public access is directly connected to the island and landmark values inherent in the landscape
- the Aboriginal oral histories document its uses as a place of burial, healing and medicine
- as an 'island' it is an extraordinary place for special events
- the diaries of the First Fleet describe the Aboriginal people at North Head
- a range of historical events of national significance occurred at North Head that helped to shape the nature of relationships between Aborigines and the first settlers. These events include the kidnapping

of Manly, Colbee and Bennelong and in 1790 the spearing of Governor Phillip during a whale feast

Due to North Heads 'island' and landmark qualities and the 360 degree views, the report argues that it is distinguished from 'day-to-day' sites. Traditionally, such sites were managed by those with birthright and were restricted from open access.

While the majority of the 26 sites and artefacts identified in the report are located on the resource-rich western side of North Head, the report point out that this does not mean that the eastern side is less significant. The report interprets and argues that the artefact scatters on the western side are evidence of the labours of support crews [wives, children trainees] to the koradgee. Darwala-Lia concluded that North Head was a unique place of great Aboriginal significance and association.

Although not relating to the specific study area and immediate surrounding areas, the Hawksberry sandstones throughout Sydney up to Gosford are known to contain numerous engravings and art works on both outcrops and shelters. In the sandstone country of the Sydney Basin certain topographic zones may be more or less likely to contain certain types of archaeological evidence. For example it is generally held that shelter sites are more likely to be located on slopes, and grinding grooves are commonly found ridge tops. The majority of shelter sites for which landform is recorded are situated on ridge or slope formations, a trend which is largely a reflection of the fact that sites of this type require the presence of sandstone structures which are rarely found outside these topographical contexts. Similarly, in order to establish grinding grooves, the appropriate sandstone outcrops and water resources must be available.

A number of issues must be considered with regard to the relationship between site location and water sources. First and foremost is the fact that, within the study area, reliable/permanent water sources does not consist of creeks or waterways. Rather, within the sandstone country sinkholes/cistern within the sandstone formations can act as water catchment locations and provide a ready supply of water. Importantly, features of this type can only be identified in the course of survey activity and will not be apparent on a topographic map. No such formations exist within the specific study area.

4.3

SITES WITHIN THE STUDY AREA

Prior to the knowledge of incorrect information from DECC, the DECC site search has revealed that one site appears to have been situated within the study area: NPWS # 45-6-0728. This site has been relocated (NPWS # 45-6-2493) outside the study area. DECC are currently working to amend their records and then the correct site number may be obtained.

This site is a large rock-shelter that measures 4.5m by 3m. It has a northerly aspect and an overhanging roof. The maximum height of the shelter is 1.9 metres. The NPWS Site Card identifies shell and a faint fish engraving in the rock above the shelter.

The site was excavated by Stockton in 1957. The midden contained white clay or ochre, a wad of paperbark and part of a shell fish hook. Shell types identified were all rocky shore species. Additionally, a variety of fish and small mammal bones were found as well as basalt pebbles that were located on the foreshore close to the rock shelter. Freeman states that the remains of four people were excavated by Stockton in 1957. However, it is unclear if they were recovered from the rock-shelter and what ethnicity they were. Discussion with AFP state that during all their consultation with the various Aboriginal groups over the years have not indicated any burial on the site. This site was not relocated by the Darwala-Lia survey team during their survey of the broader area.

The possibility of an additional 2 or 3 sites near the study area, specifically in the rock shelters below the study area have arisen. However, as discussed in *Section 1.2*, this area has been subject to previous surveys and no sites were identified in the cliff line below this study area but were identified further to the east and west of the current study area. Additionally, as explained above a site thought to be in the cliff line under the current study area was in fact proven by DECC to be in another location. Finally, Darwala-Lia (2001), also discusses the sites of the headland and no sites were identified under the study area.

4.4 *PREDICTIVE MODEL FOR THE STUDY AREA*

Previous archaeological studies undertaken throughout the coastal area, sites registered on the NSW DECC AHIMS Register, landforms and past land use activities, provide a good indication of site types and site patterning in the area. Research has shown that midden sites, open camps and isolated finds are the most predominant site types likely in the area.

Within the specific study area, due to past land uses, it is predicted that there is a low potential for evidence of past occupation. As no rock shelters or exposed sandstone sheets are present, no art or engraving sites are expected. It is anticipated that if sites are present, they will contain artefact assemblages dating from the mid to late Holocene, and the artefacts will probably consist predominantly of flaked pieces, flakes, broken flakes and cores. Some modified artefacts including retouched flakes, and asymmetrical and symmetrical backed artefacts may be expected.

It must be emphasised that sites within the study area are expected to have been disturbed by both natural and human disturbances, therefore the accuracy of these predictions will be largely determined by the degree of such disturbances.

Based on archaeological sites registered in the region and the results of past archaeological studies, two site types are likely to occur in the study area, and include open artefacts scatters and isolated finds.

- Shell middens

Shell middens result from seasonal camping and the associated exploitation of estuarine and/or marine shellfish. Extended camping results in the deposition of a feature which may be stratified and is distinguishable from a natural shell layer through the inclusion of burnt or blackened shell, non-molluscan fauna, dis-articulated bivalves, charcoal, burnt wood, hearth stones and stone artefacts. Middens are typically found along the coast and on the shorelines of estuaries, lakes and inland rivers.

- Artefact scatters

Also described as open campsites, these deposits include archaeological remains such as stone artefacts, shell, and sometimes hearths. These sites are usually identified as surface scatters of artefacts in areas where ground surface visibility is increased due to lack of vegetation. Erosion, agricultural activities (such as ploughing) and access ways can also expose surface campsites. Stone artefacts are the most common archaeological remains. They are the most numerous of all the relics produced by Aboriginal occupation, and the least susceptible to post-depositional destruction and decay. Given the recording of artefact scatters throughout the region (and in close proximity to water resources), it can be assumed that artefact scatters are present, either on the surface in erosion features, or in the form of sub-surface deposits.

- Isolated finds

Isolated finds are single artefacts that are usually identified in areas where ground surface visibility is increased due to lack of vegetation. Erosion, agricultural activities (such as ploughing) and access ways can also expose surface artefacts.

NOTE: As no sandstone outcrops or rock shelters are present within the study area, art sites and grinding grooves are not expected. However, all sites and site types present will be identified and recorded.

5.1 METHODOLOGY

The study area was surveyed on foot by one person. The survey strategy was based on levels of vegetation cover and focused on areas of high ground surface visibility and exposures.

5.2 LANDFORM UNITS

McDonald *et al* (1998) describe the categories of landform divisions. This is a two-layered division that separates the landscape into a series of 'mosaics'. The mosaics are described as being of two distinct sizes: the larger categories are referred to as *landform patterns* and the smaller as *landform elements* within these patterns. *Landform patterns* are large-scale landscape units, and *landform elements* are the individual features contained within these broader landscape patterns. There are forty *landform pattern units* and over seventy *landform elements*. However, of all the *landform element units*, ten are morphological types. For archaeological investigations they divide the landscape into standardised elements that can be used for comparative purposes and predictive modelling. The study area consists of a gentle slope area on the head land.

5.3 SURVEY UNITS

For ease of management and assessment, the study area was divided into three survey units (SU), (Refer to *Figure 5.1*).

5.3.1 Survey Unit 1

Survey Unit 1 covers southern portion between the boundary fenced and the present buildings. This area is grassed with trees and has been disturbed through buildings, drains and gardening activities. Few erosion exposures occur.

5.3.2 Survey Unit 2

Survey Unit 2 covers the centre section that contains all the buildings, gardens and roads.

5.3.3 Survey Unit 3

Survey Unit 3 covers northern portion between the boundary (cliff face) and the present buildings. This area is grassed with trees and has been disturbed through buildings, drains and gardening activities. Few erosion exposures occur.

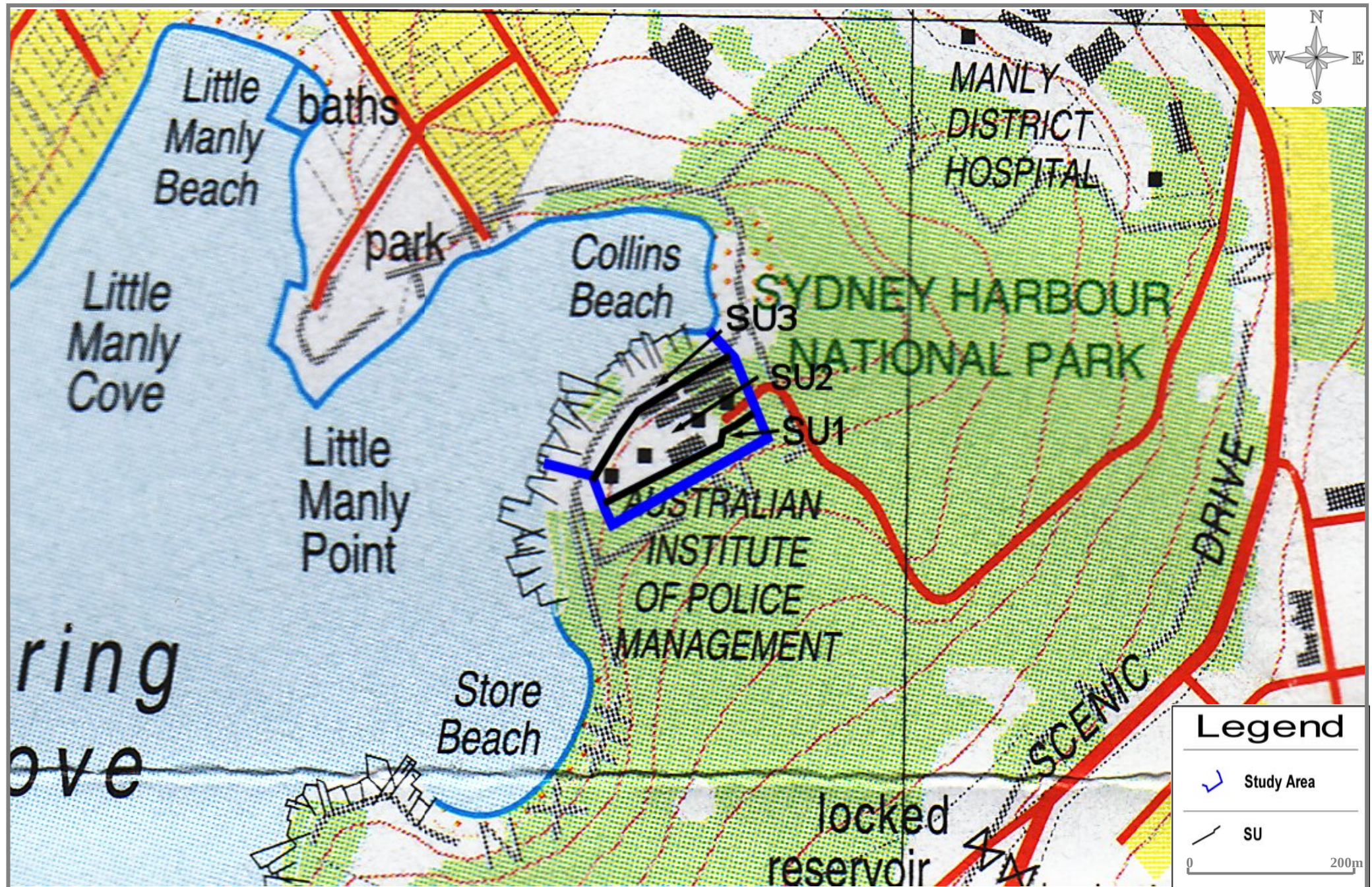


Figure 5.1 Survey Units

Effective coverage is an estimate of the amount of ground observed taking into account local constraints on site discovery such as vegetation and soil cover. The effective coverage for the study area was revised and *Table 5.1* details the visibility rating system used.

As indicated in *Table 5.2*, the effective coverage for the study area is low at 1.83%. *Figure 5.2* provides examples of the range of disturbances and vegetation across the study area. The vegetation pattern across parts of the study area reduces ground surface visibility in those areas and therefore reduces the potential to identify archaeological evidence by surface inspection.

Table 5.1 *Ground surface visibility rating*

Description	GSV Rating %
Very Poor – heavy vegetation, scrub foliage or debris cover, dense tree or scrub cover. Soil surface of the ground very difficult to see.	0-9%
Poor – moderate level of vegetation, scrub, and / or tree cover. Some small patches of soil surface visible in the form of animal tracks, erosion, scalds, blowouts etc, in isolated patches. Soil surface visible in random patches.	10-29%
Fair – moderate levels of vegetation, scrub and / or tree cover. Moderate sized patches of soil surface visible, possibly associated with animal, stock tracks, unsealed walking tracks, erosion, blow outs etc, soil surface visible as moderate to small patches, across a larger section of the study area.	30-49%
Good – moderate to low level of vegetation, tree or scrub cover. Greater amount of areas of soil surface visible in the form of erosion, scalds, blowouts, recent ploughing, grading or clearing.	50-59%
Very Good – low levels of vegetation / scrub cover. Higher incidence of soil surface visible due to recent or past land-use practices such as ploughing.	60-79%
Excellent - very low to non-existent levels of vegetation/scrub cover. High incidence of soil surface visible due to past or recent land use practices, such as ploughing, grading, mining etc.	80-100%
Note: this process is purely subjective and can vary between field specialists, however, consistency is achieved by the same field specialist providing the assessment for the one study area/subject site.	

Table 5.2 *Effective Coverage*

SU	Landform	Area (m2)	Exp %	Vis %	Exposure type	Previous disturbances	Present disturbances	Limiting visibility factors	Effective coverage (m2)
SU1	slope	2,000	5%	10%	erosion	land clearing, fences, drainage	fences	grass cover	10
SU2	slope	31,250	10%	20%	erosion	land clearing, buildings, roads, gardens	land clearing, buildings, roads, gardens	grass cover	625
SU3	slope	2,000	5%	10%	erosion	land clearing, fences, drainage	NA	grass cover	10
Totals		35,250							645
Effective coverage %									1.83%

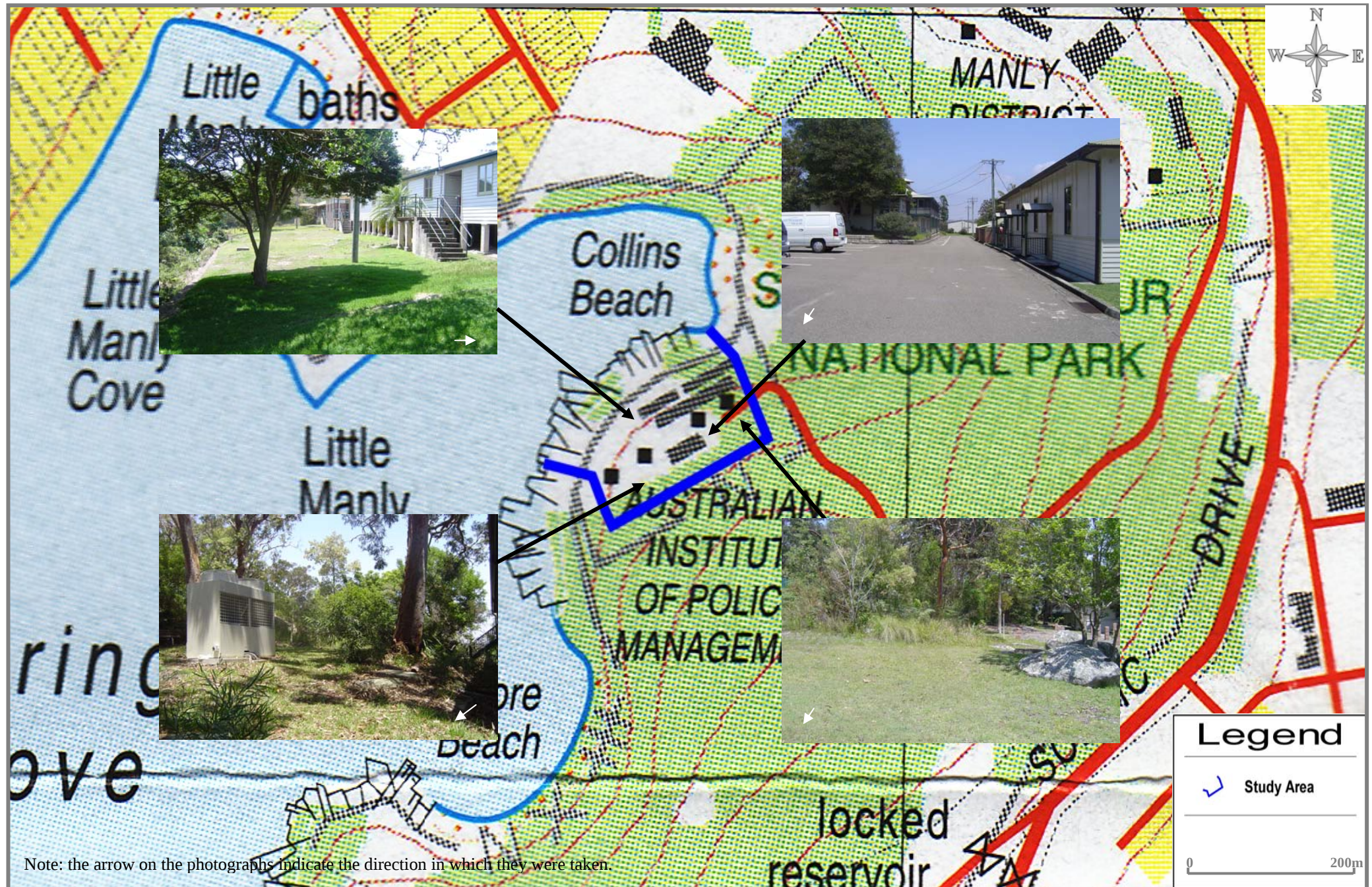


Figure 5.2 Examples of vegetation and disturbances

5.5

ARCHAEOLOGICAL SITES

The rock shelter location was pointed out by the AFP. Access was not possible due to safety. Another access point was from the ground along the base of the cliff, however it was high tide. The AFP staff member stated that the site contained two paintings of wallabies and an engraving of a fish. AFP knew nothing regarding any excavation or remains being found and removed.

MCH discussed the site with NPWS site officers who clarified that the site was there and that they had recently visited the site for its annual inspection.

5.6

POTENTIAL ARCHAEOLOGICAL DEPOSIT (PAD)

The terms 'Potential Archaeological Deposit (PAD)' and 'area(s) of archaeological sensitivity' are used to describe areas that are likely to contain sub-surface cultural deposits. These sensitive landforms or areas are identified based upon the results of fieldwork, the knowledge gained from previous studies in or around the subject area and the resultant predictive models. Any or all of these attributes may be used in combination to define a PAD.

The likelihood of a landscape having been used by past Aboriginal societies and hence containing archaeologically sensitive areas is primarily based on the availability of local natural resources for subsistence, artefact manufacture and ceremonial purposes. The likelihood of surface and subsurface cultural materials surviving in the landscape is primarily based on past land uses and preservation factors.

No PADs were identified due to the disturbances and lack of evidence of past occupation.

5.7

DISCUSSION & CONCLUSIONS

The results of the survey were that no sites were identified and no PADs were located. This level of disturbance is such that it is considered that there is no potential for sub-surface deposits.

6.1 IMPACTS OF PROPOSED DEVELOPMENT

The archaeological record is a non-renewable resource that is affected by many processes and activities. As outlined in *Chapter 2*, various natural processes and human activities may impact upon archaeological deposits. *Chapter 4* describes the impacts within the study area, showing how these processes and activities have disturbed the landscape and associated cultural materials.

A number of issues were raised regarding the impacts of the development and possible impacts on any sites. Although no sites or PADs were identified these issues are addressed here.

The proposed Preferred Project Design will involve mechanical clearing works, levelling, surface and sub-surface soil disturbance and the construction of buildings and the associated infrastructure.

Construction location: The development does not entail construction works near the cliff line and will in fact be located further away from the cliff, to be no closer to the cliff line than the axial hospital building.

Storm water: The stream on the southern part of the site between the existing library and administration building goes into a boxed culvert before the Administration building. This stream will be reinstated as part of the proposed development. This existing stormwater outlet will be different at the cliff edge as instead of a pipe it will be a stream in this location. The other 2 stormwater run off points one adjacent to the eastern boundary and the other near Kookaburra Cottage will be in the same location as the existing. The rock shelter /art site is located in between these two outlets and over 20 metres from each one. The site will not be impacted upon by the storm water drainage as it will not be altered from the current system.

Visitors: AIPM use does not entail visitation to the cliff line or any sites.

Waste collection: is maintained through appropriate rubbish collection and not dumped on site or over the cliff.

Graffiti and vandalism: are not associated with police use.

Mitigation measures to minimise these impacts are outlined in the following chapter.

Specific strategies, as outlined in the Aboriginal Cultural Heritage Standards and Guidelines Kit (NPWS 1987), are considered below for the management of identified sites and potential archaeological deposits within the study areas. One of the most important considerations in selecting the most suitable and appropriate strategy is the recognition that Aboriginal cultural heritage is very important to the local Aboriginal community. Decisions about the management of sites and potential archaeological deposits should be made in consultation with the appropriate local Aboriginal community.

7.1 CONSERVATION/PROTECTION

The Department of Environment and Climate Change (DECC) is responsible for the conservation/protection of Indigenous sites and they therefore require good reason for any impact on an indigenous site.

Conservation is the first avenue and is suitable for all sites, especially those considered high archaeological significance and/or cultural significance.

Conservation includes the processes of looking after an indigenous site or place so as to retain its cultural significance and are managed in a way that is consistent with the nature of peoples' attachment to them.

The rock shelter/art site is currently being managed and conserved by NPWS.

7.2 FURTHER INVESTIGATION

When a site is identified but its extent, the nature of its contents, level of integrity and/or its significance cannot be adequately assessed through a surface survey, subsurface testing can be an appropriate strategy to further assess the site to determine its extent, nature, content, integrity and significance. Subsurface testing is also appropriate where artefact deposits are predicted to occur in a Potential Archaeological Deposit (PAD) based on a predictive model. Subsurface testing can identify whether such deposits exist, their nature, extent, content, integrity and significance.

Test excavations can include either or a combination of auger holes, shovel test pits, mechanically excavated trenches or surface scrapes. The method of subsurface testing is determined by the terrain, vegetation cover, disturbances, available time, expected deposit and discussions/consultation with the local Aboriginal community.

A Section 87 Preliminary Research Permit is required from DECC to undertake the testing.

No PADs have been identified and therefore no further investigations are required.

Mitigated destruction is considered when a site is of significance within a local context and the options for conservation are limited. Additionally, if the surface collection of artefacts or excavation of deposits could provide benefits and information for the Aboriginal community and/or archaeological study of past Aboriginal occupation, a salvage strategy may be considered.

Salvage may include the collection of surface artefacts or systematic excavation of known artefact deposits. Where the option of conservation is not possible, this strategy is the primary means of minimising impacts to Aboriginal heritage from development.

A Section 90 Consent to Destroy with Permit to Salvage from the DECC, is required to undertake such excavations.

No sites have been identified that warrant a s90.

An alternative strategy for areas where archaeological deposits are predicted to occur is to monitor development works for cultural materials, predominantly during the initial earth moving and soil removal works. This is the main strategy for managing the possible occurrence of Aboriginal skeletal remains.

Monitoring is also used to identify the presence of artefacts and cultural materials that are important to the Aboriginal community, who may be looking to identify and salvage any materials that were not identified on the surface during the preliminary surface investigation. Monitoring may also include the sieving of a sample of graded/scraped soils.

Monitoring (in preference to sub-surface testing) is not a widely accepted method within the context of scientific investigation as it could result in costly delays to development and late/continued revisions to development plans. However, monitoring when Development Consent is granted can be of great scientific benefit and a benefit to the Aboriginal community. Monitoring undertaken in some circumstances (specifically where there is a possibility of skeletal remains) will enable the correct identification of such evidence (by qualified personnel) and thus ensure the appropriate methods of salvage or protection/conservation are undertaken.

Monitoring is not considered appropriate as no sites or PADs have been identified.

- 1) The persons responsible for the management of any works on site will ensure that all staff, contractors and others involved in construction and maintenance related activities are made aware of the statutory legislation protecting sites and places of significance. Section 90(1) of the National Parks and Wildlife Act, 1974 states that it is an offence to knowingly destroy, deface or damage, or cause or permit the destruction or defacement of or damage to, an object or Aboriginal place without first obtaining the consent of the DECC;
- 2) The rock/shelter art site will continue to be protected and conserved by both the AIPM and DECC, and
- 3) If any cultural materials are uncovered during works, work in that area are to stop and the DECC and qualified archaeologist notified.

REFERENCES

Attenbrow. V., and B. Conyers. 1983. *North Head Quarantine Station. Archaeological Survey for Aboriginal Sites.* Report to NSW NPWS.

Attenbrow. V. 1990. *Port Jackson Archaeological Report – Stage II. Preliminary Report on Excavations Undertaken in August/September 1990 under NPWS Permit Dated 30/7/1990.* Report to NSW NPWS.

Attenbrow. V. 1991. *Port Jackson Archaeological Report – Stage II. Preliminary Report to the NSW National Parks and Wildlife Service on Excavations Undertaken at NPWS Site No 45-5-792, John Curtin Reserve, In January 1991 Under NPWS Permit Dated 18 December 1990.* Report to NSW NPWS.

Attenbrow. V., and K. Bow. 2002. *Reef Beach Aboriginal Shell Midden. Analysis of Excavated Cultural materials (Preliminary).* Australian Museum.

Chapman. G. A., and Murphy. C. L. 1989. *Soil Landscapes of the Sydney 1:100 000 Sheet.* Soil Conservation Service of NSW, Sydney.

Dallas, M. 1994. *Penguin Redevelopment, Middle Head Road, Georges Heights-Archaeological Survey.* Report to Christine Young & Associates.

Fowler, KD., Greenfield, H.J. and van Schalkwyk, L.O. 2004. The Effects of Burrowing Activity on Archaeological Sites: Ndondonwane, South Africa. *Geoarchaeology* 19(5):441-470

Freeman. P. 2006 *AFP AIPM – North Head Heritage Assessment 2006.*

Hughes, P. and Sullivan, M. 1985. Environmental Approaches to the Assessment of Archaeological Significance. In S. Sullivan and S. Bowdler (eds) *Site Surveys and Significance Assessments in Australian Archaeology.* Pp: 34-47.

Koettig, M. 1987. *Monitoring Excavations at Three Locations along the Singleton to Glennies Creek Pipeline Route, Hunter Valley, NSW.* Report to Public Works Department.

Koettig, M. 1991. *Mosman Municipality Heritage Study of Aboriginal Sites. Volume 1: Heritage and Conservation Policy.* Report to Mosman Council.

L'Oste-Brown, S., L. Godwin., and C. Porter., In Association with Bowen Basin Aboriginal steering Committee. 1998. *Towards an Indigenous Social and Cultural Landscape of the Bowen Basin. Bowen Basin Aboriginal Cultural Heritage Project. Cultural Heritage Monograph Series Volume 2.* Queensland Department of Environment and Heritage, Brisbane.

McDonald, R.C., Isbell, R.F., Speight, J.G., Walker, J. and Hopkins, M.S. 1998. *Australian Soil and Land Survey Field Handbook, Second Edition.* Inkata Press, Australia.

Morris. A. K. 1986. *An Archaeological Survey of Port Jackson.* Report to NSW NPWS.

Mulvaney, J., and J. Kamminga. 1999. *Prehistory of Australia*. Allen and Unwin, Australia.

NPWS 1997. *Aboriginal Cultural heritage Standards and Guidelines Kit*. NSW National Parks and Wildlife Services, Hurstville.

Oakley, B. 1983. *A Survey of Dobroyd Point – Dobroyd Hill Area Of The Sydney Harbour National Park For National Parks and Wildlife Service*. Report to NSW NPWS.

O'Donnell, G., and M. J. Walker. 1974. *Archaeological Excavations at Reef Beach, Bolgowlah*. Report to NSW NPWS.

Peacock, E and Fant, D.W. 2002. Biomantle Formation and Artifact Translocation in Upland Sandy Soils: An Example from the Holly Springs National Forest, North-Central Mississippi, USA. *Geoarchaeology* 17(1):91-114.